To the Graduate Council:

I am submitting herewith a dissertation written by Joy T. Oliver entitled “A Social Identity Framework for Examining Leadership Schema Congruence: A Multilevel Analysis.” I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Industrial-Organizational Psychology.

David J. Woehr, PhD, Major Professor

We have read this dissertation

and recommend its acceptance:

Lowell Gaertner, PhD

Michael D. McIntyre, PhD

Michael Lane Morris, PhD

Michael Cavin Rush, PhD

Accepted for the Council:

Carolyn R. Hodges, Vice Provost
and Dean of the Graduate School

(Original signatures are on file with official student records.)
Dedication

In gratitude to my mother, Judy, and in memory of my father, Dan.

And for Jim. For everything.
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Abstract

Recent leadership research has focused on the importance of implicit leadership theory (ILT) for organizational outcomes (e.g., Epitropaki & Martin, 2005; Hains, Hogg, & Duck, 1997). Specifically, when followers perceive their leader’s trait profile to be closer to the ILTs they endorse (i.e., leadership schema congruence), this results in a number of positive outcomes (e.g., Epitropaki & Martin, 2005; Hains et al., 1997; Martin & Epitropaki, 2001). Although recent leadership research has highlighted the need for multilevel examinations of leadership (Hall & Lord, 1995; Lord & Hall, 1992), no multilevel models of leadership schema congruence have been examined to date.

The social identity theory of leadership (SITL) offers potential insight into how a multilevel model of leadership schema congruence can be examined (Hains et al., 1997; Hogg, 2001b; Hogg et al., 2006). Using multilevel analysis, this study indicated that self-concept clarity, cohesion, and group identification were positively related to leadership schema congruence. Likewise, belongingness climate strength was positively related to leadership schema congruence agreement within teams, but climate strength did not have an affect on individual leadership schema congruence.

Results of this analysis failed to support the SITL, thereby raising questions about the central theoretical tenets of the SITL. Alternatively, the results of this study support the influence of self- and group-related perceptions at multiple levels when examining leadership emergence. The implications of this study relate to the motivational mechanisms inherent in leadership endorsement. Future research directions in emergent leadership, including an increased use of multilevel models, are outlined.
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CHAPTER I

Introduction & Theoretical Overview

Multilevel models of leadership have been called for in recent years, in part because leadership often depends on both perceiver and leader characteristics at different levels of analysis (Hall & Lord, 1995). A multilevel model outlines processes and perceptions occurring at multiple levels of analysis, including the dyad, group, and individual level. Multilevel models can improve our understanding of how different levels of analysis interact in forming leadership perceptions and attributions (Hall & Lord, 1995; Lord & Hall, 1992). For example, a multilevel model can integrate group contextual variables with individual differences in order to model group-level outcomes. Although previous theoretical studies in emergent leadership have addressed emergent leadership using a multilevel approach (e.g., Hollander, 1958, 1961, 1964; Stein et al., 1979), little empirical research has attempted to test a multilevel approach to emergent leadership (see Livi, Kenny, Albright, & Pierro, 2008, for an exception). Thus, the appeal of multilevel models lies in their ability to address leadership from multiple perspectives.

Recent research has also begun to focus on the importance of implicit leadership theory (ILT; Eden & Leviatan, 1975; Lord and colleagues, 1978, 1980, 1984; Mulaik, 1964; Schneider, 1973) to individual and organizational outcomes (e.g., Epitropaki & Martin, 2001; Epitropaki & Martin, 2005; Hogg et al., 2006). ILT addresses the interaction between internal schema of followers and their implicit recognition of attributes related to leadership. The relationship of ILT with positive individual and organizational outcomes is proposed to result from the implicit match made by a follower between their ILT and their perception of their focal leader (i.e., leadership schema congruence). Recent studies in ILT have been restricted to examining
leadership schema congruence for focal leaders, have focused only on individual levels of analyses, and have failed to consider the context of the group in which leaders emerge.

However, leadership schema congruence for emergent leaders can be examined in a multilevel model using the social identity theory of leadership (SITL: Hogg, 2001b) as a framework (e.g. Hogg, 1996, 2000, 2001a, 2001b; Hogg & Abrams, 1988, 1990, 1999; Hogg, Terry, & White, 1995; Turner, 1999). The SITL addresses how perceptions of psychological belongingness (e.g., group identification and cohesion) influence followers’ reliance on their ILT. The SITL proposes that these group-related psychological variables affect reliance on ILT because as an individual’s psychological belongingness to the group increases, followers are more likely to depersonalize the leadership situation. This means that followers will not rely on their ILT for their impressions of their leader, but will rely on correspondence of the leader to the characteristics of the team. The SITL framework makes it possible to model how individuals’ perceptions, when combined with group-level variables, influence leadership schema congruence for emergent leaders at both the individual and group level.

Likewise, by employing a multilevel model, the effects of individual differences on leadership schema congruence can also be examined. One individual difference purported to relate to leadership schema congruence is self-concept clarity (e.g., Howell & Shamir, 2005). By examining leadership schema congruence in a multilevel model, individual differences (i.e., self-concept clarity) and group-related perceptions (i.e., cohesion and group identification) can be integrated into a model aimed at improving our understanding of leadership schema congruence.

In this study, the relationship of self-concept clarity, cohesion, and individual identification with the group will be examined with respect to followers’ leadership schema congruence for the emergent leader at the individual level. Next, the effects of cohesion climate
strength and identification climate strength will be examined for how these variables impact leadership schema congruence agreement for the emergent leader at the group level. Third, the effects of cohesion climate strength and identification climate strength will be modeled for possible cross-level effects of these climate strength variables on individual leadership schema congruence. Finally, leadership schema congruence at both the individual and group level will be examined for its potential impact on team task performance. Each of these effects will be tested concurrently through multilevel modeling.

Leadership schema congruence research has indicated the importance of schema congruence for perceptions of leadership effectiveness (Epitropaki & Martin, 2005). Thus, it is important to understand how individual differences and perceptions influence congruence for individuals within groups, as well as how group context impacts congruence for both individuals and the group as a whole. It is with this purpose in mind that the relevant theoretical framework for this study will be overviewed.

In the following sections, two early theoretical perspectives of leader emergence will be highlighted in order to draw attention to how both the group and the individual are considered in both models. Next, ILT will be outlined in order to explicate how categorization and correspondence to leader prototype function in emergent leadership. Third, the SITL will be addressed as a framework for studying leadership schema congruence in emergent leadership using a multilevel model. Fourth, drawing on the SITL, antecedents of leadership schema congruence at the individual level will be highlighted, followed by an explication of how these variables may function as climate variables. Hypotheses and related research questions relevant to the antecedent of leadership schema congruence within teams at multiple levels will be offered. Finally, drawing on the theoretical overview and with special attention to the hypotheses
and research questions of this study, the overarching purpose of this examination will be summarized.

**A Brief Overview of Two Multilevel Approaches to Emergent Leadership**

There have been many different multilevel, theoretical perspectives of leader emergence proposed in the last 60 years (e.g., Hollander, 1958, 1961, 1964; Zaccaro, 2002). The earliest and most cited is Hollander’s approach to leader emergence (Hollander, 1958, 1961, 1964). Hollander’s approach was the first to examine the process of emergence by addressing the role of traits in the leadership attribution process. According to Hollander (1958, 1961, 1964), individuals who conform to expectancies in the early stages of group interaction increase their status. This increase in status is referred to as idiosyncratic credit. In order to increase their idiosyncratic credit, individuals must contribute to the task in line with group expectancies. Once a threshold of credit is reached according to the group, the group member attains the role of leader along with the status that accompanies the role. As Hollander states (1958), status is an outcome of the group’s differentiated perception of the individual, and leads to a set of particularized expectancies regarding behavior.

Status exists as a feature in someone’s perceptual field, and perceptual differentiation by the group has consequences for the behaviors the leader is expected to display subsequent to gaining idiosyncratic credit (Hollander, 1958). The conferral of status through the surpassing of threshold cannot occur without the perceptions of the group, thereby highlighting the importance of both followers’ perceptions and relevant group variables when examining emergent leadership. Group variables in examining emergent leadership have often been overlooked in empirical work on emergent leadership, but studies that outline group variables and their impact
on emergent leadership have a strong theoretical basis from the work of Hollander (1958, 1961, 1964).

Stein and colleagues’ (1979) valence model of emergent leadership within groups also highlights the importance of followers’ perceptions. That is, Stein et al.’s (1979) model proposes that leaders emerge within groups because group members generate a valence (i.e., a force towards a cognition) for what their leader should represent. According to Stein and colleagues, leaders emerge as the result of three processes: those who are unsuitable are eliminated from consideration for leadership status; the selection of potential leaders occurs as a group and individual process; and, during the probationary period, the leader must continue to demonstrate his or her capabilities (Bormann, 1969). Valences are generated within groups in order to define the problem that the group faces. However, valence generation is implicit for each group member since groups almost never explicitly raise the need for leadership; the identification of necessary leadership functions occurs implicitly during the course of interaction. The leader emerges as a product of the interaction of the group members and the valence toward the leadership qualities necessary to address the group’s problems.

Valence points are similar to idiosyncratic credit, as outlined by Hollander (1958). Therefore, similar to Hollander’s idiosyncratic credit, there is a normative aspect to the valence model of emergent leadership. In both models, emergence cannot occur without conformity to both individuals’ and the group’s expectations, or without having characteristics that group members find desirable. Therefore, both of these models are best tested as multilevel approaches. Both models include the interaction between traits of the leader, individual perceptions of the group members, the behavior of the emergent leader, and a reference to the context of the group in conferring leadership. Empirical models relying on the work of Hollander (1958, 1961, 1964)
and Stein and colleagues (1979) in order to justify the examination of group context rest on strong theoretical grounds. Likewise, although the models of Hollander (1958, 1961, 1964) and Stein and colleagues (1979) are not the sole models outlining how leadership attributions occur, these models have an added benefit in that they can be integrated with other models of leadership without compromising the integrity of their propositions.

Implicit Leadership Theory and Categorization Theory

Another perceptual model often examined in empirical leadership research, and related to leader emergence, is implicit leadership theory (ILT; Eden & Leviatan, 1975; Lord and colleagues, 1978, 1980, 1984; Mulaik, 1964; Schneider, 1973). An ILT is a set of assumptions about what constellation of traits comprises leadership (Schneider, 1973). ILT addresses the interaction between the internal leadership schema of followers and the recognition of attributes constituting leadership in others. ILT emerged from the concept of prototype recognition as outlined in categorization theory.

Categorization theory resulted from an application of Rosch’s (1978) theory of person perception. In categorization theory, Cantor and Mischel (1979) argued that individuals make judgments about the behaviors and attributes of others based on their preexisting knowledge about another’s traits or category membership. Membership is gauged by prototypicality, which is a judgment about how well the attributes of a target fit within an observer’s implicit, perceptual categories (Lord, Foti, & DeVader, 1984). The recognition of prototypicality in another then guides the observer’s perceptions of the target’s attributes (Rosch, 1978). The categories that individuals access for judgment in person perception serve as a guide for selective attention, social judgments, and the retrieval of information (Lord et al., 1984), and categories are differentiated by the prototypes within them. Prototypes are easily accessed schemata, and
they serve as abstract representations of the most common examples of a particular category (Rush & Russell, 1988). ILT holds that the locus of leadership involves the behaviors, traits, and characteristics of leaders, as followers perceive these elements (Lord & Maher, 1990-italics theirs).

Although ILTs develop from individual, internal processes of both prototype recognition and subsequent categorization, ILTs form in similar ways across cultures. Research has indicated that the assumptions of characteristics needed for successful leadership (i.e., ILTs) are solidified through socialization (Nye & Forsyth, 1991). ILTs also help define individuals’ expectations of leaders (Kenney, Schwartz-Kenney, & Blascovich, 1996) and serve as a precursor to what followers will perceive as effective. For instance, Nye and Forsyth (1991) demonstrated that participants are biased toward rating leaders who match their prototypes as more effective. This bias occurs because the closer the match between an individual’s prototype (i.e., their ILT) and the leader’s attributes, the more favorably the leader is evaluated. In contrast, leaders who do not measure up to an individual’s idea of an effective leader are designated as not worthy of influence (Kenney et al., 1996).

Until more recently, ILT research was conducted in the late 1970s and early 1980s (e.g., Lord et al., 1978; Lord et al., 1984; Phillips & Lord, 1982; Rush, Thomas, & Lord, 1977; Rush & Russell, 1988). During this period, ILTs were primarily examined with respect to their impact on leader behavior questionnaires (e.g., Lord and colleagues, 1978, 1980, 1984), such as the Leader Behavior Description Questionnaire (LBDQ, Stogdill, 1948). Although a number of studies were conducted at this time, none of these initial studies measured employees’ ILTs and their perceptions of their actual leaders separately in order to test whether there was discriminant validity (Martin & Epitropaki, 2001).
In more recent years, ILTs have resurfaced in empirical studies because of their positive impact on other leadership constructs (e.g., leader-member exchange - Epitropaki & Martin, 2005; Hogg et al., 2005: transformational leadership - Martin & Epitropaki, 2001). Despite these recent studies, the relationship of ILTs and followers’ perceptions of emergent leadership has not yet been examined in ILT research. Nonetheless, the relationship of ILTs to schema congruence for the emergent leader is a worthy topic for consideration considering the proposition of the importance of followers’ expectations in emergent leadership highlighted by Stein and colleagues (1979) and Hollander (1958, 1961, 1964).

ILTs are intimately linked with the perceptions involved in emergent leadership through the formation of benchmarks. ILTs account for leader emergence through the interaction of traits and individual prototypes held by observers; that is, the traits of potential leaders affect the extent to which individuals are perceived as leaders (Cronshaw & Lord, 1987). Implicit leadership theories are the standard “…that employees use to form an impression of their manager and from which they engage in ‘ILT versus actual manager’ comparisons” (Martin & Epitropaki, 2001, p. 249). Therefore, recognition of one’s ILT in an emergent leader should be a more reliable predictor of leader behavior perceptions than an abstract ILT prototype (e.g., Cronshaw & Lord, 1987; Fraser & Lord, 1988; Lord et al., 1984). In short, emergence is a function of follower perceptions of the trait composition of an individual.

Examining ILTs in a Group Setting

Although ILTs are often examined in a follower-leader relationship (e.g., within dyads), leadership does not occur solely within a dyad relationship. Within the group context of emergent leadership, ILTs of group members can also affect perceptions of an emergent leader. ILTs are shared within culture and they rely on the concept of shared prototypes of leaders.
Without a shared concept of what defines a category (i.e., a prototype), categorization would not be effective (i.e., prototype recognition would be unreliable across individuals). With respect to a group environment, it is logical to assume that individuals within groups may exhibit shared prototypes. This is especially likely in groups comprised of individuals from the same culture. Culturally homogenous groups are comprised of individuals who have been socialized into a shared value system. Groups of culturally homogenous individuals should have less variance with respect to the type of individual who emerges because of shared prototypes within cultures. (for more on the nature of dimensions of effective leadership across cultures, please see the results of the GLOBE studies; House et al., 2002).

Despite research on leadership across cultures, shared ILTs in emergent leadership have yet to be studied. As Hall and Lord (1995) have stated, the prototypes of perceivers may include many common attributes that define a leader. Furthermore, higher-level influences on leadership categorization may occur through the combined effects of followers who possess similar leadership schemas (Hall & Lord, 1995). The higher-level effect of the group on an individual’s leadership categorization occurs though two routes. First, information about the leader or potential leader may be acquired indirectly through communications shared by the members of a group (Lord & Maher, 1990). This mode of acquisition is likely to produce greater agreement in the group than when schemas are acquired through direct, external experiences of individuals (Hall & Lord, 1995). The second route of information processing addresses a variety of factors that are also susceptible to higher-level influences; that is, ILT matching may result from matching on a group level. Group level matching can occur through indirect communications and information processing within the group (i.e., the creation of a climate for emergence through higher-level group processes). Because of the dual nature of the matching process, it is important
to examine the impact of ILT congruence at the individual level (i.e., does this individual within my group match my ILT through my personal interaction with s/he?). The higher-level matching process (i.e., does this individual within my group match my ILT through his/her interactions with others in the group?) addresses the context of congruence. Integrating the ILT and leader emergence streams within groups will help to enhance the understanding of how these processes are related.

*Dimensionality and Generalizability of ILTs*

Examining ILTs within groups would not be possible without understanding the content and structure of ILTs. A study by Offerman and colleagues (Offerman, Kennedy, & Wirtz, 1994) examined the generalizability of the content structure of ILTs across both leaders and perceivers. The researchers attempted to reduce individually generated prototypical characteristics into factors that represent collectively held expectations (Offerman et al., 1994). The researchers used five steps to carry out their development of a scale that would assess the factors commonly associated with ILTs: item generation, factor identification, content validation of the factors, hypothesis testing, and a working sample validation. The results of their examination indicated the presence of eight primary dimensions of ILTs: sensitivity, dedication, tyranny, charisma, attractiveness, masculinity, intelligence, and strength. Furthermore, no statistically significant differences were found in factor loadings between sexes or across stimuli groups (i.e., students and organizational samples). In terms of factor stability, the factor structure of ILTs did not differ across stimulus targets, effective leaders, and supervisors. This indicated that people use similar dimensions for their perceptions of the leadership targets (Offerman et al., 1994).

Similarly, Epitropaki and Martin (2004) conducted a study of the generalizability of ILTs, wherein ILTs were measured with Offerman et al.’s (1994) 41-item scale. The results of
this study revealed six factors of ILTs: sensitivity, intelligence, dedication, dynamism, tyranny, and masculinity. Second-order confirmatory factor analyses identified two higher order factors, the leadership prototype (including sensitivity, intelligence, dedication, and dynamism) and the leadership antiprototype (tyranny and masculinity). The results of this study supported Lord et al.’s (1984) distinction between prototypic (or positive) and antiprototypic (or negative) leadership traits. The finding of total invariance between different groups of organizational tenure is of special interest - if ILTs are indeed malleable concepts (e.g., Rush & Russell, 1988), then employees with short tenure and less exposure to leaders would construct their ILTs in a different way than employees with more years of service and more experiences with actual managers. The results suggest that this is not the case and that despite their different experiences, both short and long-tenured employees have similar leadership schema. The invariance across rater groups provides preliminary evidence for the stability of ILTs over time. Thus, it appears that ILTs are relatively static in their composition and reliable across time.

**Overview of the Social Identity Theory of Leadership: The Relationship to Implicit Leadership Theory**

Leadership schema congruence can be examined using the framework of the social identity theory of leadership (SITL: Hogg, 2001b). The SITL developed from social identity theory (Tajfel, 1972). Tajfel (1972) introduced the concept of social identity to explain how people conceptualize themselves in intergroup contexts; he theorized that groups exist and derive their social meaning in relation to other groups (Hogg, 2001a). This creation of meaning occurs in order to enhance a group’s distinctiveness and social identity (Turner, 1985). Social identity relates to leadership schema in that social identity is related to an individual’s self-knowledge.
within groups. Since ILT can be a factor in perceptions of leadership within groups, it is important to understand how individuals’ self-perceptions impact how they perceive leadership.

The SITL approaches leadership with respect to the influence of the larger social system and explains leadership as generated by processes associated with psychological belongingness to a group. It states that basic social cognitive processes result in leader emergence. These processes include individuals’ tendencies to conceive themselves in terms of the features of their group, individuals’ tendency to cognitively and behaviorally assimilate themselves to the features of the group, and individuals’ tendency within groups to perceive their group members in terms of the characteristics of the group (Hogg, 2001b).

According to the SITL, leadership conferral results from social categorization and group prototype-based depersonalization (Hogg, 2001a). Social categorization means that group members are more likely to socially-categorize their group as the in-group when in the presence of other salient out-groups. Depersonalization means that as group members increase their experience of psychological belongingness, they no longer rely exclusively on their own conceptualization of leadership, and instead tend to adopt the group’s norms for who best represent their values. These processes (i.e., categorization and depersonalization) interact in order to support the emergence of leaders who correspond to the defining features of the group (or team). Individuals who correspond to the leadership schema of followers are not as likely to emerge because in the face of an increased sense of psychological belongingness within ingroups (i.e., categorization), the locus for leadership is depersonalized from correspondence to a personal schema (i.e., ILT) to correspondence to the group’s features (i.e., correspondence to the team’s “prototype”).
The Framework of the SITL

The SITL proposes that as group membership becomes more salient, group members identify more strongly with the group (Hogg, 2001b). The SILT also proposes that as individual group identification becomes stronger, individual’s leadership schemas become less important (Hogg, 2001b). Therefore, the greater the degree of group identification, the lower the likelihood that group members will rely on leadership schema congruence for emergent leaders. Group identification also accentuates perceptions of representative members when an intergroup context is introduced. Empirical laboratory work has supported the occurrence of this process (Hogg, Hains, & Mason, 1998; Hogg & Terry, 2000).

Group identification also influences group cohesion within groups, which in turn affects reliance on leadership schema congruence. With increasing group identification, the SITL proposes that the result of identifying with the group is a sense of cohesion (Hogg, 2001b). In a number of studies, schema congruence became less influential in emergence in more cohesive groups (Hains et al., 1997; Hogg et al., 1998). In summary, there is theoretical and empirical justification to expect that group identification and cohesion are influential for leadership schema congruence within groups.

Improving the Framework: Issues in Research in the SITL

By using the framework of the SITL in this study, it is necessary to clarify wording choices in order to prevent confusion. The SITL refers to leadership schema congruence, or correspondence of the leader to one’s ILT, as “stereotypicality.” In this study, stereotypicality will be referred to as “leadership schema congruence” because the construct is derived from correspondence to an individual’s ILT. Furthermore, the SITL refers to leaders/leadership perceived to correspond to features of the team as “prototypicality.” Although the original
definition of prototypicality does not include prototypes related to team representativeness (Cantor & Mischel, 1979), and it is used in person perception to refer to leadership behaviors that are the most characteristic of leaders, the SITL does not use this terminology in the same way as the ILT literature. However, in order to adopt the language of the framework of the SITL, the term “prototypicality” will be used when referring to the correspondence of a leader to the attributes of the team from which the leader emerged.

Construct operationalization issues are not the only issues that must be rectified in working within the framework of the SITL. Although the goal of this study was to use the SITL as a framework, it is very important to cast a critical eye on the studies that have attempted to measure leader prototypicality and leadership schema congruence. The methodology and task environment in which the SITL has been examined are problematic as well. The problems associated with research in the SITL occur in both the methods used and the resulting analyses employed, and have some general themes. Problems exist in (a) the measurement of schema congruence, (b) the measurement of prototypicality, (c) the unit/level of analysis, and, (d) the use of artificial leaders and manipulated perceptions related to the artificial leader.

With respect to issue (a), leadership schema congruence has often been measured poorly or subjectively in studies using the SITL. In Fielding and Hogg’s (1997) field study of outward-bound groups, leadership schema congruence was measured by asking each participant to list attributes they felt were typical of leadership. Later, participants were presented with these attributes again, and were asked to indicate on one item to what extent the leader was similar to this schema. While this particular methodology can be helpful in getting at aspects of leader-related schema, this methodology is especially problematic in light of its deficiency in measuring leadership schema congruence as it was theoretically conceptualized. That is, no explanation was
given for why the authors did not use pre-existing measures of ILT which were theoretically derived to empirically examine categorization theory (e.g., Lord et al., 1978; Lord et al., 1984; Phillips & Lord, 1982; Rush, Thomas, & Lord, 1977; Rush & Russell, 1988). Similarly, in Hogg et al.’s (1998) lab study, leadership schema congruence was measured using Cronshaw and Lord’s (1987) General Leadership Impression (GLI) measure. Although this measure has been used in a number of contexts, it has not been used to measure leader correspondence to ILT. Likewise, the measurement of leader prototypicality (b) has been measured in multiple ways, some of which do not make theoretical sense. For instance, in a recent experiment, Hogg and colleagues (2006) defined leader prototypicality on the basis of gender stereotypes. That is, the authors “produced” the prototypicality variable based on traditional gender attitudes, instrumental or expressive group norms, and the presence of a male or female leader. However, in explaining the rationale for this decision, the authors cite no theoretical rationale for this choice. Instead, they simply claim that “…members who subscribe less strongly to traditional gender stereotypes will, relative to more traditional members, feel that males are less prototypical of a group with traditionally male norms but more prototypical of a group with traditionally female norms, and vice versa for females” (p. 337). That is, they defined prototypicality and leadership schema congruence on gender role subscription and endorsement. Again, no theoretical rationale or supporting literature was presented for the assumption that gender roles are substitutes for leader prototypicality and schema congruence perceptions.

Additional studies have measured leader prototypicality using different, and seemingly unrelated, measures (b). In a 2005 study of employees in the service industry, Hogg and colleagues proposed that in high salience groups, participants would rate team prototypical leadership as more effective. Problems in this analysis, however, include the measurement of
leader prototypicality. Prototypicality was measured by two items, which asked participants to rate how frequently the leader “treats me as an individual rather than just a member of a group,” and, “considers me to have different needs, abilities, and aspirations from others”. While these items were proposed to gauge differences in leadership style, it is not clear where these items came from, and the reliability of the two-item scale was low ($\alpha = 0.61$). Likewise, the wording of the first question was a double-barreled question, which is psychometrically undesirable. Therefore, it appears as though the authors were not measuring prototypical versus leadership schema congruent leadership in a reliable way.

Similarly, in the same study, Hogg and colleagues’ “study 2” defined leadership schema congruent and prototypical leadership based on responses to two items developed from general Leader-Member Exchange research (LMX; e.g., Gerstner & Day, 1997; Graen & Uhl-Bien, 1995). While the reliability coefficient of the LMX-derived items is an improvement over the reliability of the item composite used in “study 1” ($\alpha = 0.81$), it was not clear what the theoretical rationale was for measuring leadership schema congruent versus prototypical leadership by using items from the LMX scale. That is, the authors purport to measure leader prototypicality and leadership schema congruence by the interpretation of the leadership style the employee believes that he or she has with their leader (i.e., LMX relationship). However, in doing so, the authors confuse perception of leadership style with a cognitive assessment, and both prototypicality and leadership schema congruence are cognitive assessments. Therefore, it does not appear that Hogg et al. (2005) were measuring leader prototypicality and leadership schema congruence, but rather, the resulting leadership perceptions (i.e., satisfaction and affect, which characterize LMX relationships) that result from leadership.
There have also been problems in the unit of analysis (c) employed in research in the SITL. For instance, although Fielding and Hogg (1997) examined natural groups in their study for nonindependence of observations and noted that, “…indeed, it would be quite remarkable if each group did not develop over such a period of time a degree of uniqueness,” (p. 44) the authors chose not to examine the group as the unit of analysis. Their reasons for ignoring nonindependence included concerns that examining the theory at the group level reduced statistical power, and despite noting that “…the group itself is a theoretically important source of variance (we expect people in different groups to behave differently) in our model of leadership, we opted to run the main analyses using the individual as the unit of analysis” (p. 44).

Likewise, Hogg and colleagues (1998) purported to measure the SITL in a way that included a social comparison of the prototypicality and leadership schema congruence of the leader in comparison to the followers. This measurement resulted in prototypicality and leadership schema congruence functioning as within-group comparisons. However, the study hypotheses were tested as the individual level. By substituting a within-group outcome based solely on within-group comparisons for a between-group outcome, Hogg and colleagues (1998) committed a level of analysis error in their tests of hypotheses. This error impacts the degrees of freedom at which they tested their hypotheses, and may invalidate the significance tests of their findings. When combined with the results of Fielding and Hogg (1997), Hogg and colleagues (1998) level of analysis errors point to the attractiveness of examining the SITL using a multilevel model. That is, multilevel models solve the problem of accounting for nonindependence as well as accounting for how people in different groups “behave differently”.

Finally, studies based on the SITL have often relied on artificial leaders and manipulated group perceptions (d). That is, Hains and colleagues (1997) used a randomly selected group
leader whom the researchers described as being prototypical or leadership schema congruent, or in contrast, as possessing or not possessing typical qualities of the widely applicable leader schema. The cognitive assessment of leader qualities was dictated, and therefore, artificial.

In summary, as outlined, there are a number of methodological and analytical shortcomings in the SITL primary literature. The current study employed the appropriate conceptualizations of prototypicality and leadership schema congruence and measured both concepts in line with previous work in the existing literature. This study did not employ artificial leaders or manipulate group perceptions of leaders, but rather, allowed individuals to assess and endorse their own leader, as well as to gauge the prototypicality and leadership schema congruence of their endorsed leader. The chosen methodology and measurement approach of this study, which will be outlined in subsequent chapters, is a significant improvement over the past primary studies of this theory.

**Antecedents of Leadership Schema Congruence:**

**A Social Identity Framework and Related Hypotheses**

The SITL as it was proposed does not help us answer the question, “what individual differences and group level variables influence the match I make between my ILT and the emergent leader of my group?” An important research question is to determine whether the same variables proposed by the SITL are relevant to the individual process of leadership endorsement, as well as the within-group endorsement of the emergent leader. The theoretical justification for the influence of these variables points to the validity of their inclusion in the proposed multilevel approach to understanding leadership congruence for emergent leaders.
Self-Concept Clarity

Self-concept clarity is the extent to which self-beliefs are clearly defined, internally consistent, and stable (Campbell, Trapnell, Heine, Katz, Lavellee, & Lehman, 1996). From a theoretical basis, the self is the central point of the perceptual field and is “the frame of reference in terms of which all other perceptions gain their meaning” (Combs & Snygg, p. 145). Self-schemas have a systematic influence on the way information about the self is organized and used. The self-schema can serve as a framework within which the behavior of others becomes meaningful (cf. Hayes-Roth, 1977; Jones & Davis, 1965; Markus & Smith, 1981). The structure of perception of and the organization of the behavior of another person is guided by the structure of the self rather than by anything inherent in the behavior of the target (Markus, Smith, & Moreland, 1985). Self-concept can influence the entire person perception process, including the perception and organization of the behavior of others, the memory for and inferences about the behavior, and the evaluation of the behavior of others.

Although not addressed in the emergent leadership, ILT, or SITL literature, self-concept has been addressed in other leadership literatures. Leadership research in transformational leadership has indicated that individuals with lower self-concept clarity are more likely to seek a relationship with a person who displays traits and behaviors that are schematic of transformational leaders (Howell & Shamir, 2005). One implication of this behavior is that lower self-concept clarity individuals will be drawn to a leader who actively displays charismatic attributes, such as self-confidence or a high level of energy (Howell & Shamir, 2005). In contrast, individuals who have higher self-concept clarity will not have a charismatic relationship with the leader unless the leader appeals to the followers’ values and identities. Because values
and identities have a social basis, these followers’ attraction to the leader is likely to be more social than personal (Hogg, 2001b).

Therefore, it is possible that individuals with lower self-concept clarity will be more likely to have a high degree of leadership schema congruence for the emergent leader. This is because their leadership schema is proposed to influence the matching process for the emergent leader. In contrast, the matching process for higher self-concept clarity is dependent on the degree to which social identities are important. Leadership perceptions are more likely to be based on the degree to which the leader embodies the values and identity of the individual for higher self-concept clarity followers.

Although transformational leadership theory postulates self-concept clarity as negative for reliance on leadership schema congruence, the SITL understand the relationship of self-concept clarity with leader endorsement in a different manner. Although not specifically addressed in the SITL, self-concept clarity is related to leadership schema congruence through the products of psychological belongingness. The SITL posits lack of clarity within the self-concept as a driver for the experience of group identification and the resulting cohesion. That is, an individual with lower self-concept clarity is more likely to experience higher group identification within the group setting, and perceive the in-group status of the group more strongly. This is because this individual will rely more on the group for his or her perceptions (i.e., depersonalization). Thus, an individual with low self-concept clarity may experience higher levels of group identification in an effort to derive a social identity, and likewise experience higher levels of cohesion through the vehicle of psychological belongingness.

Therefore, an individual with lower self-concept clarity (i.e., one who is more likely to experience higher levels of group identification) should be less likely to rely on leadership
schema congruence when endorsing a leader for the group because the locus of decision making in this individual lies with their experience in the group. According to Hogg (2001b), when group membership is salient, members are likely to be attracted to the most representative member of the group. The most representative member is the one who embodies the values, attitudes, and identity of the group. Thus, according to the SITL, individuals will lower self-concept clarity will be attracted to the most representative member of their group because they derive their identity from the group experience.

Although it is theorized that self-concept clarity, as outlined by transformational leadership, may relate to leadership schema congruence in a negative manner, the transformational leadership literature does not account for the resulting belongingness and the impact of the team on leadership schema congruence for lower self-concept clarity individuals. Through the framework of the social identity theory, the positive relationship of self-concept clarity and leadership schema congruence should be expected for lower self-concept clarity individuals within teams because of the resulting production of psychological belongingness. That is, lower self-concept clarity will drive higher psychological belongingness, which in turn decreases individual leadership schema congruence. Therefore, the lower the self-concept clarity, the more likely it is that an individual will experience high levels of cohesion and decrease their reliance on leadership schema congruence, which would be indicated by a positive correlation between self-concept clarity and individual leadership schema congruence. Accordingly,

\textit{Hypothesis 1: Self-concept clarity will positively relate to individual leadership schema congruence.}
Cohesion

Emergent leadership has been associated with cohesion in prior research (Dobbins & Zaccaro, 1986; Hurst, Stein, Korchin, & Soskin, 1978). Previous findings have indicated that when groups are more cohesive, people endorse the representative leader as being much more effective than the non-representative leader (Hains et al., 1997). According to social identity theory, as individuals experience higher levels of group identification, their sense of psychological belongingness to the group should increase, thereby engendering feelings of enjoyment from the group experience. Highly cohesive groups should base leadership on correspondence to the group prototype (i.e., how well does the leader represent the terms I use to describe my group; Hogg, 2001b). Therefore, social identity theory indicates that higher levels of cohesion resulting from higher levels of group identification will decrease leadership schema congruence (Hogg, 2001b). That is, individuals who perceive lower cohesion in their group should be more likely to rely on leadership schema congruence because it is an internal, individual perception, and not a group-based perception. Accordingly,

Hypothesis 2: Cohesion will negatively relate to individual leadership schema congruence.

Group Identification

Social identity theory proposes that individuals with a higher level of group identification are also more likely to rely on group prototype as the basis for emergent leadership (Hogg, 2001a). As followers identify more strongly with a group, followers’ leadership ascription becomes increasingly based on correspondence to the group prototype rather than leadership schema or intrinsic status characteristics. That is, higher levels of group identification decrease the likelihood of leadership schema congruence at the individual level. This is because as
identification increases, an individual’s internal schema for leadership is less important, and supporting an individual who represents the group itself becomes the individual’s basis for supporting a potential emergent leader, thereby removing the impact of leadership schema congruence at the individual level. Thus, the more an individual identifies with the group, the less likely they are to have leadership schema congruence for the emergent leader.

**Hypothesis 3:** Group identification will negatively relate to individual leadership schema congruence.

The Operation of Climate Strength on Leadership Endorsement

Although the SITL was outlined to describe how an individual’s perceptions about their group influences that same individual’s basis for endorsement of the emergent leader, the SITL does not address the impact of these variables at the group level. The context of the group has important ramifications for individuals’ perceptions through the transmission of communication between members, as well as between the potential leaders of the group and other group members (Hall & Lord, 1995). This direct and indirect communication and the resulting attitudes produced by the group situation can create a “climate” for the group.

This psychological environment within the group is typically referred to as “climate” in the organizational psychology literature when the psychological environment demonstrates “sharedness” (James & Jones, 1974; Jones & James, 1979). Schneider (1990) defined climate, specifically team climate, as the set of norms, attitudes, and expectations that individuals perceive to operate in a specific social context (p. 384). Similar to affective tone, which is defined as shared affect within teams (George, 1990), the existence of team climate depends on group members having shared experiences (Anderson & West, 1998).
While climate was defined at the individual level because it is defined as the meaning an individual attaches to their environment, certain individual, psychological perceptions can operate at the group level if there is agreement within the group on the psychological construct of interest. Cohesion and identification can be considered climate variables if there is agreement at the aggregate level regarding the pervasiveness of individual’s psychological perceptions of group identification and cohesion within the group. In fact, “workgroup cooperation, friendliness, and warmth” is a second-order factor of psychological climate (James & James, 1989), and the items within the second-order factor on James and James’ general psychological climate questionnaire are indicative of cohesion and identification. Cohesion and identification can function as climate variables if they are informative about the sharedness of these group-related perceptions. However, cohesion and identification must meet the requirements of agreement in order for the aggregate means to be used as group-level variables (James, 1982).

Central to the question of aggregation is how much agreement exists within the group. When less agreement is present within a group, the mean is a less reliable indicator of the group level of a variable (Klein, Conn, Smith, & Sorra, 2001). Examining the group-related variables of the SITL at the mean level is worthwhile because it gives an indication of the normative context of the group and the degree to which the intra-individual process of leadership conferral outlined by the SITL can be impacted by the psychological environment of the group. This variable gives an indication of the climate level within the group, and this variable is incumbent on demonstrating agreement within the group. Some studies use the group-level mean of the group-level variable without consideration of within-group agreement. However, the group-level mean, absent agreement, is not an informative indicator of the climate of the group. This is because the mean of the group does not consider the variance within the group, and therefore,
cannot constitute a climate variable (James, 1982). Without agreement on the group-level variable, the climate level of the variable does not exist.

In contrast to the examination of variables as climate level variables, it is possible to examine group-related perceptions as climate strength variables. Although climate level variables (e.g., leadership climate) have been found to relate to group performance (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; Pirola-Merlo, Hartel, Mann, & Hirst, 2002), climate strength has been proposed as an important new aspect of perception within groups (Chan, 1998; Schneider, Salvaggio, & Subirats, 2002). Climate strength, as outlined by Schneider et al. (2002) is based on the concept of situational strength, a concept developed by Mischel (1976). High levels of climate strength indicate that there is a strong situation present; strong situations are created when aspects of the situation lead people to perceive events the same way, induce uniform expectations about the most appropriate behavior, and instill necessary skills to perform that behavior (Mischel, 1976). Weak situations do not foster similar perceptions of events in the same way. In weak situations, there are often inconsistent expectations about appropriate behavior (Schneider et al., 2002). Mischel argued that individual differences determine behavior most clearly in ambiguous, weak situations; in weak situations, responses can be judged as equally appropriate. From Mischel’s perspective, an organization with a strong climate (i.e., a place where events are perceived the same way and where expectations are clear) should produce uniform behavior from the people in that setting (Schneider et al., 2002). Thus, from Mischel’s (1976) and Schneider and colleagues work (2002), climate strength provides some insight on how the environment of the group can impact expressions of behavior within the group. In a high climate strength group, there is less room for individual responses to situations.
The operation of climate strength in leadership is an important construct to consider in that it provides an index of the distribution of perceptions within groups and has been found to relate to work-unit leaders’ informing behavior (Gonzalez-Roma, Peiro, & Tordera, 2002). Furthermore, in this analysis, the index of climate strength can provide a more clear explanation of how leadership schema congruence is affected in groups with strong climates for cohesion and identification. The social identity theory does not offer an explanation of how the climate of the group with respect to cohesion and identification impacts the basis for leader emergence. Furthermore, examining the climate strength of a group in combination with an individual difference variable (in this study, self-concept clarity) can shed light on how individuals within groups respond to the climate strength of their group. That is, variation in climate perceptions stems from individual differences, perceived differences in the situation, and the interaction of the two (Brown & Leigh, 1996). Examining climate strength in multiple levels can elucidate how individual differences play a role in climate strength.

Modeling cohesion and identification as climate strength can also provide an indication of how variation on perceptions within the group impacts whether the group agreed on their perception of the leader. That is, leadership schema congruence agreement can be modeled as a climate strength variable as well; in fact, leadership facilitation and support is a second-order factor of general psychological climate (James & James, 1989). Examining how the social identity framework impacts the strength of shared perception of a group’s emergent leader is a proposition that is novel to this study and can help answer how shared group-related psychological perceptions can impact shared perception of the group leader.

In order to examine the statistical influence of cohesion and identification climate strength on leadership schema congruence agreement (i.e., does the group agree with respect to
their perceptions of the leader), agreement within groups with respect to leadership congruence must be examined. For instance, in the face of shared perceptions of high cohesion and high identification, everyone in the group should fail to rely on their ILT, resulting in low leadership schema congruence; thus, high leadership schema congruence agreement. Likewise, in the face of shared perceptions of low cohesion and low identification, everyone in the group should rely solely on their ILT, thereby resulting in high leadership schema congruence; thus, high leadership schema congruence agreement. The converse can occur as well. In groups with very low agreement on cohesion and identification (e.g., a failure to come to consensus), the variance in cohesion and identification (e.g., the lack of a climate) should lead to variation within the group on leadership schema congruence. In this case, group members will have variations between their leadership schema congruence, thereby leading to low leadership schema congruence agreement within the group. Thus,

*Hypothesis 4: Cohesion climate strength will positively relate to leadership schema congruence agreement.*

*Hypothesis 5: Identification climate strength will positively relate to leadership schema congruence agreement.*

By using the agreement index, the strength of sharedness of cohesion and identification within groups can be modeled for their impact on the sharedness of leadership schema congruence at the group level. Additionally, in using the agreement index within groups instead of the mean, groups that do not meet the threshold of agreement in order to justify aggregation can be retained (Klein et al., 2001). In essence, using the agreement index allows for modeling the group level aspect of the model without discarding groups that do not meet the threshold for aggregation, and allows for the complete relationship between the strength of these climate variables to be examined.
Additional Research Questions

Additionally, exploratory research questions will be offered for which no formal hypotheses will be generated. These questions are presented as research questions, as opposed to formal hypotheses, because no studies to date have been able to examine these questions and they are exploratory in nature.

Cross-Level Effects

Although identification and cohesion may be modeled as group level variables when measured with respect to the amount of agreement, it is not possible to determine the relationship of identification and cohesion climate strength with individual-level leadership schema congruence. This is because the nature of the relationship of the aggregate mean has been disregarded in favor of the agreement index (Klein et al., 2001). However, in examining group-level cohesion and group-level identification within the teams as climate strength variables, it is possible to empirically address whether the climate strength of these variables should be considered in the SITL. That is, examining whether the climate strength of cohesion and identification influence individual-level leadership schema provides an empirical extension of the theoretical explanation for how individuals respond to the team climate in determining their leadership ascriptions. Furthermore, it allows for a test of whether the SITL holds true regardless of the climate strength for the focal variables outlined in the theory (i.e., whether individual cohesion and identification drive leadership schema congruence regardless of the team climate strength for these two variables).

Therefore, the following questions pose the question of how the strength of the climate for group identification and cohesion affect individual-level leadership schema congruence.
Question 1: What is the relationship between identification climate strength and individual leadership schema congruence?

Question 2: What is the relationship between cohesion climate strength and individual leadership schema congruence?

Likewise, although individual-level leadership schema congruence has been examined with respect to its positive relationship on subjective, individual criteria resulting from leadership (e.g., Epitropaki & Martin, 2005), the relationship of individual-level leadership schema congruence with team-level performance is unknown. In order to determine the relationship of an individual-level predictor with a group-level variable in this study, a multilevel model is necessary.

Question 3: What is the relationship between individual leadership schema congruence and team task performance?

Finally, the relationship of leadership schema congruence agreement with team task performance will be examined. This question will examine how group agreement related to leader characteristics affects team task performance. Again, while individual-level leadership schema congruence has been examined with respect to positive outcomes, there have been no examinations of how shared (or unshared) perceptions of the emergent leader affect the subsequent task performance of the team.

Question 4: What is the relationship between leadership schema congruence agreement and team task performance?

Purpose

All of this begs the question, “Why is it important to examine antecedents of leadership schema congruence for emergent leadership?” The short answer is that the examination of leadership schema congruence helps us to explain in part why individuals within groups select the leader that they do. As outlined in previous sections, past research has found that leadership
schema congruence is important to individual outcomes that are relevant to organizational functioning (e.g., Epitropaki & Martin, 2005; Hains et al., 1997). The missing link in all of the current ILT research highlighting leadership schema congruence is the examination of antecedents of the leadership schema congruence for individuals within groups. Furthermore, as previously outlined, there are individual-level antecedents (i.e., self-concept clarity) of leadership schema congruence that the SITL does not consider. It is important to examine both individual-level and group-related antecedents because emergent leadership conferral is both an individual- and group-level conferral (Stein et al., 1979). Integrating these levels of analysis can aid our understanding of what factors influence leadership schema congruence in groups.

Finally, attention to the climate strength of antecedents of leader emergence is important. In group-level analyses of emergent leadership perceptions, the agreement on group-related variables takes precedence (Klein et al., 2001). While the mean level of leadership schema congruence within a group may tell us whether the group is using their ILT or not, in the absence of agreement, it is not possible for us to say with any confidence whether leadership schema congruence exists within the group. Furthermore, it is not possible to model how leadership schema congruence at the group level impacts group level outcomes, such as team task performance.

The construct operationalizations and definitions employed in this study can be found in Table 1 (see Appendix A for all study tables and figures). Similarly, a model depicting the different levels of analysis, the hypotheses, and the research questions that will be examined in this dissertation can be found in Figure 1. In the next section, the methodology and analytical approach by which the hypotheses and research questions of this study will be tested is outlined.
Participants

Participants in this study were undergraduate students enrolled in an upper-level, business administration course at a large southeastern university ($N = 772$). Students in the course were assigned to work in teams ($n = 159$), consisting of either four or five individuals, on a semester-long market simulation game. Due to the restrictions of the course in which this data was collected, team composition was not established via random assignment. Rather, teams were created by students selecting each other for a particular business function within each team. The demographics of the university at which the data collection occurred were as follows: 65% White, 7% Black, 2% Asian, 1% Hispanic, 0.9% non-US resident, and 0.3% American Indian (Office of Institutional Research and Assessment, University of Tennessee, Knoxville, Fact Book 2006-2007), and females comprised 40.3% of the participants. Because of the lack of diversity in the university, controlling for within- and between-group demographic diversity was not a concern.

Task Environment

The *Global Corporate Management in the Marketplace* simulation (Cadotte, 2003a) provided the research environment. The *Marketplace* is a computer-based business simulation that emulates the real-world marketplace. Within the simulation, teams competed for PC sales in domestic and international locations and each team took on the role of top management of a manufacturing and sales company in the microcomputer industry. To prevent concerns regarding the impact of different production starting points, all teams began the simulation with the same
resources and market information. The simulation rests on the assumption that the PC industry is new and there is no history or other competitors outside of the teams involved in the simulation (Cadotte, 2003b).

The *Marketplace* is played over the course of an academic semester. The simulation condenses eight business quarters into the length of an academic semester. During each business quarter, teams must determine strategies and make tactical decisions in organizational areas such as marketing, sales, manufacturing, logistics, human resources, and finance. Throughout the semester, teams were given the opportunity to adjust their strategies before the beginning of each new quarter in order to stay competitive (Cadotte, 2003b).

The *Marketplace* simulation was selected as the context for examining leadership schema congruence because of the characteristics of the simulation. Performance in the *Marketplace* depends on teams’ composite performance, so each participant is likely to become engaged in the decision making process and their team’s performance. Participants spent an average of 212 minutes per quarter (i.e., 3.5 hours per quarter) engaged in the game, and some business quarters required upwards of 2,000 minutes (i.e., 33 hours) in order to make all of the necessary decisions prior to the close of the quarter. Likewise, leadership within each team was essential to performance, as multiple resources must be coordinated in order to ensure success. Therefore, because of the requirements for participant engagement, *Marketplace* served as a ripe arena in which to investigate leadership schema congruence.

**Measures**

None of the measures employed in this study were developed for this study alone. That is, each measure included in this study was used in previous research. Therefore, there is
preexisting evidence for the reliability and the resulting validity of each of the measures included in this study. The complete measures may be found in Appendix B.

*Self-Concept Clarity*

Self-concept clarity was measured by Campbell and colleagues’ (1996) 12-item measure. Responses options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). This measure has undergone extensive item development and validation (Campbell, 1990; Campbell et al., 1996) and has demonstrated acceptable internal consistency (Campbell et al., 1996). Sample items for this scale include, “I seldom experience conflict between the different aspects of my personality” and “In general, I have a clear sense of who I am and what I am.” In this study, coefficient alpha for this scale was $\alpha = 0.82$.

*Group Identification*

Group identification was measured with a four-item measure used in previous research in the SITL (Hains et al., 1997; Hogg, Cooper-Shaw, & Holzworth, 1993; Hogg & Hains, 1996; Hogg & Hardie, 1991, 1992; Hogg et al., 2006). This inventory asked participants questions related to their perceptions of their relationship with the group as a whole, on a scale that ranged from 1 (*not very much*) to 9 (*very much*). Sample items for this scale include, “How important do you feel that the group is to you?”, and, “How similar do you feel to the group as a whole in terms of general attitudes and opinions?” Previous research has found coefficient alphas in the range of $\alpha = 0.89$ (Hogg & Hains, 1996) to $\alpha = 0.93$ (Hogg et al., 2006). Coefficient alpha for this scale in this study was $\alpha = 0.86$.

*Cohesion*

Cohesion was measured by a three-item questionnaire used in previous research (Gaertner, Iuzzini, Witt, & Orina, 2006; Hogg et al., 1993; Hogg & Hains, 1996; Hogg & Hardie, 1992; Hogg et al., 2006). This inventory asked participants questions related to their perceptions of their relationship with the group as a whole, on a scale that ranged from 1 (*not very much*) to 9 (*very much*). Sample items for this scale include, “How important do you feel that the group is to you?”, and, “How similar do you feel to the group as a whole in terms of general attitudes and opinions?” Previous research has found coefficient alphas in the range of $\alpha = 0.89$ (Hogg & Hains, 1996) to $\alpha = 0.93$ (Hogg et al., 2006). Coefficient alpha for this scale in this study was $\alpha = 0.86$. 

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Following Hogg’s methodology, participants were instructed to, “Think about your group as a whole, its performance today, and its characteristics.” Participants then responded to questions on a 7-point scale, ranging from 1 (not at all) to 7 (very much). Sample items include, “How much do you like your group members as a whole?” and “How much would you like to work with your group members on future problems?” This measure has been found to be internally consistent ($\alpha = 0.77$) in previous research (Gaertner et al., 2006). Coefficient alpha for this scale in this study was $\alpha = 0.86$.

**Implicit Leadership Theory**

Individual ILTs were measured using a 21-item scale (Epitropaki & Martin, 2004). Participants were asked to indicate the degree to which each attribute in the scale was characteristic of an abstract leader. Responses were made to the attribute using a scale ranging from 1 (not at all characteristic) to 9 (extremely characteristic). Sample attributes to which participants responded include, “Educated”, and, “Hard-working.” The ILT scale is proposed to have a six-factor structure, wherein the six primary factors (sensitivity, intelligence, dedication, dynamism, tyranny, and masculinity) tap two higher-order factors (prototype and antiprototype). Coefficient alpha for the subscales of this measure in this study were: Sensitivity: $\alpha = 0.69$; Intelligence: $\alpha = 0.75$; Dedication: $\alpha = 0.83$; Dynamism: $\alpha = 0.77$; Tyranny: $\alpha = 0.88$; Masculinity: $\alpha = 0.93$. Coefficient alphas for the higher-order factors, Prototype and Antiprototype, were $\alpha = 0.86$ and $\alpha = 0.87$, respectively.

**Implicit Leadership Theory Recognition**

Participants rated the emergent leader using the same 21-item scale that they completed for their ILT (Epitropaki & Martin, 2005). However, the directions were re-worded to ask participants to rate the degree to which each attribute was characteristic of the emergent leader.
Responses were made to the items using a scale ranging from 1 (not at all characteristic) to 9 (extremely characteristic). Participants completed this ILT Recognition scale (ILTR) for each of the members of their team in order to determine whether the person they listed as the emergent leader was rated as highly characteristic for each of the ILT prototypical scales. This was done in order to examine disagreements between ILT recognition and ranking of emergent leadership within teams. After the emergent leader was determined for each team, self-ratings were removed from the analysis in order to control for source effects (Facteau & Craig, 2001; Woehr, Sheehan, & Bennett, 2005). Coefficient alphas for the subscales of this measure in this study were: Sensitivity: $\alpha = 0.91$; Intelligence: $\alpha = 0.93$; Dedication: $\alpha = 0.94$; Dynamism: $\alpha = 0.89$; Tyranny: $\alpha = 0.90$; Masculinity: $\alpha = 0.90$. Coefficient alphas for the higher-order factors, Prototype Recognition and Antiprototype Recognition, were $\alpha = 0.96$ and $\alpha = 0.78$, respectively.

**Leadership Schema Congruence**

Leadership schema congruence was constructed by taking the difference between responses on the ILT scale and ILTR scale items that comprise the higher-order factor “prototype”. That is, in order to examine leader congruence, Epitropaki and Martin (2005) calculated the absolute difference of scores on the ILT prototype factor and the ILTR prototype factor. The multiple steps taken in order to use the absolute difference score of the ILT prototype factor and the ILTR prototype factors mirror those conducted by Epitropaki (O. Epitropaki, personal communication to J. T. Oliver, November 28, 2007).

The first major portion of determining the usability of the difference scores involved examining the factor structures of the scales that comprised the difference scores, as well as the difference scores themselves. The factor structures of the ILT, ILTR, and ILTD data were examined in confirmatory factor analyses (CFA) prior to determining the usability of the ILTD
scores. Past research has supported a six primary factor, and two higher-order factor, structure for the ILT scale, ILTR scale, and the ILTD scores (Epitropaki & Martin, 2004; Offerman et al., 1994).

The CFAs were conducted using LISREL v. 8.70 (Jöreskog & Sörbom, 2004) and the models of the ILT and ILTR scales and the ILTD scores were evaluated on the basis of the fit indices of the models. Model evaluation focused on four different overall fit indices: Pearson’s $\chi^2$, Steiger’s (1990) Root Mean Square Error of Approximation (RMSEA), the Nonnormed Fit Index (NNFI; Bentler & Bonnett, 1980), and the Comparative Fit Index (CFI; Bentler, 1990). Chi-square ($\chi^2$) is an absolute fit index, meaning that the index does not use an alternative model as a base for comparison. Although $\chi^2$ is often used as a model fit index, it is impacted by sample and model size, the distribution of variables, and a lack of fit because of omitted variables. The $\chi^2$ index can often indicate misfit ($p < 0.05$) because of these issues despite adequate levels of other fit indices; therefore, it is important to examine other fit indices when determining acceptable model fit.

The fit indices RMSEA, NNFI, and CFI were also used. Browne and Cudek (1993) suggest that RMSEA represents a measure of lack of fit per degree of freedom and that a value of 0.05 or less represents close fit, whereas values up to 0.10 represent reasonable fit. Both NNFI and CFI are incremental fit indices that, 1) evaluate model fit relative to a null model, and, 2) take into account the total number of model parameters estimated. The NNFI and CFI range from zero to one with values closer to 1.0 indicating better model fit. General rules of thumb suggest that values between 0.90 and 0.95 indicate acceptable model fit, and a value above 0.95 indicates good fit. These indices were selected because they are widely used in model fit testing.
Results of the CFA of the ILT scale provided support for both the six-factor model ($\chi^2 = 903.03$, NNFI = 0.94, CFI = 0.95, RMSEA = 0.08), and the two higher-order factor model ($\chi^2 = 1022.71$, NNFI = 0.93, CFI = 0.94, RMSEA = 0.08). Thus, because the six-factor model fit the data, as did the two higher-order factor model, this step of examining the factor structures of the scales that comprise the ILTD factors was acceptable. For the factor models of both the six-factor and two higher-order factor models, see Figure 2 and Figure 3.

The next step involved using the same procedure, but completing it for the ILTR scale. The ILTR scale was also examined in a CFA. Two models were tested and in order to follow the methodology of Epitropaki and Martin (2005). Results of the CFAs provided support for both the six-factor model ($\chi^2 = 1241.63$, NNFI = 0.96, CFI = 0.97, RMSEA = 0.10), and two higher-order factor model ($\chi^2 = 1187.15$, NNFI = 0.96, CFI = 0.97, RMSEA = 0.10). Thus, because the six-factor model fit the data, as did the two higher-order factor model, the next step of testing the suitability of examining the ILT and ILTR difference score was acceptable. For the factor models of both the six-factor and two higher-order factor models, see Figure 4 and Figure 5.

Finally, the last step of examining the factor structures of the components of the ILTD scores involved taking the absolute difference score per item between the ILT and ILTR scales, which lead to a new 21-item (ILTD scores). Coefficient alpha was examined for the ILTD scores prior to completing the CFA. Coefficient alphas for the subscales of the difference score were: Sensitivity: $\alpha = 0.78$; Intelligence: $\alpha = 0.80$; Dedication: $\alpha = 0.87$; Dynamism: $\alpha = 0.80$; Tyranny: $\alpha = 0.87$; Masculinity: $\alpha = 0.91$. Coefficient alphas for the higher-order factors, Prototype Difference Score and Antiprototype Difference Score, were $\alpha = 0.90$ and $\alpha = 0.79$, respectively.
The six-factor model was applied to the new, 21-item difference score scale (ILTD scale), as was the two higher-order factors model of “prototype difference” and “antiprototype difference.” Results of the CFA provided support for both the six-factor model ($\chi^2 = 733.27$, NNFI = 0.95, CFI = 0.96, RMSEA = 0.07), and two higher-order factor model ($\chi^2 = 831.04$, NNFI = 0.95, CFI = 0.95, RMSEA = 0.08) of the ILTD scale scores. For the factor models of both the six-factor and two higher-order factor models, see Figure 6 and Figure 7.

The second major portion of analyses directed at determining the usability of the prototype factor from the ILTD score involved testing the appropriateness of using the difference score via regression analyses. Like other difference scores, absolute differences create a number of difficulties such as reliability problems, difficulties in interpretation, and a potential confound effect on the components of the difference score (Edwards, 1993, 1994). According to Edwards (1993, 1994), it is vital to test a series of assumptions that will determine whether the underlying model is true prior to using difference scores. Edwards (1993, 1994) recommends testing absolute differences by examining the difference score in relation to the component scales. In previous examinations (e.g., Epitropaki & Martin, 2005), this examination was done for both the prototype and antiprototype difference score.

For this study, Edwards’ (1993, 1994) procedure involved a regression of the absolute difference on the prototype scale of the ILT and the ILTR scale. After regressing the absolute difference on the ITL prototype scale and the ILTR prototype scale, the difference score was regressed on a dummy variable. The dummy variable took the value of 0 if the prototype scale of the ILT was greater than or equal to the prototype scale of the ILTR, and 1 if the converse was true. The dummy variable was also multiplied by the prototype scale of the ILT as well as the ILTR scale (i.e., interactions were created). The amount of variance explained ($R^2$ value) for the
entire model, inclusive of both components of the difference score as well as the interactions of
the dummy variable and the components of the difference score, was then examined.

In order to retain the higher-order prototype factor for use in hypothesis testing, Edwards
(1993, 1994) requires that the following parts of the regression equation are significant. First, the
coefficients of the prototype scale of the ILT, the ILTR prototype scale, and the two interaction
terms must be significant. Second, the coefficient for the regression of the difference score on the
dummy variable should not be significant. Third, the coefficients for both components of the
difference score should be opposite in sign, but not significantly different in magnitude. Fourth,
the coefficients of the interactions of the dummy variables and the components of the difference
scores should be opposite in sign and not significantly different in absolute magnitude. Fifth, the
coefficient on the interaction of the dummy variable and the prototype scales of the ILT should
not be significantly different from twice the negative of the coefficient of the ILTR prototype
scales. In order for the absolute difference score to be used in subsequent analysis, each of these
conditions must be met.

The results of the polynomial regressions for both difference scores (i.e., the ILTD
prototype and antiprototype scores) can be found in Table 10. For the ILTD prototype scale, the
polynomial regression coefficients indicated that the ILT prototype, ILTR prototype, and the two
interaction terms were significant, and the coefficient for the regression of the difference score
on the dummy variable was not significant \( (B \text{ values are used to determine whether each of these}
conditions are met in line with Epitropaki and Martin, 2005). The coefficients for both
components of the difference scores (ILT prototype and ILTR prototype scale scores) were
opposite in sign, but not significantly different in magnitude \( (B = 12.95 \text{ and } B = -12.94,\)
respectively). Additionally, the coefficients of the interactions of the dummy variables and the
components of the difference scores were opposite in sign and not significantly different in absolute magnitude \((B = -25.90\) and \(B = 25.87\), respectively). Finally, the coefficients on the interaction of the dummy variable and the prototype scales of the ILT were not significantly different from twice the negative of the coefficient of the ILTR prototype scales relied on \((B = 12.95\) compared to \(B = -25.90\), and \(B = -12.94\) compared to \(B = 25.87\)). Therefore, the remainder of the analyses using the difference score for ILTD prototype as the measure of “leadership schema congruence” were justifiable.

In examining the coefficients for the ILTD antiprototype factor, the coefficient for the dummy variable in the regression was found to be significant, indicating that the difference score for the ILTD antiprototype factor did not meet one of Edwards’ (1993, 1994) conditions. Because it did not meet Edwards’ requirement, it was not possible to retain this factor for any further analyses. Leadership schema congruence was represented as congruence with prototypical leadership in the form of the higher-order factor ILTD prototype score.

In summary, leadership schema congruence was constructed via examining the factor structure of the ILT scale as well as the ILTR for the emergent leader. After confirming the factor structures of the ILT and ILTR measures, it was then necessary to determine whether the difference score between the ILT scale and the ILTR scale justified the use of the absolute difference score as a measure of leadership schema congruence. The ILTD prototype factor score was retained from these analyses.

*Team Task Performance*

The *Marketplace*’s indicator of total business performance, known as the cumulative balance index, represented team task performance. Total business performance in the *Marketplace* is a “quantitative measure of the group’s ability to effectively manage firm
resources” (Cadotte, 2003b; p. 8). The cumulative balance index was calculated by multiplying eight performance indicators: financial performance, market performance, marketing effectiveness, investment in the firm’s future, human resource management, asset management, manufacturing productivity, and creation of wealth (Cadotte, 2003b). By combining all of these indicators, the cumulative balance account for task performance and long-term viability of the team (Cadotte, 2003b). Therefore, the cumulative balance measure of total business performance is a global measure of a team’s task performance in all areas of business.

**Potential Control Variables**

*Team Prototype*

In most SITL research, samples are highly differentiated on demographic and cultural background (e.g., Hains et al., 1997; Hogg & Hains, 1996; for an exception, see Hogg et al., 2005). However, as the student sample used in this study was more homogeneous than some samples used in past SITL studies, an attempt was made to ensure that the teams’ descriptions of their team-specific values and attitudes differentiated from the leadership attributes comprising ILTs. That is, in order to differentiate the words that teams used to describe their attributes from the attributes listed in the ILT questionnaire, a separate measure was necessary.

Different methods of examining team prototype have been employed in previous examinations (Fielding & Hogg, 1997; Hogg et al., 1993; Hogg & Hains, 1996; Hains et al., 1997; Hogg et al., 1998; Hogg & Hardie, 1991). These methods generally involve asking participants to consider the behaviors, qualities, norms, and goals that characterize their team and differentiate it from other teams, and then list five qualities that best describe their team (Fielding & Hogg, 1997; Hogg et al., 1993; Hogg & Hardie, 1991). After making a list of five items that describe their team, team members then indicate how representative they felt the leader they had
nominated was by indicating how well he or she fit the team prototype they had generated. Other effective methods have included asking participants to list the five members of their team whom they felt best embodied their team (Hains et al., 1997; Hogg et al., 1998).

The measurement of prototypicality in this study was based on the method employed by Fielding and Hogg (1997). Similar to this study, Fielding and Hogg’s 1997 study was done with teams in a field setting. However, the current study has an advantage over Fielding and Hogg (1997) in measuring prototypicality because it was possible to intertwine team prototype with the structure of the Marketplace. At the beginning of the Marketplace, teams were asked to write a mission statement for their team. Later, in order to determine the prototype for the team, and thus have a baseline for which to determine the correspondence of the emergent leader to the team prototype, teams were asked to, “Consider the behaviors, qualities, goals, and norms that characterize your team and differentiate it from other teams. Then, list five qualities that best describe the character, style, and spirit of your team.” Finally, teams were asked to again “Consider the behaviors, qualities, goals, and norms that characterize your team and differentiate it from other teams.” This time, team members were also asked to list five qualities that best describe the “character, style, and spirit” of the emergent leader of the team.

In order to support the examination of leadership schema congruence at both the individual and group level, it was necessary to ensure that individuals could differentiate how they described their team from how they viewed leadership. That is, if individuals describe their team using the same words they identified with leadership, it would not be possible to ensure that the model was predicting leadership schema congruence, or whether it was predicting whether individuals select leaders who fit abstract, social terms. In order to differentiate team prototype from ILT, team prototype was measured at the individual level, and agreement across individuals
with respect to the terms they used to describe their team was calculated and termed “team prototype agreement”.

In order to calculate the overlap between words used to describe the team and participants ILTs, the proportion of overlap was calculated between team prototype and the ILT measure. That is, of the five words participants used to describe their teams, the proportion of words that overlapped with ILT words was calculated. Results of the individual-level analysis of the team prototype indicated that the proportion of uniqueness of the team prototype descriptors from the terms comprising the ILT measure was quite high (mean uniqueness proportion = 0.82). The average overlap of individual descriptors used to describe the team prototype for individuals was only 0.18. Therefore, it was evident that individuals used a number of unique descriptors that do not appear on the ILT measure in describing their teams’ prototypes.

In order to calculate team prototype agreement, team members’ lists were examined, and the proportion of overlap between team member prototype lists was controlled for both number of descriptors used (i.e., some team members chose to list less than five group descriptors on the team prototype measure) and number of team members. Team prototype agreement was rather low (mean agreement proportion = 0.17), indicating that individuals within teams were not using the same terms to describe their teams. Furthermore, the proportion of overlapping descriptors on the team prototype measure with the terms comprising the ILT measure was 0.39. Although this proportion was somewhat higher than expected, the proportion of uniqueness of the teams’ overlapping descriptors on the team prototype measure was 0.61. In general, although most teams did not describe their team in a shared manner, when they did agree, they used more unique words than ILT words.
Finally, in order to statistically differentiate the leader prototypicality ratings from leadership schema congruence ratings for the emergent leader, correlational analysis at both the individual and team level was conducted. The correlation between leader prototypicality and leadership schema congruence was $r = 0.02$ at the individual level ($N = 613$) and $r = 0.05$ at the team level ($n = 159$), neither of which were significant. Because leader prototypicality and leadership schema congruence for the emergent leader were not related in this examination, it was not necessary to control for the possible overlap between these two concepts in any of the multilevel tests of the study hypotheses and research questions.

*Perceived Leadership*

In order to construct the leadership schema congruence criterion within the team, it was necessary to determine the emergent leader within the team. This ranking was collected to control for, as well as examine, any potential disagreements related to identification of the emergent leader. This ranking was also collected in order to determine whether individuals representing one particular business function (e.g., the team’s vice president for finance) were nominated as emergent leader significantly more often than individuals who represented the other business functions included in the game.

Determining the emergent leader was done using a multistage strategy. To begin, each participant was asked to rank the leadership of each of his or her team members. This resulted in an individual assessment of each team members’ leadership. The mean rank of each team member was then examined. However, in order to control for an over-weighting of one teammate’s perception of the “emergent leader”, the standard deviation of the leadership ranking for each team member was examined. The emergent leader was determined by selecting based on the average rank within team of each team member, and then by standard deviation of within-
team rankings in order to break any ties. The emergent leader was the one who had the lowest average ranking (i.e., closest to 1, indicating that the team perceived this person to have been ranked the highest on leadership) and the lowest standard deviation on the ranking within team (indicating the smallest variation in team members’ perception of the leadership contributed by this team member).

The emergent leader selected by the team was generally split among the five Vice President positions that are available on the executive team of each of the Marketplace teams (VP Finance & Accounting = 27.7%; VP Manufacturing = 20.1%; VP Marketing = 14.5%; VP Sales Management = 22.6%; VP Marketing Research = 15.1%). The Pearson’s $\chi^2$ value of position of emergent leader/number of groups was not significant ($\chi^2 (790) = 795.00, p = \text{n.s.}$). Furthermore, the emergent leader selected by the team was somewhat representative of the sample characteristics; females represented 40.3% of the sample, and were selected as the emergent leader in 35.2% of the teams. While females were slightly underrepresented as team emergent leaders, the Pearson’s $\chi^2$ value of sex of emergent leader/number of teams was not significant ($\chi^2 (158) = 159.00, p = \text{n.s.}$).

**Procedure**

Participants were given the self-concept clarity measure on the first day of the course, prior to any exposure to their team members. Likewise, participants were given the ILT measure in order to measure ILTs without contamination from performance feedback or exposure to their teams (Offermann et al., 1994). During week three of the course, each student was assigned to a team in the Marketplace. Teams were tasked with listing their team’s core values when they wrote the team’s mission statement. About nine weeks after team formation, the participants completed questionnaires the group identification, cohesion, and team prototype questionnaires.
During week 12 of the game, participants provided ratings of the emergent leader of their team using the ILT recognition questionnaire. This measure was used to compute the leadership schema congruence variable, which was operationalized as the difference between the ratings taken from the ILT ratings and the ILTR ratings of the emergent leader. Leader prototypicality was also measured at this same time. These measures were collected at the end of “year two” of performance in order ensure that teams had enough time interacting within the game for a leader to emerge (E. R. Cadotte, personal communication to J. T. Oliver, May 15, 2007).

Participants also provided rankings of the leadership within their team at this time. Collecting this variable allowed for the deletion of the self-rankings of the emergent leader, which means that one individual’s rankings of the emergent leader on the ILT scale were removed from both the individual- and group-level analyses. This removal did not harm power, however, because the strength of multilevel models is more strongly related to the number of clusters rather than the number of individual participants. Finally, the team task performance measure was collected after the second “year” of business in order to determine the impact of leadership schema congruence for the emergent leader on team performance.

Analysis

The analytic method employed in this study was multilevel modeling. In order to test the multilevel model proposed in this study, multiple issues were addressed to ensure the usability of multilevel modeling in this study. These issues include determining sample size for adequate power, conducting missing data analysis, and determining the within-team agreement of team-level variables. Each of these issues will also be addressed in the following sections.
Multilevel Modeling

The presence of the nesting effect (i.e. individuals within teams) and the presence of group-level variables (cohesion climate strength, identification climate strength, leadership schema congruence agreement, and team task performance) warranted the use of multilevel modeling in this study (Gano-Overway et al., 2005). Information provided from individual-level data often violates assumptions of random sampling and independence of observations assumptions, causing an underestimation of parameter estimates and higher Type I errors (Hofmann, 1997; Raudenbush & Bryk, 2002). Likewise, information provided only from aggregated means may ignore potentially meaningful individual-level variation (Cheung & Au, 2005; Hofmann, 1997), and factor analytic studies based on aggregated data are often misleading (Muthén, 1994). Therefore, multilevel modeling was a desirable analytic approach for this study.

Multilevel structural confirmatory factor analysis (MCFA) allows simultaneous testing of the multilevel covariance matrix, but for the sake of clarity, the methodology is typically outlined sequentially (Muthén, 1989, 1994). Model-1, which is the individual-level model, accounts for individual variation in the observed scores at the individual level. Model-2 accounts for the between-cluster variation in the outcomes. Multilevel modeling is used when there is reason to suspect that there is a cluster- or unit-level variable that explains the covariation among the observed variables in a particular study (Vandenberg, 2005).

Accordingly, multilevel structural equation modeling (MSEM) builds on MCFA. Additionally, differing amounts of information may be available in the two levels. Sample differences (i.e., the difference in sample size between the within-group model and the between-group model) can occur, and this may result in potential difficulty in interpreting goodness-of-fit indices. There is still some debate regarding the utility and usability of goodness-of-fit indices in
MSEM. Therefore, it is important to keep in mind the differences in contribution of the within-group and the between-group models to the overall model. The 14 equations that comprise MCFA and MSEM can be found in Appendix B. It is also important to note that the multilevel theoretical model, presented in Figure 1, has no manifest indicators of the latent variables proposed. Single indicators with fixed reliabilities were examined in the structural model. This was done in order to simplify the analyses, as well as conserve power by estimating the minimum number of paths necessary for the theoretical model to converge.

*Mplus* (Muthén & Muthén, 1998) was used in order to analyze the theoretical model. *Mplus* is particularly desirable for multilevel modeling because of its flexibility. The general latent variable modeling framework for *Mplus* allows for integration of random intercepts and slopes, representing across-group variation measured by multiple indicators at both the individual and group level (Muthén & Muthén, 1998). In summary, the range of capabilities of the software and the simplicity of the syntax made *Mplus* a desirable choice for analyzing this data.

*Sample Size Issues in Multilevel Models: Power in Two-Levels*

Power analysis was necessary prior to conducting the multilevel analysis to ensure a large enough sample size to detect effects. Power is defined as the probability of rejecting the null $H_0$ given the effect size in the population, the significance level $\alpha$, and sample size $N$ (Cohen, 1992). The significance level, $\alpha$, represents the risk of mistakenly rejecting the null hypothesis. In the literature, this is commonly known as a Type I error. In contrast, $\beta$ is known as the risk of not rejecting the null when in fact the effect does exist in the population, also known as a Type II error. Power is therefore $1 - \beta$.
Cohen (1992) suggests that power is moderate when $1 - \beta = .50$, and high when it is at least $1 - \beta = .80$. Power increases as $\alpha$, the sample size, and/or effect size increases. The effect size is the researcher’s idea about “the degree to which the null hypothesis is believed to be false” (Cohen, 1992, p. 156). The formula for the relationship of effect size, power, significance level, and sample size can be summarized in one equation, which is valid for practical use for a one-sided $t$-test with a reasonably large number of degrees of freedom. Effect size is expressed by a parameter that is estimable with a certain standard error; the larger the sample size, the smaller the standard error. The following equation represents that relationship of these variables:

$$(\text{effect size/standard error}) = (z_{1-\alpha} + z_{1-\beta}) = (z_{1-\alpha} - z_{\beta})$$

where $z_{\alpha}$, $z_{1-\beta}$, and $z_{\beta}$ are the z scores from the normal distribution that were associated with the $\alpha$ and $\beta$ values. Thus, the search for a sample size that satisfied effect size = 0.30 (a small effect, according to Cohen, 1992) required a 0.12 standard error.

Power analysis gave the appropriate sample size wherein the minimum sample size that would satisfy the constraints designed to minimize Type I and Type II error within studies was discovered. To illustrate, for a study wherein the a priori effect size = 0.30, the 1- $\beta$ (power estimation) is 0.80, and $\alpha = 0.05$ (1-tailed test of significance), the sample size of groups necessary in order to achieve these values is only $n = 64$. For many types of designs, it is possible to do this simple calculation based on Cohen’s (1992) work. However, for nested designs, there are two kinds of sample sizes, and the power analysis required in nested designs is considerably more complex than Cohen’s (1992) work. In order to estimate power in nested (hierarchical) designs, it was necessary to use the software Power IN Two-level designs, also known as PINT (Bosker, Snijders, & Guldemond, 2003, version 2.1).
PINT allows for the estimation of the standard errors associated with each aspect of the multilevel equation. The information required for PINT is as follows: the number of individual-level variables with only a fixed effect, the number of individual-level variables with a random effect and a fixed effect, and group-level variables intended to explain the within-group variability. A fixed effect refers to assumptions about the independent variable and the error distribution for the variable. The results of fixed analyses generalize only to the level of the variables included in the study. However, if the researcher wants to make inferences beyond the particular values of the independent variable used in the study, a random effects model must be used. Generalizations from random effects variables are more of an inference, making the random effects model less powerful. Analyses using both fixed and random effects are called “mixed models”. This study was a random effects model because the goal was to generalize the results to the entire universe of levels of the included variables.

PINT allows for estimation of standard errors of interest at each level of \( N \) in order to minimize the error in multilevel models. Likewise, PINT allows for calculation of the design effect, which indicates how the particular design affects the standard error of each parameter (Snijders, 2005). The design effect is calculated by taking the squared standard error of the design component and dividing it by the squared standard error of the simple random sample design. If the value of the design effect is over 1, the multilevel design is less efficient than the single level design (Snijders, 2005). Since squared standard errors are inversely proportional to sample sizes, the required sample size for a multilevel design will be given by the sample size that would be required for a simple random sample design multiplied by the design effect (Snijders, 2005). That is, if the design effect is greater than 1, the sample size required for a multilevel design will be greater than the size required for a simple random sample design.
In order to use PINT, the means of the group-level variables must first be set. In order to estimate the level of the means, it was necessary to estimate the group-level means as well as to estimate the covariance of the variables. In order to establish point estimates for the means of the group-level variables, previous research using the same variables as measured by the same measures was consulted (Hogg et al., 1998). These variables were examined as random variables in order to set a higher standard for generalizability. In a study employing both group identification and cohesion, and using the same measure of identification that was used in this study, the estimated means for cohesion (M = 5.69) and group identification (M = 4.94) were entered into the software. It was then necessary to estimate the between-groups covariance matrix for the two group level variables, which prior research has found to vary around $r = 0.30$ (Hogg et al., 1998). This value was imputed into the software in order to estimate the between-groups standard error. From this input, the software outputs the standard errors for each component of the equation. It was then possible to determine the sample size at which the standard errors of the components of interest were minimized and therefore, acceptable.

The simple random sample design power analysis indicated that a standard error of 0.12 would meet the necessary constraints in order to minimize Type I and Type II error. From the output of the PINT software (see Appendix B for the results of the multilevel power analysis), it was evident that the number of groups required in order to meet the standard error of 0.12 was between 94 and 96 groups.

To illustrate, for both estimates, the number of groups had to be adjusted by the design effect. For 94 groups, the number of groups required in order to adjust for the design effect was:

$$\frac{\text{squared standard error of design}}{\text{squared standard error of simple random sample design}} = 51$$
\[
(0.12)^2/(0.12088)^2 = 1.01
\]

\[
1.01 \times 94 = 94.9 \sim 95 \text{ groups}
\]

For 96 groups, the number of groups required in order to adjust for the design effect was:

\[
\text{squared standard error of design/squared standard error of simple random sample design} =
\]

\[
(.12)^2/(0.11962)^2 = 0.993
\]

\[
0.993 \times 96 = 95.4 \sim 95 \text{ groups}
\]

Therefore, from the most stringent analysis, it was necessary to have 95 groups to meet the power level of 0.80 in this examination. Interestingly enough, this number of groups is comparable to multiplying the design effect of the same \( n \) (group level) in the power analysis derived from PINT by the simple random sample power analysis. That is, the standard error for \( n = 64 \) is 0.1465. When this value is squared and divided by 0.12, the accepted standard error for simple random sample design, the adjustment to the number of groups is 64 * 1.49, which is equal to 95.4, or roughly 95 groups. Research has indicated that the design effect is more important than the ICC because it indicates how much the standard errors are underestimated (Kish, 1965). In cluster samples, the design effect is approximately equal to:

\[
1 + (\text{average cluster size -1}) \times ICC
\]

If the design effect is smaller than 2, using single level analysis on multilevel data does not seem to lead to overly misleading results (Muthén & Satorra, 1995). In this particular study, the ICC needed to be between 0.20 and 0.30 in order to have a design effect larger than 2. The ICC (1) in this study was 0.39 for the fourteen ILTD items comprising the leadership schema congruence score.

Using \( n = 95 \) with balanced groups prevented some of the commonly cited problems that occur with the between-groups part of multilevel models. That is, the between-groups part of
multilevel models often is plagued by inadmissible estimates, which typically occurs in unbalanced groups. Unbalanced groups result when group-level sample size is small, and when the intra-cluster correlation is low (Hox & Maas, 2001). Hox and Maas (2001) demonstrated that the strongest factor in multilevel models containing unbalanced groups with small sample sizes is inadequate sample size at the group level. However, for balanced data, a full information maximum likelihood (FIML) estimation should produce unbiased and asymptotically correct standard errors, as well as chi-squares that are close to their nominal values (Hox & Maas, 2001). This analysis used FIML estimation.

**Missing Data Analysis**

Prior to conducting multilevel analyses, missing value analyses is recommended by the authors of Mplus (Muthén & Muthén, 1998) in order to have a complete data set. Missing item-level data analyses can be found in Tables 2 through 6, while missing instrument-level data analyses can be found in Table 7. In selecting a strategy for missing data, it was necessary to consider what form the missing data took because there are different procedures based on whether the missing data is instrument-level or item-level data (Downey & King, 1998; Roth & Switzer, 1999; Roth, Switzer, & Switzer, 1999).

**Missingness in Instrument-Level Data.** With respect to missing instrument-level data (i.e., responses on the entire instrument are missing), it is possible to replace the missing values for the instrument using imputation. There are different strategies to estimate missing instrument-level data. They include mean substitution, regression imputation, hot-deck imputation, and the Expectation Maximization Algorithm (EM; Hartley, 1958; Dempster, Laird, & Rubin, 1977; McLachlan & Krishnan, 1997).
Mean substitution replaces missing data with the mean score of all other subjects. This approach has been criticized for suffering from a strong downwardly-biased estimation of covariance and variance (Switzer, Roth, & Switzer, 1998). Regression substitutes missing data by using an equation defined by the relationship of two other independent variables in the same study (Roth & Switzer, 1999). This approach is favorable in that it takes advantage of existing relationships to make estimates of the missing data; however, researchers have noted the importance of not using independent variables to impute dependent variables and vice versa because this procedure leads to an overstatement of the relationship between the independent and dependent variables (Roth & Switzer, 1999). Hot-deck imputation looks for a similar case to the case with the missing data, and then steals the value (Roth & Switzer, 1999). Hot-deck uses relationships within the data to make estimates and the imputed score already has error variance attached to it because it is an actual value from the data, and not an estimated data point (Roth & Switzer, 1999).

Finally, the EM algorithm is used to find maximum likelihood estimates of parameters in probabilistic models. This algorithm alternates between an expectation step (E step) and a maximization (M step), which maximizes the expected likelihood found in the E step (Dempster, Laird, & Rubin, 1977). This method takes advantage of relationships in the data by iteratively estimating missing values (Roth & Switzer, 1999). In the first step, means and variances for variables are calculated, then using the estimates, the missing data points are calculated (Switzer & Roth, 2004). After the newly filled in data is completed, new means, variances, and covariances are calculated, then using the new parameter estimates, the expected values for this new data set are calculated. This process continues until the estimates converge with the means, variances, and covariances inherent in the original data set (Switzer & Roth, 2004). This
approach is computationally rigorous if attempted by hand, but SPSS (SPSS Inc., 2007) handles this with relative ease, which is an advantage to this method. Another advantage to this method is that previous studies (e.g., Arbuckle, 1996; Enders, 2001b, 2001c; Enders & Bandalos, 2001) have demonstrated that EM estimation is superior to ad hoc missing data techniques with respect to reducing both bias and increasing efficiency (Enders, 2003).

**Missingness in Item-Level Data.** In order to handle item-level data, one strategy is to do nothing and continue the analyses without accommodating for missing data. This is acceptable in instances where there are very few missing value because it is possible to form an item composite even with missing values on some of the items. In creating an item composite, however, it is necessary to consider how SPSS treats missing values. Listwise deletion allows SPSS to remove a case because there are some missing items, while pairwise deletion allows SPSS to save the case and retain all data that is available (Switzer & Roth, 2004). Furthermore, listwise deletion is discouraged by many researchers because missing one item in an instrument results in missing the entire instrument score, which results in eliminating the case; researchers have termed this effect “cascading” (Roth & Switzer, 1999). Likewise, listwise deletion results in root mean square errors that are usually three to four times larger than imputation techniques (Roth & Switzer, 1999).

The same concern regarding cascading exists for pairwise deletion of missing item-level data. One missing item means that the total instrument score is not calculated and all procedures using the instrument score delete the case (Roth & Switzer, 1999). Another approach to item-level missing data is to delete the entire case if there are any item-level missing values. This is a big disadvantage if the data set is small. Furthermore, this is problematic because of the probability that the cases with missing data are non-random. Thus, removing the entire case from
the analyses may result in a data set that is non-representative of the entire sample. Therefore, missing value researchers have recommended item-level substitution through imputation using the EM algorithm (e.g., Enders, 2003). In a recent Monte Carlo simulation, the two-step approach of determining the covariance matrix and mean vector using the EM algorithm and then carrying out normal estimation of coefficient alpha using the EM covariance matrix as input yielded the most accurate reliability estimates (Enders, 2003).

Therefore, missing item-level data and missing instrument-level data were addressed by using the EM algorithm. In this way, it was possible to address missing item-level data as well as to ensure that an instrument-score was calculated when missing. Furthermore, since EM has been recommended in previous research, EM was selected as the estimation and substitution strategy.

Determining Agreement in Group-Level Predictors

After data collection, within-group agreement for cohesion, identification, and leadership schema congruence was operationalized as the standard deviation within teams. The sign-reversed within-team standard deviation was used in place of the $r_{wg}$ statistic (James, Demaree, & Wolf, 1984, 1993) in this study. Within-team standard deviations were sign-reversed so that larger standard deviations across teams indicated more agreement within teams. The sign-reversed standard deviation was selected because of research suggesting theoretical and practical problems associated with $r_{wg}$ (Bliese, 2000). The predominant problem associated with $r_{wg}$ is the failure of the rectangular distribution, which is the most frequent null distribution used in calculating $r_{wg}$. The use of this distribution does not account for range restriction in responses and can result in agreement values above 1, which provide no practical interpretation value (Bliese, 2000).
The use of the sign-reversed standard deviation within teams is a recent convention in climate strength research that has been adopted in light of the problems associated with the $r_{wg}$ statistic (e.g., Schneider et al., 2002; Zohar & Luria, 2005). Because cohesion climate strength, identification climate strength, and leadership schema congruence agreement were modeled as “strength of climate” variables (i.e., the strength of agreement was used), the variables were not aggregated to form team-level means. Again, this was due to modeling the team-level variables as level of agreement, wherein the purpose of the question was to decipher whether climate strength influenced team members’ use of their ILT to evaluate their emergent leader.

Using Intraclass Correlations in Multilevel Models

Although the sign-reversed standard deviation was used to construct both of the climate strength predictors (i.e., group identification and cohesion climate strength) and the outcome (i.e., leadership schema congruence agreement), multilevel models recommend examining intraclass correlation coefficients (ICCs; McGraw & Wong, 1986; Shrout & Fleiss, 1979) when conducting multilevel analyses. The ICC (1) statistic is typically calculated in multilevel modeling to ensure that there is enough variation in the outcomes explained by the between-group variables in order to proceed with the examination in a multilevel model, and is an essential calculation prior to completing multilevel modeling. ICC (1)s for the appropriate variables are reported in Table 8.

Summary of Methods Employed in this Examination

To summarize, the participants in this study participated in a task that required extensive engagement. The participants completed questionnaires on individual differences prior to their interaction, and then completed questionnaires about their team-related perceptions during the course of team interaction. After data collection, each of the questionnaires were examined for
missingness at both the instrument- and item-level. Additionally, confirmatory factor analyses were conducted on both portions of the leadership schema congruence score, followed by polynomial regression, thereby permitting its usage as a criterion. Finally, leadership schema congruence was statistically differentiated from prototypicality, thereby assuring that leadership schema congruence could be assessed by participants without contamination. In summary, after dealing with the analytical issues resulting from data collection, the tests of study hypotheses and research questions could be addressed. The results of these tests will be discussed in the next section.
CHAPTER III

Results

Descriptive Statistics

Means, standard deviations, variances, and reliability information (where appropriate) can be found in Table 8 (individual-level analyses) and Table 9 (group-level analyses). Individual-level correlations between relevant study constructs can be found in Table 11, while group-level correlations can be found in Table 12.

Examination of Predictors

Upon examination of the individual-level correlations of the predictors (i.e., self-concept clarity, cohesion, and group identification), it was evident that cohesion and group identification were very highly correlated \( (r = 0.75) \). Therefore, it was necessary to explore creating a composite measure of these two factors. Creating this composite would decrease multicollinearity, thereby improving the accuracy of the standard error against which hypothesis testing would be conducted, as well as to decrease the complexity of the analysis. Additionally, constructing a composite would decrease the number of predictors in the model, thereby adding to the power of the analysis. In order to construct a composite of “psychological belongingness”, an EFA with principal components extraction was conducted. Results of the EFA with principal components extraction revealed that one factor exceeded eigen value > 1.0 and explained over 65% of the variance in the two scales. The resulting coefficient alpha based on this factor was high enough to justify constructing the composite \( (\alpha = 0.91) \).

Therefore, a standardized composite comprised of cohesion and group identification was created entitled “psychological belongingness.” The items composing each scale were
standardized before taking the mean because the cohesion and group identification
questionnaires were not measured on the same scale (i.e., group identification is a 9-point scale,
while cohesion is a 7-point scale). Standardization removed the issue of differing scales. All
subsequent model testing will be done using this composite variable. For the modifications to the
structural model of the study, see Figure 8.

Results of the Tests of the Study Hypotheses

The hypotheses proposed in this study were tested using Mplus. The results of the full
model of the hypotheses and the research questions of the study can be found in Table 13. Prior
to running the multilevel model, team task performance was rescaled (i.e., divided by a constant)
in order to constrain the variance to < 10. This was done in order to readjust the starting values
associated with the model so that the parameter could be properly estimated and the model could
converge (L. K. Muthén, personal communication to J. T. Oliver, May 6, 2008). Likewise, it is
important to note that the criterion, leadership schema congruence, is a difference score. Larger
values of the score indicate less congruence. However, in the interest of clarity, the results will
be presented in the same format as the hypotheses. That is, a smaller difference in the ILT-ILTR
prototype scale (ILTD score) will be presented as higher leadership schema congruence.

Therefore, it is important to keep in mind that while the tables of results may indicate a
directionality on the relationships between predictors of the leadership schema congruence
criterion that is different than what is written in the text, the results presented within the text are
in the direction in which they were proposed in the study hypotheses.

Hypothesis 1 proposed that the higher an individual’s self-concept clarity, the higher the
leadership schema congruence for the emergent leader. The results of the multilevel analysis
indicated that self-concept clarity was positively related to leadership schema congruence (Z =
1.79, \( p < 0.05 \)). The higher an individual’s self-concept clarity, the higher the leadership schema congruence for the emergent leader. Therefore, Hypothesis 1 was supported.

In contrast, the multilevel analysis failed to support the proposed relationship between psychological belongingness and leadership schema congruence in the directions proposed in Hypotheses 2 and 3. That is, Hypothesis 2 and 3 proposed that cohesion and group identification would both negatively relate to leadership schema congruence. These hypotheses were tested in combination because cohesion and group identification were combined into a composite entitled psychological belongingness. In contrast to the proposed hypotheses, this study revealed that psychological belongingness was positively related to leadership schema congruence. That is, the greater the psychological belongingness, the smaller the difference between an individual’s ILT and their rating of their team’s leader on the ILTR scale. Therefore, neither Hypothesis 2 nor 3 was supported; while the results were significant, they were in the opposite direction than hypothesized (\( Z = 2.68, \ p < 0.01 \)). Although a relationship between the study predictors was not hypothesized, self-concept clarity and psychological belongingness were not related (\( Z = -0.95, \ p = \text{n.s.} \)).

Cohesion and identification climate strength were also combined in the form of belongingness climate strength. The results of this study support the influence of belongingness climate strength on the leadership schema congruence agreement (\( Z = 2.17, \ p < 0.05 \)). That is, a stronger climate of cohesion and identification increased the likelihood that the teams agreed on their leadership schema congruence for the emergent leader. Therefore, Hypotheses 4 and 5, as tested through the composite of belongingness climate strength, were supported.

Research questions 1 and 2 were also tested using multilevel analysis, albeit both of these questions involved cross-level effects within the model. The belongingness climate strength
composite was used in testing Questions 1 and 2. The results indicated that belongingness climate strength was unrelated to leadership schema congruence for individuals \( (Z = 0.79, p = \text{n.s.}, \text{observed power} = 1.00) \). Therefore, because no significant relationship was found, Questions 1 and 2 were unanswerable.

The results of the test of Question 3, whether leadership schema congruence at the individual level influenced team task performance, was not significant \( (Z = 0.13, p = \text{n.s.}, \text{observed power} = 0.97) \), and therefore, unanswerable. Finally, Question 4 was also tested in the multilevel analysis. The results of the analysis indicated that there was no relationship between leadership schema congruence agreement and team task performance \( (Z = 0.34, p = \text{n.s.}, \text{observed power} = 0.10) \). Therefore, because no significant relationship was found, Question 4 was unanswerable.

**Summary of the Results of the Hypotheses Tests and Research Questions**

The study hypotheses and the research questions were tested in a multilevel model. The results of the hypothesis tests indicated that self-concept clarity was positively related to leadership schema congruence in the way that the SITL would indicate (Hypothesis 1). In contrast, the relationship of psychological belongingness was opposite what was proposed by the SITL (Hypotheses 2 & 3). Additionally, belongingness climate strength was positively related to leadership schema congruence agreement (Hypotheses 4 & 5). However, belongingness climate strength was unrelated to individual leadership schema congruence (Questions 1 & 2). Finally, leadership schema congruence was unrelated to team task performance (Question 3), and leadership schema congruence agreement was unrelated to team task performance (Question 4). In light of the findings resulting from the tests of the study hypotheses and research questions, post hoc analyses were conducted. These analyses are described in the next section.
Post Hoc Analyses

Climate Strength and Team Task Performance

Interestingly, the multilevel model test of the study hypotheses revealed that the climate strength of belongingness was also significantly related to team task performance ($Z = 2.67$, $p < 0.01$). However, to clarify, no a priori study hypotheses addressed belongingness climate strength and team task performance. Thus, it appeared that while shared perceptions of the leader did not impact team task performance, shared perceptions of the belongingness climate positively influenced team task performance.

Climate Level Analyses

Although the multilevel analysis indicated a non-significant relationship between belongingness climate strength and individual leadership schema congruence, an additional question was whether belongingness climate level had any impact on the individual leadership schema congruence. That is, does the climate level for belongingness in the group impact the individual leadership schema congruence for the emergent leader? This analysis was run in Mplus using the same design as the study hypotheses and the research questions. The full model was run in Mplus and the result of this cross-level analysis can be found in Table 14. The results indicated that the climate level of belongingness within the group was a significant predictor of leadership schema congruence at the individual level. That is, the higher the belongingness climate level in the group, the greater the leadership schema congruence at the individual level. This result is contrary to what the SITL postulates with respect to both the relationship of belongingness and leadership schema congruence, but also contradicts the level of analysis at which the SITL was proposed.
The relationship of belongingness climate level was much stronger than the relationship of belongingness climate strength with individual leadership schema congruence (i.e., $Z = -2.91$ and $Z = -0.79$, respectively). It should be noted that climate strength and climate level were correlated at $r = 0.66$. Therefore, while climate strength and climate level were moderately related (Cohen, 1992), it appears that the climate strength and climate level are non-redundant within teams due to their differing relationship with the criterion of leadership schema congruence. The mean level and the distribution of climate within teams of belongingness provide different influences on individual’s leadership schema congruence for the emergent leader.

**Leader Prototypicality**

Although this study was an attempt to examine the antecedents included in the SITL and their impact on leadership schema congruence, it is important to examine prototypicality of the emergent leader in order to determine the validity of the SITL in this setting. Therefore, a post hoc analysis was done in order to examine how psychological belongingness related to both the team prototype agreement and the perceived prototypicality of the emergent leader. The post hoc analyses were done in order to attempt to account for the control variable (leader prototypicality) as well as to further explain the results of the findings for the a priori hypotheses.

Despite the lack of relationship between prototypicality and leadership schema congruence, leadership schema congruence was used in the first step of the hierarchical regression of prototypicality on psychological belongingness. Before conducting the hierarchical regression, it was necessary to replace missing values in the prototypicality rating, as was done with the variables included in the study hypotheses. The results of whether psychological belongingness at both the individual and team level (i.e., belongingness climate level) was
related to individual- and team-level prototypicality ratings can be found in Table 15. The results of the analyses at both levels indicate that the relationship of psychological belongingness with leader prototypicality was not significant ($\beta = 0.08$ and $\beta = 0.04$, $p = \text{n.s.}$, respectively).

**Team Prototype Agreement**

In this study, the relationship between psychological belongingness and team prototype agreement was rather complicated. Because psychological belongingness was a standardized composite, the components of the composite were examined in order to provide a clearer explanation of the difficulty in addressing the relationship. The components of psychological belongingness both demonstrated negatively skewed means [cohesion skewness ($N = 772$): -1.49; identification skewness ($N = 772$): -1.45]. Furthermore, the mean for team prototype agreement across groups was only 0.17 (out of a possible proportion of 1.0), and only 4 groups out of 159 had an agreement proportion above 0.50, resulting in a skewness of 2.67. To increase the complexity of this relationship, aggregation tends to decrease variance (team prototype agreement variance was only 0.02). Therefore, the correlational analysis between team prototype agreement and psychological belongingness resulted in a non-significant finding ($r = 0.12$, $p = \text{n.s.}$). Thus, from this study, it may be said that belongingness is unrelated to team prototype agreement, but this finding should be understood in light of the limits of the distributions of both variables in the study.

In order to fully discount the impact of the weak team prototype agreement within teams on leader prototypicality, the hierarchical regressions were again run on the relationship between psychological belongingness and leader prototypicality, and team prototype agreement was used as a moderator. Specifically, the first step again involved controlling for the relationship of leadership schema congruence with leader prototypicality; the second step included
psychological belongingness only; and the last step included the interaction of team prototype agreement with psychological belongingness. The analyses were run at both the individual and group level. It was possible to use team prototype as a moderator in the individual-level analysis without accounting for the cross-level effect because of the very small variance on team prototype agreement (variance = 0.02) without committing a level of analysis error. The results of whether the relationship of psychological belongingness at both the individual and group level, and individual- and team-level leader prototypicality, was moderated by team prototype agreement can be found in Table 16. The results indicate that the relationship between psychological belongingness and prototypicality was not moderated by team prototype agreement at either the individual or the team level.

Summary of Findings from Post Hoc Analyses

The post hoc analyses revealed a number of findings that indicated a lack of support for the SITL as it is conceptualized. For instance, support was found for a positive relationship between belongingness climate level and leadership schema congruence. The relationship of belongingness climate level and leadership schema congruence was contrary to what the SITL outlines at the individual level; the higher the climate level of belongingness, the higher the leadership schema congruence for individuals. Likewise, the SITL does not account for any influence of climate level variables despite its focus on group-generated perceptions. Therefore, the finding of a positive relationship between belongingness climate level and leadership schema congruence at the individual level is problematic for the level of analysis at which the SITL was specified.

Additionally, self-concept clarity and psychological belongingness were unrelated, and psychological belongingness was unrelated to leader prototypicality. The lack of relationship
between psychological belongingness and prototypicality, despite controlling for any possible redundancy with leadership schema congruence and a potential interaction with team prototype agreement, is especially problematic for the SITL.

In summary, in combination with the results of the tests of the study hypotheses and the research questions, the results of the post hoc analyses cast additional doubt on the validity of the SITL in the environment of this study.
CHAPTER IV

Discussion and Conclusion

The primary goal of this study was to use the social identity theory of leadership (SITL) as a framework to examine leadership schema congruence in an emergent leadership context. The SITL framework made it possible to account for whether individual differences, group-related perceptions, and climate strength impacted leader-related cognitions influencing leadership emergence. A secondary purpose of this study was to examine whether leadership schema congruence and leadership schema congruence agreement impacted team task performance. Using a multilevel model inclusive of individual relationships, group-level relationships, and cross-level effects, the hypotheses and research questions posited in this study were examined. A number of the proposed hypotheses were supported. Furthermore, the results provided support for examining the role of team level variables in leadership schema congruence. The results, however, generally did not support the social identity theory of leadership (SITL).

The results of the hypothesis tests contribute to the SITL, implicit leadership theory (ILT), and leadership emergence literature. The hypotheses were generally based on the theoretical tenets of the SITL, and the environment of the study was one that should have elicited the same general data pattern evident in past studies of the SITL. The fact that identification and cohesion in the form of psychological belongingness were not related to leadership schema congruence for individuals in the manner proposed by the SITL points to problems in both the theoretical and empirical tests of the SITL.
The results of the tests of the study hypotheses and the research questions will be discussed in the following section. Next, alternative explanations for results that did not support the proposed hypotheses will be generated, followed by implications related to the results of this study. Finally, limitations of the study and some future directions for research will be addressed.

Antecedents of Leadership Schema Congruence

The tests of the hypotheses and research questions were altered based on the initial results of the relationship of group identification and cohesion, which were formed into a composite called “psychological belongingness.” This composite was used to replace cohesion and group identification, and the within-team agreement on this variable became “belongingness climate strength.” Belongingness climate strength was then used in both the team-level analysis of the relationship of climate strength with leadership schema congruence agreement, and the cross-level analysis of the relationship of climate strength with individual leadership schema congruence.

The results of this study indicated that individual differences do play a role in leadership schema congruence, as was hypothesized. Self-concept clarity was positively related to leadership schema congruence, indicating that individuals who are more consistent in their behavior, attitudes, and beliefs were more likely to recognize leader-related traits in the emergent leader. This result supported Hypothesis 1, and supported the propositions posited by the SITL.

Although there was no hypothesis generated to address the relationship of group identification and cohesion, these variables were so highly related that it made neither theoretical nor empirical sense to address them separately. The lack of true empirical distinction between the two is troublesome because group identification is supposed to be the driver for cohesion in high intergroup salience conditions. The resulting test of the relationship of the composite,
psychological belongingness, with leadership schema congruence indicated that individuals who experienced higher levels of belongingness within their teams were more likely to rate the emergent leader as schema congruent. This finding did not support Hypotheses 2 and 3. Likewise, this finding does not support the SITL’s formulation of the relationship of cohesion and group identification with leadership schema congruence.

The test of the relationship of belongingness climate strength with leadership schema congruence agreement was also positive. This result supported Hypothesis 5. This result indicates that in stronger climates of belongingness, teams were more likely to view their leader in a similar manner. This finding is unique to this study, but provides support for the influence of shared perceptions of the group climate on the sharedness of perceptions of emergent leader.

Although most of the findings resulting from the tests of the study hypotheses are not supportive of the SITL, and alternative explanations exist for those findings, one of the results is supportive of the SITL. The positive relationship of self-concept clarity and leadership schema congruence uncovered in the test of Hypothesis 1 is consistent with both the SITL and the motivational mechanisms of transformational leadership (e.g., Shamir, House, & Arthur, 1993; Bono & Judge, 2003). According to the SITL, individuals with higher self-concept clarity should be attracted to the most schema-congruent member of their group because they do not derive their identity from the group experience (i.e., higher self-concept clarity individuals do not depersonalize leadership endorsement). In this study, the examination of the relationship between self-concept clarity and leadership schema congruence indicated that individuals with higher self-concept clarity demonstrated higher schema congruence for the emergent leader, thus providing support for the SITL. This finding is novel to this study because self-concept clarity is not specifically included nor measured in any previous study addressing the SITL.
The relationship of self-concept clarity with leadership schema congruence not only relates to the SITL literature, but also is related to the transformational leadership literature. Although some research associated with the theory of transformational leadership (Burns, 1978) indicate that higher self-concept clarity individuals should rely less on their ILT (Howell & Shamir, 2005), other literature in transformational leadership may help explain findings with respect to self-concept clarity and leadership schema congruence. In particular, the literature on the motivational mechanisms resulting from transformational leadership are most relevant. Some theorists in transformational leadership have proposed that one way in which transformational leaders are able to increase intrinsic motivation, effort, and engagement in their employees is by making participation in a collective effort meaningful to the follower (Shamir et al., 1993). Shamir and associates (1993) proposed that by exhibiting behaviors that increase the self worth of followers through a connection to collective success, leaders increase the salience of the collective identity in their followers’ self-concept (Shamir et al., 1993). By enacting these behaviors, followers will be more likely to behave consistently with the leader’s values, such as putting the interests of the collective over their own (Wang, Law, Hackett, Wang, & Chen, 2005). This theory is referred to as the self-concept theory of transformational leadership (Shamir et al., 1993).

A competing theory on the motivational mechanisms of transformational leadership is the self-concordance at work theory (Bono & Judge, 2003). This theory proposes that the self is not transcended in followers of a transformational leader, but rather, that the leader appeals to how group tasks allow individual to express their authentic interests and values (Sheldon & Elliot, 1999). Shamir and colleagues’ work suggests that the heightened motivation resulting from transformational leadership is linked with sacrifice of the self. However, Bono and Judge’s
(2003) self-concordance theory suggests that when followers internalize work values, they do not feel that they are sacrificing themselves; rather, their actions on behalf of the collective result from pursuing personally held, internalized values (Bono & Judge, 2003). The self is not transcended; rather, the self and the group are both pursued because the values of the work group have been internalized.

The self-concept based theory has received some tacit support in the theoretical literature of transformational leadership, but only limited empirical support (Shamir, Zakay, Breinin, & Popper, 1998). Likewise, empirical support for the self-concordance theory of transformational leadership is very limited (Bono & Judge, 2003). Despite limited empirical support for both of these competing motivational mechanisms, these theories provide a complementary explanatory mechanism for the relationship of self-concept clarity and leadership schema congruence in this study. That is, research on the motivational mechanisms of transformational leadership has indicated that the goal of employee engagement enacted through transformational leadership behaviors can occur through either self-transcendence (i.e., moving beyond the self in order to pursue the collective good) or self-concordance (i.e., seeing the self in collective work products). In this analysis, self-concept was positively related to leadership schema congruence. Furthermore, psychological belongingness was positively related to leadership schema congruence and belongingness climate strength was related to leadership schema congruence agreement. The positive relationship of self-concept clarity with leadership schema congruence occurred in the presence of these other positive relationships.

To extend this illustration, Shamir and colleagues’ (1993) self-concept based theory focused on the importance of internalization of the group’s values and goal through appealing to the group membership in individuals’ self-identities. Furthermore, although self-concept theory
suggests that individuals with high self-concept clarity would require more of a personal appeal to their values and attributes to endorse a leader, this perspective fails to account for the “values” that may exist in an individual’s ILT. That is, the correspondence to one’s ILT (i.e., leadership schema congruence) may serve as proxy for leader-related values and attributes if the ILT is internalized and acted upon, which would occur when a leadership schema congruent leader is endorsed within one’s team. In the case of correspondence, one’s ILT is not an abstract schematic that is depersonalized (to steal Hogg’s terminology). In contrast, recognition of one’s own ILT in another’s behavior can allow for expression of self in the endorsement of another.

Therefore, both of motivational mechanisms that transformational leadership proposes as important for motivation (i.e., self-concept theory and self-concordance theory) may have occurred in leader endorsement in this study. Some individuals with lower self-concept clarity may have moved “beyond the self” in line with the self-concept theory and adopted the leader that the group has agreed on solely on the strong climate of belongingness in the group. Alternately, some other individuals may have “seen” their self-definition in their endorsement because of higher self-concept clarity alone in line with the self-concordance theory of motivation.

The relationship of self-concept clarity with leadership schema congruence in this study points to the importance of accounting for individual differences when examining leadership schema congruence. Leadership is a multileveled exercise (cf. Yammarino & Dansereau, 2008), and leader emergence involves a multiphased endorsement process (e.g., Hollander, 1958, 1961, 1964; Stein et al., 1979). The SITL ignores the impact of individual differences in leadership endorsement. This study highlights that failure by uncovering positive results for self-concept clarity and leadership schema congruence that make theoretical sense.
In contrast to the mild support for the SITL indicated in the results of Hypothesis 1, the results of the test of the relationship of belongingness and leadership schema congruence in Hypotheses 2 and 3 did not support the SITL. That is, higher levels of cohesion and identification did not remove the locus of leadership emergence from an individual’s ILT. The individual’s schema for leadership was not sacrificed to the group solely because of higher levels of cohesion and a salient out-group. The SITL cannot provide an explanatory mechanism for the results of these hypotheses. However, this relationship can be explained by the empirical work of Gaertner and colleagues on motivational primacy and intragroup regard (e.g., Gaertner, Iuzzini, Witt, & Orina, 2006; Gaertner, Sedikides, & Graetz, 1999; Gaertner, Sedikides, Luke, & Iuzzini, 2007; Gaertner, Sedikides, Luke, & Iuzzini, 2008; Gaertner, Sedikides, Vevea, & Iuzzini, 2002).

The motivational primacy literature is focused on determining which definition of the self is the primary motivator of individual behavior, and discovering what conditions (if any) can alter the hierarchy of self-definition within individuals. There are three components to the self: the *individual self*, the *collective self*, and the *relational self*. Each of the self-definitions is an important component of the self-concept (Gaertner et al., 2002). The *individual self* consists of attributes that make an individual unique from their group members (Gaertner et al., 2002). The *collective self* is comprised of attributes that are shared with fellow in-group members (Gaertner et al., 2002). Finally, the *relational self* is forged from close, personal bonds with others (Gaertner et al., 2007).

Based on competing findings in the literature, a few studies have attempted to pit the forms of self-definition against each other in order to determine the order of the motivational hierarchy (e.g., Gaertner et al., 1999; Gaertner et all, 2008). Gaertner and colleagues (1999) used four different investigations to examine the hierarchy of the self-concept, and pitted the
individual self versus the collective self, as well as tested the potential for contextual primacy. The contextual primacy argument proposes that certain conditions can change the primacy of the different types of self-definition. The contextual primacy supports self-definition expression in the same way as proposed by the SITL; that in circumstances of high group identification and cohesion, and in a condition of high intergroup salience, the individual self would be of secondary importance, and leadership endorsement would be driven by the collective self.

Four investigations of motivational primacy revealed the primacy of the individual self over the collective self (Gaertner et al., 1999). Support for this finding resulted from the multiple investigations. In comparison to the collective self, individuals whose individual self was threatened, (a) considered the threat more severe, (b) experienced a more negative mood, (c) reported more anger, and (d) derogated to a greater extent the source of threat, and (d) participants generated more aspects of the individual self than the collective self (Gaertner et al., 1999). The primacy of the individual self occurred even when confounding variables (i.e., accessibility of the selves, group identification, individualism and collectivism, and importance of threat domain) were controlled for. A meta-analytic extension of this work confirmed the finding of the primacy of the individual self over the collective self (Gaertner et al., 2002), as has additional work in this area. While the results for the primacy of the individual self over the relational self have been somewhat mixed (Gaertner et al., 2007), there is little remaining empirical dispute that the individual self is motivationally elevated above the collective self.

The relationship of psychological belongingness with leadership schema congruence found in this study support the motivational primacy argument. That is, if the contextual primacy argument were true (i.e., in-group salience, higher levels of identification and group cohesion, all of which were present in this study), then the results of this study lead directly to questions about
the ubiquity of the relationship of group-related psychological belongingness with leadership schema congruence as proposed by the SITL. In contrast, it appears that high psychological belongingness enforced the primacy of self-related cognitions. That is, higher psychological belongingness increased reliance on one’s ILT. Under conditions where the individual self, as represented by the ILT, should be secondary (i.e., high psychological belongingness within the group), increased reliance on the ILT occurred.

Additional concerns related to the SITL result from the findings on the relationship of group identification and cohesion in the form of psychological belongingness and leadership schema congruence. One of the central arguments of the social identity theory, from which the SITL was derived, is that group cohesion is the result of group identification engendering group-related affect in the face of intergroup comparisons. That is, the social identity theory requires an out-group in order for group identification and cohesion to result. The failure of psychological belongingness to demonstrate the results that the SITL would predict can also be understood in terms of an argument against a central tenet of social identity theory; an in-group does not require an out-group in order for group-related affect to develop (Gaertner et al., 2006). Gaertner and colleagues’ (2006) work indicated that cohesion can develop from interpersonal attraction within the in-group (intragroup regard) regardless of the presence of an out-group. There is no reason to suggest that the higher levels of identification and cohesion resulting from the presence of an out-group are powerful enough to change the locus of leadership endorsement. The work of Gaertner and colleagues (2006) on the genesis of intragroup regard casts doubt on the SITL’s claim that identification and cohesion in the face of an out-group are powerful enough to alter the basis for endorsement of a leader for individuals.
The results of the test of Hypotheses 4 and 5 indicated that higher levels of belongingness climate strength within the group operated in such a way as to increase reliance for team members on their ILTs. The SITL cannot offer a satisfactory explanation for these findings because the SITL does not address shared perceptions of the leader. However, the motivational primacy concept, especially the expression of the relational self, can also provide an explanatory mechanism for the relationship of belongingness agreement and leadership schema congruence agreement. Stronger climates for belongingness require a shared understanding of the climate. Sharedness of climate is a by-product of close, personal relationships because interaction and similarity in affective responses to the team climate are required in order for the climate to be shared, and thus, strong.

Although leadership schema congruence is a within-person perception, information about the leader is transmitted within the team though two routes (Hall & Lord, 1995). Information about the leader may be acquired indirectly through communications shared by the members of a team, or through indirect communications and information processing within the group. Both of these routes involve close relations with others. The relationship of belongingness climate strength with leadership schema congruence agreement is unique to this study, but is congruent with the relationship of self-concept clarity and psychological belongingness with leadership schema congruence at the individual level. The expression of the self (i.e., leadership schema congruence for the emergent leader) was through close, personal bonds with groups (belongingness climate strength), pointing to the relational self-definition as an additional motivational mechanism of leader endorsement in teams.

In summary, the multilevel model in this study allowed a number of unique hypothesized relationships to be examined with respect to leadership schema congruence. Although a number
of significant relationships that were uncovered did not support the SITL, the findings were supported in part by literature on the motivational mechanisms related to transformational leadership and the self-definitions expressed within groups. The implications of these findings will be discussed in the implications section of this study.

Research Questions Related to Leadership Schema Congruence

The research questions included in this study examined novel relationships that involved both cross-level effects and previously unexamined relationships between leadership schema congruence and team task performance. The cross-level analysis of the influence of belongingness climate strength on individual leadership schema congruence did not result in a significant finding. Again, although the SITL does not provide an explanatory mechanism for this result, these results also point to the motivational primacy concept in combination with the post hoc finding of the significant relationship of belongingness climate level with leadership schema congruence. Although climate strength did not increase individual leadership schema congruence, the interplay between climate level and leadership schema congruence indicates support for the effects of the relational self as well as the individual self as they are expressed in within-group relationships.

In combination with the group level analyses, the impact of climate level on individual-level leadership schema congruence provides some empirical dispute to tests of the SITL at only one level. These results support the need to include not only group-level relationships in the theoretical composition and empirical investigations of the SITL, but also to account for the influence of cross-level influences in both the theory and in empirical investigations.

Similar to the cross-level relationship of climate strength and leadership schema congruence, the cross-level relationship of leadership schema congruence with team task
performance was not significant. Likewise, no relationship was found between leadership schema congruence agreement and team task performance. The lack of findings in this study with respect to team task performance are not entirely surprising. The distribution of task performance in this study was kurtotic and highly skewed, both of which impacted the variance of the variable. In fact, the variance of team task performance had to be rescaled in this study in order for the multilevel models to converge. Distributional characteristics such as these can impact the significance level used in statistical indicators of relationship, such as Pearson correlations and regression-based beta coefficients. Therefore, it appears that the lack of significant findings in this study related to team task performance are due to statistical issues related to the distribution of team task performance in the sample. Nevertheless, despite the lack of significant findings, the tests of the relationship of leadership schema congruence and leadership schema congruence agreement with task performance were unique to this study.

**Contributions to the Literature**

*Contributions to the Emergent Leadership Literature*

As outlined in the introduction, the earliest theories of emergent leadership by Hollander (1958, 1961, 1964) and Stein and colleagues (Stein et al., 1979) addressed how group factors influence how leaders emerge. Although these early theoretical works have rarely been addressed in empirical studies of emergent leadership, a few notable studies have attempted to address multiple contributing factors to emergent leadership (e.g., Livi et al., 2008). This study adds to the empirical literature in leadership emergence by addressing how group-related factors and one’s own self-concept play a part in the endorsement of emergent leaders. These findings are important because they bring the attribution of leadership outside of leader behavior only. Leader emergence cannot occur simply through passive observation of the leader. Endorsement
is required in order for the leader to enact influence and exercise power. Because leadership emergence within groups requires more than just a leader, it is important to understand how other contributing factors to within-group behavior influence emergence. This study adds to the literature in emergent leadership by examining how an individual difference (self-concept clarity) and group-related perceptions (psychological belongingness) at both the individual and team level affect leadership emergence. In including variables taken from a social psychology framework of leadership, these results draw attention to different perspectives for the future study of leadership emergence in industrial-organizational psychology.

Contributions to the Implicit Leadership Theory Literature

The results demonstrated that group perceptions can actually reinforce the selection of an ILT-congruent emergent leader. These results have implications for the ILT literature. That is, this study adds to the renewed interest in ILT, and produced unique findings in that group perceptions and climate variables were related to both individual leadership schema congruence and leadership schema congruence agreement within teams. Although this study did not reveal a significant effect for leadership schema congruence on team task performance, it did provide some insight into the antecedents of leadership schema congruence. Other research has discovered the importance of leadership schema congruence for other positive, more subjective, organizational outcomes (e.g., Epitropaki & Martin, 2005). Therefore, future research should examine other potential antecedents, especially in the case of dyadic leadership relationships, in order to encourage the many positive outcomes that may result from leadership schema congruence for one’s leader.
Contributions to the Social Identity Theory of Leadership Literature

The results of this study contribute to the SITL literature by casting doubt on some of the theoretical propositions of the SITL. That is, the theoretical mechanism by which intragroup cohesion develops and creates the conditions for leader prototypicality in the SITL is based on depersonalization. Depersonalization presumes a shifting of the locus of endorsement of leadership from the self to the group. This is clearly not the case in this study, despite the high levels of psychological belongingness reported by group members, because a positive relationship between psychological belongingness and leadership schema congruence was present, and the relationship between psychological belongingness and prototypicality was not found. Clearly, in this case, the participants did not transcend themselves, but rather, relied more heavily on their own ILT in endorsing the emergent leader. Additional research in SITL should address some of the shortfalls that this study identified. These shortfalls include ensuring shared group prototype prior to measuring group prototypicality, modeling the impact of group-level variables in light of the proposed group-relatedness of the theory, and addressing the importance of individual differences in examining leader prototypicality and leadership schema congruence.

Practical Applications Related to the Findings of this Study

These results have implications for managers and leaders. In this study, the more attached and identified individuals were with their team, the more likely they were to report that the emergent leader demonstrated traits that they felt were characteristic of leaders. Furthermore, strong climates of cohesion and identification increased the likelihood that teams would agree on their perceptions of their leader. By encouraging positive affective feelings towards the group in individuals, it may be possible to foster a high climate level of belongingness, which was related to team task performance. Therefore, managers and leaders should focus on helping
organizational leaders increase feelings of attachment and identification in all members of their work groups. Attachment and identification to the group increased the likelihood of teams selecting a leader who matched the traits that team members deemed characteristic of leaders and the likelihood of the team agreeing on what this leader is like. In a related manner, high team feelings of attachment and identification to the group positively influenced task performance, making this construct even more desirable in work teams.

These results also indicate that how individuals feel about their behavioral consistency and self-knowledge contributes to why they endorse a leader. Likewise, the results of this study point to the importance of developing belongingness feelings within teams. Endorsing a leader can activate different expression of the self, and managers and leaders would be wise to include actions directed at increasing group belongingness in leader development programs because of the positive effects of belongingness on leadership schema congruence and other team performance indicators.

**Limitations**

This study is not without flaws. For example, measuring group identification and cohesion at the same time may have increased the likelihood of finding the high correlation between the two variables. That is, participants may not have been able to differentiate the two variables based on presenting the two questionnaires in the same data collection period. However, it should be noted that previous SITL studies have measured group identification and cohesion using the same instruments during the same data collection (e.g., Fielding & Hogg, 1997; Hogg & Hains, 1996; Hogg et al., 1998). Therefore, the strong relationship found between group identification and cohesion appears to be novel to this study.
Another potential flaw is the time between the initial measurement of team prototype and the subsequent assessment of the correspondence between individual’s ratings of the prototypicality of their respective team members. Because there was a four-week gap between when team prototype was measured and when correspondence to team prototype was measured, team prototype could have changed during the lag in measurement. However, holding the lag time relatively constant for the measurement of both leadership schema congruence and leader prototypicality was a desired outcome to ensure that both constructs were assessed without contamination. Therefore, measuring team prototype and leader prototypicality at separate times outweighed any change in prototype between the measurement periods. Additional research should focus on improving the measurement of team prototype over time in order to determine what factors may alter it, and how team prototypes are influenced by differing team context circumstances (e.g., periods of high intragroup conflict).

Furthermore, the non-significant findings with respect to the relationship of leadership schema congruence and leadership schema congruence agreement with team task performance appeared to be the result of the distribution of team task performance in this sample. Despite constraining the variance of team task performance, it was not possible to determine how leadership schema congruence influenced team task performance. Therefore, additional indicators of team task performance should be examined to determine how leadership schema congruence affects important positive and negative organizational outcomes.

Finally, the lack of relationships between psychological belongingness and team prototype agreement and psychological belongingness and leader prototypicality was difficult to assess because of statistical issues related to the distribution of these variables within this sample. Despite these issues, it is important to consider these distributional problems in light of
the advances made in measuring “team prototype” prior to determining leader prototypicality made in this study.

**Implications and Future Research**

*General Implications*

Implications of this study primarily relate to the locus of leader endorsement within groups. The motivational primacy argument supports the relationship of self-concept clarity and leadership schema congruence. That is, although self-concept clarity was less strongly related to leadership schema congruence than psychological belongingness, leadership emergence has been proposed to function as a within-individual, dyadic, and within-group phenomena (e.g., Livi et al., 2008; Mumford, Antes, Caughron, & Friedrich, 2008). Leadership endorsement involves consideration of the multiple relationships existing with the team. Therefore, leadership endorsement has the potential to incorporate many expressions of the self, even beyond the individual self proposed by self-concept theory (Shamir et al., 1993) or self-concordance theory (Bono & Judge, 2003).

Additionally, the post hoc analysis of belongingness and team performance has implications for climate strength research. In this study, belongingness climate strength was positively related to team task performance. Previous research has found that different types of climate level relate to team performance indicators (leadership climate: Chen et al., 2007; procedural justice climate: Colquitt, Noe, & Jackson, 2002; safety climate: Zohar & Luria, 2005), and that the effect of climate level on team task performance is moderated by climate strength (Colquitt et al., 2002; Lindell & Brandt, 2000). Climate strength on its own has been found to relate to customer service quality (Schneider et al., 2002). The finding that belongingness climate strength was positively related to team task performance in this study adds
to the body of research supporting the importance of climate strength to organizational outcomes. In this case, it appeared that a shared understanding of the climate of belongingness increased team task performance.

Implications for Social Identity Theory of Leadership Research

Post hoc results on the relationship of self-concept clarity and prototypicality relate to the validity of the theoretical propositions of the SITL. One of the assumptions of the SITL is that self-concept clarity should influence prototypicality. This is because self-concept clarity has been theorized to be a driver for group identification and cohesion, and the resulting tendency to endorse a more prototypical leader within highly salient in-groups. Self-concept clarity was unrelated to leader prototypicality, as well as to psychological belongingness, in this study. Self-concept clarity was not a driver for endorsing a prototypical leader as theorized in the SITL in this study. The failure of self-concept clarity to demonstrate a relationship with leader prototypicality points to a potential problem in one of the central theoretical arguments of the SITL; an individual’s ILT should be transcended in circumstances of high group identification and cohesion, and the leadership endorsement process should occur through depersonalization. However, according to these results, the ILT was not transcended in the face of higher psychological belongingness. In contrast, individuals with higher self-concept clarity relied more extensively on the ILT.

Furthermore, the fact that identification and cohesion in the form of psychological belongingness were not related to leadership schema congruence for individuals in the manner proposed by the SITL has implications for the SITL. In circumstances of high intergroup salience, group identification, and group cohesion, prototypicality was not the basis for emergent leadership as the SITL proposed. The lack of validity of the SITL in this study, which included
highly cohesive and identified individuals, points to serious problems with the validity of the SITL.

Adding to the problems of the SITL, post hoc analyses indicated no relationship between psychological belongingness and prototypicality agreement. Although team prototypicality agreement has never been measured in any prior study, the SITL proposes that the intergroup context is essential. Thus, the soul of the argument for the increasing reliance on prototypicality of the leader lies, in part, in how well the leader represents the team prototype. In previous studies of the SITL, the only measure of team prototypicality was questions asking whether the leader is “prototypical”. This begs the questions: does team prototypicality exist if the team prototype is never measured, and no agreement index is ever presented? From the perspective of the findings of this study, the answer to both questions is “no”. Therefore, although this study did not confirm the SITL’s perspective on leader prototypicality, it did reveal a fundamental flaw in the measurement of prototypicality in the primary studies supporting the SITL; the failure to determine what the team prototype “is” prior measuring emergent leader prototypicality.

In combination, these issues do not bode well for the generalization of the SITL outside the laboratory conditions, wherein perceptions of prototypicality and leadership schema congruence of the leader are not easily manipulated. The findings resulting from this study, which included the conditions necessary for depersonalization, do not support the generalizability of the SITL to field studies of leader emergence.

Future Research

There are additional areas of research stemming from the methods and results of this study. Additional research should investigate the multilevel impact of the interaction of climate level and climate strength as they relate to leadership schema congruence. Furthermore, other
Multilevel models can address the differing sources of motivation that result from leadership at different levels, as well as the self-definition evoked in emergent leadership. Future research should attempt to tease apart how these motivational mechanisms are expressed and under what circumstances one or both motivational mechanisms for self-expression are present.

Additional information regarding the self-definition invoked in leadership can be gathered by using social relations modeling (SRM: Kenny, 1994; Kenny & La Voie, 1984). This study included a round robin structure, wherein each person reviewed all other members, for ranking leadership and rating the correspondence of the target of their rating to the rater’s ILT. There are three effects in social relations models: actor effects, partner effects, and relationship effects. For instance, the endorsement of a leader may be the result of a perceiver effect, wherein the differences in ratings of leadership are in how much leadership the rater perceived. Alternatively, the endorsement may be the result of a target effect, wherein the leader’s ratings are the result of the average level of a response that the leader elicits from a variety of partners. Or, the endorsement may be the result of a relationship effect, wherein the leader ratings are the result of idiosyncratic perceptions of the extent to which someone is a leader. By examining emergent leadership using SRM, it would be possible to determine which relationship is dominant in leadership endorsement. Furthermore, by combining SRM with an empirical examination of self-definition, it would be possible to determine how differences in self-expression result in different SRM effects, and to demonstrate the respective contribution of differences of self-expression in emergent leadership.

The proposed role of the relational self in this study has additional implications for future research in leadership endorsement. Leader endorsement does not present a threat to any one component of the self-definition, so there is little reason to assume that the individual self would
be the only self-definition accessed in leader endorsement. These findings support the expression of the relational self as seen in both the relationship of psychological belongingness and leadership schema congruence and belongingness climate strength and leadership schema congruence agreement on the basis of close, personal bonds with others. The climate level and climate strength relationships with leadership schema congruence found in this study, in concordance with the relationship of self-concept clarity and psychological belongingness with leadership schema congruence, point to support for the importance of the expression of the relational self in emergent leader endorsement. However, in order to confirm the expression of the relational self, it is necessary to examine the extent to which the different relationships in leader emergence influence leadership schema congruence. And although belongingness climate level may appear to have the strongest relationship with individual leadership schema congruence, it is not yet possible to conduct dominance analysis (e.g., Budescu & Azen, 2004; Johnson & LeBreton 2004) in multilevel analysis in order to ascertain which construct contributed most strongly to leadership schema congruence in this study. Future research should attempt to address the relative importance of the coefficients resulting from multilevel models in such a way that the hierarchy of self-definition expressed in leadership endorsement may be uncovered.

Finally, additional research should be directed at how climate strength and climate level function together in task performance. It was not possible to ascertain whether the relationship of belongingness climate strength with team task performance occurred climate strength’s effect on the processes of the team (e.g., decreased intra-group conflict due to shared perceptions of the within-team climate), or whether higher levels of performance were the result of shared cognitions regarding the affective environment of the team. Future research should examine
potential moderators of the impact of belongingness climate strength on team task performance in order to determine if any other relevant group-related variables may be cultivated to contribute to the higher levels of performance that belongingness climate strength appears to foster.

**Conclusion**

In summary, the goal of this study was to use the framework of the SITL to examine how individual differences, group-related perceptions, and team climate related to leadership schema congruence for emergent leaders. Most of the results of this study did not support the previous empirical results from studies of the SITL, and the results cast doubt on both the theoretical tenets of the SITL and the level of analysis at which the theory was posited. This study revealed that individual differences in self-concept clarity, group-related perceptions of psychological belongingness, and belongingness climate strength within teams positively influence leadership schema congruence at the individual and team level. Because leadership schema congruence at the individual level relates to positive leadership outcomes, leaders should take action to increase belongingness within their teams. Future research should continue to test the theoretical assumptions of the SITL, as well as develop additional multilevel models of emergent leadership, especially towards uncovering how self-definitions are expressed in leadership endorsement.


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APPENDICES
Appendix A: Results
Figure 1. Multilevel Model of Antecedents and Outcomes Related to Leadership Schema Congruence

Group-Level Analyses
Expected n = 95

Individual-Level Analyses
Expected N = 600-700
Figure 2. Six Factor Model of ILT
Figure 3. Two Higher-Order Factors Model of ILT
Figure 4. *Six Factor Model of ILTR*
Figure 5. Two Higher-Order Factors Model of ILTR
Figure 6. Six Factor Model of ILTD
Figure 7. Two Higher-Order Factors Model of ILTD
Figure 8. Modified Multilevel Model of Antecedent and Outcomes Related to Leadership Schema Congruence
<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Operationalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Concept Clarity</td>
<td>The degree to which an individual’s self-beliefs are stable, clearly defined, and consistent</td>
<td>Measured by the mean of individual responses to the Self-Concept Clarity scale</td>
</tr>
<tr>
<td>Group Identification</td>
<td>The degree to which followers feel similar to the team, identify with the values and attitudes of the team, and feel that the team is important to them</td>
<td>Measured by the mean of individual responses to the Group Identification scale</td>
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<tr>
<td>Cohesion</td>
<td>The degree to which followers enjoy the group experience and feel attached to the members of their team</td>
<td>Measured by the mean of individual responses to the Cohesion scale</td>
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<td>Identification Climate Strength</td>
<td>The sharedness of individuals’, within-team group identification</td>
<td>Measured by the sign-reversed standard deviation of the within-team, individual responses to the Group Identification scale</td>
</tr>
<tr>
<td>Cohesion Climate Strength</td>
<td>The sharedness of individuals’, within-team cohesion</td>
<td>Measured by the sign-reversed standard deviation of the within-team, individual responses to the Cohesion scale</td>
</tr>
<tr>
<td>Leadership Schema Congruence</td>
<td>The degree to which individuals’ internal schema for leadership are matched to their perceptions of the characteristics of the emergent leader</td>
<td>This variable is an empirically-derived variable that comes from taking the absolute difference score by item on the ILT and ILTR scales, and then summing the prototype factor items (Items 1-13) once the six-factor model and the two higher-order factor models are confirmed for the ILT, ILTR, and ILTD scales; a ranking can be done for this variable</td>
</tr>
<tr>
<td>Leadership Schema Congruence Agreement</td>
<td>The degree of agreement within teams on match to individuals’ perceptions of the characteristics of the emergent leader</td>
<td>This variable is measured by the sign-reversed standard deviation of the within-team, individual leadership schema congruence agreement</td>
</tr>
<tr>
<td>Team Task Performance</td>
<td>The objective task performance of the team</td>
<td>This variable is the cumulative balance scorecard value for the team for Q1-Q8</td>
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Table 2. Missing Item-Level Information for Self-Concept Clarity

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Table 3. *Missing Item-Level Information for Cohesion*

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Table 5. *Missing Item-Level Information for the Implicit Leadership Theory Scale*

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<td>ILT 5 - Clever</td>
<td>729</td>
<td>43</td>
<td>5.57</td>
<td>2.08</td>
</tr>
<tr>
<td>ILT 6 - Knowledgeable</td>
<td>730</td>
<td>42</td>
<td>5.44</td>
<td>1.92</td>
</tr>
<tr>
<td>ILT 7 - Educated</td>
<td>731</td>
<td>41</td>
<td>5.31</td>
<td>2.15</td>
</tr>
<tr>
<td>ILT 8 - Motivated</td>
<td>731</td>
<td>41</td>
<td>5.31</td>
<td>2.61</td>
</tr>
<tr>
<td>ILT 9 - Dedicated</td>
<td>726</td>
<td>46</td>
<td>5.96</td>
<td>2.59</td>
</tr>
<tr>
<td>ILT 10 - Hard-working</td>
<td>728</td>
<td>44</td>
<td>5.70</td>
<td>2.63</td>
</tr>
<tr>
<td>ILT 11 - Dynamic</td>
<td>729</td>
<td>43</td>
<td>5.57</td>
<td>1.57</td>
</tr>
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<td>ILT 12 - Strong</td>
<td>726</td>
<td>46</td>
<td>5.96</td>
<td>1.95</td>
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<tr>
<td>ILT 13 - Energetic</td>
<td>726</td>
<td>46</td>
<td>5.96</td>
<td>1.54</td>
</tr>
<tr>
<td>ILT 14 - Domineering</td>
<td>724</td>
<td>48</td>
<td>6.22</td>
<td>2.64</td>
</tr>
<tr>
<td>ILT 15 - Pushy</td>
<td>730</td>
<td>42</td>
<td>5.44</td>
<td>3.08</td>
</tr>
<tr>
<td>ILT 16 - Manipulative</td>
<td>729</td>
<td>43</td>
<td>5.57</td>
<td>3.30</td>
</tr>
<tr>
<td>ILT 17 - Conceited</td>
<td>729</td>
<td>43</td>
<td>5.57</td>
<td>3.30</td>
</tr>
<tr>
<td>ILT 18 - Selfish</td>
<td>730</td>
<td>42</td>
<td>5.44</td>
<td>3.46</td>
</tr>
<tr>
<td>ILT 19 - Loud</td>
<td>729</td>
<td>43</td>
<td>5.57</td>
<td>3.03</td>
</tr>
<tr>
<td>ILT 20 - Masculine</td>
<td>728</td>
<td>44</td>
<td>5.70</td>
<td>3.33</td>
</tr>
<tr>
<td>ILT 21 - Male</td>
<td>727</td>
<td>45</td>
<td>5.83</td>
<td>3.47</td>
</tr>
</tbody>
</table>

Note. ILT: Implicit Leadership Theory scale/factor score.
Table 6. Missing Item-Level Information for the Implicit Leadership Theory Recognition Scale

<table>
<thead>
<tr>
<th>ILTR</th>
<th>Count</th>
<th>Missing</th>
<th>Percent Missing</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Understanding*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.15</td>
</tr>
<tr>
<td>2 – Sincere*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.05</td>
</tr>
<tr>
<td>3 – Helpful*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.91</td>
</tr>
<tr>
<td>4 – Intelligent*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.81</td>
</tr>
<tr>
<td>5 – Clever*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.99</td>
</tr>
<tr>
<td>6 – Knowledgeable*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.84</td>
</tr>
<tr>
<td>7 – Educated*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.76</td>
</tr>
<tr>
<td>8 – Motivated*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.94</td>
</tr>
<tr>
<td>9 – Dedicated*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.91</td>
</tr>
<tr>
<td>10 – Hard-working*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.80</td>
</tr>
<tr>
<td>11 – Dynamic*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.09</td>
</tr>
<tr>
<td>12 – Strong*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.13</td>
</tr>
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<td>13 – Energetic*</td>
<td>590</td>
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<td>1.14</td>
</tr>
<tr>
<td>14 – Domineering*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>2.59</td>
</tr>
<tr>
<td>15 – Pushy*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>2.02</td>
</tr>
<tr>
<td>16 – Manipulative*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.59</td>
</tr>
<tr>
<td>17 – Conceited*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.48</td>
</tr>
<tr>
<td>18 – Selfish*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.50</td>
</tr>
<tr>
<td>19 – Loud*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.80</td>
</tr>
<tr>
<td>20 – Masculine*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>3.19</td>
</tr>
<tr>
<td>21 – Male*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>3.62</td>
</tr>
</tbody>
</table>

Note. ILTR: Implicit Leadership Theory scale/factor score. *Because the ILTR scores for emergent leaders were only calculated for team members who were not the emergent leader, the sample size from which the constructs are calculated was automatically decreased by the number of teams (N = 613).
Table 7. Missing Instrument-Level Information for all Study Constructs

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Count</th>
<th>Missing</th>
<th>Percent Missing</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Concept Clarity</td>
<td>677</td>
<td>95</td>
<td>12.31</td>
<td>1.39</td>
</tr>
<tr>
<td>ILT – Sensitivity</td>
<td>729</td>
<td>43</td>
<td>5.57</td>
<td>2.02</td>
</tr>
<tr>
<td>ILT – Intelligence</td>
<td>728</td>
<td>44</td>
<td>5.70</td>
<td>1.91</td>
</tr>
<tr>
<td>ILT – Dedication</td>
<td>725</td>
<td>47</td>
<td>6.09</td>
<td>2.56</td>
</tr>
<tr>
<td>ILT – Dynamism</td>
<td>723</td>
<td>49</td>
<td>6.35</td>
<td>1.11</td>
</tr>
<tr>
<td>ILT – Tyranny</td>
<td>722</td>
<td>50</td>
<td>6.48</td>
<td>2.94</td>
</tr>
<tr>
<td>ILT – Masculinity</td>
<td>726</td>
<td>46</td>
<td>5.96</td>
<td>3.35</td>
</tr>
<tr>
<td>ILT – Prototypicality</td>
<td>717</td>
<td>55</td>
<td>7.12</td>
<td>1.75</td>
</tr>
<tr>
<td>ILT – Antiprototypicality</td>
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<td>52</td>
<td>6.74</td>
<td>3.01</td>
</tr>
<tr>
<td>Cohesion</td>
<td>681</td>
<td>91</td>
<td>11.79</td>
<td>1.28</td>
</tr>
<tr>
<td>Group Identification</td>
<td>685</td>
<td>87</td>
<td>11.27</td>
<td>1.30</td>
</tr>
<tr>
<td>ILTR – Sensitivity*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.96</td>
</tr>
<tr>
<td>ILTR – Intelligence*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.77</td>
</tr>
<tr>
<td>ILTR – Dedication*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.83</td>
</tr>
<tr>
<td>ILTR – Dynamism*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.00</td>
</tr>
<tr>
<td>ILTR – Tyranny*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.55</td>
</tr>
<tr>
<td>ILTR – Masculinity*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>3.26</td>
</tr>
<tr>
<td>ILTR – Prototypicality Recognition*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>0.80</td>
</tr>
<tr>
<td>ILTR – Antiprototypicality Recognition*</td>
<td>590</td>
<td>23</td>
<td>3.75</td>
<td>1.89</td>
</tr>
</tbody>
</table>

Note. *Because the ILTR scores for emergent leaders were only calculated for team members who were not the emergent leader, the sample size from which the constructs are calculated was automatically decreased by the number of teams (N = 613).
Table 8. Descriptive Statistics for Study Variables-Individual Level

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Variance</th>
<th>SD</th>
<th>α</th>
<th>Mean ICC (1)</th>
<th>Mean ICC (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Concept Clarity**</td>
<td>3.92</td>
<td>0.39</td>
<td>0.62</td>
<td>0.82</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Group Identification</td>
<td>7.45</td>
<td>1.49</td>
<td>1.22</td>
<td>0.86</td>
<td>0.57</td>
<td>0.84</td>
</tr>
<tr>
<td>Cohesion</td>
<td>5.84</td>
<td>1.22</td>
<td>1.10</td>
<td>0.86</td>
<td>0.58</td>
<td>0.82</td>
</tr>
<tr>
<td>Psychological Belongingness*</td>
<td>0.00</td>
<td>0.65</td>
<td>0.80</td>
<td>0.91</td>
<td>0.60</td>
<td>0.91</td>
</tr>
<tr>
<td>ILT – Sensitivity</td>
<td>8.00</td>
<td>0.98</td>
<td>0.99</td>
<td>0.69</td>
<td>0.40</td>
<td>0.68</td>
</tr>
<tr>
<td>ILT – Intelligence</td>
<td>7.98</td>
<td>0.91</td>
<td>0.95</td>
<td>0.75</td>
<td>0.40</td>
<td>0.73</td>
</tr>
<tr>
<td>ILT – Dedication</td>
<td>8.57</td>
<td>0.61</td>
<td>0.78</td>
<td>0.83</td>
<td>0.62</td>
<td>0.83</td>
</tr>
<tr>
<td>ILT – Dynamism</td>
<td>7.64</td>
<td>1.48</td>
<td>1.22</td>
<td>0.77</td>
<td>0.52</td>
<td>0.77</td>
</tr>
<tr>
<td>ILT – Tyranny</td>
<td>4.01</td>
<td>2.72</td>
<td>1.65</td>
<td>0.88</td>
<td>0.48</td>
<td>0.85</td>
</tr>
<tr>
<td>ILT – Masculinity</td>
<td>4.30</td>
<td>7.00</td>
<td>2.65</td>
<td>0.93</td>
<td>0.87</td>
<td>0.93</td>
</tr>
<tr>
<td>ILT – Prototypicality</td>
<td>8.05</td>
<td>0.56</td>
<td>0.75</td>
<td>0.86</td>
<td>0.28</td>
<td>0.84</td>
</tr>
<tr>
<td>ILT – Antiprototypicality</td>
<td>4.16</td>
<td>3.43</td>
<td>1.85</td>
<td>0.87</td>
<td>0.42</td>
<td>0.86</td>
</tr>
<tr>
<td>ILTR – Sensitivity***</td>
<td>8.36</td>
<td>0.92</td>
<td>0.96</td>
<td>0.91</td>
<td>0.77</td>
<td>0.91</td>
</tr>
<tr>
<td>ILTR – Intelligence***</td>
<td>8.48</td>
<td>0.61</td>
<td>0.78</td>
<td>0.93</td>
<td>0.75</td>
<td>0.92</td>
</tr>
<tr>
<td>ILTR – Dedication***</td>
<td>8.53</td>
<td>0.68</td>
<td>0.82</td>
<td>0.94</td>
<td>0.83</td>
<td>0.94</td>
</tr>
<tr>
<td>ILTR – Dynamism***</td>
<td>8.23</td>
<td>1.12</td>
<td>1.06</td>
<td>0.89</td>
<td>0.72</td>
<td>0.89</td>
</tr>
<tr>
<td>ILTR – Tyranny***</td>
<td>1.93</td>
<td>2.27</td>
<td>1.51</td>
<td>0.90</td>
<td>0.55</td>
<td>0.88</td>
</tr>
<tr>
<td>ILTR – Masculinity***</td>
<td>4.21</td>
<td>10.73</td>
<td>3.28</td>
<td>0.90</td>
<td>0.79</td>
<td>0.88</td>
</tr>
<tr>
<td>ILTR – Prototypicality Recognition***</td>
<td>8.40</td>
<td>0.65</td>
<td>0.81</td>
<td>0.96</td>
<td>0.61</td>
<td>0.96</td>
</tr>
<tr>
<td>ILTR – Antiprototypicality Recognition***</td>
<td>3.07</td>
<td>3.51</td>
<td>1.87</td>
<td>0.78</td>
<td>0.22</td>
<td>0.72</td>
</tr>
<tr>
<td>Leadership Schema Congruence***</td>
<td>10.81</td>
<td>80.39</td>
<td>8.97</td>
<td>****</td>
<td>****</td>
<td>****</td>
</tr>
</tbody>
</table>

Note. N = 772. *Because psychological belongingness is a composite variable based on variables of two different scales, all items comprising the new composite were standardized. **ICC(1) and ICC(2) are not reported for self-concept clarity because this variable was only examined at the individual level. ***The ILTR and leadership schema congruence scores for emergent leaders were only calculated for team members who were not the emergent leader, the sample size from which the constructs are calculated was automatically decreased by the number of teams (N = 613). ****Because leadership schema congruence is based on the absolute difference between the ILT prototypicality and ILTR prototypicality items, it was not possible to determine reliability for the construct.
Table 9. *Descriptive Statistics for Study Variables-Group Level*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Variance</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belongingness Climate Strength</td>
<td>-0.58*</td>
<td>0.15</td>
<td>0.38</td>
</tr>
<tr>
<td>Leadership Schema Congruence Agreement</td>
<td>-7.40*</td>
<td>17.29</td>
<td>4.16</td>
</tr>
<tr>
<td>Team Task Performance**</td>
<td>84.59</td>
<td>34435.62</td>
<td>185.57</td>
</tr>
</tbody>
</table>

Note. $n = 159$. *The mean reported is the mean of the sign-reversed standard deviation, the measure of agreement. Leadership Schema Congruence: the difference score between the ILT prototype scale score on the ILT scale and the ILTR scale. **Although the actual descriptive statistics for team task performance are reported here, it is important to note that before using the cumulative balance scorecard values, they were adjusted by a constant to constrain the variance to $< 10$. 

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Table 10. Polynomial Regression of ILTD Prototype Score on its Components

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>11.06</td>
<td>0.67</td>
</tr>
<tr>
<td>Dummy1</td>
<td>0.56</td>
<td>0.80</td>
</tr>
<tr>
<td>ILTproto</td>
<td>12.95</td>
<td>0.11</td>
</tr>
<tr>
<td>ILTRproto</td>
<td>-12.94</td>
<td>0.07</td>
</tr>
<tr>
<td>ILTproto x dummy1</td>
<td>-25.90</td>
<td>0.13</td>
</tr>
<tr>
<td>ILTRproto x dummy1</td>
<td>25.87</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Dependent Variable: ILTD prototype score

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.42</td>
<td>0.94</td>
</tr>
<tr>
<td>Dummy2</td>
<td>7.11</td>
<td>1.99</td>
</tr>
<tr>
<td>ILTantiproto</td>
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<tr>
<td>ILTRantiproto</td>
<td>-5.40</td>
<td>0.24</td>
</tr>
<tr>
<td>ILTantiproto x dummy2</td>
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<td>0.50</td>
</tr>
<tr>
<td>ILTRantiproto x dummy2</td>
<td>-1.95</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Dependent Variable: ILTD antiprototype score

Note. N = 613. Dummy1 = 0 if ILT prototype scale score > ILTR prototype scale score. Dummy = 1 if ILT prototype scale score < ILTR prototype scale score. ILTproto: ILT prototype scale score. ILTRproto: ILTR prototype scale score. ILTproto x dummy1: the interaction term of ILT prototype scale score and the dummy 1 variable. ILTRproto x dummy1: the interaction term of ILTR prototype scale score and the dummy 1 variable. Dummy 2 = 0 if ILT antiprototype scale score > ILTR antiprototype scale score. Dummy = 2 if ILT antiprototype scale score < ILTR antiprototype scale score. ILTantiproto: ILT antiprototype scale score. ILTRantiproto: ILTR antiprototype scale score. ILTantiproto x dummy2: the interaction term of ILT antiprototype scale score and the dummy 2 variable. ILTRantiproto x dummy2: the interaction term of ILTR antiprototype scale score and the dummy 2 variable. *Because dummy 2 was significant, the ILTD antiprototype score was not retained for use in analyses.
Table 11. Correlations Between Study Constructs—Individual Level

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Self Concept Clarity</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Group Identification</td>
<td>0.06</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
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<td>3 Cohesion</td>
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<td>0.75</td>
<td>1</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>4 Belongingness</td>
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<td>0.91</td>
<td>1</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
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Note. Correlations in **bold**: p < 0.01 level. Correlations that are *underlined*: p < 0.05 level. *N*= 613.
### Table 11 cont’d. Correlations Between Study Constructs–Individual Level

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<td>0.09</td>
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<td>-0.07</td>
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<td>-0.05</td>
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<td>-0.10</td>
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Leadership Schema

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Note: Correlations in **bold**: \( p < 0.01 \) level. Correlations that are *underlined*: \( p < 0.05 \) level. *\( N = 613 \).*

129
Table 12. *Correlations Between Study Constructs–Group Level*

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<th></th>
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<td>2 Leadership Schema Congruence Agreement</td>
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<td>3 Team Task Performance</td>
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Note. $n = 159$. 

130
Table 13. *Model Results for the Multilevel Model with Cross-Level Influences: Climate Strength*

<table>
<thead>
<tr>
<th>Within Group</th>
<th>Estimates</th>
<th>Std. Error</th>
<th>Est./Std. Error</th>
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<tbody>
<tr>
<td>Leadership Schema Congruence</td>
<td>on</td>
<td>Self-Concept Clarity</td>
<td>-1.26**</td>
</tr>
<tr>
<td></td>
<td>on</td>
<td>Belongingness</td>
<td>-1.24*</td>
</tr>
<tr>
<td></td>
<td>on</td>
<td>Self-Concept Clarity</td>
<td>0.05</td>
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</table>

<table>
<thead>
<tr>
<th>Cross-Level</th>
<th>Estimates</th>
<th>Std. Error</th>
<th>Est./Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership Schema Congruence</td>
<td>on</td>
<td>Belongingness Climate Strength</td>
<td>-0.81</td>
</tr>
<tr>
<td>Team Task Performance</td>
<td>on</td>
<td>Leadership Schema Congruence Agreement</td>
<td>-0.02</td>
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</table>

<table>
<thead>
<tr>
<th>Between Group</th>
<th>Estimates</th>
<th>Std. Error</th>
<th>Est./Std. Error</th>
</tr>
</thead>
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<td>Leadership Schema Congruence Agreement</td>
<td>on</td>
<td>Belongingness Climate Strength</td>
<td>2.06**</td>
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<tr>
<td>Team Task Performance</td>
<td>on</td>
<td>Leadership Schema Congruence Agreement</td>
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<tr>
<td></td>
<td>on</td>
<td>Belongingness Climate Strength</td>
<td>0.73*</td>
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</table>

Note. Est./Std. Error = parameter estimate divided by the standard error of the estimate, which is a Z-score; * $p < 0.01$, ** $p < 0.05$, *** $p < 0.10$
Table 14. *Model Results for the Multilevel Model with Cross-Level Influence: Climate Level*

<table>
<thead>
<tr>
<th>Within Group</th>
<th>Estimates</th>
<th>Std. Error</th>
<th>Est./Std. Error</th>
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</thead>
<tbody>
<tr>
<td>Leadership Schema Congruence</td>
<td>on Self-Concept Clarity</td>
<td>-1.27</td>
<td>0.73</td>
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<td>Belongingness</td>
<td>on Self-Concept Clarity</td>
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<td>0.05</td>
</tr>
<tr>
<td>Cross-Level</td>
<td>Estimates</td>
<td>Std. Error</td>
<td>Est./Std. Error</td>
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<td>on Belongingness Climate Level</td>
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<td>0.88</td>
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<td>Team Task Performance</td>
<td>on Leadership Schema Congruence</td>
<td>-0.32</td>
<td>0.35</td>
</tr>
<tr>
<td>Between Group</td>
<td>Estimates</td>
<td>Std. Error</td>
<td>Est./Std. Error</td>
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<td>Leadership Schema Congruence Mean</td>
<td>on Belongingness Climate Level</td>
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<td>Team Task Performance</td>
<td>on Leadership Schema Congruence Mean</td>
<td>0.08</td>
<td>0.09</td>
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Note. Est./Std. Error = parameter estimate divided by the standard error of the estimate, which is a Z-score; * $p < 0.01$, ** $p < 0.05$, *** $p < 0.10$. 

132
Table 15. Hierarchical Regression of Prototypicality on Psychological Belongingness in Two Levels

<table>
<thead>
<tr>
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<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Model Coefficients</th>
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<td>B</td>
<td>Std. Error</td>
<td>β</td>
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<td>Dependently Variable:</td>
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<td>Individual-Level Prototypicality*</td>
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<td>(Constant)</td>
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</tr>
<tr>
<td>Leadership Schema</td>
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<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Congruence</td>
<td>0.01</td>
<td>0.01</td>
<td>0.08</td>
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<td>Psychological Belongingness</td>
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<td>(Constant)</td>
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Note. *N = 613; Because the prototypicality score for the emergent leader and the ILTR scores for emergent leaders were only calculated for team members who were not the emergent leader, the sample size from which the constructs are calculated was automatically decreased by the number of teams (n = 159). **n = 159.
Table 16. *Moderated Hierarchical Regression of Prototypicality on Belongingness in Two Levels*

<table>
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<th>Model Coefficients</th>
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<td>Std. Error</td>
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<td>0.08</td>
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Note. *N = 613; Because the prototypicality score for the emergent leader and the ILTR scores for emergent leaders were only calculated for team members who were not the emergent leader, the sample size from which the constructs are calculated was automatically decreased by the number of teams (n = 159). **n = 159.
Appendix B: Measures, Power Analysis, & Syntax
Measure of Self-Concept Clarity  
(Campbell et al., 1996)

1. My beliefs about myself often conflict with one another.*
2. On one day I might have one opinion of myself and on another day I might have a different opinion.*
3. I spend a lot of time wondering about what kind of person I really am.*
4. Sometimes I feel that I am not really the person that I appear to be.*
5. When I think about the kind of person I have been in the past, I'm not sure what I was really like.*
6. I seldom experience conflict between the different aspects of my personality.
7. Sometimes I think I know other people better than I know myself.*
8. My beliefs about myself seem to change very frequently.*
9. If I were asked to describe my personality, my description might end up being different from one day to another day.*
10. Even if I wanted to, I don't think I would tell someone what I'm really like.*
11. In general, I have a clear sense of who I am and what I am.
12. It is often hard for me to make up my mind about things because I don't really know what I want.*

Note. Scale ranges from 1 (strongly disagree) to 5 (strongly agree).  
• Reverse-keyed item.
Measure of Group Identification  
(Hans et al., 1997; Hogg & Hains, 1996)

1. How glad are you to be a member of the group?

2. How committed do you feel to the group?

3. How important do you feel that the group is to you?

4. How similar do you feel to the group as a whole in terms of general attitudes and opinions?

*Note.* Scale ranges from 1 (*not very much*) to 9 (*very much*)
Measure of Cohesion
(Hogg, Cooper-Shaw, & Holzworth, 1993; Hogg & Hains, 1996; Hogg & Hardie, 1991)

Directions: Prior to completing this measure, please think about your group as a whole, its performance today, and its characteristics. Then please answer these following questions using the scale provided.

1. How much do you like your group members as a whole?

2. How attached do you feel to your group?

3. How much would you like to work with your group members on future problems?

Note. Scale ranges from 1 (not at all) to 7 (very much)
Implicit Leadership Theory
(Epitropaki & Martin, 2004)

Directions: Indicate the extent to which each trait listed is characteristic of a leader, using the scale provided.

1. Understanding
2. Sincere
3. Helpful
4. Intelligent
5. Clever
6. Knowledgeable
7. Educated
8. Motivated
9. Dedicated
10. Hard-working
11. Dynamic
12. Strong
13. Energetic
14. Domineering
15. Pushy
16. Manipulative
17. Conceited
18. Selfish
19. Loud
20. Masculine
21. Male

Note. Scale ranges from 1 (not at all characteristic) to 9 (extremely characteristic).
ILT Recognition (Epitropaki & Martin, 2005) and Leadership Perceptions

Directions: Indicate the extent to which each trait listed is characteristic of your group’s leader, using the scale provided.

1. Understanding
2. Sincere
3. Helpful
4. Intelligent
5. Clever
6. Knowledgeable
7. Educated
8. Motivated
9. Dedicated
10. Hard-working
11. Dynamic
12. Strong
13. Energetic
14. Domineering
15. Pushy
16. Manipulative
17. Conceited
18. Selfish
19. Loud
20. Masculine
21. Male

Note. Scale ranges from 1 (not at all characteristic) to 9 (extremely characteristic).
Measure of Group Prototype
(Fielding & Hogg, 1997; Hogg et al., 1993; Hogg & Hardie, 1991)

Directions: Consider the behaviors, qualities, goals, and norms that characterize your group and differentiate it from other groups. Then, list five qualities that best describe the character, style, and spirit of your group.

1. __________________________
2. __________________________
3. __________________________
4. __________________________
5. __________________________
Group Prototype Recognition  
(Fielding & Hogg, 1997; Hogg et al., 1993; Hogg & Hardie, 1991)

Directions: Consider the behaviors, qualities, goals, and norms that characterize your group and differentiate it from other groups. Then, list five qualities that best describe the character, style, and spirit of the leader of your group.

1. __________________
2. __________________
3. __________________
4. __________________
5. __________________
Equations Comprising Multilevel CFA and SEM
(Muthén, 1994; Muthén & Satorra, 1989)

- The single-level CFA assumes a model wherein individual responses are held in a vector $Y_{ci}$, where $c =$ cluster and $i =$ individual in that cluster. That is, equation 1 in the single-level CFA is:

$$Y_{ci} = v + \lambda \eta_{ci} + \varepsilon_{ci}$$ (1)

- where $y =$ vector of items measuring some construct, $v =$ vector of intercepts/means, $\lambda =$ vector of factor loadings, $\eta =$ latent factor, $\varepsilon =$ item uniqueness. This formula is the standard representation of a CFA where independence is included. To note, independence may only be assumed over the $c$ clusters.

- In multilevel CFA, the latent factor $\eta$ in the multilevel case may be expressed as:

$$\eta_{ci} = \alpha + \eta_{Bc} + \eta_{Wci}$$ (2)

- where $\eta_{ci} =$ “total” latent factor, $\alpha =$ grand mean or overall expectation, $\eta_{Bc} =$ random-latent between factor capturing that part of the total due to unit or between effects, and $\eta_{Wci} =$ random-latent within factor varying over individuals within clusters/units. The point is that theoretically, one can estimate both the between and within portions (Vandenberg, 2005).

- Extended from this equation, it is possible to estimate $\eta_{Bc}$ and $\eta_{Wci}$ by extending equation 1 to:

$$Y_{ci} = v + \lambda_B \eta_{Bc} + \varepsilon_{Bc} + \lambda_W \eta_{Wci} + \varepsilon_{Wci}$$ (3)

- where $Y_{ci} =$ vector of responses for the $i^{th}$ person in the $c^{th}$ cluster, $v =$ vector of intercepts, $\lambda_B$ and $\lambda_W$ are matrices of factor loadings, $\eta_{Bc} =$ latent between factor varying randomly among/between clusters, $\eta_{Wci} =$ latent within factor varying randomly over individuals within clusters, and $\varepsilon_{Bc}$ and $\varepsilon_{Wci} =$ unique between and within effects, respectively. Furthermore, $\eta_{Bc}$ reflects cluster-level effects in individual-level responses (Vandenberg, 2005).

- Given that within and between contributions represent separate contributions to the $Y_{ci}$ it stands to reason that the variances/covariances among the observed scores $V(Y_{ci})$ are direct functions of both the between and within population variance/covariances (Vandenberg, 2005). Thus,

$$V(Y_{ci}) = \Sigma_B + \Sigma_W$$ (4)

- Therefore, the population variance/covariance matrices are represented by

$$\Sigma_B = \lambda_B \Psi_B \lambda_B^* + \Theta_B$$ (5)

$$\Sigma_W = \lambda_W \Psi_W \lambda_W^* + \Theta_W$$ (6)

- Where $\lambda_B$ and $\lambda_W$ are the matrices of factor loadings; $\Psi_B$ (psi) and $\Psi_W$ are the variances/covariances among the between-cluster and within factors; $\Theta_B$ and $\Theta_W$ are diagonal matrices of between-cluster and within unique variances.

- In order to estimate the $\Sigma_W$, the pooled within-group covariance matrix $S_{pw}$, the observations are group-mean centered. The deviation scores are uncorrelated with the disaggregated group means used in the between-clusters matrix. Estimating $\Sigma_B$ is not simply estimated by the between-clusters sample covariance matrix $S_B$; cluster size must be considered and. Therefore, the within-group covariance matrix is subtracted from the between-clusters sample covariance matrix, and divided by the common cluster size (Vandenberg, 2005).
Because of the independent nature of the within and between contributions to $\eta_{ci}$ we can make use of this to calculate the latent variable counterpart to the intraclass correlation, which is the variance of the latent factor.

- This formula is $V(\eta_{ci}) = \Psi_T = \Psi_B + \Psi_W$ (10)
- Thus, the proportion of factor variance that is due to between clusters/groups is $\Psi_B / (\Psi_B + \Psi_W)$ (11).

In short, the steps to a multilevel confirmatory factor analysis (MCFA) are:

- Step 1: Check over the measurement model using full sample
- Step 2: Check ICC values
- Step 3: Check model using pooled within-groups covariance matrix
- Step 4: Run full MLCFA model
- Step 5 thru x: Alternative models are specified

Multilevel structural equation modeling (MSEM) has the same presumptions as MCFA. Both the within and between components are estimable. Using the between-group and within-group models results in the general mean and covariance structure model for multilevel data (Muthén & Muthén, 1998) given in the following equations.

$$\mu = v_B + \lambda_B (I-B_B)^{-1} \alpha_B$$
$$\Sigma_B = \lambda_B (I-B_B)^{-1} \Psi_B (I-B_B)^{-1} \lambda_B' + \Theta_B$$
$$\Sigma_W = \lambda_W (I-B_W)^{-1} \Psi_W (I-B_W)^{-1} \lambda_W' + \Theta_W$$

As with the multilevel confirmatory factor analysis model, the intercepts of the observed variables are hypothesized to vary across organizations (Heck & Thomas, 2000).
The following table contains the standard errors (s.e.):
Fixed: s.e. of regression coefficients of level-1 variables with a fixed effect only.
Const: s.e. of the intercept.
Group: s.e. of regression coefficients of level-2 variables.
Random: s.e. of regression coefficients of level-1 variables with a random effect.
Cross-L: s.e. of regression coefficients of cross-level interactions
(product of "Group" with "Random effect" variables).

Sample sizes and the standard errors by component

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Mplus Syntax for Model Inclusive of Climate Strength

Title: cross level influence

Data: file is C:\Documents and Settings\Joy Oliver\Desktop\Diss.txt;
Variable: Names are GroupNum cumbal belong scc ILTcong bagree ILTagree;

WITHIN are scc belong;
BETWEEN are cumbal bagree ILTagree;
CLUSTER = GroupNum;
CENTERING = GRANDMEAN (scc belong bagree);

Analysis: Type = TWOLEVEL RANDOM;
Iterations = 1000000

Model:
%WITHIN%
ILTcong on scc;
ILTcong on belong;
belong on scc;

%BETWEEN%
ILTcong on bagree;
ILTcong on ILTagree;
ILTagree on bagree;
cumbal on ILTcong;
cumbal on ILTagree;
cumbal on bagree;

OUTPUT: SAMPSTAT STANDARDIZED RESIDUAL TECH1;
**Mplus Syntax for Model Inclusive of Climate Level**

**Title:** cross level influence

**Data:** file is C:\Documents and Settings\Joy Oliver\Desktop\Diss.txt;
**Variable:** Names are GroupNum cumbal belong scc ILTcong bmean ILTmean;

WITHIN are scc belong;
BETWEEN are cumbal bmean ILTmean;
CLUSTER = GroupNum;
CENTERING = GRANDMEAN (scc belong bmean);

**Analysis:** Type = TWOLEVEL RANDOM;
Iterations = 1000000

**Model:**

%WITHIN%
ILTcong on scc;
ILTcong on belong;
belong on scc;

%BETWEEN%
ILTcong on bmean;
ILTcong on ILTmean;
ILTmean on bmean;
cumbal on ILTcong;
cumbal on ILTmean;
cumbal on bmean;

**OUTPUT:** SAMPSTAT STANDARDIZED RESIDUAL TECH1;
VITA

Joy Theresa Oliver

Education

Postdoctoral Research Associateship Program (RAP), National Research Council
Human Effectiveness Directorate - Air Force Research Laboratory, Warfighter Research Division
Mesa, Arizona
Supervising Director: Winston R. Bennett, Jr., PhD

Doctor of Philosophy, Management (expected: Summer, 2008)
University of Tennessee, Knoxville (College of Business, AACSB certified)
Knoxville, Tennessee
Area: Industrial-Organizational Psychology
Major Advisor: David J. Woehr, PhD

Fulbright Fellow, 2002-2003
Utrecht University
Utrecht, the Netherlands
Fellowship Advisor: Arnold B. Bakker, PhD

Bachelor of Science, 2002
University of Scranton
Scranton, Pennsylvania
Majors: Psychology, Philosophy Cum Laude; Special Jesuit Liberal Arts Program graduate
Concentration: Biopsychology

Professional Experience

Research Associate (7/05-4/08), Fors Marsh Group, Arlington, Virginia
- Duties include conducting market research for the United States Military.
- Responsibilities include analyzing applicant and accession data for the Joint Services of the United States Military using segmentation analysis and applied time series methodology and constructing presentations regarding trends in the Joint Services recruitment.
- Human Research Protection Program (HRPP) certification: 2006-present
Supervisor: Brian K. Griepentrog, PhD, Director of Research; Katherine R. Helland, PhD

Assessor (6/04-4/08), Tennessee Assessment Center, Knoxville, Tennessee
- Duties include conducting evaluations of managerial candidates using Assessment Center methodology for both selection and developmental purposes. Responsibilities include
participation in managerial simulations, preparing assessment feedback reports, and participating in consensus meetings.
Supervisors: E. Kate Atchley, PhD; R. Tom Ladd, PhD; William R. Walton, PhD

Assessor (1/04-4/08), Senior Executive, Physician Executive, and Aerospace Executive MBA Programs, University of Tennessee, Knoxville, Tennessee

- Duties include assessing the performance of executive MBAs using Assessment Center methodology for developmental purposes. Responsibilities include participation in managerial simulations, preparing assessment feedback reports, and participating in consensus meetings.
Supervisors: E. Kate Atchley, PhD; Cheryl D. Barksdale, PhD

Special Project - Facilitator (6/07), Professional MBA Program, University of Tennessee, Knoxville

- Duties included moderating a negotiation exercise conducted as a part of the course requirements for the Professional MBA program.
Supervisor: Michael D. McIntyre, PhD

Special Project - Team Member (3/06; 9/06), Tennessee Assessment Center, Knoxville, Tennessee

- Duties include conducting evaluations of MBA students at the University of North Carolina, Chapel Hill, employing Assessment Center methodology for developmental purposes. Responsibilities include participation in managerial simulations and preparing assessment feedback reports with developmental suggestions.
Supervisors: E. Kate Atchley, PhD; William R. Walton, PhD

Special Project - External Research Analyst (1/05), CVS Pharmacy Distribution Center, Knoxville, Tennessee

- Duties included preparing the results of a job satisfaction survey related to shift re-design and presenting the results of the survey to the upper management of the distribution center.
Supervisor: Michael D. McIntyre, PhD

Research and Teaching Experience

Research Assistant (8/03-5/08), I-O Psychology Program, University of Tennessee, Knoxville, Tennessee

- Duties include conducting research in boundary spanning content areas (e.g., leadership, conflict within teams, diversity, research methods in team studies), employing advanced research methods and various statistical analyses.
- Defense Advanced Research Projects Agency (DARPA) Grant (6/05-6/06)
  - Duties included conducting the project, “Acquisition of complex skills in a team-training environment: An investigation of the suitability of a complex computer...
task for team-oriented training evaluation.” Responsibilities include preparing a
lab manual for the project, scheduling data collection, conducting training
sessions, and analyzing resulting data.
Supervisor: David J. Woehr, PhD

Teaching Assistant (8/07-5/08), Integrated Process Management, College of Business,
University of Tennessee, Knoxville, Tennessee
• Duties included mentoring teams during the course of the global marketplace simulation,
grading assignments, and conducting lectures related to organizational behavior.
Supervisor: Ernest R. Cadotte, PhD

Lecturer (9/06-12/06), Organizational Management, Department of Management,
University of Tennessee, Knoxville, Knoxville, Tennessee
• Duties include outlining course requirements, delivering lectures related to motivation,
leadership, organizational structure, and strategic planning, for a course in organizational
behavior for 188 students. Responsibilities include grading assignments and
communicating with both students and the university regarding student progress in the
course.
Supervisor: E. Kate Atchley, PhD

Teaching Assistant (8/04-5/05), Organizational Behavior, College of Business, University of
Tennessee, Knoxville, Tennessee
• Duties included developing course content, scheduling individual differences
assessments, assigning other teaching assistants to course sections, and analyzing
resulting data from questionnaire research.
Supervisor: Michael D. McIntyre, PhD

Fulbright Fellow (9/02-6/03), Department of Social & Organizational Psychology, Utrecht
University, Utrecht, the Netherlands
• Project completed: Projection of own on others’ job characteristics: Evidence for the
false consensus effect in job characteristics information (Paper published March, 2005).
Supervisor: Arnold B. Bakker, PhD

Teaching Assistant (8/00-5/02), Research Methods in the Behavioral Sciences, University of
Scranton, Scranton, PA
• Duties included conducting lab sessions, meeting with students, and developing lab
content.
Supervisor: J. Timothy Cannon, PhD

Peer Reviewed Journal Articles

job characteristics: Evidence for the false consensus effect in job characteristics
Non-Peer Reviewed Articles


Manuscripts under Review

Oliver, J., Bowler, M.C., & Woehr, D.J. (2008). Reducing variance in performance during skill acquisition as an indicator of training effectiveness: A case study. *Chapter under review for the book. If you build it...Investigating the use of reaction to and effectiveness of voluntary web-based rehearsal to mitigate complex skill and knowledge loss following nonuse.*


Manuscripts in Preparation


Refereed Conference Proceedings


Professional Presentations


Poling, T. L., Oliver, J., & Woehr, D. J. (2008). Diversity in team member personality as an antecedent to team climate strength & level. Paper to be presented at the 23rd Annual Conference of the Society for Industrial-Organizational Psychology (SIOP), April, 2008, San Francisco, CA.


- Finalist for the John C. Flanagan Award for Outstanding Student Paper of the Conference


Reviewer Experience

- SIOP, 2008
- AOM, 2008, Organizational Behavior Division
- SMA, 2008, Research Methods Division

Graduate Coursework

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<td>Seminar in Motivation</td>
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Technical Competencies

SAS, NCSS, SPSS, LISREL, ConsumerPoint, Mplus, Microsoft Office Suite (Access, Excel, Word), Data Ferrett

Professional Activities

Member (9/06-5/07), Dean of Libraries Dean’s Student Advisory Committee, University of Tennessee, Knoxville, Tennessee
- Representative of the College of Business Administration on the advisory committee to the Dean of Libraries at the University of Tennessee, Knoxville

Coordinator (9/05-5/06), Industrial-Organizational Psychology Student Association (IOPSA), University of Tennessee, Knoxville, Tennessee

Professional Affiliations and Honor Societies

Fulbright Association
Alpha Sigma Nu, the National Honor Society for Jesuit Colleges & Universities
Psi Chi, the National Honor Society for Psychology
Phi Sigma Tau, the National Honor Society for Philosophy
Pi Gamma Mu, the International Honor Society for Social Sciences
Honor Society of Phi Kappa Phi
Society for Industrial and Organizational Psychology (Student Affiliate)
Academy of Management (Student Affiliate)
Association for Psychological Science (Student Affiliate)
Southern Management Association (Student Affiliate)
American Statistical Association (Student Affiliate)

References

David J. Woehr, PhD: Major Advisor; Professor, Industrial-Organizational Psychology Program, Department of Management, University of Tennessee, Knoxville, TN; 865-974-1673; djw@utk.edu

E. Kate Atchley, PhD: Assistant Department Head/Director of Leadership Development Programs, Department of Management, University of Tennessee, Knoxville, TN; 865-974-6526; kateatchley@utk.edu

Michael D. McIntyre, PhD: Director, Professional MBA Program, University of Tennessee, Knoxville, TN; 865-974-1664; mmcintyr@utk.edu