The Relation between Group Diversity and Group Functioning: Disentangling the Effects of Objective and Subjective Diversity

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE Master of Arts

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HOUSTON, TEXAS

DECEMBER 2003
DECEMBER 2003

ABSTRACT

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This research proposes a revised conceptualization of the construct of diversity in groups to include both the traditional, objective diversity as well as perceptual, subjective diversity. Theoretical rationale for the differentiation is discussed and a framework is proposed in which objective and subjective diversity both have independent effects on group processes and outcomes. Hypotheses were tested through the use of a laboratory experiment in which 46 groups of 3-4 persons each performed organizational simulation tasks. Results include a series of hierarchical regression analyses that provide initial support for the differentiation between objective and subjective diversity. Issues of aggregation, level of analysis, and methodology are discussed. Additionally, the implications of the differentiation of objective and subjective diversity are highlighted.
Acknowledgements

First and foremost, I would like to thank my advisor, Miguel Quiñones, for all of his leadership and assistance thus far. Without his inspiration and endless “drawings,” this research would never have been possible. Additionally, I thank Mickey for his continual support for allowing me to choose my research path, no matter how different it may be from his. Furthermore, many thanks go to my committee members, Bob Dipboye and Brent Smith, for all of their insightful feedback and suggestions.

There are several people who contributed to the massive undertaking of this research. Many thanks go to my research assistants, Christel Miller, Jackie Rellis, Irena Popova and Vuk Rajavec who logged countless hours recruiting participants, running experiments and entering and coding data. Without their tireless help, I would never have managed this project. Additionally, the Hebl lab research assistants and Alison Broadfoot deserve special thanks for their help with the logistics of this research. In connection, many thanks to Mikki Hebl for use of her lab space and equipment. Also, thanks to all my fellow graduate students for being great sounding boards as well as providing invaluable suggestions and feedback.

Finally, thanks must go to my husband, Marc de Chermont, for his unwavering support and encouragement. He deserves thanks for always reassuring me that I would get through it and providing the comic relief as needed.
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The Relation between Group Diversity and Group Functioning:

Disentangling the Effects of Objective and Subjective Diversity

Increasing workforce diversity and the use of groups in the workplace are altering the nature of work. With increased diversity has come the challenge of harnessing its benefits and limiting its potential negative consequences. With nearly half of all companies reporting use of teams (Devine et al., 1999), the importance of understanding group functioning has been recognized. Although the potential benefits of diversity have been frequently touted, a mix of contradictory and complex empirical findings only partially supports this claim. Especially the research community and its findings have been split between those who think diversity is positive for group performance (rationale being that by adding perspectives to the group, performance will benefit) and those who think that it is detrimental (heterogeneity leads to coordination problems, conflict and lower satisfaction) (Guzzo & Dickson, 1996).

In an effort to further disentangle the effects of diversity on group functioning, this research proposes that the contradictory findings may be a result of the failure to conceptualize diversity as more than simply the absolute differences present in a group. Specifically, one aspect that has been ignored is that “diversity” can be thought of as both a characteristic of groups and a perceptual construct. In the literature, diversity has been conceptualized as the objective reflection of the actual composition of the group. This “objective diversity” is then measured through indices of differences such as the coefficient of variation, which capture the lack of uniformity in a group. However, group diversity research, unlike performance appraisal literature (e.g., Strauss, Barrick, & Connerley, 2001), has not fully considered the conceptualization of diversity as one of
being a perceptual construct. The degree of diversity one observes in a group depends on what features one uses to categorize, differentiate, and identify. In this sense, diversity is perceptual—it is based on what one “sees” as differences. Inherently, if diversity is conceptualized as perceptual, it is also subjective—with each person determining the features on which they see differences or similarities.

Despite the obvious differences between these distinct conceptualizations, group diversity research has, until recently, failed to make a clean distinction between objective and perceptual diversity. However, a similar distinction has been made in performance appraisal research where the typical concern has been one of similarity rather than diversity. For example, Ferris and Judge (1991) noted that the “type of similarity index (i.e., actual versus perceived) employed produces different results” when examining the effect of supervisor-subordinate similarity on work-related outcomes. With the relation between perceived similarity and work-related outcomes being found more consistently and reliably than the relation between actual similarity and the same outcomes (e.g., Dalessio & Imada, 1984; Ensher & Murphy, 1997; Strauss, Barrick, & Connerley, 2001; Turban & Jones, 1988), Ferris and Judge (1991) proposed that the underlying causation for these differential relations was that “people react on the bases of perceptions of reality, not reality per se” (p. 464).

This differentiation was applied to group diversity by de Chermont and Quiñones (2003) who sought to empirically determine if actual and perceptual diversity were independent conceptualizations. Whereas, the performance appraisal literature focused on actual and perceived similarity in dyadic relationships (i.e., supervisor and subordinate), de Chermont and Quiñones (2002) applied the differentiation to groups—
focusing on how individuals, as group members, perceived the sum of differences across the entire unit. In this work, the researchers demonstrated, via a direct comparison, that objective (actual) and subjective (perceptual) group diversity are independent, albeit related, conceptualizations of diversity. By obtaining parallel measures of objective and subjective diversity across a variety of dimensions (i.e., gender, race, age, personality, and values) at various times throughout the group’s life, direct comparison of the two diversity dimensions was possible. Results supported the hypothesis that objective and subjective are independent conceptualizations of group diversity, but the relation between the two dimensions is neither perfect nor consistent.

Thus, building from the distinction made between actual and perceptual group diversity by de Chermont and Quiñones (2003), the purpose of the current research is to extend this model of group diversity in order to isolate and independently consider the effects of objective and subjective diversity on group functioning. Specifically, the goal is to differentiate between objective and subjective diversity and then segregate and examine the distinct effects that each “type” of diversity has on group processes (i.e., cohesion, conflict, and communication) and group outcomes (i.e., performance).

Theories of Diversity

One of the initial obstacles encountered when working in the realm of diversity is that the term “diversity” itself has been used to refer to numerous different phenomena. As a result, there have been various attempts in group diversity research to classify the multitude of dimensions on which individuals can differ. From these attempts have emerged several models that cluster together the dimensions of diversity into broader, more understandable “categories” (Cummings et al., 1993; Jackson, 1992; Jackson, May,
& Whitney, 1995; Tsui et al., 1992; Pelled, 1996). One of the most widely cited and comprehensive models was developed by Jackson and colleagues (1995), which will used in the current research to lay out a common language and framework for the discussion of diversity dimensions.

**Dimensions of Diversity**

In their model, Jackson, May, and Whitney (1995) differentiated between two dimensions of group diversity: task-relatedness (task versus relations) and observability (surface versus deep) (see Figure 1). The first dimension, task-relatedness (X-axis), is anchored on the right by features that are highly task-oriented (i.e., educational level, department membership, knowledge, skills, abilities, etc.). The model posits that task-oriented diversity features are closely related to the actual functioning of a group and variation on these dimensions is thought to be a “rational and instrumental explanation for how diversity can affect decision-making” (Jackson et al., 1995, p. 218).

Placed opposite from task-oriented diversity is relations-oriented diversity, which are those features (i.e., sex, age, race, values, personality, etc.) more associated with the emotional or political aspects of team life. It is proposed that relations-oriented diversity features can influence the group’s performance indirectly through the formation of social relationships and interactions, which have subsequent effects on group functioning (Sessa & Jackson, 1995).

The second differentiation of group diversity is along the axis of observability (the Y-axis in Figure 1). The most observable dimensions (upper Y-axis) are surface-level attributes (i.e., age, sex, race/ethnicity, experience, functional background, etc.). These observable features are considered to be “overt, biological characteristics that are
Figure 1. Representation of Jackson, May, & Whitney (1995) Model of Group Diversity

- Relations-Oriented Surface-Level
  - Age
  - Sex
  - Race, Ethnicity, National Origin
  - Physical Features
  - Formal Organization Membership

- Task-Oriented Surface-Level
  - Functional Background
  - Experience
  - Department Membership
  - Formal Credentials
  - Educational Level

- Relations-Oriented Deep-Level

- Task-Oriented Deep-Level

- Observability

- Task-Relatedness

- Social Status
  - Attitudes
  - Values
  - Personality
  - Behavioral Style

- Knowledge
  - Skills
  - Abilities
  - Experience
typically reflected in physical features” (Harrison, Price, & Bell, 1998, p. 97), generally immutable, immediately observable, and measurable in simple and valid ways (Milliken & Martins, 1996). On the lower half of the Y-axis are features that are not readily or easily observable—deep-level attributes (i.e., attitudes, beliefs, values, knowledge, skills, abilities, experience, etc.). As these diversity dimensions are not easily discerned from simple observation, knowledge of their variation in a group is usually only established via “extended, individualized interaction and information gathering” (Harrison et al., 1998, p. 98) which makes them “subject to construal and more mutable” (Jackson et al., 1995, p. 217).

In sum, there are two dimensions along which diversity features are divided—task-relatedness and observability. Although there are no clean-cut lines between the four quadrants as shown in Figure 1, this framework does provide a simple language with which to further discuss diversity. Therefore, the terminology of relations versus task-oriented diversity and surface versus deep-level diversity will be used in this study.

Historically Significant Theories

The purpose of this section is to highlight the way in which each theory predicts how diversity may affect group functioning. The aim is to establish that the consideration of the perceptual conceptualization of diversity is both fundamental and essential to the theories that have long supported diversity research. With this aim, three theoretical models will be addressed: social categorization, similarity/attraction paradigm, and the information/decision-making framework (Williams & O’Reilly, 1998).
Social Categorization Theory

The first, social (or self) categorization theory (Turner, 1987) refers to the process by which people define their self-concept with respect to their memberships in social groups. In a group setting, different aspects of a person’s self-concept may become salient in response to the distribution of characteristics in the group (Markus & Cross, 1990). A salient social category is defined as one that psychologically functions to influence the perception and behavior of a person as well as how others treat that individual (Turner, Hogg, Oakes, & Reicher, 1987). With a desire to maintain a positive self-identity, individuals are assumed to have a preference for, and evaluate more positively, those who are similar on these salient social categories. A further point, addressed by Allport (1954), Messick and Mackie (1989), highlights the fundamental tendency of individuals to use physical features, such as race and sex, to form impressions of others. This theory also suggests that categorization of other group members may be instantaneous, requiring no interaction. A classic example, Sherif and Sherif’s (1953) boys camp study, demonstrates the subjectivity of salient social categories. In that study, two groups were purposefully organized so that each became more distinct after completing a series of activities. At the point when the two groups shared no salient social category, they were brought together via a common aim/salient social category (lack of water) and interaction between the groups increased. This salient category led to more positive evaluations and subsequent cooperation.

Thus, there are three implications for how diversity may affect group functioning according to this theory. First, it is known that individuals use categories, often the most salient, to make distinctions about members of a group. Second, after determining what a
salient category is, the attraction to others is based on similarity. Finally, both the selection of salient categories and the attraction that ensues affects future behavior.

*Similarity/Attraction Paradigm*

The similarity/attraction paradigm (Byrne, 1971) borrows from learning theory by using a reinforcement framework to explain how similarity affects individuals' attraction to each other. Byrne (1971) proposed that when individuals interact, if there is similarity of attitudes or beliefs, the interaction is perceived as being rewarding and a positive reinforcement of shared attributes. Correspondingly, if dissimilar individuals interact, negative reinforcement results from communication difficulties and uncomfortable feelings. For example, Riordan and Shore (1997) in an examination of the effects of demographic similarity of work groups (i.e., gender, race/ethnicity, and tenure) on employee attitudes (i.e., commitment, productivity, and perceptions of opportunities for advancement), found that demographic similarity between an individual and his/her work group was associated with perceptions of greater group productivity, higher levels of commitment to the group, and perceptions of increased opportunities for advancement.

The underlying rationale for this theory is partially explained by social categorization in that individuals, motivated to maintain a positive self-identity, seek out and interact with similar others in order to reinforce those attributes that are key in self-identification. Thus, similarity/attraction paradigm and social categorization theory yield comparable predictions—similarity will be sought, lead to more positive evaluations, more frequent interactions, and greater satisfaction. Likewise, dissimilarity will result in less positive evaluations, less frequent communication, a higher likelihood of turnover, and lower levels of satisfaction (Jehn, Northcraft, & Neale, 1999; O'Reilly, Snyder, &
Boothe, 1993; Riordan & Shore, 1997). Although this theory yields similar predictions as social categorization model, the key difference is that Byrne's model posits that interaction is essential for judgments and evaluations to occur.

**Information/Decision-making Framework**

The final theoretical approach, information/decision-making framework, investigates how the exchange of information and the decision-making process can be affected by group diversity (e.g., Gruenfeld, Mannix, Williams, & Neale, 1996). By being based partly on the similarity/attraction paradigm, this theory also takes into account the effects of similarity on how group members interact. Given the propensity for similar individuals to interact more with each other and not with dissimilar others, groups composed of similar individuals may fail to capture all information possessed by members (Gigone & Hastie, 1993) as they focus only on shared, rather than unique, attributes and information. In contrast, dissimilarity of group members is expected to bring novel and unique information, skills, abilities, and knowledge to the group as members realize the diversity that exists and how it can maximize group performance. Unlike the previous two models, the information/decision-making framework approaches the effects of diversity on group functioning by focusing on how social categorization judgments regarding the amount and variety of information, skills, abilities, and knowledge possessed by group members affect the performance of the group. For example, Tziner and Eden's (1985) field study of three-man tank crews addressed the fundamental assumption of this model—that diversity (of abilities in this case) enhances performance of groups, despite potential process loss associated with group heterogeneity. In that study, it was found that group productivity was positively related
to the *summed* abilities of all group members rather than specific individual abilities. Considering that the process loss associated with diversity was not factored into the research design, it is clear that diversity of abilities had an overall positive effect on group performance.

In total, each of these theories attempts to explain the effects of diversity on group processes and performance. Although group diversity research has long used these theories to ground the findings of how diversity may affect the functioning of groups, there is a key aspect common to all three theories that has been grossly overlooked. Even though the theories differ in significant ways, each relies on the underlying idea of the need for individuals to subjectively evaluate and make judgments about the similarity of themselves to the group. By nature, what comprises these evaluations is uniquely determined by each individual. This subjective, perceptual decision that each individual makes when faced with a social interaction is the basis for future behavior of that individual toward other group members. Therefore, consideration of the effects of diversity on group functioning necessitates that research must take into account the critical role of the subjective evaluation that is involved in determining salient social categories, and the making of similarity judgments, which ultimately affect behavior and therefore, group functioning.

A Conceptual Framework

As subjective (perceptual) diversity has never been included in the traditional approach of examining the effects of diversity on group functioning, there has been no organizing model that accurately conceptualizes or captures the potential independent effects of both objective and subjective diversity. Thus, in order to clearly conceptualize
this new approach to group diversity, the model in Figure 2 shall serve as the guiding framework for this research.

As is clear, objective and subjective diversity are treated as distinct concepts and are proposed to have independent effects on both group processes and outcomes. Group diversity literature has been, up to this point, aimed at examining the links between objective diversity and group processes (Link 2), objective diversity and group outcomes (Link 3), and group processes and outcomes (Link 4). Whereas these links have been extensively researched, the links involving subjective diversity have not been explored. Thus, consideration of this approach to group diversity proposes the addition of three links to the model: the differentiation of objective and subjective diversity (Link 1), subjective diversity’s effect on group processes (Link 5), and subjective diversity’s influence on group outcomes (Link 6). Through the inclusion of these substantive links, the effects of diversity on group functioning are expected to be more readily discernable. Therefore, the following sections will, in-depth, explore each of the links in order to outline the rationale underlying the hypotheses, which state that there are independent effects of objective and subjective diversity on the group processes of cohesion, communication, and conflict and the outcome of performance.

*Link 1. Differentiation of Objective and Subjective Diversity*

The importance of objective diversity has been highlighted in group diversity literature and is fundamental to the theories on which diversity is grounded. However, the importance of subjective diversity, an individual's perceptions of heterogeneity, has only been anecdotally mentioned, but never purposefully or directly assessed. Researchers such as Blau (1977), Tsui and colleagues (1995) have noted that perceptions of diversity
Figure 2. Hypothesized Conceptual Framework for Differentiation of Diversity
may be a relative phenomenon and that demographic attributes may not hold the same
meaning or importance for all people. The realization that diversity may be relative to
the situation or individual contradicts the traditional, "objective," operationalization of
the concept in group literature. In this traditional approach, group heterogeneity has been
determined by using a simple "counting" approach to identify what proportion of the
group belongs to one category versus another. Whereas this counting, objective method
provides a standardized index of heterogeneity; conceptually, perceptual judgments of
diversity are not differentiated from the mere presence of diversity.

Despite some recognition for the importance of a person's perceptions and
judgments of heterogeneity (O'Conner 1998), research has failed to conceptually and
empirically differentiate between objective and subjective diversity. For example, work
by Campion, Jeon and their colleagues (1993, 1996, 1999) noted the importance of
multiple information sources, such as "self-perceptions, observer perceptions, and
objective measures" (1993, p. 825) when examining groups, but in practice only utilized
subjective self-report questions to measure group heterogeneity and value diversity.
Furthermore, even though the researchers obtained what are considered subjective
ratings, the findings were compared to those of studies using more objective measures of
diversity.

In response to this lack of conceptual distinction between actual and perceptual
diversity, de Chermont and Quiñones (2003) made an initial theoretical and empirical
differentiation between these two conceptualizations. Through a controlled experimental
design in which both objective and subjective measures of diversity were obtained in
parallel form, the researchers were able to directly compare the standard measures of
diversity (objective) to the perceptual judgments of group diversity (subjective). Results demonstrated that what group members “saw” as the diversity of their group (subjective) was not necessarily equivalent to the index of diversity that was obtained via the traditional “counting” approach (objective). The relational strength between subjective and objective measures of group diversity was dependent on the observability of the feature, with more apparent aspects (e.g., sex, race) giving rise to stronger relations between the two types of diversity. Additionally, the point at which subjective diversity measurement was taken influenced its relation with objective diversity. That is, subjective diversity demonstrated a closer relation with objective diversity later in group functioning as compared to earlier. The researchers were able then to conclude that individuals’ perceptions of group diversity (subjective) were not equivalent to the heterogeneity that was actually present (objective) in that group, but rather that each is an independent conceptualization of the group diversity.

Thus, by drawing support from the work of de Chermont and Quiñones (2003) as well the theoretical bases provided by the above-discussed models, it is expected that the current research will replicate the findings that objective and subjective diversity are distinct conceptualizations of diversity.

H1: Objective and subjective diversity are related, but not identical conceptualizations of diversity.

*Links 2 and 3. Effect of Objective Diversity on Group Processes and Performance*

In formulation of the hypothesized model of how objective and subjective diversity relate to group functioning, objective diversity will be framed in the organization of the Jackson et al. (1995) model with task-relatedness and observability
dimensions being utilized. By using this framework, the findings of past research will be reviewed and proposed effects of objective diversity on group cohesion, communication, conflict, and performance will be delineated.

*Objective Task-Oriented Diversity*

Task-related diversity refers to heterogeneity on the dimensions more directly connected to the task performance of a group (i.e., Simons et al., 1999; Pelled, 1996; 1996b). Simons and colleagues (1999) argue that the concept of job-relatedness or task-orientedness is theoretically important as it details whether differences on a specific dimension will increase the task-related knowledge, skills, and abilities that facilitate more effective team performance.

*Functional background.* Functional background is defined by one’s workplace experiences, exposure to domain-specific knowledge and skills, and tenure with the organization (Pelled, Eisenhardt, & Xin, 1999). Research examining the influence of functional background diversity on group functioning has specifically focused on its impact on conflict, communication and performance. For example, Pelled and colleagues (1999) conducted a study of 45 cross-functional project teams and found the hypothesized positive effect of functional background diversity on intragroup task conflict. Likewise, functional background diversity and group communication have been examined under the tenets of the information processing/decision-making framework. The premises that groups comprised of dissimilar persons will communicate more frequently and share unique information were supported both by Glick, Stasser, and colleagues (1995; 1993) in their examinations of functionally diverse top management teams (TMTs) and groups.
However, the relations between functional background diversity and innovation, performance and effectiveness are not as unambiguous. For example, Bantel and Jackson (1989) found that functionally diverse TMTs were more administratively innovative, whereas Ancona and Caldwell (1992) found that functional diversity had a direct negative effect on management-rated innovation. Similarly, Smith and colleagues (1994) found no relation between TMT functional diversity and performance, but Korn and colleagues (1992), by using increase return on assets as the performance measure, examined furniture and software industry TMTs and found a positive effect in the furniture industry, but not software.

**Experience.** Group heterogeneity of industry-related or task-specific experience has not been as extensively examined as it has often been intertwined with tenure diversity. Hoffman and Maier (1961) suggested that experiential diversity has the potential to add to the number of perspectives available to a group and to allow for production of novel approaches to tasks/problems. Empirical work has demonstrated that TMT experiential diversity is positively associated with organizational growth (Eisenhardt & Schoonhoven, 1990), but negatively related to returns on investments (Smith et al., 1994). The research of Smith et al. (1994) also highlighted that heterogeneity of experience does not seem to have an impact on the social integration of the group directly, but rather, heterogeneous experiences can lead groups to use more formal communication, which results in lessened social integration. Both social categorization theory and similarity/attraction paradigm support this finding as each model states that dissimilarity leads to distance between group members, which in turn, can lead to the use of more formal communication patterns.
Knowledge, skills, and abilities (KSAs). Group diversity of knowledge, skills, and abilities has been found to have a positive effect on performance. This is most true when the tasks assigned to the group are diverse, require a broad range of competencies, or are disjunctive in nature (Gladstein, 1984; Shaw, 1981; Steiner, 1972). The work of Jehn and colleagues (1999), in an examination 545 members of formally designated work units of a top household goods moving company, found that knowledge diversity increased team effectiveness. Campion, Medsker, and Higgs (1993) went further and addressed the possible need for a minimum skill level in order for groups to benefit from diversity by asking group members to assess the variety of areas of expertise, experiences, and skills/abilities that existed in their group. With results indicating no relation between heterogeneity and effectiveness, the researchers concluded that their measure might have assessed the variation in skill levels, rather than a variation of skills. Williams and O’Reilly (1998), in their review, stated that the failure to determine the relation between KSA diversity and group performance/effectiveness may be a limitation of the measurement of KSA heterogeneity rather than a solid empirical finding.

Summary of Task-Oriented Diversity and Hypotheses. This model proposes that task-relevant diversity will more directly affect the ability of a group to perform a given task. That is, the diversity of functional background, experience, knowledge, skills, and abilities will have a direct effect on the performance of the group. As discussed, task-oriented diversity has been found to have a positive influence on the performance of the group especially when the tasks assigned to the group are diverse and require a broad range of competencies (Gladstein, 1984; Shaw, 1981). Given the relatively consistent findings regarding the role of objective task-oriented diversity in group performance and
the theoretical groundwork on which it is based, the current research expects similar findings.

H2a: Objective task-oriented diversity will have the largest impact (as compared with objective relations-oriented, subjective task-oriented and subjective relations-oriented diversity) on group performance.

Further, objective task-oriented diversity is proposed to be related to task conflict. Although conflict has typically been considered a more social aspect of group functioning, Pelled and colleagues (1999) differentiated between two distinct components of conflict: task conflict and emotional conflict. Task conflict occurs when group members disagree about task-related issues, including procedures, goals, and decisions (Jehn, 1994). Following the previous research findings, it is expected that more job-related diversity dimensions have a greater effect on task conflict (Jehn et al., 1997; Pelled et al., 1999). Thus, task-oriented diversity should have direct influence task conflict, just as it influences the performance of the task itself.

H2b: Objective task-oriented group diversity will have a positive effect on task conflict.

Objective Relations-Oriented Diversity

As Sessa and Jackson (1995) suggest, relations-oriented attributes form the context of more general social relationships and are less directly associated with group objectives. Thus, in examination of the group processes, it is essential to consider the relations-oriented aspects of group diversity. Further, Pelled and colleagues (1996, 1999) also consider diversity attributes (e.g., age, gender, race) to be less germane to the group’s task, but have pointed out the essentiality in considering these dimensions
because impermeable attributes are more likely to be used to form judgments which can affect future behavior and likelihood of interaction.

*Age.* Age heterogeneity, while being frequently examined, was at one time not considered conceptually distinct from tenure diversity. However, age diversity is has been considered distinct in later research (Tsui et al., 1992), as individuals born at similar times may develop similar outlooks on life and shared experiences, which not necessarily related to similarity in tenure. The relation between age diversity, turnover and absenteeism has been found quite reliably with greater age diversity typically being related to higher levels of turnover and absenteeism (Jackson et al., 1991; O’Reilly et al., 1989). Furthermore, O’Reilly, colleagues, and others (1989; Cummings, Zhou, & Oldham, 1993) have found that the member most different in age from their work group is the most likely to turnover. Similarly, Tsui and colleagues (1992), in an examination of 151 groups from manufacturing plants, hospitals, and a Fortune 100 company, found that age heterogeneity was negatively related to commitment, attachment, and comfort levels. Furthermore, age diversity has been negatively linked to relational conflict (Pelld, 1996b) and positively associated with the frequency of technical communication (Zenger & Lawrence, 1989).

These findings highlight that age diverse groups are likely to experience relations-related problems, which is predicted by social categorization model and similarity/attraction paradigm. In contrast, the expectation of the information processing/decision-making framework that age diversity would lead to differences in perspectives or knowledge useful for group performance has not been widely supported by the literature.
Gender. Similarly, the same contradictory predictions apply to the role that
gender diversity may play in group functioning with findings supporting the social
categorization model and the similarity/attraction paradigm. The negative effects of
gender diversity include: decreased number of interactions (Chatman, Polzer, Barsade, &
Neale, 1998); increased number of uncomfortable feelings and decreased attachment
(Tsui et al., 1992); and higher levels of conflict, especially in terms of emotional and role

However, research has found that the effects of gender diversity on group
processes are nonsymmetrical. Tsui and O’Reilly (1989) in their study of industrial,
hospital, and organizational teams found a negative association between gender diversity
and commitment for men, but for women the association was positive. Similar effects
have also been found when considering the gender distribution of groups. Sackett and
colleagues (1991) found that if the gender composition of the group consisted of less than
20 percent women, the women received lower performance ratings than men, but when
women were in the majority (greater than 50 percent), they were rated higher than men.
However, there were no proportionality effects for men.

In sum, although this research points to the negative effects of gender diversity,
there have been studies that do tout the benefits of gender differences (Hoffman & Maier,
1961; LePine, Hollenbeck, Ilgen, Colquitt, & Ellis, 2002). The relative importance of
gender diversity has also been debated with Riordan and Shore (1997) finding that group
gender diversity was not related to outcomes (i.e., commitment, productivity,
cohesiveness), while Cummings and colleagues (1993) were able to show that
heterogeneity of gender in groups had a larger impact on performance than educational background or tenure diversity.

*Race.* Despite the quantity and quality of research that has been devoted to racial diversity, the findings reveal a very complex picture. Under the same model predictions that contradictory suggest both positive and negative effects of racial diversity, support has been found for both stances. Hoffman (1985) demonstrated that racial diversity was negatively associated with the frequency of interpersonal communication and positively associated with the amount of formal communication when increasing the black representation at the supervisory level of 96 federal civilian installations. Further, racial diversity has been related to increased occurrence of uncomfortable feelings, lowered attachment, increased absenteeism, increased relational conflict and decreased commitment (Pelled, 1996b; Tsui et al., 1992). Nevertheless, racial diversity has been positively linked to creativity, ability to implement plans and ideas, and consideration of a wider range of perspectives and alternatives (O’Reilly, Williams, & Barsade, 1998; Watson, Kumar, & Michaelsen, 1993). Additionally, Cox and colleagues (1991) examined the differences between Anglo, Black, Hispanic, and Asian Americans who were assigned to either a diverse or all-Anglo groups for a Prisoner’s Dilemma task and found that the minority groups demonstrated significantly more cooperative behavior than the homogeneous (all Anglo) groups.

Much like the findings of gender diversity, there are also complex and nonsymmetrical effects of racial diversity. Chatman and colleagues (1998) linked racial diversity to increased levels of productivity despite decreased levels of interaction, just as Kirchmeyer and Cohen (1992) found that racially heterogeneous groups produce higher
quality ideas despite greater task conflict. Furthermore, nonsymmetrical effects of racial diversity for whites and minorities have been found with whites experiencing greater negative effects than nonwhites when in the minority (Tsui et al., 1992). Likewise, Espinoza and Garza (1985) found, in a study of Anglo- and Hispanic-American students, that members were equally cooperative when their group was in the majority, but Hispanics were more and Anglos less competitive when in the minority.

Although many of the findings point to the potentially detrimental effects of racial diversity (as predicted by the social categorization model and similarity/attraction paradigm), there still exists the possibility, supported by limited evidence, that racial diversity may be beneficial to groups as predicted by the information processing/decision-making framework. However, the key seems to be overcoming the potential group process losses often associated with racial diversity.

*Personality.* As personality diversity has not been an extensively researched topic, Driskell, Hogan, and Salas (1988) speculated that this deficit of research might be due to the lack of consensus on the measurement of personality. With the five-factor model emerging as a defensible organization of personality traits, research has begun to link the Big 5 traits (i.e., extraversion, emotional stability, agreeableness, conscientiousness, and openness to experience) and performance at the individual level. Barrick and Mount's (1991), as well as Hough's (1992), meta-analyses found that conscientiousness (which Hough broke into achievement and dependability), emotional stability, and agreeableness were positively related to performance.

However, untangling the effects of personality on group performance brings up the issue of the way in which group personality composition should be framed. One
approach, which Neuman and colleagues (1999) dubbed Team Personality Elevation (TPE), is conceptualized as the “team’s mean level on a particular personality trait or set of personality traits” (p. 30). TPE of conscientiousness, agreeableness, openness to experience and emotional stability was related to increased performance (Barrick, Stewart, Neubert, & Mount, 1998; Neuman et al., 1999). Additionally, Barrick and colleagues (1998), via mediation analyses, found that groups having TPE of extraversion and emotional stability were “more likely to experience positive intragroup interactions and thereby become more socially cohesive” (p. 388). A second approach, the complementary team personality diversity (TPD) model, suggests that group performance will improve with team members’ personality diversity (Muchinsky & Monahan, 1987, Neuman et al., 1999). Just as elevation on certain dimensions was beneficial, TPD of extraversion and emotional stability was associated with better performance, whereas TPD of conscientiousness was negatively related to performance (Barrick et al., 1998; Neuman et al., 1999). Further, teams without a very low-conscientious member reported less conflict, more communication, and more workload sharing, whereas teams without any particular disagreeable or introverted members were higher performing (Barrick et al., 1998)—suggesting that agreeableness and extroversion may be important for predicting group performance on additive tasks.

Values. Perhaps the least considered diversity dimension has been values (also referred to attitudinal) diversity. Like personality, there has historically been a lack of consensus on what dimension and measures best capture the concept of values, which makes comparison of findings and generalizations challenging. Despite the limited research, early work found that that value heterogeneity was positively associated with
group creativity (Triandis, Hall, & Ewen, 1965; Willems & Clark, 1971). However, most subsequent research has not found positive effects of value diversity. In fact, Jehn and colleagues (1999) suggested that “the diversity associated with values, and not social category, causes the biggest problems in and has the greatest potential for enhancing both workgroup performance and morale” (p. 758). Mielkino and colleagues (1989) found that worker satisfaction and commitment were greater when their values were congruent with, not dissimilar from, the values of their supervisors and that the effect was strongest for longer tenured employees. In the same vein, Jehn & colleagues (1999) found that value diversity was associated with decreased satisfaction, intent to remain, and commitment to the group. Moreover, Jehn et al. (1999) demonstrated that value diversity moderated the effect of information diversity on actual performance and efficiency; that is, informational diversity was less beneficial to the group when there was greater value diversity.

In sum it appears that value diversity has the potential to be very detrimental to group functioning. Considering the predictions of the social categorization model and similarity/attraction paradigm, the logic of these findings is sound—dissimilarity on values, which have been deemed salient, leads to judgments and behavior that does not promote positive group functioning. The point raised by Jehn and colleagues that values may be more fundamental than social categories is interesting in that social categories may or may not represent true underlying differences whereas values do. However, there has not been sufficient research to substantiate the claim regarding the centrality of values to the operation of groups.
Summary of Relations-Oriented Diversity and Hypotheses. In total, relations-oriented diversity is essential to the functioning of the group, specifically with regard to the social aspects of group interaction and group processes. Specifically, Pelled et al. (1999) pointed out the necessity for considering the relations-oriented dimensions of diversity in the examination of group functioning as both social categorization model and similarity/attraction paradigm predict that impermeable attributes are more likely to lead to social categorizations, which affects how group members interact, which in turn affects group functioning. Following this logic, many researchers have found effects of relations-oriented diversity features on social aspects of group interaction such as communication, conflict, and cohesion (Jehn, 1994; Hoffman, 1985; O’Reilly et al., 1989; Zenger & Lawrence, 1989). Relying on findings of the direct effect of objective relations-oriented diversity on the social interaction of a group as well as the predictions of the similarity/attraction paradigm and the social categorization model, similar findings are expected. That is, the independent effect of objective relations-oriented diversity will be greater on the group processes of conflict, cohesion, and communication than performance.

With regard to the effect of relations-oriented objective diversity on conflict, the key aspect is the consideration of emotional conflict. Eisenhardt and colleagues (1997) define emotional conflict as interpersonal clashes between group members that are often accompanied by frustration, anger, and other negative feelings. As this conflict is interpersonal in nature, rather than task-related, less job-related dimensions of diversity have been shown to have a more direct positive effect on emotional conflict (Pelled et al.,
Thus, the greater the objective relations-oriented diversity, the greater the amount of emotional conflict present in a group.

**H3a:** Objective relations-oriented group diversity will have a positive effect on emotional conflict.

Further, cohesion is also affected by relations-oriented diversity. In this research, cohesion is conceptualized as the degree to which group members are attracted to one another (Shaw, 1981) or "attraction to the group, satisfaction with other members of the group, and social interaction among the group members" (O’Reilly et al., 1989, p. 22). Given these conceptualizations of group cohesion, it is simple to understand how the effects objective relations-oriented diversity on cohesion can be explained by the tenets of the similarity/attraction paradigm. In fact, the model proposes that groups that are more homogeneous should exhibit greater levels of cohesion than heterogeneous groups, support for which has been found by a variety of researchers (O’Reilly et al., 1989; Smith et al., 1994; Wiersema & Bantel, 1992). Thus, it is hypothesized that the greater the objective relations-oriented diversity, the less cohesion will be felt by the members of the group.

**H3b:** Objective relations-oriented diversity will have a negative effect on group cohesion.

The ways in which objective relations-oriented diversity can influence group communication entails examining the specific communication dimensions of frequency and the task-relatedness of comments. According to the social categorization model and the similarity/attraction paradigm, judgments of dissimilarity should lead to avoidance or negative reinforcement of interaction with dissimilar others, lessening communication
frequency. In fact, research has repeatedly found that relations-oriented heterogeneity (e.g., gender, race) leads to less frequent interactions (Chatman et al., 1998; Hoffman, 1985). Thus, it is expected that greater objective relations-oriented diversity will result in less frequent interactions and less evenly distributed communication among group members.

H3c: Objective relations-oriented diversity will have a negative effect on the frequency of communication and a negative effect on the distribution of communication among group members.

Similarly, it is necessary to consider the amount of group communication that is relevant to the task as opposed to non-task topics. According to the information processing/decision-making framework, groups comprised of dissimilar others will be more likely to share unique information, presumably task-related, in order to perform the task (Stasser, Stewart, & Wittenbaum, 1995). Furthermore, the predictions of the social categorization model and the similarity/attraction paradigm point to the likelihood of reduced social communication between dissimilar others (Zenger & Lawrence, 1989). Thus, groups comprised of relations-oriented diverse persons will be more likely to discuss task-relevant topics than non-task topics.

H3d: Objective relations-oriented diversity will have a positive effect on the amount of task-relevant communication of the group.

Link 4. Effect of Group Processes on Group Outcomes

Along with the effects of objective diversity on group processes and outcomes, the effect of group processes on outcomes has been extensively examined. With the aim of reviewing literature relevant to the current study, this section will only highlight
findings pertaining to the group processes/outcomes: conflict, cohesion, communication, and performance. First, task conflict, has been shown to have a positive effect on performance, whereas, emotional conflict has the opposite effect (Jehn et al., 1997; Pelled et al., 1999). However, further evidence suggests that the type of task affects the benefit of task conflict (Jehn, 1995). That is, in groups that perform routine tasks, group functioning actually suffers when there is task conflict, whereas, in groups that perform nonroutine tasks, the effect of task conflict has been found to be nonsignificant or even positive (Jehn, 1995). As for cohesion, Mullen and Copper's (1994) meta-analysis of the link between group cohesiveness and performance found a positive effect that was "highly significant and of small magnitude" (p. 210). These researchers noted the complexity of previous findings (e.g., Summers, Coffelt, & Horton, 1988; Stogdill, 1972) and the multitude of conceptualizations of cohesion, but were still able to determined that the effect of cohesion on performance was being driven by one cohesion dimension—"commitment to task." Later work has differentiated between task and interpersonal cohesion and found that groups high in both task and interpersonal cohesion had the highest performance on a creative task (Craig & Kelly, 1999). Finally, the link between communication and performance has been studied to a lesser extent by group diversity researchers. However, research has found that communication frequency has a positive effect on team outcomes such as performance (Brannick, Roach, & Salas, 1993). In sum, there appears to be a positive effect of task conflict, cohesion and communication frequency on group performance as well as a negative effect of emotional conflict.
Links 5 and 6. Effect of Subjective Diversity on Group Processes and Performance

Having now explored the links between objective diversity and group processes and outcomes, it is necessary to consider what effects subjective diversity will have on group functioning (Links 5 and 6). However, as no research has separately examined the effects of objective and subjective diversity on group functioning, there is a lack of both the theoretical and empirical work. Nevertheless, by drawing from the theoretical arguments, as presented thus far and previous research findings, the effect of subjective diversity on group functioning will be hypothesized. Further, it will be assumed, for simplicity and parallelism that subjective diversity can be thought of in the same structure as objective, in that it too has task and relations-oriented features.

Subjective Task-Oriented Diversity

Subjective task-related diversity refers to the perceived heterogeneity of dimensions more directly connected to the task performance of a group. Given that task-related dimensions, such as knowledge and skills, are more directly necessary for completion of tasks, the role of subjective diversity is proposed to be independent from, yet secondary to, the effect of objective task-oriented diversity. The most critical factor influencing performance is whether the group has the actual information, skills, experience, or knowledge needed to complete the task. Given this, performance will be most influenced by the objective task-oriented diversity. Subjective task-oriented diversity may also be related to group performance but is a lesser way. For example, image that two group are assigned the task of designing a bridge, a task for which it would be essential to have architectural skills, design knowledge, or engineering experience. The first group possessed these skills (objective task-oriented diversity),
whereas the second group did not. However, each group, in subjective diversity ratings, perceived that the necessary skills were present in their group. In the end, the first group (with objective task-oriented diversity) was more successful at designing the bridge than the second group (who only perceived task-oriented diversity). That is, simply perceiving task-related group diversity is not sufficient to enhance the task performance of the group—it is vital that the group actually have the needed task-related information, skills, or experience to successfully perform.

H4: Subjective task-oriented diversity will be positively related to group performance.

Subjective Relations-Oriented Diversity

Whereas subjective diversity is expected to play a secondary role to objective diversity when considering task-related dimensions and functions, a much greater impact of subjective diversity is expected when considering the social, or relational, aspects of group functioning. In review, objective relations-oriented diversity has been found, and is predicted here, to have a greatest effect on the social aspects of group life (H3a–H3d). However, the addition of subjective relations-oriented diversity adds a key component to the model. Given that subjective evaluation of the relations-oriented diversity in a group necessitates that each person identify the salient characteristic, evaluate other group members on this feature, and form a "perception" of the group diversity, this process is directly predicted by the social categorization model, the similarity/attraction paradigm, and the information processing/decision-making framework. Despite the theoretical importance of considering perceptions, the only empirical evidence has been provided by de Chermont and Quiñones (2003). This research established that the relation between
objective and subjective relations-oriented diversity was variable and dependent on observability of the feature and the amount of time the group had been together. Coupled with the suggestion by Ferris and Judge (1991) that often people react on the basis of what they perceive, rather than reality, this suggests that subjective relations-oriented diversity may play a larger role in group processes than objective relations-oriented diversity. That is, personal evaluations of the relation-related differences exist in the group (subjective) will have an effect even after accounting for the effects of objective diversity.

H5: Subjective relations-oriented diversity will have the largest impact (as compared with objective relations-oriented, subjective task-oriented and subjective relations-oriented diversity) on group processes of conflict, cohesion, and communication.

With regard to the effect of subjective relations-oriented diversity on the specific group processes of conflict, cohesion, and communication, objective relations-oriented group diversity was hypothesized as being positively related to the amount of emotional conflict and communication formality and negatively related to the level of cohesion and communication frequency and distribution. Following the rationale just laid out regarding the role of subjective relations-oriented diversity in the social functioning of the group; the same pattern of effects is expected when considering conflict and cohesion. As the literature has shown that greater objective relations-oriented diversity is related to greater emotional conflict and lower cohesion (Pelled et al., 1999), so should be the effect of subjective relations-oriented diversity on emotional conflict and cohesion. Using the theory that behavior is driven by our perceptual reality, it is expected that subjective
relations-oriented diversity will have a positive effect on emotional conflict. Likewise, subjective relations-oriented diversity will have a negative effect on cohesion.

H5a: Subjective relations-oriented diversity will be positively related to emotional conflict.

H5b: Subjective relations-oriented diversity will be negatively related to cohesion.

By the same rationale, there are expected effects of subjective relations-oriented diversity on group communication, specifically frequency and task-relatedness. First, with regard to the effects of diversity on the frequency of communication in groups, research has demonstrated that objective relations-oriented diversity is likely to result in less frequent interactions among group members which supports the theoretical idea that similarity/attraction judgments lead to positive and negative reinforcements of interactions depending on the judgment of homogeneity. Therefore, subjective relations-oriented diversity will have a negative effect on the frequency and distribution of communication.

H5c: Subjective relations-oriented diversity will be negatively related to frequency of communication and negatively related to the distribution of communication among group members.

Likewise, the predictions of social categorization model and the similarity/attraction paradigm point to the likelihood of reduced social communication between dissimilar others (Zenger & Lawrence, 1989) and the information processing/decision-making framework suggests dissimilar others will be more likely to share unique information as it relates to the task. Given this, the effect of subjective relations-oriented diversity on the
occurrence of task and non-task related communication is expected to mirror that of objective relations-oriented diversity. Specifically, subjective relations-oriented diversity will have a positive effect on amount of task-relevant communication.

H5d: Subjective relations-oriented diversity will be positively related to amount of task-relevant communication in the group.

**Summation**

In sum, it is expected that this research will replicate certain findings regarding the role of objective diversity in group functioning as well as extend the theoretical and empirical work by examining the independent role that subjective diversity and objective diversity play in the functioning and performance of a group. Specifically, it is hypothesized that both objective and subjective diversity have independent and unique effect on group functioning. In particular, objective task-oriented diversity is expected to have the greatest effect on the task-related aspects of group functioning—task conflict and performance. Likewise, subjective relations-oriented diversity is expected to exert the greatest effect on the relational aspects of group functioning—conflict, cohesion, and communication. However, for each group process and outcomes, it is expected that by simply considering the independent effects of objective and subjective diversity a more complete understanding of the role of diversity in groups will be possible.

**Methodology**

*Experimental Task and Participants*

Forty-six groups of 3-4 persons each performed a simulation task in which participants together represented a small toy manufacturing company (simulation adapted from Shaw’s (1963) Group Task Inventory as described in Vanderslice, Rice, & Julian,
As representatives of this company, each group was challenged to successfully complete a series of administrative and performance tasks which included creation of a company name, vision statement, strategic policies as well as supply requisition forms and actual building of toy models according to predefined specifications using Erector Set parts.

The 46 groups (3-4 persons per) were composed of 176 participants who ranged in age from 17 to 52 years, with a mean age of 21.1 years (σ = 4.95 years). Additionally, 38.1% were male (N=67) and 54% were Caucasian (N=95), 11.9% African American (N=21), 8.5% Hispanic (N=15), 15.3% Asian-American (N=27), and 10.2% self identified as “other” racial/ethnic groups. Further, 44.3% (N=78) of the participants self-identified as social science majors, 18.8% humanities (N=33), 15.3% natural science (N=27), 17% engineering (N=30), and 4.5% undecided (N=8).

Procedure

Participants were allowed to freely sign up for experimental slots and no experimental manipulation of diversity was used in order to allow for maximal and natural variation on dimensions of group diversity that were of interest to the this research. After the participants had signed the informed consent statement, the experimenter briefly outlined the simulation for the group. Participants were informed that the group’s performance would be determined by their efforts on both the administrative and building tasks. After completion of objective diversity measures, the each participant completed the first subjective diversity measure prior to beginning the first phase of the simulation. Subsequently, Phase I of the simulation began and the group had 20 minutes to work together to develop a company name; write a corporate
vision statement; delineate company policies on diversity issues, work organization, performance evaluation, and compensation (see Appendix A); and decide how many Erector Set toy scooter models (each group was given the assembly instructions for reference) they expected to be able to assemble in the 20-minute building phase and requisition the necessary parts via the request form (Appendix B). Post-Phase I, each participant completed the second subjective diversity measure while the experimenter examined the supply request form and prepared the number of toy model sets requested by the group for the building phase. Next, the goals of Phase II (20 minutes) were given to each group (maximize profit by building as many models as possible) and to enhance variation between the groups, the experimenter did not instruct the groups how to structure the assembly of models, but only gave brief, necessary directions. Each group was then given tool sets, assembly instructions, and the requested number of model sets for construction. At the completion of Phase II, the participants completed the final subjective diversity and group process measures while the experimenter examined the toy scooters for accuracy, counted the incomplete models, and computed the profit. The participants were then thanked and debriefed.

Measures

*Objective Diversity.* To assess the objective diversity of each group, each participant completed a demographic questionnaire, a personality measure, values assessment, cognitive ability test, and mechanical reasoning ability evaluation. The demographic questionnaire (Appendix C) consisted of items relating to surface-level diversity attributes such as age, sex, race, grade point average, and functional background
(major). This measure also contained three questions assessing the individual’s experience with the Erector Sets.

**Personality.** The personality measure (Appendix D) consisted of 50 items measuring the 5 factors of neuroticism ($\alpha = 0.889$), extraversion ($\alpha = 0.878$), openness to experience ($\alpha = 0.749$), agreeableness ($\alpha = 0.771$), and conscientiousness ($\alpha = 0.749$). The measure was adapted from the International Personality Item Pool (2001), which provides free, web-accessible, personality assessment tools.

**Values.** The values assessment (Appendix E) was taken from the work of Smith and colleagues (2002) and consisted of 64 items (59 retained after scale reliability analyses) measuring 10 values: need for affiliation ($\alpha = 0.571$), aestheticism ($\alpha = 0.694$), benevolence ($\alpha = 0.872$), economic orientation ($\alpha = 0.879$), hedonism ($\alpha = 0.673$), need for power ($\alpha = 0.777$), scientific orientation ($\alpha = 0.738$), need for status ($\alpha = 0.860$), need for security ($\alpha = 0.639$), and traditionalism ($\alpha = 0.819$).

**Cognitive and Mechanical Ability.** Cognitive ability was assessed with the Wonderlic Personnel Test (Form IV) according the specifications provided with the assessment. Mechanical ability ($\alpha = 0.716$) was ascertained via a shortened form (35 items, 31 retained after reliability analysis) of the Mechanical Reasoning sub-test (Form V) of the Differential Aptitude Tests (Bennett, Seashore, & Wesman, 1982).

**Indices of Objective Group Diversity.** To create within-group indices of diversity on the various components of objective diversity measured, the coefficient of variation (standard deviation/mean) was used. The selection of this index was based on both the precedence set by prior diversity literature (e.g., Harrison, Price, & Bell, 1998; Bantel & Jackson, 1989; Jackson et al., 1991) as well as the simplicity and clarity that the measure
offers for comparison to subjective diversity indices (see next section). Thus, a within-group coefficient of variation was computed for each group on each dimension of objective diversity.

For the features that were categorical in nature (i.e., race, gender, and major), a different approach was taken as the coefficient of variation is not appropriate for categorical data. For gender, male and female dummy coded variables were created and then the total number of males was divided by the group size to create a “percent male” index and likewise a “percent female” index of gender diversity. These were then combined such that higher numbers represented more gender diversity and lower numbers represent groups in which there was less gender diversity.¹ Likewise, the same procedure used to create an index of racial diversity. Given that 54% of the sample self-identified as Caucasian, it was decided that racial diversity would be a simple split between Caucasian and the other racial categories summed to allow for maximum variation (e.g., Ibarra, 1995; Tsui et al., 1995). Therefore, race was dummy coded into “Caucasian” and “Other” indices of racial diversity and then the indices were aggregated such that higher numbers represented more diversity. Finally, major was dummy coded into “natural science/engineering” and “non-science” as that was decided to be the natural division for using major as a index of functional background. The resulting indices were also combined such that higher numbers indicated greater functional background diversity.

¹ Gender diversity, as well as the other categorical variables of race and major, in this research were conceptualized in the following manner. For a 4 person group, the most diverse group is one that is comprised of 2 males and 2 females. Likewise, a homogeneous group, with respect to gender, is one that has all males or all females.
Subjective Diversity. Following the work of de Chermon and Quiñones (2003), the subjective diversity measure was in parallel structure and equivalent specificity to the objective diversity dimensions. The questions were framed in the following manner: "How would you describe the composition of people in your group with respect to [given dimension]?" Responses were given on a 5 point scale, from very dissimilar to very similar (Appendix F). All responses were reverse coded so that higher scores indicated perceptions of greater diversity to allow for ease of comparison to objective diversity indices.

In order to directly compare subjective diversity to objective diversity, it was necessary to aggregate the individual subjective diversity responses to the group level. Typically, aggregation requires agreement of a sufficient level to justify the upward averaging. However, given the nature of the construct of subjective diversity as being an individual's perception of their group's diversity, conceptually agreement may not be present as individuals are likely to perceive and conceptualize diversity differently. To take into account both the subjective diversity at the group level and the disagreement among group members regarding their perceptions of diversity, two measures were calculated. Following the lead of Schneider and colleagues (2002), a mean was calculated for each group on each dimension of subjective diversity to represent the average subjective diversity of that group. Further, a standard deviation was calculated to represent the degree of disagreement about each dimension of subjective diversity for each group. Thus, the result was two sets of information for each, the mean level of each dimension of subjective diversity and the disagreement among group members regarding the same dimensions.
Group Processes. Group conflict was measured using Jehn's (1995) 8-item scale that assessed both task and emotional conflict (Appendix G). However, rather than confirming the 2 factor structure presented by Jehn (1995), factor analysis revealed a simple one factor solution ($\alpha = 0.773$, accounted for 54.2% of variance). Cohesion was measured with a 5 item scale ($\alpha = 0.827$) that was originally developed by Seashore (1954) and extensively used in group diversity literature (e.g., O'Reilly, Caldwell, & Barnett, 1989) with wording adapted to this research context (Appendix H). As there were no readily available measures of group communication that fit the research context, scales were developed (see Appendix I for items) to assess the overall frequency of communication (4 items, $\alpha = 0.795$), the proportion of time spent discussing task versus non-task topics (used $z$-scores due to differences in response scales between items to compute mean score; 5 items, $\alpha = 0.816$), and the distribution of speaking among group members (3 items, $\alpha = 0.865$). When aggregating to the group-level, group processes were computed by taking the average across group members.

Group Performance. A self-report measure of group performance consisting of 4 items (3 items revised, $\alpha = 0.881$) was developed to pertain directly to the tasks utilized in this experiment (see Appendix J for items). Performance was aggregated to the group-level by taking the average across group members. Additionally three independent raters, blind to hypotheses, coded the Phase I products (company name, vision statement, and policies) for creativity (O'Quin & Besemer, 1989), novelty and overall performance with sufficient interrater agreement ($0.670 \leq \alpha \geq 0.881$, mean $\alpha = 0.788$). Further, it was noted that there were significantly high correlations between the creativity, novelty and performance ratings and a factor analysis revealed the presence of only one factor
(94.778% of variance accounted for). Therefore the differentiation between the three components could not be made and the ratings of creativity, novelty, and performance were averaged for each of the three coders. Further, the composites were examined for interrater reliability ($\alpha = 0.847$) and then averaged to create one overall creativity-performance score for each group. For Phase II, performance was operationalized in three ways: cost of requested models (number requested * $5.60), gross profit (number completed *$10.00), and net profit (gross profit minus cost).

Results

Preliminary Analyses

Examination of the effects of diversity on group processes and outcomes necessitated analysis at the group level. As previously mentioned, the coefficient of variation and related heterogeneity measures were computed for each dimension of objective diversity. Likewise, means and standard deviations were computed for each dimension of subjective diversity to reflect both the average level of and disagreement regarding those dimensions. Subsequently, it was necessary to create 4 summary indices of diversity in order to test the hypotheses set forth by this research. These 4 indices were (1) objective task-oriented diversity, (2) objective relations-oriented diversity, (3) subjective task-oriented diversity, and (4) subjective relations-oriented diversity. Task-oriented diversity, both objective and subjective respectively, was composed of functional background, cognitive ability, and mechanical ability diversity. In contrast, relations-oriented diversity, both objective and subjective, was composed of age, racial, gender, personality, and values diversity. Each index was composed of the sum of the diversity on the components contained within that classification.
For both objective task- and relations-oriented diversity, first the dimensional diversity scores were standardized due to differences in scaling between continuous and categorical variables and then summed to creative the overall indicators. For subjective task-oriented and relations-oriented diversity, it was first necessary to deal with the multiple measures of subjective diversity that were obtained during the experimental procedure. First, a repeated-measures ANOVA was performed separately for each dimension of subjective diversity to compare differences in subjective diversity across the three measurement points (pre-interaction, post-Task I, and post Task II). Results revealed a moderate number of significant differences (9 of 21 analyses). Examination of these tests revealed that in most cases, the greatest change in perceptions occurred from Time I to Time II, which intuitively makes sense. Given that Time I perceptions were pre-group interaction; the information on which these judgments were based is questionable. It was decided that the Time I subjective diversity judgments were not the best reflection of the true diversity perceptions of the group members given that the ratings were done prior to interaction, and thus were eliminated from further analyses. Subsequently, paired t-tests comparing Time II and Time III subjective diversity judgments revealed only 3 of 21 paired comparison were significantly different (subjective diversity of: functional background \( t(45) = 2.212, p = .039 \); openness to experience \( t(45) = 2.281, p = .027 \); and extraversion \( t(45) = 2.257, p = .029 \) and all but 1 pair (subjective diversity of need for stability) were significantly correlated (average \( r = 0.533 \)). Given these limited differences and in order to create an index that captured the overall picture of subjective diversity over the lifespan of the group, the group means of subjective diversity for Time II and Time III were averaged to create one measure of
subjective diversity. From there, the subjective task and relations-oriented diversity indices were created by summing up the appropriate dimensions.

Thus, the result of the preliminary analyses was the creation of the 4 indices of diversity: objective task-oriented, objective relations-oriented, subjective task-oriented and subjective relations-oriented. In order to attempt to examine the effects of this type of aggregation, additional information will be provided regarding the contributions of the dimensional components of these diversity indices when appropriate.

Main Analyses

The overriding question driving this research was if objective and subjective diversity would be differentially related to group processes and outcomes. Of particular interest was the importance of subjective diversity for predicting group outcomes. Thus, to test this overarching hypothesis hierarchical regression analyses were used to address each of the hypotheses. The one control variable, group size, was first entered into each regression equation. In the next 4 stages, the diversity indices (objective task-oriented, objective relations-oriented, subjective task-oriented, subjective relations-oriented) were entered separately to determine the independent contributions of each toward the group process or performance of interest. The results are presented below.

The means, standard deviations, and correlations among all independent, dependent and control variables (at the group level) are presented in Table 1. Initial support for Hypothesis 1, which predicted that objective and subjective diversity were two conceptualizations of diversity, was obtained in that objective and subjective diversity are correlated, but not perfectly (average $r = .257$).
### Table 1

**Means, Standard Deviations, and Intercorrelations**

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<td>0.189</td>
<td>0.172</td>
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<td>0.355*</td>
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<td>0.064</td>
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<td><strong>Task II Cost</strong></td>
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<td>0.201</td>
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<td>0.225</td>
<td>0.174</td>
<td>0.160</td>
<td>0.142</td>
<td>0.507**</td>
<td>0.124</td>
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<td><strong>Task II Gross Profit</strong></td>
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<td>29.420</td>
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<td>0.057</td>
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<td>27.363</td>
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<td>0.065</td>
<td>0.063</td>
<td>0.084</td>
<td>0.697**</td>
<td>0.098</td>
<td>-0.340**</td>
<td>0.658**</td>
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<tr>
<td><strong>Conflict</strong></td>
<td>1.952</td>
<td>0.402</td>
<td>0.149</td>
<td>0.035</td>
<td>0.023</td>
<td>0.272</td>
<td>0.226</td>
<td>0.256</td>
<td>0.370</td>
<td>0.438**</td>
<td>0.164</td>
<td>0.127</td>
<td>-0.205</td>
<td>0.329*</td>
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<tr>
<td><strong>Cohesion</strong></td>
<td>3.256</td>
<td>0.349</td>
<td>0.496**</td>
<td>0.054</td>
<td>0.077</td>
<td>0.242</td>
<td>-0.115</td>
<td>-0.194</td>
<td>-0.181</td>
<td>0.382**</td>
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<td>0.037</td>
<td>0.164</td>
<td>-0.383**</td>
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<tr>
<td><strong>Task-Related Communication</strong></td>
<td>0.005</td>
<td>0.494</td>
<td>-0.078</td>
<td>0.027</td>
<td>0.192</td>
<td>0.033</td>
<td>-0.162</td>
<td>0.035</td>
<td>-0.159</td>
<td>0.233</td>
<td>0.006</td>
<td>0.147</td>
<td>0.332*</td>
<td>0.230</td>
<td>-0.389**</td>
<td>0.134</td>
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<tr>
<td><strong>Communication Frequency</strong></td>
<td>3.156</td>
<td>0.614</td>
<td>0.291*</td>
<td>-0.173</td>
<td>0.033</td>
<td>-0.018</td>
<td>0.068</td>
<td>-0.087</td>
<td>0.079</td>
<td>0.128</td>
<td>0.197</td>
<td>-0.060</td>
<td>0.038</td>
<td>0.093</td>
<td>0.060</td>
<td>0.391**</td>
<td>0.417**</td>
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<tr>
<td><strong>Communication Distribution</strong></td>
<td>2.906</td>
<td>0.527</td>
<td>-0.523**</td>
<td>-0.092</td>
<td>0.136</td>
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<td>-0.389</td>
<td>0.139</td>
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<td>0.092</td>
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<td>0.053</td>
<td>0.236</td>
<td>0.171</td>
<td>0.166</td>
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</table>

*Standardized Scores

* p < .05

** p < .01
The results will be discussed according to the manner laid out previously, such that the various links of the proposed model will be examined systematically by considering the effects of objective task-oriented diversity, objective relations-oriented diversity, subjective task-oriented diversity and subjective relations-oriented diversity on group processes and performance. The results of each hierarchical regression analysis to be discussed are presented in Table 2.

**Objective Task-Oriented Diversity.** The first set of listed hierarchical regression equations (1 for each performance measure) involved the examination the effects of the 4 indices of diversity on group performance. Hypothesis 2a predicted that objective task-oriented would have the largest impact on group performance. From Table 2, it is clear that only limited support, at the p < .10 level, for hypothesis 2a was found; objective task-oriented diversity has a negative impact ($\beta = -.294, p = .075$) on gross profit (Task II performance) ($\Delta R^2 = .074, p = .075$). For no other measure of performance did objective task-oriented diversity significantly contribute. Thus, since objective task-oriented diversity did not systematically relate to performance in the way predicted, hypothesis 2a was not fully supported.

Further, hypothesis 2b predicted that objective task-oriented group diversity would have a positive effect on task conflict. As is clear in Table 2, objective task-oriented diversity did not explain any unique variance in conflict ($\Delta R^2 = .001, p = .859$). Therefore, hypothesis 2b was not supported.

**Objective Relations-Oriented Diversity.** Hypotheses 3a through 3d predicted relations between objective relations-oriented diversity and group processes based on previous research findings. Specifically, hypothesis 3a predicted that objective relations-
### Table 2
Hierarchical Regression Analyses Relating Diversity to Group Functioning

<table>
<thead>
<tr>
<th></th>
<th>Objective Task-Oriented</th>
<th>Subjective Task-Oriented</th>
<th>Objective Relations-Oriented</th>
<th>Subjective Relations-Oriented</th>
<th>Total $R^2$</th>
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</thead>
<tbody>
<tr>
<td><strong>Group Performance</strong></td>
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<tr>
<td>Performance Ratings</td>
<td>.046</td>
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<td>.030</td>
<td>-.181</td>
<td>.011</td>
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<tr>
<td>Task I Pfm/Creativity</td>
<td>.004</td>
<td>-.067</td>
<td>.002</td>
<td>.064</td>
<td>.009</td>
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<tr>
<td>Task II Cost</td>
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<td>.137</td>
<td>.039</td>
<td>.220</td>
<td>.054</td>
</tr>
<tr>
<td>Task II Gross Profit</td>
<td>.023</td>
<td>-.163</td>
<td>.033</td>
<td>.231</td>
<td>.005</td>
</tr>
<tr>
<td>Task II Net Profit</td>
<td>.074+</td>
<td>-.294+</td>
<td>.001</td>
<td>.060</td>
<td>.015</td>
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<td><strong>Group Processes</strong></td>
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<tr>
<td>Conflict</td>
<td>.001</td>
<td>-.066</td>
<td>.078+</td>
<td>.257</td>
<td>.001</td>
</tr>
<tr>
<td>Cohesion</td>
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<td>.162</td>
<td>.058+</td>
<td>-.084</td>
<td>.001</td>
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<tr>
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<td>.001</td>
<td>.122</td>
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<tr>
<td>Communication Frequency</td>
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<td>.002</td>
<td>.052</td>
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<td>Communication Distribution</td>
<td>.004</td>
<td>.005</td>
<td>.006</td>
<td>.227</td>
<td>.060*</td>
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</tbody>
</table>

+ p < .10
* p < .05
** p < .01

Objective and Subjective Group Diversity

45
oriented group diversity would have a positive effect on emotional conflict. The results in Table 2 indicate that objective relations-oriented diversity was not related to conflict ($\Delta R^2 = .001, p = .842$). Therefore, hypothesis 3a was not supported.

Further, hypothesis 3b predicted that objective relations-oriented diversity would have a negative effect on group cohesion. Again, the results indicated that, rather, there was no significant effect of objective relations-oriented diversity on cohesion ($\Delta R^2 = .001, p = .775$). Hypothesis 3c related objective relations-oriented diversity to decreased communication frequency and more unequal distribution of communication among group members. As for the first part of the hypothesis, objective relations-oriented diversity to decreased communication frequency, no support was found ($\Delta R^2 = .016, p = .394$). However, for the relation between objective relations-oriented diversity and greater dissimilarity of percentage of total communication contributed by each group member, support was found ($\Delta R^2 = .060, p = .054$). That is, as objective relations diversity increased, the distribution of communication (percentage of total communication contributed by each person) became more unequal, providing partial support for hypothesis 3c. Finally, hypothesis 3d predicted that objective relations-oriented diversity would be positively related to the amount of task-relevant communication in the group. As evidenced in Table 2, no such relation was found ($\Delta R^2 = .050, p = .149$).

Subjective Task-Oriented Diversity. The role of subjective task-oriented diversity was hypothesized to be secondary to that of objective task-oriented diversity, but generally relating to performance in a similar manner. Specifically, hypothesis 4 related that subjective task-oriented diversity would be positively related to group performance. Over the various measures of group performance, however, subjective task-oriented
diversity has no significant effect on performance, as shown in Table 2. Thus, hypothesis 4 was not supported.

Although unpredicted, subjective task-oriented diversity was found to be positively related to conflict ($\Delta R^2 = .078, p = .053$). That is, as group members perceived more task-oriented diversity, the occurrence of group conflict was more likely. Additionally, a limited, at the $p < .10$ level, negative relation was found between subjective task-oriented diversity and group cohesion ($\Delta R^2 = .058, p = .068$). Specifically, as subjective task-oriented diversity increased, the cohesion of the group decreased.

*Subjective Relations-Oriented Diversity.* The role of subjective relations-oriented diversity was anticipated to have the largest impact on group processes. Specifically, hypothesis 5a posited that subjective relations-oriented diversity would be positively related to emotional conflict. However, no effect of subjective relations-oriented diversity was seen on amount of group conflict ($\Delta R^2 = .003, p = .728$).

Hypothesis 5b predicted that subjective relations-oriented diversity would be negatively related to cohesion. Examination of Table 2 reveals strong support for this hypothesis ($\Delta R^2 = .083, p = .025$). That is, as perceived diversity of relations-oriented features increased, group cohesion decreased ($\beta = -.401, p = .025$). Additionally, subjective relations-oriented diversity by far had the largest impact on cohesion as was predicted by hypothesis 5.

Subsequently, hypothesis 5c predicted that subjective relations-oriented diversity would be negatively related to the frequency and distribution of communication among group members. No support was found for the relation between subjective relations-
oriented diversity and communication frequency ($\Delta R^2 = .001, p = .839$). However, limited support, at the $p < .10$ level, was found for the relation between subjective relations-oriented diversity and distribution of communication ($\Delta R^2 = .046, p = .090$). That is, as more diversity of relations-oriented dimensions was perceived, the distribution of communication among group members became more unequal ($\beta = -.297, p = .091$). Finally, hypothesis 5d projected that subjective relations-oriented diversity would be positively related to the amount of task-relevant communication present in the group. However, no support was found for this hypothesis ($\Delta R^2 = .019, p = .371$).

*Group Processes to Group Performance.* To further explore the proposed model, the link between group processes and group performance was examined. Again, hierarchical regression analyses were employed to test for the effects of group processes on group performance. Further, group size was controlled for by entering it into the first step and then the group processes were entered subsequently. Table 3 displays the results. There was a strong relation between conflict and performance ($\Delta R^2 = .223, p = .001$), such that as conflict increased performance decreased ($\beta = -.402, p = .022$). Furthermore, increased conflict was also related to task II performance (net profit) ($\Delta R^2 = .108, p = .028$). In contrast, there were no effects of cohesion on performance as is evident in Table 3. However, the percentage of communication that was task-focused was positively related, at the $p < .10$ level, to the number of models requested (Task II cost) ($\beta = .331, p = .081$). Additionally, the percentage of communication spent on task was positively related to the number of models completed (Task II gross profit) ($\beta = .427, p = .023$). That is, groups that spent more of the communication effort discussing the task were more likely to request more models and actually complete more models.
Finally, communication frequency was positively related to Task I performance (creativity) ($\Delta R^2 = .097, p = .034$). Specifically, group that communicated more overall were more likely to perform successfully creatively on Task I (name, vision statement, policies) ($\beta = .396, p = .034$).

**Summary.** In sum, only partial support for hypotheses was found. In particular, objective task-oriented diversity was only limitedly related to task performance and subjective task-oriented diversity did not demonstrate the hypothesized positive relation to task performance. However, subjective task-oriented diversity did display some of the hypothesized relations. Specifically, greater subjective task-oriented diversity was associated with greater conflict and less cohesion. Likewise, the hypothesized relations between objective relations-oriented diversity and group processes did not evidence in the exactly the manner predicted. The only link between objective relations-oriented diversity and group processes was with communication distribution, such that greater objective relations-oriented diversity was related to greater inequality of communication distribution.

Further, subjective relations-oriented diversity was expected to display the greatest impact on group processes, but in only 2 of the 5 processes measures did this occur. In fact, subjective relations-oriented diversity was only strongly negatively related to group cohesion and somewhat negatively related to the distribution of communication among group members. Examination of the links between group processes and performance revealed that conflict was negatively related to performance as well as the Task II performance (net profit). Furthermore, as communication among group members centered more on the tasks, the more building set requested and build. Additionally, the
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<td>0.046</td>
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<td>0.009</td>
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<td>0.083</td>
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<td>Task II Gross Profit</td>
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<td>0.200</td>
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<td>Task II Net Profit</td>
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<td>0.129</td>
<td>0.108*</td>
<td>-0.284</td>
<td>0.001</td>
<td>-0.084</td>
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</table>

+ p < .10
* p < .05
** p < .01
overall frequency of communication between group members was positively related to performance on Task I.

Ancillary Analyses

There were two main issues that were thought to be potential causes for the lack of predicted findings. First, was concern over the use of the aggregation method to create indices of diversity at the task- and relations-level. Second was the issue of the disagreement within groups regarding perceptions of diversity. Each concern was addressed with additional analyses, which are presented here.

Aggregation and level of specificity for subjective diversity. In spite of these promising findings, there were many hypothesized relations that were not found to be significant. One possible reason for the limited findings was thought to the use of the indices of diversity (objective and subjective task- and relations-oriented) and potential issues surrounding the aggregation. It was thought that perhaps the dimensions that composed each index of diversity might be differentially related to group processes and performance in such a way that the summation masked these connections. To examine the relation of the dimensional component to group processes and performance, a correlation analysis was performance and the results are presented below in Table 4. From Table 4, it is clear that there were differential relations between the dimensions of subjective task- and relations-oriented diversity and group processes and performance. In particular, the personality components of conscientiousness and agreeableness and the value dimension, benevolence, exhibited the strongest relations with group processes and performance. This suggests that perhaps not all dimensions of subjective diversity are equally influential in determining the effects of subjective diversity on group functioning.
| Objective and Subjective Group Diversity | 52 |

**Table 4**

<table>
<thead>
<tr>
<th>Correlations Matrix: Subjective Diversity Dimensions and Group Processes/Performance</th>
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<td><strong>Objective Task-Oriented</strong></td>
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<tr>
<td>Cognitive Ability</td>
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<tr>
<td>0.16</td>
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<tr>
<td>Mechanical Ability</td>
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<tr>
<td>Openness to Experience</td>
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<td>Conscientiousness</td>
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<td><strong>Group Processes/Performance</strong></td>
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<td>Cooperation</td>
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<tr>
<td>Distribution</td>
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<td>0.09</td>
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</table>

*P < .05, **P < .01*
Further examination of Table 4 reveals that within the a single indicator of processes or performance, not all subjective diversity measures are consistently related. For example, the correlations among subjective diversity dimensions and performance range from -.242 to .271 and between subjective diversity and communication frequency, from -.192 to .237. This variance in the relation between the dimensions of subjective diversity and group functioning may help to clarify why the effects previously discussed were not found in the manner or strength predicted. That is, summation across the task-oriented and relations-oriented dimensions of subjective diversity to create indices compound the dimensional diversity relations to group functioning in such a way that there is a wash-out of results.

Another approach to this same issue was to use the subjective diversity ratings that were at a higher, more general level of group diversity. In the original questionnaire that each group member completed regarding their perceptions of subjective diversity within their group, the final question asked them to rate the overall diversity of their group. For the following analyses, this index of diversity was aggregated to the group level by the same procedure used up to this point and a mean score was created to index the average overall subjective group diversity and a standard deviation was computed to represent the disagreement. Subsequently, another set of hierarchical regression analyses were performed in which group size was entered in the first step as a control variable, then the objective diversity indices, then the subjective overall diversity index. Results are presented below in Table 5. These results indicate that this overall subjective diversity judgment explained unique variance in both group conflict ($\Delta R^2 = .100$, $p =$
Table 5
Hierarchical Regression Analyses Using Overall Subjective Diversity as Predictor

<table>
<thead>
<tr>
<th></th>
<th>Group Size</th>
<th>Objective Diversity</th>
<th>Subjective Diversity</th>
<th>Subjective Disagreement</th>
<th>Interaction Sub Div x Disagreement</th>
<th>Total Δ R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>0.037</td>
<td>0.058</td>
<td>&lt;.001</td>
<td>0.040</td>
<td>0.006</td>
<td>0.142</td>
</tr>
<tr>
<td>Task I Performance</td>
<td>0.040</td>
<td>0.013</td>
<td>0.010</td>
<td>0.021</td>
<td>0.016</td>
<td>0.101</td>
</tr>
<tr>
<td>Task II Cost</td>
<td>0.011</td>
<td>0.079</td>
<td>&lt;.001</td>
<td>0.011</td>
<td>0.001</td>
<td>0.102</td>
</tr>
<tr>
<td>Task II Gross Profit</td>
<td>0.003</td>
<td>0.010</td>
<td>0.012</td>
<td>0.007</td>
<td>0.006</td>
<td>0.037</td>
</tr>
<tr>
<td>Task II Net Profit</td>
<td>0.001</td>
<td>0.060</td>
<td>0.012</td>
<td>0.031</td>
<td>0.003</td>
<td>0.107</td>
</tr>
<tr>
<td>Conflict</td>
<td>0.022</td>
<td>0.003</td>
<td>0.100*</td>
<td>0.119**</td>
<td>0.072*</td>
<td>0.316*</td>
</tr>
<tr>
<td>Cohesion</td>
<td>0.246**</td>
<td>0.001</td>
<td>.153**</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>.400**</td>
</tr>
<tr>
<td>Task Comm.</td>
<td>0.006</td>
<td>0.050</td>
<td>0.033</td>
<td>0.019</td>
<td>0.076+</td>
<td>.370**</td>
</tr>
<tr>
<td>Comm. Frequency</td>
<td>0.085*</td>
<td>0.052</td>
<td>0.006</td>
<td>0.012</td>
<td>0.012</td>
<td>.184</td>
</tr>
<tr>
<td>Comm. Distribution</td>
<td>0.274**</td>
<td>0.061</td>
<td>0.006</td>
<td>0.002</td>
<td>0.028</td>
<td>.166</td>
</tr>
</tbody>
</table>

+ p < .10
* p < .05
** p < .01
.036) and group cohesion (ΔR2 = .153, p = .002). This parallels the previous findings and suggests that the level of specificity at which subjective diversity is capture is an issue that warrants further examination.

*Role of subjective diversity disagreement.* Another possible reason for the limited findings was thought to be the nature of the measurement of subjective diversity and the potential role of within group disagreement. That is, given that subjective diversity is inherently a self-generated conceptualization of diversity, it may be possible that members within each group were wildly disparate in their perceptions of diversity, particularly for non-surface attributes. Could this disagreement itself be related to group processes and outcomes? It was hypothesized, post-hoc, that disagreement among group members may lead to greater process loss (i.e., conflict, lack of cohesion, less frequent communication) than was predicted by subjective diversity alone.

To test this post-hoc hypothesis, indices of disagreement were created to parallel the 2 subjective task-oriented and relations-oriented diversity indices. This was done by summing the standard deviations previously computed across the same diversity dimensions as the objective counterparts. Means, standard deviations, and correlations for these measures are included in Table 1. Following, hierarchical regression equations were constructed such that group size was entered first as a control variable, then the objective diversity measures, then subjective diversity measures, then the two disagreement indices, and finally the two interaction terms (subjective diversity x disagreement for both task-oriented and relations-oriented) in the final step. Results are presented in Table 6. As addition of the disagreement indices further explained unique
<table>
<thead>
<tr>
<th></th>
<th>Group Size</th>
<th>Objective Diversity</th>
<th>Subjective Diversity</th>
<th>Subjective Disagreement</th>
<th>Interaction Sub Div x Disagreement</th>
<th>Total Δ R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>0.037</td>
<td>0.058</td>
<td>0.029</td>
<td>0.021</td>
<td>0.034</td>
<td>0.179</td>
</tr>
<tr>
<td>Task I Performance</td>
<td>0.040</td>
<td>0.013</td>
<td>0.004</td>
<td>0.027</td>
<td>0.045</td>
<td>0.129</td>
</tr>
<tr>
<td>Task II Cost</td>
<td>0.011</td>
<td>0.079</td>
<td>0.034</td>
<td>0.062</td>
<td>0.038</td>
<td>0.224</td>
</tr>
<tr>
<td>Task II Gross Profit</td>
<td>0.003</td>
<td>0.010</td>
<td>0.083</td>
<td>0.118+</td>
<td>0.054</td>
<td>0.269</td>
</tr>
<tr>
<td>Task II Net Profit</td>
<td>0.001</td>
<td>0.060</td>
<td>0.048</td>
<td>0.024</td>
<td>0.013</td>
<td>0.147</td>
</tr>
<tr>
<td>Conflict</td>
<td>0.022</td>
<td>0.003</td>
<td>0.079</td>
<td>0.114+</td>
<td>0.021</td>
<td>0.239</td>
</tr>
<tr>
<td>Cohesion</td>
<td>0.246**</td>
<td>0.001</td>
<td>0.142*</td>
<td>0.017</td>
<td>0.024</td>
<td>0.430**</td>
</tr>
<tr>
<td>Task Comm.</td>
<td>0.006</td>
<td>0.050</td>
<td>0.021</td>
<td>0.010</td>
<td>0.022</td>
<td>0.428**</td>
</tr>
<tr>
<td>Comm. Frequency</td>
<td>0.085*</td>
<td>0.052</td>
<td>0.002</td>
<td>0.017</td>
<td>0.017</td>
<td>0.102</td>
</tr>
<tr>
<td>Comm. Distribution</td>
<td>0.274**</td>
<td>0.061</td>
<td>0.055</td>
<td>0.015</td>
<td>0.009</td>
<td>0.165</td>
</tr>
</tbody>
</table>

+ p < .10
* p < .05
** p < .01
variance, at the p < .10 level, in two separate models: gross profit (number of models completed) (ΔR² = .118, p = .069) as well as conflict (ΔR² = .114, p = .075).

A parallel set of analyses was performed using the overall subjective diversity rating previously discussed and results are presented in Table 5. The findings in that analysis indicated that the disagreement on the overall subjective diversity rating predicted, above and beyond both objective and subjective diversity, unique variance in group conflict (ΔR² = .119, p = .016). Further, the interaction between subjective diversity and disagreement was significant for conflict as well (ΔR² = .072, p = .050; β = 2.198, p = .050). Specifically, this interaction suggests that the level of conflict was greatest in those groups in which both there were perceptions of dissimilarity and there was disagreement among group members on their perceptions.

In many respects, both sets of analyses, at the task and relations-oriented index level and at the overall subjective diversity level, produce similar findings. However, the results are not completely parallel. For example, when using the indices of diversity, there were no interaction (subjective diversity x disagreement) effects on group functioning as were present with the overall subjective diversity judgments. As a result, two fundamental questions are raised. First, is the distinction between task and relations-oriented diversity appropriate for the conceptualization of subjective diversity? Second, what is the role of the level of measurement and specificity on capturing subjective diversity? Both questions are critical for understanding the role of subjective diversity and necessitate additional research.
Discussion

The purpose of this study was to empirically differentiate between the conceptualizations of objective and subjective group diversity and to measure and examine the independent effects of each on group processes and performance. In the proposed model, various links between diversity, group processes, and group performance were hypothesized. Through measurement of both objective and subjective diversity in parallel, as well as the capturing of group processes and performance each of the links was able to be examined empirically.

Link 1. Differentiation of objective and subjective diversity. The first hypothesized link was that objective and subjective diversity are theoretically and empirically distinct conceptualizations of group diversity. The results of simple correlational analyses revealed that indeed, objective and subjective diversity were not completely overlapping conceptualizations. Additionally, support presented below for the existence of the other links in the model serves to augment the distinction between the two.

Link 2. Effect of objective diversity on group processes. The second hypothesized link was between objective diversity and group processes. Given the vast amount of research that has examined the various links between diversity and group processes, the hypotheses here were simply to replicate previous findings. First, it was hypothesized that objective task-oriented diversity would be positively related to task conflict. Despite measurement of both task and emotional conflict (Jehn, 1995), the resulting construct did not reveal the two factor structure as intended. Instead, the conflict measurement items reduced to a single one-factor solution. Therefore, the
differentiation of the two types of conflict could not be examined. However, this general conflict measure was used as a substitute for intended task and emotional conflict scales. The results indicated no relation between objective task-oriented diversity and conflict. Thus, these results did not replicate the findings of other research that has suggested that task-related diversity is positively associated with increased task conflict (e.g., Jehn et al, 1997; Pelled et al., 1999).

Second, it was hypothesized that objective relations-oriented diversity would have an effect on the conflict, cohesion and communication within the group. Results indicated that objective relations-oriented diversity was not related to conflict, cohesion, communication frequency, or task-relevant communication, contrary to predictions. However, it was found that more dissimilarity on relations-related dimensions was linked to greater inequality in communication (distribution), suggesting that groups homogeneous on relations dimensions of diversity (i.e., age, race, sex, values, personality) would be more likely to have every member equally contribute to group communication.

**Link 3. Effect of objective diversity on group performance.** The link between objective diversity and group performance was hypothesized to be a positive one for the relation of objective task-oriented diversity. Results indicated only partial support for this hypothesis in that objective task-oriented diversity was somewhat related to Task II performance. However, rather than a positive relation, it was found that as objective task-oriented diversity increased, the overall performance on Task II decreased. Additionally, objective task-oriented diversity was not significantly related to any of the other performance measures. One potential explanation for the negative relation between
Objective and Subjective Group Diversity

objective task-oriented diversity and Task II performance is that the task was not diverse and did not necessarily require a broad range of competencies, both of which are components that tend to draw out the benefits of task-related diversity (Gladstein, 1984; Shaw, 1981). Thus, given the task of building model scooters, perhaps only mechanical ability was necessary and diversity of this feature led to a detriment, rather than a boost, in performance.

Link 4. Effects of group processes on group performance. The results of the current research indicate a strong effect of conflict on both the ratings of performance and actual Task II performance. Specifically, as conflict increased, both ratings of performance and actual Task II performance decreased. These findings are in line with the hypothesized relation of emotional conflict and performance, but contrary to that of task conflict and performance. However, as Jehn (1995) has previously pointed out, on routine as opposed to non-routine tasks, task conflict is detrimental to group performance as is emotional conflict. The current finding may be an example of this. Even though Task I and Task II differed a great deal on the type of activities the group was engaged in, the systematic building in Task II may have been perceived as routine by the end of the experiment. Thus, any conflict experienced by the groups would have had a negative effect on performance. Additionally, it is possible that the time pressures imposed by the experiment (20 minutes per task) could have also added to the negative relation between conflict and performance. Not having sufficient time to comprehensively work through the tasks perhaps did not allow for the potential benefits of conflict to surface as the processes loss associated with disagreement simply translated into lower performance.
Subsequently, it was hypothesized that the proportion of communication within the group that was task-focused would be positively related to performance. Support for this was found in both the number of models requested (Task II cost) and the number of models completed (Task II gross profit) measures of performance. Specifically, groups who centered more of their communication on the task were marginally more likely to request a greater number of model sets. Further, groups with task-focused communication completed more models than those groups in which the communication included non-task topics. Not surprisingly, this suggests that communication focus may be important in further explaining the variation in group performance. Specifically, groups that stay “on-task” are more likely to both strive toward and actually perform at a higher level than groups in which the communication is often “off-task.”

Additionally, communication frequency was found to be significant related to the performance of the team on Task I. Precisely, as communication frequency in the group increased, so did the performance on the task. Given that the performance measure on this task had a strong creativity component, this may suggest that increased communication is necessary for production of more creative products. This finding further replicates the findings of Brannick and colleagues (1993) who found that communication frequency had positive effects on team outcomes.

Despite these clear connections between group processes and performance, one of the hypothesized relations was not supported by the results. First, cohesion was expected to have a positive effect on performance, but no relation was found. The failure of the current research to replicate this finding may be a result of the use of ad hoc groups that simply do not allow for sufficient time or opportunity for members to form cohesive
bonds. Additionally, as pointed out by Mullen and Copper (1994) in their meta-analytic review of the link between group cohesiveness and performance, there are a multitude of conceptualizations of cohesion. Although this research used a very frequently used measure that is prevalent in group research (Seashore, 1954), it is possible that it did not capture the relevant aspects of group cohesion that are related to group performance, namely “commitment to task” (Mullen and Copper, 1994).

Link 5. *Effect of subjective diversity on group processes.* There was no expected relation between subjective task-oriented diversity and group processes, but the results did indicate a positive link between subjective task-oriented diversity and conflict. That is, as group members perceived greater task-oriented diversity, conflict increased. Further, an unexpected weak link between subjective task-oriented diversity and cohesion was present in the findings. That is, as subjective task-oriented diversity increased, cohesion decreased. Although not anticipated, these results are not contrary to the model presented. It was hypothesized that subjective diversity would be most related to group processes rather than group performance—the social, relational side of group interactions. Although it was thought that the effect would be manifest via subjective relations-oriented diversity, it is possible to understand how subjective task-oriented diversity also plays a role. Perceptions of cognitive ability, mechanical ability, and functional background diversity served alter the way in which the group interacted, such that perceptions of greater diversity led to occurrence of higher conflict and lower cohesion. Both the social categorization theory and the similarity attraction paradigm predict that dissimilar others are less likely to interact, which in turn leads to negatively affected group processes and outcomes. Although, it was hypothesized that this
application would only be true for relations-oriented dimensions of diversity, there is no rationale for not expecting the same effects for the task-oriented dimensions on group processes.

Further supporting these links were the hypothesized effects of subjective relations-oriented diversity on group processes. The strongest effect of subjective relations-oriented diversity was found to be on group cohesion. That is, as perceptions of dissimilarity increased, the cohesion of the group declined, paralleling the findings of subjective task-oriented diversity and cohesion and lending additional support to the theoretical models. Additionally, a weak effect of subjective relations-oriented diversity on the distribution of communication within the group was found. Specifically, as individuals perceived greater relations-related diversity, the more unequal the communication was among group members.

Despite these clear findings supporting the effects of subjective diversity on group processes, other parallel hypotheses were not supported. Particularly, it was found that there were no effects of subjective relations-oriented diversity on the amount of group conflict, communication frequency, or amount of task relevant communication. Although this seems to contradict the previously mentioned findings, it may be that different aspects of subjective diversity were related to the various aspects of group processes. For example, as both Task I and Task II were strongly focused on the completion of the activities and did not allow for much “down time” or socialization among group members, the only source for conflict may have been perceptions of task-related dimensions of functional background, cognitive and mechanical abilities. Thus, although the hypotheses predicted rather uniform effects of subjective relations-oriented
diversity on group processes, the actual effects are more complex and uneven. That is, it may be that subjective task-oriented diversity is just as important as subjective relations-oriented diversity, and that the relation between subjective diversity and group processes is strongly tied to the task. Further, it appears that the effects of subjective diversity are especially seen on group conflict and cohesion.

*Link 6. Effect of subjective diversity on group performance.* The proposed link between subjective diversity and performance was expected to be between subjective task-oriented diversity and performance. However, results did not indicate a significant link between the two. This result suggests that perhaps subjective diversity does not have a direct impact on group performance, but rather it only affects group processes as previously discussed.

*Integration and Revised Framework*

So, was the proposed framework supported? Only in a limited sense. On the links between objective diversity and group processes and outcomes (Links 2 and 3), which were hypothesized on the basis of past research, partial support was found. Particularly, objective task-oriented diversity linked to performance and objective relations-oriented diversity linked to communication distribution. However, neither link was fully supported as both objective task- and relations-oriented diversity only related to one dimension of both group processes and performance. Why the limited findings to support past research? One possible explanation is the type of tasks employed. Although both tasks required the group to work together to produce one final product, Task II permitted the groups to structure work as desired whereas Task I necessitated that the group members work collaboratively to complete the activities. Just by observation of
the group interactions revealed that there was a range of task organization in Task II. That is, some groups worked to assemble the models via an assembly line method with each group member complete a specific part of the model; other groups had only limited interactions as group members individually worked on models; even other groups worked in subunits (i.e., dyads) and assisted each other with building; and finally, some groups were highly interactive throughout the building phase with constant dialogue between members. This variation on Task II structure as coupled with Task I may have mitigated the findings of links between objective diversity and group processes and outcomes in that each group did not have the same “task experience” and thus comparison across groups may be confounding the effects of diversity with the effects of task type. This is an interaction that warrants further research.

Moving forward to Link 4 (group processes to group outcomes); support was found to further bolster that of past research. In particular, conflict was strongly and negatively related to both performance ratings and Task II performance; task-relevant communication was positively related to number of models requested (limited link) and number of models produced; and communication frequency was positively associated with Task I performance. Additionally, there was no effect of cohesion on performance as expected. The specificity of these findings may also be related to the task and methodology used. The strong task-focus of the experiment and the use of ad hoc groups may have served to limit the linkages between processes and performance.

Moving to the subjective diversity to group process and outcome links (Links 5 and 6), it is here in which the main hypotheses of this research were examined. Given that these two links are new and unique to this research; this is the critical piece of the
model. Having said that, the density of findings within these two links further complicates the understanding of these connections.

Link 5 (subjective diversity to group processes) was supported by the following: the positive relation between subjective task-oriented diversity and conflict; a limited negative relation between subject task-oriented diversity and cohesion; a strong negative relation between subjective relations-oriented diversity and cohesion; and a limited negative relation between subjective relations-oriented diversity and distribution of communication. As previously discussed, the strong link here was expected to be between subjective relations-oriented diversity and group processes, not between subjective task-oriented diversity and group processes. However, in reflection on the original predictions of the social categorization model and the similarity/attraction paradigm, the differentiation may be arbitrary. That is, it is the subjective perceptions of group members that are most strongly related to group interaction and processes. What components of those perceptions matter most and which group processes will be most affected is up for debate. In this research with the use of a timed task that focused group members attention and energies to on simply performing the tasks, the role of subjective task-oriented diversity was important in explaining both group conflict and cohesion. Likewise, subjective relations-oriented diversity served to contribute to the explanation of cohesion and communication distribution. These significant findings that subjective diversity explains unique variance that was unaccounted for by objective diversity lends strong support to the overarching hypothesis of this model and to Link 1 in particular. However, given the very uneven findings of the effects of subjective diversity across the various group processes, it will be necessary for future research to begin to determine the
specific mechanisms and processes by which subjective diversity affects group functioning.

Further, the ancillary analyses indicated that there may be an effect of both the levels at which subjective diversity measured and the disagreement among group members on perceptions on group processes—conflict and cohesion in particular. In this research, when the overall subjective diversity measure was employed, results indicated a link between subjective diversity and conflict and cohesion. Although this parallels, the previous findings, the links are much stronger. Additionally, the disagreement in perceptions of diversity marginally predicted group conflict above and beyond both objective and subjective diversity, such that the greater the disagreement the greater the conflict. When the overall subjective diversity measure was used, both an effect of the disagreement and an interaction between subjective diversity and disagreement was found. Thus, this preliminary evidence suggests the importance of this disagreement as an independent contributor in examining the effects of subjective diversity on group processes and further research is needed to address this issue.

An additional hypothesis that may serve to further illuminate the relation between subjective diversity and group processes is one in which there is a feedback loop or reciprocal relation. Rather than assuming that subjective diversity influences group processes in a forward direction only; it may be that group processes, over the course of the group’s lifespan, also serve to influence subsequent subjective diversity ratings. That is, do groups that experience more group process loss (i.e., conflict, lowered cohesion) subsequently perceive greater diversity? Coupled with this potential reciprocal relation between subjective diversity and group processes, there is another factor that may affect
the relation—time. Given that groups in this experiment were together for 1.5 hours and the evidence that the dimensional ratings of subjective diversity were significantly correlated, the impact of more time remains to be tested. With an extended amount of time, would the perceptions of the various dimensions of diversity become more distinct from one another as individuals are able to gain more information about group members? Further, the interactive role of time and the interchange between subjective diversity and group processes is interesting and warrants further examination to tease apart the details. These considerations would propose changes to the original framework such that Link 5 would no longer be a simple unidirectional link from subjective diversity to group processes; instead, consideration of the reciprocal effects as well as the influence of time would need to be considered.

Link 6 (subjective diversity to group outcomes) was not actually supported by the current research as expected. As has been previously discussed, a possible reason for this non-significant link may be due to the notion that perceptions of diversity are more instrumental in determining the ways in which the group will interact, rather than perform. That is, according to the framework laid out by Jackson and colleagues (1995), task-related dimensions of diversity should be more related to the actual performance of the group, whereas the more relational aspects are useful for understanding how the group interacts, which may in turn, may have an indirect effect on group functioning (Sessa & Jackson, 1995). In that framework, this research hypothesized that subjective diversity should mirror the same structure in that perceptions of diversity on task-related dimensions would be more related to performance and perceptions of diversity on relations-related dimensions would be related to group processes. However, the findings
of the current research may suggest that subjective diversity, whether it is referencing task- or relations-related dimensions of diversity, operates through group processes, not performance. That is, perceptions of diversity, themselves, may be “relations-oriented” and that differentiation between task- and relations-related dimensions within subjective diversity may not be as important as with objective diversity.

Summary and Implications

This research began with the basic idea that objective and subjective diversity are distinct conceptualizations of group diversity that have independent effects on group functioning. Through the use of a controlled laboratory experiment involving a series of group tasks, the effects of both objective and subjective diversity were examined. The overall summary of results has a number of implications.

For one, the results lend support to the proposition that objective and subjective group diversity are indeed distinct conceptualizations. This fundamental distinction in and of itself contributes to the current state of the group diversity literature. Simply, it raises questions about the appropriateness of using only objective measures when examining the effects of group diversity. Although most research has used only objective indices of diversity (Riordan & Shore, 1997; Tsui et al., 1995), it is it is clear that this approach is limited. Consideration of this alternative conceptualization of subjective diversity, while adding a layer of complexity, adds to the comprehensiveness of the group diversity-group functioning link.

Second, the results suggest that further theoretical and empirical refinement of the conceptualization of subjective diversity is needed. This research made the first attempt to differentiate between the two and test the independent contributions of each to group
functioning. However, as the results have indicated, the picture is not as clear as predicted. At the most basic level, there is both theoretical and empirical support for the differentiation of objective and subjective diversity. Despite this, the implications are not simple. This research proposed that subjective diversity would manifest itself, independent from objective diversity, as effects on group processes, for which support was found. This further suggests that the distinction between objective and subjective diversity is fundamental to the understanding of the role of diversity in group functioning.

Third, although the hypothesized model suggested that the effects of subjective diversity on group processes would be uniform, the findings suggest another structure. In particular, subjective diversity had the greatest effects on group conflict and cohesion. These findings that subjective diversity is detrimental to group functioning are directly supported by the social categorization model and the similarity/attraction paradigm, but not the decision-making/information-processing framework. This suggests that future research will need to further examine if it is always the case that perceptions of diversity lead to negative group functioning. Further, this raises the question of whether this subjective diversity operates only through certain group processes. Alternatively, the finding of specific relations between subjective diversity and group processes may be a result of the type of task used. In either case, future research is needed to further delineate the effects of subjective diversity on group processes.

Fourth, this research hypothesized that subjective task-oriented diversity would affect group performance, but no such relation was found. In fact, there were no connections between subjective diversity and performance. As discussed previously, this suggests that subjective diversity may not parallel the structure of objective diversity (i.e.,
task versus relations-oriented), but rather the dimensions of subjective diversity have the strongest effect on group processes. That is, these perceptions are not essential in predicting the group’s performance, but are critical in understanding the social interactions and functioning of the group. However, the framework of Jackson and colleagues (1995) also suggests that relational aspects of group diversity may have indirect effects on performance via group interactions. Thus, theoretically, subjective diversity could affect performance via group processes such as conflict or cohesion. However, this is a question for future research.

Limitations and Future Research

This research is an initial attempt to disentangle the conceptualizations of objective and subjective group diversity and the effects on group functioning. Given that, there is only limited precedent in the literature for many of the methodological considerations approached here. Thus, the approach taken by the current study was the best first attempt to study this issue. Therefore, there are bound to be problems and limitations that will need to be addressed in future research.

The most obvious limitation of the current work is one of statistical power. Since the analyses were performed at the group level, the sample size was reduced to 46. As a result of this limited sample size, the decision was made to use the indices of diversity in the analyses rather than the more detailed dimensional measures of diversity. Although that strategy did reduce the number of predictors to 4-6, the overall sample size is still an issue. Given the promising findings of this work, additional research can build upon this produce more sound results with greater sample sizes.
The second potential limitation of the current research was the use of ad hoc groups in an experimental setting, which raises issues of validity and generalizability. There has always been a heated debate in the psychological research about these issues with the trade-offs frequently discussed. With recognition of the trade-offs between lab and field studies, the aims of this research were to establish the differentiation of objective and subjective diversity and examine the independent effects of each on group functioning. Given the sensitivity of subjective diversity to time effects, which was not addressed in this research (see Harrison, Price, & Bell, 1998 for example), it was critical to control the initial acquaintance of the group members and the length of time the group was together in order to eliminate between group differences on these variables. Additionally, it was felt that a controlled laboratory experiment was the first step in examining this research question and later work would take those findings and examine them in a field setting.

On a related note, the type of task employed for this research may be a potential limitation. It is not clear whether the findings presented here would be generalizable to other types of tasks or if some of the findings are task specific. Given the extensive research on task type and the various organizing frameworks discussing tasks (e.g., McGrath, 1984), there is the potential in all of group diversity literature for task effects and this research is no exception. Only further research that examines this framework in setting where groups perform various types of tasks will address this.

Additionally, this research employed both 3 and 4 person groups which may further complicated the results in unanticipated ways. Researchers have long noted the potential and actual effects of group size on both group processes and outcomes (e.g.,
Brewer & Kramer, 1986; de Cremer & Leonardelli, 2003; Weick & Penner, 1966). In particular, the differences in group size have been particularly evident in small groups of 2-4 persons (Weick & Penner, 1966). Examination of the regression analyses previously presented demonstrates that there are significant effects of group size on various group processes and performance. These findings suggest that future research is needed to further define the role that group size plays in the presented framework.

Furthermore, the issue has been raised regarding the role of prior acquaintance among group members on their perceptions of diversity. As no research has measured subjective diversity in this manner, there are no readily available answers. Given the setting in which the research was conducted; it is more than likely that some of the groups were composed of participants who were of varying degrees of acquaintanceship. Within this issue there are various dimensions, such as the degree of acquaintance between group members and the number of group members that are acquainted that may be important.

Another possible limitation of this research concerns the measurement issues surrounding subjective diversity. As no other research has tested a similar model, there is no benchmark for direct comparison of the methodology used in this work. A fundamental question is at what level of specificity subjective diversity should be measured. This research measured it at both the same level as objective diversity and at a more general level for comparison. Results indicated some similarity of findings across both, but also some differences. Again, additional research is needed to examine the effects that the level of measurement specificity has. Related to the specificity issue with subjective diversity measurement is the concern over how to create indices of diversity
that represent larger categories such as task- or relations-oriented diversity. This research
took an additive approach to the issue by creating summed indices of diversity
components to allow for comparison. Despite the complexity in diversity literature and
the multi-leveled manner in which diversity is conceptualized, considerations
surrounding the levels issues have not been widespread.

Finally, an issue confronted is how to aggregate subjective diversity to the group
level for comparison to objective diversity. Given that subjective diversity is inherently
an individual level construct (each person has their own perceptions) and objective
diversity is a group level construct, there are methodological problems for comparison.
This research took the approach of aggregating subjective diversity to the group level
through the creation of two measures—mean level of subjective diversity and a
disagreement index which captured the within-group variability on perceptions. Future
research may be able to address methodological and measurement issues associated with
this approach and find a different means by which to capture subjective diversity.

Conclusions

In summary, despite this study's limitations, the results are important for research
concerning group diversity. First and foremost, this research has made an initial attempt
to theoretically and empirically differentiate between objective and subjective diversity as
well as to examine the effects of each on group functioning. The results suggest that
objective and subjective diversity are not redundant and that each plays a different role in
group functioning. Of particular interest in this research was the role of subjective
diversity, which was shown to be one of independently contributing to the explanation of
both group conflict and cohesion. Practically, this finding is important due to the
potential processes loss associated with increased conflict and decreased cohesion in a
group or team setting. If mere perceptions of dissimilarity are driving more conflict and
lowered cohesion, above and beyond what can be explained by objective diversity, the
implications are significant. For one, this research brings to light the importance of
considering the individual experiences and viewpoints of the group members in
attempting to understand group functioning. Classic group diversity and demography
research has focused on attempting to explain the role of group diversity in group
functioning by using measures of diversity that are “objective” in the sense that they are
abstractions of self-report data to the group level by statistical measures such as the
coefficient of variation. While providing an element of consistency, these measures fail
to capture the subjective experiences of group members and their individualized
perceptions of group diversity. Thus, this research demonstrates that consideration of
both types of diversity is together more fully contribute to the understanding of the
effects of group diversity on group functioning.

This research also highlighted that subjective diversity may not be structured in
the same manner as objective diversity has been conceptualized. Although this research
measured objective and subjective diversity at the same level of specificity, results
indicated that the differentiation between task- and relations- oriented subjective diversity
was not parallel to that of objective diversity. One possibility is that subjective diversity
affects group functioning through group interaction and processes, not through
performance directly. Additionally, the difference in conceptual level of objective and
subjective diversity (individual versus group) is an issue that is brought to light by this
research. This differentiation of “objective” (reality) and subjective (perceptual)
diversity is akin to the idea that individuals operate in their own reality, not true reality; a basic premise of social psychology that has long been disregarded by group diversity research. Future research is needed to examine the structure and methodological issues surrounding the differentiation and measurement of objective and subjective diversity.

Overall, continued research is needed to fully realize and understand the significance of the differentiation of objective and subjective diversity. At a minimum, future research should acknowledge the distinction and realize that consideration of only one “type” of diversity produces a limited view of role that diversity plays in group functioning.
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Appendix A
Task I Stimuli

Company Name

As a group, please decide on a name for your toy manufacturing company and write it in the space below.

______________________________

Company Vision Statement

A vision statement is the beginning of organizational leadership. It provides overall direction and clarifies your purpose in meaning. By referring to it, and internalizing its meaning, you will be more likely to choose behavior that serves your values and reject behavior that opposes them.

The strength of writing an organizational vision statement is three-fold:

1) It will encourage you to clarify the purpose of your company and identify what is really important to the group.
2) It will allow you to clarify and express succinctly your company’s values and aspirations.
3) The integration of your vision statement into your planning will give you a tangible method of keeping that vision before you.

Sample Organizational Vision Statement

For an organization that works with clients:

We are committed to providing our clients with high quality developments and responsive management services and creating enjoyable and productive living and working environments. We are fair, honest, courteous, and professional. We are sensitive to our client’s needs and dedicated to their satisfaction.

Your Company’s Vision Statement:

______________________________

______________________________

______________________________

______________________________
Strategic Policies

In organizing your company, it is essential to ensure that the policies you develop are directly tied to and reflect the overall vision of the organization. As the vision statement enabled you to express and clarify your company’s values and goals, the formation of strategic policies is the first step in transforming your vision statement from simply words to realistic practices. Four key issues that every company must address at its inception are: stance of diversity policy, how work will be structured, how performance will be measured, and how compensation will be determined. You are to develop a policy to address each issue individually. Your policy should reflect the aims of the vision statement, state your company’s position on the issue, and provide some detail of how the policy will be implemented.

Sample Policy

For the policy regarding performance:

As we are a company committed to customer service as well as creating a productive and enjoyable working environment, assessment of performance will be a reflection of this dual purpose. One component of the performance evaluation will be assessed through indices of customer satisfaction with our services. Performance will also be based on supervisory ratings of individual performance to ensure that each person’s work is considered individually. As we want to instill a sense of trust in our employees, we will not use surveillance equipment or other monitoring devices for the purpose of evaluating performance.
**Diversity Policy** – Will your company use an affirmative action policy for hiring? Is diversity important? Is it discriminatory to have such a policy or to not have the policy? What is your rationale for either having or not having such a policy? Will employees at your company benefit from such a policy?

**Structure of Work Policy** – How will your company organize the structure of work? Will it be individual work or group work? Will it be a combination of the both? Will people have many different tasks to do or will each person do one set of tasks?
Performance Policy – How will your company measure and monitor performance? Will it be based on quantity produced or quality of product? Does the opinion of your clients matter? What is best: a supervisor’s rating, self-rating, or peer rating?

Compensation Policy – How will your company compensate its employees? Will pay be based on a pay-for-units-produced system or hourly wages or salaried? Will the compensation be based on individual work, group work, or company performance, or some combination?
Appendix B

Supply Request Form

In the building phase of this task, you will be given **20 minutes** in which you must assemble toy scooters (see attached assembly instructions). The objective is to maximize your profits. You will be able to sell each correctly assembled model to the experimenter for $10.00. However, any pieces that are left or only partially assembled at the end of the task will be considered a loss. Each leftover piece (of which there are 28 per model) will cost you $0.20. So, as a group, determine how many models you plan to build and complete the following request form.

<table>
<thead>
<tr>
<th>SCOOTER</th>
<th># PER MODEL</th>
<th>X</th>
<th># MODELS EXPECT TO MAKE</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td>square nuts---------------------</td>
<td>-------------</td>
<td>X</td>
<td></td>
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<tr>
<td>screws (4 small + 2 large)-----</td>
<td>-------------</td>
<td>X</td>
<td></td>
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<tr>
<td>driving band (tire)-------------</td>
<td>-------------</td>
<td>X</td>
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<tr>
<td>pulley (yellow wheel)-----------</td>
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<td>X</td>
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<tr>
<td>perforated strip (7 holes)-----</td>
<td>-------------</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>perforated strip (3 holes)-----</td>
<td>-------------</td>
<td>X</td>
<td></td>
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<tr>
<td>washers------------------------</td>
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<td>X</td>
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<tr>
<td>axle rod (5cm 2&quot;) (handlebar)</td>
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<td>X</td>
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<tr>
<td>reversed angle bracket---------</td>
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<td>X</td>
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<tr>
<td>spring clip---------------------</td>
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<td>X</td>
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<tr>
<td>angle brackets (135 degrees) (kickstand)</td>
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<td>X</td>
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</tbody>
</table>

**Total= 28**

**Total=**
Appendix C
Basic Information

Age

Sex
○ Male  ○ Female

Race (select all that apply)
○ White  ○ Black  ○ Hispanic
○ Asian American  ○ Other

Major
○ Humanities  ○ Architecture
○ Social Sciences  ○ Engineering
○ Natural Sciences

Grade Point Average (overall)

Have you ever owned an Erector Set?
○ YES  ○ NO

Have you ever played with an Erector Set before?
○ YES  ○ NO

Please indicate how much previous experience you have had using an Erector Set.
○ No experience  ○ Some experience  ○ A lot of experience
Appendix D
Personality Measure

On the following pages are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then write the number of the number on the scale that best reflects your answer.

<table>
<thead>
<tr>
<th>1</th>
<th>Very Inaccurate</th>
<th>2</th>
<th>Moderately Inaccurate</th>
<th>3</th>
<th>Neither Inaccurate or Accurate</th>
<th>4</th>
<th>Moderately Accurate</th>
<th>5</th>
<th>Very Accurate</th>
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</table>

1. Get stressed out easily.
2. Am the life of the party.
3. Don't mind being the center of attention.
4. Change my mood a lot.
5. Use difficult words.
6. Worry about things.
7. Don't like to draw attention to myself.
8. Feel others' emotions.
9. Talk to a lot of different people at parties.
10. Start conversations.
11. Get upset easily.
12. Like order.
15. Get chores done right away.
16. Am not interested in abstract ideas.
17. Have a rich vocabulary.
18. Often forget to put things back in their proper place.
19. Feel comfortable around people.
20. Keep in the background.
21. Seldom feel blue.
22. Am interested in people.
23. Follow a schedule.
24. Have frequent mood swings.
25. Insult people.
26. Do not have a good imagination.
27. Have a vivid imagination.
28. Am relaxed most of the time.
29. Have little to say.
30. Make a mess of things.
31. Make people feel at ease.
32. Am exacting in my work.
33. Am quick to understand things.
34. Pay attention to details.
35. Have excellent ideas.
36. Spend time reflecting on things.
37. Am quiet around strangers.
38. Get irritated easily.
39. Am not really interested in others.
40. Am not interested in other people's problems.

41. Am full of ideas.

42. Leave my belongings around.

43. Am always prepared.

44. Have a soft heart.

45. Don't talk a lot.

46. Feel little concern for others.

47. Take time out for others.

48. Often feel blue.

49. Sympathize with others' feelings.

50. Have difficulty understanding abstract ideas.
Appendix E
Values Measure

The following statements are possible guiding principles for people. Rate each statement on how important it is as a guiding principle in your life.

<table>
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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Very Unimportant</td>
<td>Unimportant</td>
<td>Neutral</td>
<td>Important</td>
<td>Very Important</td>
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<tr>
<td>1. Not being dependent on others</td>
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<tr>
<td>2. Acquiring material possessions</td>
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<tr>
<td>3. Being popular and well known</td>
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<td>4. Living by the customs of previous generations</td>
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<td>5. Concern for social justice</td>
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<td>6. Commanding respect from others</td>
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<td>7. Living a life of leisure</td>
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<td>8. Being aware of family history</td>
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<td>9. Controlling my destiny</td>
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<td>10. Living by a strict moral code</td>
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<td>11. Having a good time</td>
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<td>12. Leading a life of adventure</td>
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<td>13. Maintaining predictability in life</td>
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<td>14. Being financially successful</td>
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<tr>
<td>15. Being original and unique</td>
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<td>16. Being respectful of tradition</td>
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<td>17. Following the conventions of society</td>
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<td>18. Helping others</td>
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<td>19. Being with others rather than being alone</td>
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<td>20. Being surrounded by beauty</td>
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<tr>
<td>21. Appreciating art, music, and literature</td>
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<td>22. Seeking personal advancement</td>
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<td>23. Interacting with a wide variety of people</td>
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<td>24. Leaving as little to chance as possible</td>
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<td>25. Understanding the workings of the Universe</td>
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<td>26. Having many close friends</td>
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<td>27. Living in accordance with old fashioned values</td>
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<td>28. Taking risks in life</td>
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<td>29. Making the world a better place</td>
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<td>30. Keeping life’s affairs in order</td>
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<td>31. Making money</td>
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<td>32. Receiving recognition for accomplishments</td>
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<td></td>
<td>Very Unimportant</td>
<td>Unimportant</td>
<td>Neutral</td>
<td>Important</td>
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<td>33</td>
<td>Having a stable job</td>
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<td>34</td>
<td>Leading rather than following</td>
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<td>35</td>
<td>Living a lifestyle of culture and good taste</td>
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<td>36</td>
<td>Enjoying life to its fullest</td>
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<td>37</td>
<td>Being respected by those with status</td>
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<td>38</td>
<td>Being in charge</td>
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<td>39</td>
<td>Earning the approval of others</td>
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<td>40</td>
<td>Seeking pleasure</td>
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<td>41</td>
<td>Being publicly praised</td>
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<td>42</td>
<td>Keeping up with scientific and medical advances</td>
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<td>43</td>
<td>Having influence over others</td>
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<td>44</td>
<td>Looking out for the well-being of others</td>
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<td>45</td>
<td>Becoming wealthy</td>
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<td>46</td>
<td>Gaining knowledge about new technology</td>
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<td>47</td>
<td>Ensuring that others care about me</td>
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<td>48</td>
<td>Increasing general knowledge about the world</td>
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<td>49</td>
<td>Being in control of one’s own life</td>
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<td>50</td>
<td>Adhering to time-honored rituals and traditions</td>
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<td>51</td>
<td>Being recognized as important</td>
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<tr>
<td>52</td>
<td>Contributing to society</td>
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<td>53</td>
<td>Living in attractive surroundings</td>
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<td>54</td>
<td>Being successful</td>
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<td>55</td>
<td>Having status in the community</td>
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<td>56</td>
<td>Owning many nice things</td>
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<td>57</td>
<td>Venturing into business</td>
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<td>58</td>
<td>Providing aid to the needy or less fortunate</td>
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<td>59</td>
<td>Being respectful of authority figures</td>
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<td>60</td>
<td>Being a member of a close social group</td>
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<td>61</td>
<td>Increasing social status</td>
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<tr>
<td>62</td>
<td>Satisfying curiosity about how things work</td>
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<tr>
<td>63</td>
<td>Living a life of indulgence</td>
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<tr>
<td>64</td>
<td>Being artistically creative</td>
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Appendix F
Subjective Diversity Measure

The following items ask you to form perceptions about your group. Determine how similar or different your group is, as a whole, on each feature by using the scale below. Circle the number that corresponds with your answer for each item.

How would you describe the composition of people in your group with respect to . . .

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<th>1</th>
<th>2</th>
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<tbody>
<tr>
<td>Very Dissimilar</td>
<td>Even Mix</td>
<td>Very Similar</td>
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Secondarily, determine how confident you are in your judgment. Use a percentage estimate to represent your confidence, with 0% being not at all confident and 100% being completely confident. Place your confidence estimate in the column next to each item.

If you are unsure, go with your first impressions. There is no right or wrong answer, so please

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<th>1</th>
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Confidence in Judgment
0% to 100% Scale
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<th>11. Extraversion</th>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(outgoing, sociable, talkative, fun-loving)</td>
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<td>12. Openness to experience</td>
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<td>(daring, imaginative, nonconforming)</td>
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<td>13. Neuroticism</td>
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<td>(anxious, self-conscious, guilty-feeling, insecure)</td>
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<td>14. Age</td>
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<td>15. Overall values</td>
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<td>16. Overall demographics</td>
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<td>17. Agreeableness</td>
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<td>(warm, trusting, sympathetic, cooperative)</td>
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<td>18. Overall personality</td>
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<td>19. Benevolence</td>
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<td>(help others, social justice, make world better)</td>
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<td>20. Conscientiousness</td>
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<td>(responsible, reliable, ethical)</td>
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<td>21. Sex</td>
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<td>22. Mechanical ability</td>
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<td>23. Economic orientation</td>
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<td>(need for financial success, material possessions)</td>
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<td>24. Race</td>
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<td>25. Cognitive ability</td>
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<td>26. In general, rate your impression of your group’s composition.</td>
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Appendix G
Conflict Measure

Jehn, 1995
5 point scale of strongly disagree to strongly agree

1. There was emotional conflict among members in my group.
2. There was little conflict about the work performed in my group.
3. There was little tension among members in my work group.
4. There were frequent conflicts about ideas in my group.
5. Personality conflicts were evident in my work group.
6. There were few differences of opinion in my work group.
7. There was not much friction among members in my group.
8. People in my group agreed on opinions regarding the work being done.
Appendix H
Cohesion Measure

Seashore, 1954
4 point scale from “Not at All” to “Very Much

Please evaluate the degree to which your group . . .

1. would have defend each other if faced with criticism from outsiders.
2. helped each other complete the tasks given to the group.
3. got along with each other.
4. stuck together.
5. was cohesive.
Appendix I
Communication Measures

**Task-Relevant Communication**
5 point scale of strongly disagree to strongly agree

1. The communication between group members was centered on completing the tasks given to us.
2. The conversation of the group often revolved around topics not related to the task. (Reversed)
3. We talked mostly about the tasks we were working on.
4. My group discussed a variety of different things, some of which were not relevant to what we were working on. (Reversed)
5. Please allocate the appropriate percentage of the total communication that took place in group between that spent discussing the TASK and that spent discussing NON-TASK.

\[
\begin{align*}
\text{\underline{\hspace{1cm}}} \% \text{ of communication spent on TASK topics} \\
\text{\underline{\hspace{1cm}}} \% \text{ of communication spent on NON-TASK topics} \\
\text{\textbf{Total = 100\%}}
\end{align*}
\]

**Communication Frequency**
5 point scale of strongly disagree to strongly agree

1. Overall, my group was very talkative.
2. In my group, we only communicated when necessary. (Reversed)
3. My group talked more than the average group performing the same tasks.
4. My group did not communicate very much. (Reversed)
**Communication Distribution**

1. Everyone in my group spoke about the same amount.
2. Some people in my group spoke more than others. (Reversed)
3. In my group, we all took turns talking.
4. The distribution of speaking in my groups was roughly equal. (Reversed)
5. Allocate a percentage of the total amount (100%) of communication to each person in your group according to how much they spoke during your group activities.

Person A ______%  Person B ______%  Person C ______%  Person D ______%