Theses and Dissertations

Fall 2012

Group size and the trust, cohesion, and commitment of group members

Shane Drew Soboroff
University of Iowa

GROUP SIZE AND THE TRUST, COHESION, AND COMMITMENT OF GROUP

MEMBERS

by

Shane Drew Soboroff

An Abstract

Of a thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Sociology
in the Graduate College of
The University of Iowa

December 2012

Thesis Supervisor: Professor Michael J. Lovaglia

ABSTRACT

This research investigated the relationship between group size and trust, cohesion, and commitment formation in task groups. Theory proposes that groups with greater than six members will produce lower trust, cohesion, and commitment than those smaller than six members. Group size is linked to these processes through the mechanism of anticipated mutual perception, the amount an individual considers what others are thinking about them. Two experimental studies test the impact of anticipated mutual perception on influence and trust, cohesion, and commitment. Study 1 tested the impact of being able to see a partner and closeness to a partner on a partner's level of influence over participants. Participants were more influenced by partners they could see than by partner's who were separated from the participant by place or time. Status differences affected influence, even when partners were absent, having left information for use by participants.

Study 2 investigated how group size affected participant reports of interpersonal trust, cohesion, and commitment to group members. Results suggest that members of larger groups were less committed and that groups larger than six members were negatively associated with levels of trust reported by group members. Further, measures used to isolate aspects of anticipated mutual perception were shown to affect development of interpersonal trust, cohesion, and commitment. Group cohesion varied with expectations of group member competence. These expectations significantly predicted measures of shared awareness capturing aspects of anticipated mutual perception, possibly offsetting negative effects of increasing group size. Study 2 found evidence that group members prefer to work with groups made up of 4-6 members, consistent with the theory. This research has implications for the ways in which organizations structure group work and suggests that the size of groups as well as characteristics of individuals and their partners may affect how people form cohesive

relationships. Trust is an important aspect of groups that promotes cooperation, commitment, and collective identity formation. Further, this research supports a growing literature on the ways that micro-interaction promotes commitment to organizations by promoting or detracting from attributions of positive sentiment to smaller, nested groups within those organizations.

Abstract Approved: _____
                                Thesis Supervisor

                                _____
                                Title and Department

                                _____
                                Date

GROUP SIZE AND THE TRUST, COHESION, AND COMMITMENT OF GROUP

MEMBERS

by

Shane Drew Soboroff

A thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Sociology
in the Graduate College of
The University of Iowa

December 2012

Thesis Supervisor: Professor Michael J. Lovaglia

Graduate College
The University of Iowa
Iowa City, Iowa

CERTIFICATE OF APPROVAL

_____

PH.D. THESIS

_____

This is to certify that the Ph.D. thesis of

Shane Drew Soboroff

has been approved by the Examining Committee
for the thesis requirement for the Doctor of Philosophy
degree in Sociology at the December 2012 graduation.

Thesis Committee: _____
                    Michael J. Lovaglia, Thesis Supervisor

                  _____
                    Kevin Leicht

                  _____
                    Steve Hitlin

                  _____
                    Jeff Lucas

                  _____
                    Jerry Suls

ACKNOWLEDGMENTS

ABSTRACT

This research investigated the relationship between group size and trust, cohesion, and commitment formation in task groups. Theory proposes that groups with greater than six members will produce lower trust, cohesion, and commitment than those smaller than six members. Group size is linked to these processes through the mechanism of anticipated mutual perception, the amount an individual considers what others are thinking about them. Two experimental studies test the impact of anticipated mutual perception on influence and trust, cohesion, and commitment. Study 1 tested the impact of being able to see a partner and closeness to a partner on a partner's level of influence over participants. Participants were more influenced by partners they could see than by partner's who were separated from the participant by place or time. Status differences affected influence, even when partners were absent, having left information for use by participants.

Study 2 investigated how group size affected participant reports of interpersonal trust, cohesion, and commitment to group members. Results suggest that members of larger groups were less committed and that groups larger than six members were negatively associated with levels of trust reported by group members. Further, measures used to isolate aspects of anticipated mutual perception were shown to affect development of interpersonal trust, cohesion, and commitment. Group cohesion varied with expectations of group member competence. These expectations significantly predicted measures of shared awareness capturing aspects of anticipated mutual perception, possibly offsetting negative effects of increasing group size. Study 2 found evidence that group members prefer to work with groups made up of 4-6 members,

consistent with the theory. This research has implications for the ways in which organizations structure group work and suggests that the size of groups as well as characteristics of individuals and their partners may affect how people form cohesive relationships. Trust is an important aspect of groups that promotes cooperation, commitment, and collective identity formation. Further, this research supports a growing literature on the ways that micro-interaction promotes commitment to organizations by promoting or detracting from attributions of positive sentiment to smaller, nested groups within those organizations.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1. INTRODUCTION: WHY GROUP SIZE MATTERS

How is the size of a work group related to cohesion and trust between group members? The ideal size of a small group working on a shared task is of interest to both researchers that wish to understand fundamental processes and those who wish to design more effective work groups. Research has shown that larger groups generate more accurate answers to problems (Bray, Kerr, and Atkins 1978), are more likely to retain important information (Horowitz and Bordens 2002) and generally have higher performance (Stewart 2006). However, a growing body of research suggests that performance gained from more group members may be counteracted because people's cognitive and emotional resources for forming personal relationships are quickly exhausted in larger groups, resulting in stress (Mueller 2011). Further, research finds sub-groups may form to reduce this stress that promote conflict between group members and harm group productivity (Lau and Murninghan 2005). Individual level stressors may reduce group cohesion, which has been found to undermine group success and increases the likelihood that schisms will develop between group members, specifically when they experience negative emotion or are left out of group decision-making (Herbsleb, Mockus, Finholt, and Grinter 2000; Sani 2005). Group members appear to have more difficulty being both productive and building social relationships as the number of group members increases. The theory developed below builds on research in sociology, psychology, and management to explain how group size is related to aspects of relationship quality in groups, interpersonal cohesion, commitment and trust.

Theory developed here proposes that increasing group size has a negative impact on group member trust, cohesion, and commitment. This theory builds on the work of Lawler, Thye, and Yoon (2008), who proposed that positive emotions people attribute to groups to which they belong promote commitment to groups over and above the commitment people have to specific members of the group. This theory introduces the

concept of anticipated mutual perception, the amount that individuals think about what others are thinking of them, to explain how increasing group size likely reduces how aware group members are of one another, affecting cohesion and trust between group members. Cohesion is the perception held by the members of a group that they share common purposes and outcomes. Trust is a person's perception that another person or set of people will not harm them if given the opportunity. As cohesion is reduced, group members are more likely to focus on interactions with people they feel are more aware of them, promoting coalition formation and schisms within groups. These coalitions, by developing their own cohesion and collective identity, may reduce individual group members' commitment to the group as a whole.

Chapter 2 provides a theoretical background for this research. I review how collaboration in the workplace, classrooms, and athletic teams requires group members to interact frequently and behave as though they trust one another, and these are signs of cohesion within groups (Schaefer 2009; Lawler, Thye, and Yoon 2008). Research has found that tasks requiring interdependence are performed better by group members reporting greater cohesion (Gully, Devine, and Whitney 1995). However, increasing group size may make it more difficult to coordinate group member contributions, and may reduce people's motivations to contribute to shared tasks. Such problems as within-group coalition formation may result partly because increasing group size limits group members' mutual awareness, the ability to monitor each other's behavior, and leads to a reduction in the frequency of one-on-one interaction. This in turn can reduce group member commitment (Lawler, Thye, and Yoon 2008). The classic theoretical response to group coordination problems has been bureaucracy, the rational assignment of individuals to limited roles within organizations to simplify decision-making processes and focus people's attention within a formalized hierarchy (Weber 1947). Theory developed here relates group size and group member mutual awareness to trust and cohesion, and proposes that increasing group size is likely to promote coalition formation

that reduces people's commitment to groups and may counter the positive effects of increasing group size. In part, bureaucracy may be understood as a response to the natural tendency for groups to fragment as they grow in size.

The creation of divisions within groups is a process referred to as schismogenesis (Bateson 1953). Political parties and social movements also exhibit tendencies toward schisms, suggesting that coalition formation and internal dissent is likely a natural outcome of group growth and collective identity negotiation (Husbands 1988; Mamiya 1982; Balser 1997). The effect has also been seen in religious groups, with the size of denominations being identified as a factor in the breaking of protestant churches (Liebman, Sutton, and Wuthnow 1988), as well as in the splintering of the Mormon religious movement following the death of Joseph Smith (Jorgenson 1995).

Schisms, divisions within groups, can create difficulties for group member relationships as group size increases. For example, Fischer (1953) found that larger groups formed more dyadic subgroups and tended to have lower frequency and intimacy of contact between group members. Group members that interact less frequently are more likely to violate group norms, report feeling more anonymous, and contribute less (Simmel 1908; Latane 1981; Prentice-Dunn and Rogers 1989; Levine and Moreland 1990; Valacich, Dennis, and Nunamaker 1992). Members of larger groups also report greater difficulty establishing trust with each other (Wheelan 2009) and are less sociable than members of smaller groups (Bales and Borgatta 1966; Kelley and Thibaut 1954). Members of larger groups report lower group member satisfaction and cooperation (Kerr 1989; Sato 1988), despite findings suggesting that larger groups are more accurate at solving problems (Bray, Kerr, and Atkin 1978). It is possible that effective unstructured groups have a natural size limit (Merton, Fiske, and Kendall 1956). Groups larger than this limit may have lower cohesion and may perform worse on tasks compared to groups within the limit. Explaining this process theoretically and testing hypotheses based on this theory are the aims of this research.

Chapter 3 develops theory linking group size to trust, cohesion, and commitment. The theory assumes that groups are sets of individuals who mutually influence one another through a process of collective negotiation of meanings attached to their shared experiences. The theory proposes that a basic mechanism for this mutual influence is the relative validity of partners as sources for self-relevant information. Partners expected to be more valid as a source of self-relevant information are more likely to be considered as valid sources of feedback and be thought of more often. Partners thought of more often as sources of valid self-relevant information are proposed to be more influential than partners seen as less valid sources, all else being equal. The amount that individuals think about a partner thinking of them will be referred to as anticipated mutual perception. Based on theories of status, social identity, and social impact, theory developed below proposes that the more two people think about what the other person is thinking of them, the greater the mutual influence those people will have on each other.

The theory proposes that in task groups people view each other as resources for accomplishing the task, and that people with such resources are likely to be found in larger groups. However, larger groups make it more difficult to attend to each member of the group, reducing trust and commitment. Based on this theory, I predict that group members who seek to form effective relationships in task groups will prefer groups larger than three members, though likely no larger than six members.

Chapter 4 describes study 1 and an extension, laboratory experiments that test the basic assumption that anticipated mutual perception affects interpersonal influence. In Study 1, participants were assigned to one of five experimental situations. They were led to believe they were working on a decision making task with either 1) a partner in the same room, 2) an unseen partner in an adjacent room, 3) a partner in an adjacent room but visible on a television monitor, or 4) an unseen partner in an adjacent room that was viewing the participant on a television monitor, or 5) an absent partner who had come

early to complete the study due to a scheduling conflict. An extension study assigned participants to work with either a higher status graduate student or a lower status high school student on the same task as in study 1.

Results of both Study 1 and its extension are discussed in Chapter 5 and suggest that rather than simply coordinating efforts within face-to-face groups, status also likely results from the expectation that the feedback one receives from a partner is more or less valid. Results indicated that seeing one's partner gave partners more influence over participants, and suggest that proximity operated primarily through ability to see one's partner to affect how much influence partners had over participants. Findings suggest that status disadvantaged participants were influenced by partners even when those partners were absent, and that participants believed higher status partners were more interested in task success when compared to lower status partners. Whereas current theories of status assume that expectations of competency and an expressed interest in group success will interact to determine influence hierarchies within groups, this process is assumed to take place when group members are mutually available to each other and capable of responding to one another.

Chapter 6 describes study 2, an experiment conducted with face-to face groups of four different sizes: three, four, seven, and eight members. These groups worked on an investment task with two phases in which each individual group member prepared a proposed distribution of money between four businesses, argued for their proposal to the group, voted as a group on the best proposal, and then worked either alone or with a coalition of other group members on a back-up proposal in the second phase. This experiment tested hypotheses developed from the proposed relationship between group size, anticipated mutual perception, and cohesion and trust in a highly joint task setting, hypothesized by Lawler et al. (2008) to likely result in high group cohesion. To show that increasing group size is truly problematic and that coordination problems in groups are not simply a factor of task type, it was useful to show that groups working on tasks

where cohesion may be highly likely develop less trust and cohesion as group size increases.

Chapter 7 presents the analyses and results of study 2 that indicate group size was negatively related to individual reports of cohesion and trust. Evidence suggests that members preferred groups between 4 and 6 members, in support of the theory. Analyses also indicate that the effect of group size on trust and cohesion were partially accounted for by variations in individual reports of how aware participants believed other group members were of them on average, a proxy for anticipated mutual perception in this study. Interestingly, how aware people reported being of *others* was significantly correlated with how committed they were to their relationships with fellow group members.

Chapter 8 provides a discussion of the results of study 2 and their implications. Findings from this research suggest that the attention people believe they receive from others is related to the level of trust and cohesion they believe developed within their groups, but that their own awareness of others was a predictor of their commitment to the group. This suggests that groups may have a size limit, beyond which trust and cohesion diminish with as the group increases in size.

Finally, I discuss the implications of both of these studies in Chapter 9. Here I present future directions for research and for thinking of interaction as a process of mutual influence based on shared awareness between actors. I also discuss the likely role that other group processes, such as power and status, are likely to play in affecting shared awareness and trust, cohesion, and commitment to groups. Overall, this project contributes to the literature on group dynamics that view groups as the basis for creating commitment to social structure.

CHAPTER 2. THEORETICAL BACKGROUND

Sociologists have made distinctions between larger, more structured groups, and smaller, informal groups since Simmel (1908) first proposed that group size is an important person affecting group member experiences. According to Simmel (1908), the ability to make eye contact with other people allows for effective communication. In order to monitor each other, group members need to share a space and be able to visually account for one another. One difference between smaller, informal groups and larger structured groups is the ability of group members to maintain awareness of other group members. This led Bales (1950) to define a small group as a set of individuals engaged in face-to-face meetings where each person can recall that everyone else was present.

<u>Small Group Analysis by Bales and Borgatta</u>

Bales and Borgatta (1955) directly assessed the effect of group size on interaction. Groups varying in size from two to seven people were brought together in a laboratory for four sessions. Members of the group were given a task for which it was necessary that each group member share information with others for the group to be successful. Bales' and Borgatta's studies provide evidence for how group size limits interaction. Given time constraints, members of larger groups were less likely, all else being equal, to state opinions, show agreement, or release tension through laughter. These group members were more likely to express tension, such as disengagement from the task and nervous movement, possibly due to fewer individual opportunities to contribute to group activities. These studies also showed that increasing group size results in increased expression of solidarity, as coded by an observer. Bales and Borgatta speculate that this may result from larger groups spending more time on becoming acquainted (1955: 401). An important finding of this research is that the variability of individual group member behavior differs as both a function of group size and the specific behaviors of group members, but that across groups of all sizes the variability of individual behaviors

declines as the group works together over time. Bales and Borgatta (1955) also note that people who were coded as exhibiting leadership behaviors, such as giving more opinions or providing information to fellow group members, showed less variability in observed behavior over time, while people who interact less often with others show higher variability, especially early in a group's history.

Findings from Bales and Borgatta (1955) suggest that group interactions generate expectations, based on the behaviors of group members, which guide subsequent interactions. This proposition formed the basis for the expectation states theoretical research program (Berger et al. 1977; Berger and Fisek 2006), and the effects of these hierarchies need to be accounted for when studying the effects of group size on group member behaviors. Even vs. odd numbers of members also appear to contribute to group member behavioral variability due to the difficulty groups have in overcoming deadlock when groups can break into equal-sized coalitions. Both the emergence of a prestige hierarchy, which orders group member contributions and may increase people's confidence the group will succeed, and the ability to form equal-sized coalitions, which promotes longer periods of group conflict, may have effects independent of group size on people's interpersonal trust and cohesion. Based on the research of Bales and Borgatta, it is reasonable to assume that increasing group size 1) places limits on opportunities to contribute, 2) makes it more difficult for group members to pay attention to all members of the group equally, and 3) promotes efforts to maximize group efforts by forming hierarchies that order the attention paid to some group members and not others. Erving Goffman (1963) proposed that face-to-face encounters, especially when they occur in "open places," make people accessible to one another for interaction. Shared task groups fall under the scope of "open places" provided by Goffman, because the nature of the task requires people to work together and pay attention to other people's contributions in order to achieve a shared goal. The question of whether interaction will be initiated between any two members of a group depends on whether they have opportunities to

interact and whether expectations placed on specific people make them appropriate targets to approach for interaction. Following from Bales and Borgatta (1955), it seems reasonable that some people will become more likely than others to be approached as potential interaction partners when people work together on shared tasks.

Goffman (1963) proposed, in line with Simmel, that interaction requires group members be able to share meaningful gestures, and that a shared physical location was necessary for this to occur. Goffman (1963) referred to this basic condition of interaction, shared location, as co-presence. For Goffman, co-present people are able to interpret meanings from others as self-relevant and important for their own situational definitions. Co-presence, according to Goffman, either exists between people or doesn't, but recent research on computer-mediated communication suggests that the subjective experience of co-presence may vary continuously with the availability of information about other people provided the environment (Biocca, Harms, and Gregg 2001; Bailenson et al. 2005). These subjective experiences are likely to vary due to several causal factor, such as physical proximity, proximity in time, and sensory information availability. In fact these factor are major determinants of social influence in social impact theory (Latane 1981; Latane and L'Herrou 1996). Therefore co-presence, while a likely contributing factor in the formation of perceptions, is one of several factor affecting a person's awareness of others and the self during interaction.

The awareness group members have of one another, and the awareness they anticipate others have of them, likely comes from both the structure of their current group and its environment as well as from experience in past groups. Performance expectations related to group member status characteristics, once activated through group interaction, continue to affect future task-related behaviors such as who will attempt to influence others, the number of contributions individuals make to group activities, and the evaluations group members give to others for their contributions (Berger et al. 1977). The size of a group can also affect how aware members feel others will be of their

behavior. Students in large lecture classrooms where professors are focused on the class as a whole may learn quickly that their anonymity allows them to surf the internet or send text messages through their cell phones with little chance of being penalized. Imbalances in expected awareness may reduce group member commitment to the group as a whole as people come to expect their actions have little impact on other group members. To Goffman (1963), a lack of "co-presence" between individuals literally renders their gestures to each other meaningless, as they no longer view each other as significant sources of information.

The following chapter develops theory relating group member mutual awareness to the process of commitment formation. It builds upon the work of Lawler, Thye, and Yoon (2008), social impact theory (Latane 1981), and studies of subjective co-presence in computer-mediated communications to propose 1) The perceived jointness of a task decreases as the number of group members increase, 2) As group size increases, the shared sense of responsibility between group members decreases, 3) the less joint people perceive the task to be, the more likely coalition formation will be within the group, 4) As group size increases, group member perceptions of trust will decrease, and 5) As group size increases, individual group members will be less committed to the group.

CHAPTER 3. THEORETICAL DEVELOPMENT

This chapter presents a theory relating group size to the interpersonal trust, cohesion, and commitment of group members. The theory builds on sociological theories of symbolic interaction and social psychological theories of social influence, social identity, and relational cohesion to propose that increasing group size reduces how often a group member thinks about what fellow group members are thinking of that member. As a result, people are more likely to view only those people they perceive are most aware of them as valid sources for self-relevant information. According to the theory, it will be to those individuals that group members attribute trust and cohesion. As group size grows, the theory explains that people are likely to seek out coalitions with those who they trust and feel most cohesive with, and that these coalitions can lead to schisms that undermine group identity. This theory predicts that group members' perceived trust, cohesion, and commitment will peak in groups approaching six members, with reduced trust, cohesion, and commitment in groups larger than six. The chapter concludes with hypotheses based on propositions of the theory that will be tested in two experimental studies.

Social interaction is a process of mutual influence. In a conversation, for example, people shape their thoughts and responses based on the speech and gestures of others. Significant gestures from other people are required for individuals to define a shared reality (Mead 1934; Festinger 1954). In order for these gestures to be significant, they must come from other people who are believed to share a common situation and who are available for interaction (Goffman 1959; 1963; Collins 2001). Theory regarding the effects of group size on mutual awareness first requires theory that explains how mutual awareness affects the influence group members have on each other's perceptions and behaviors. These propositions were developed by Soboroff and Kelley (2011), and link

expectations for the validity of self-relevant information people receive from others to the influence those others are likely to have other them.

Influence is a process whereby a person voluntarily changes their behavior or attitudes to more closely align with the behavior or attitudes of another person (Friedkin 1998). Existing theoretical research programs in social psychology provide mechanisms explaining how one person influences another. Status characteristics theory (Berger et al. 1977) proposes that often non-conscious expectations of competence tied to different states of a person's socially significant attributes (i.e. gender, age, race, education) allow people to determine who they should defer to when working with others on shared tasks. Social identity theory (Tajfel 1979; Tajfel and Turner 1982) proposes that people are more likely to be influenced by people who belong to similar social categories or in-groups, because people tend to perceive greater similarity between themselves and those others. Social impact theory (Latane 1981) suggests that the influence of other people in our environment is proportional to their distance, ease of communication, and personal attributes such as status characteristics. Each of these theories provides key insights into the influence process, and some research has found evidence that these processes operate together within the same setting (Markovsky and Thye 1996; Kalkhoff and Barnum 2000). The question remains whether a common outcome, influence, may be based on a common underlying mechanism. The scope conditions of the above theories differ in their generality. Identifying mechanisms that operate across the conditions necessary for influence in each of these processes may allow social psychologists to expand the scope of theories beyond face-to-face interactions while offering a more parsimonious explanation of the influence processes these theories explain.

Theories of symbolic interaction, interaction ritual chains, and research on computer-mediated communication may provide such mechanisms. Symbolic interactionism proposes that people negotiate a shared reality with other people when they interact (Blumer 1969). This requires that people pay attention to the meaningful

symbols generated by their partners, assign meaning to those symbols, and behave toward others based on those meanings. Theories of structural symbolic interaction, such as affect control theory, propose that people enter social settings with expectations regarding the meanings they will encounter (Heise 1979). According to affect control theory, people are motivated to verify culturally shared meanings using feedback from their partners because these meanings are relevant to how people view themselves. It follows that people enter social settings with expectations for the kinds of people they will pay attention to, and towards whom they must behave to verify the meanings they brought with them into the setting. Fundamental to this process are expectations for shared attention, termed *anticipated mutual perception*. The more Person A expects attention from Person B, the more relevant Person B will be for Person A's maintenance of self-relevant meanings. Assume that people are critical of the feedback they receive from others. If this is the case, then influence that occurs in social situations is likely to be based on the perceived validity of a partner's feedback.

Co-presence and Interaction Rituals

Interaction requires people to be available to each other as sources of meaningful gestures (Blumer 1969; Goffman 1963). When we encounter other people, we use all information available about the other person and the setting to determine 1) who we are in the situation, 2) who the other person is, and 3) who we are to the other person. Goffman proposed that gestures shared between two people would only be interpreted as meaningful if those people are co-present. Co-presence according to Goffman (1963) is defined as:

> "the sense that (people) are close enough to be perceived in whatever they are doing, including their experiences of others, and close enough to be perceived in this sensing of being perceived."

According to Collins (2001), social settings generate emotional energy that motivates people to engage in social ritual. Rituals associated with role identities carry

culturally defined behavioral expectations. For Goffman, rituals are how we express the value attached to people and situations within society; they have a moral as well as functional aspect. For Collins, interactions are ritual displays that not only maintain meanings, but charge objects and people within the setting with emotional energy that allow those meanings to carry value for people beyond the immediate situation. This is important, because it means that bodily co-presence is not a necessary but rather a sufficient condition for ritual and the evocation of emotional energy, though Collins argues that co-presence will be preferred for ritual interaction due to the availability of emotionally charged stimuli in face-to-face encounters.

Goffman and Collins give special weight to face-to-face interaction, but this gives co-presence limited utility as a theoretical concept. Modern technologies such as the internet and cell phones vary distance and the amount of sensory information available to partners. Research on these technologies has found that even when sensory information is limited people still develop an individual sense of subjective co-presence (Biocca, Harms, and Gregg 2007; Zhao 2003; Bailenson et al. 2005). Even simulated contact creates the expectation people are being sensed by others (Pauchet et al. 2007; McLaughlin et al. 2003; Hauber et al. 2005). This perception, referred to here as *anticipated mutual perception*, is the amount that individuals think about what others are thinking of them. Theory developed here explains how anticipated mutual perception varies as a result of characteristics of people and situations, and how these variations affect influence between people.

<u>Anticipated Mutual Perception and Mutual Influence</u>

Theories of symbolic interaction suggest we actively reflect on what other people think about us (Cooley 1902; Mead 1934; Heise 1979; Burke 1991). Symbolic interactionism and dramaturgical theory explain that people influence each other throughout interactions by evaluating each other's role performances. When people come

into contact with one another, they become aware of others and sense that others are aware of them. This awareness motivates people to contribute to group goals to avoid losing status, and to facilitate interactions (Troyer and Younts 1997). According to symbolic interactionism, people enact role identities based on the people they encounter and the situation in which they encounter them (Heise 1987; Robinson and Smith-Lovin 1999). People attempt to behave in ways that are consistent with role identities they hold in order to maintain meanings attached to those identities (Heise 1979; Burke 1991; Burke and Stets 2000). When people enact role identities, partners evaluate their performances. These evaluations allow people to determine if they are performing role identities properly. When people receive evaluations suggesting they are not performing identities properly, they attempt to change their behavior to maintain their identities. People try to view themselves from another person's perspective in order to gain a shared understanding of reality. Psychological theories of social comparison (Festinger 1954) also assume that other people are important sources for our sense of reality, and that comparisons between people are a sufficient condition for achieving consensus about the nature of that reality. Therefore it can be assumed that when people work together to define a shared situation they seek to define themselves in relation to other people. It can also be assumed that people are likely to seek self-relevant information from others with whom they share that situation to arrive at this shared definition.

According to affect control theory and identity control theory (Heise 1979; Burke 1991), failing to confirm identities motivates behavioral adjustment. People work to avoid identity disconfirmation (MacKinnon 1994). Therefore it is reasonable to assume people are critical of self-relevant information they receive for role performances. If evaluations received from others are based on poor or biased information, people would want to avoid using those evaluations to define themselves. Therefore it can be assumed that people seeking self-relevant information from other people will be concerned with the validity of that information. Bias may be inferred if people believe partners have

goals that conflict with their own. A reasonable scope condition for a theory of how interaction facilitates social influence would be that partners' goals are not perceived to conflict with the individual's goals.

The next two assumptions of the theory relate to how people determine the validity of the evaluations they receive from interaction partners. Determining actual validity may not be possible. Therefore, people likely use cues from partners to determine how valid those partner's evaluations are *likely* to be. Theories within the expectation states research program explain how this may occur based on group member status. In task groups, higher status people are expected to be better able to perform work necessary to accomplish a shared task (Berger, Cohen, and Zelditch 1972). Higher status people are also more likely to be seen as competent sources of evaluation, and the self-evaluations of individual group members are likely to be influenced by higher status person's evaluations of those members (Webster and Sobieczek 1974; Moore 1985; Troyer and Younts 1997). Therefore, reflected appraisals from higher status people are more likely to be seen as valid, having greater truth value compared to reflected appraisals from lower status people. In sum, if a person is concerned with the validity of self-relevant information from others, then it is likely they will seek cues to the validity of that information. It follows that in order to gather such information people will use information from their environment and apparent characteristics of people in the situation to determine the validity of self-relevant information (Festinger 1954).

Research on social identity theory (Tajfel 1979) and studies finding that social identities can combine with performance expectations to affect influence (Kalkhoff and Barnum 2000) also support the claim that validity of a source is likely related to a source's influence. People who actors believe are similar to them are viewed as having knowledge of the social categories to which similar people belong. This likely increases the validity of self-relevant information from similar others.

Social impact theory (Latane 1981) suggests that factor in the environment might also be used as cues to the validity of people's social evaluations. When people are in public, and believe other people can evaluate their behavior, they become more self-conscious and think more about meanings attached to their behavior (Carver and Scheier 1981; Gibson 1990). These processes make people within a shared context more relevant and valid as sources of information than people who are not present. As a result, people take others who share a social context into account more than people who are not present, and assume that the validity of evaluations from present others is higher than that of non-present others. It follows that the greater the perceived validity of self-relevant information from others, the more often a person will think of what those others think about them.

Given the above assumptions, the theory can accommodate social interaction as a process. Changes in the validity of self-relevant information from others can occur for many reasons; people may lose status at work due to demonstrated incompetence, they may change jobs and give up a shared identity, or they may move away and no longer be present in another person's life. The more often people reflect on how another person sees them, the more they will consider their perspective. Influence requires, by definition, that a person change their behavior or attitudes in the direction of the behaviors or attitudes of another person; the more often behaviors and attitudes of others are considered, the more likely those people will be influential. Taken together, the assumptions above suggest proposition 1.

> Proposition 1: The greater the perceived validity of a person's
> evaluations of others, the greater the influence they will have
> on others.

The influence process described here is mutual; it occurs for each person interacting in a given situation. As people influence one another through mutual feedback about role performances, a shared definition of the situation takes shape

(Goffman 1963). Situational factors can impede or enhance people's ability to take each other into account during interaction in order to define the situation. Social Impact Theory (Latane 1981) proposes that people are influenced in direct proportion to the strength, immediacy, and number of other people (real or imagined) who hold views that differ from their own. The social impact of other people is reduced when interaction is impeded by physical distance, an inability to receive sensory information about one's partner, or any other factors limiting the strength, immediacy, or number of sources.

If people are separated by distance or are unable to see each other, we assume that anticipated mutual perceptions decrease. If anticipated mutual perception decreases, people are less likely to view evaluations from their partners as self-relevant, containing information about a person's role-identity performances. As a result, people are less motivated to negotiate a shared definition of the situation and will accept less influence from one another when interactions are impeded. Not all impediments have an equal effect on the influence process. As stated, influence is mutual, but we assume that people are most concerned with evaluations that are self-relevant, evaluations of role performances directed from a partner to the self. Therefore impediments to gaining information from our interaction partners ought to have a greater negative effect on influence than impediments to evaluating our partners, reflected in our second proposition.

> Proposition 2: Influence will decrease more when communications from a partner are impeded than when communications to a partner are impeded.

Social impact theory accounts for impediments to influence. However, social impact theory does not explain how *direction* of an impediment affects this process. Research on social impact supports the idea that people will be affected by their awareness of others. Critics of social impact theory point out only characteristics of sources are included in the theory to explain influence. The psychology of the person

who is the target of influence is unexplained by social impact models (Martin and Hewstone 2001). Theory developed here proposes that influence in everyday settings requires people to expect feedback they receive from partners to be relevant for how they see themselves. It can be assumed that people take the role of the other and think about how much other people are thinking about them. Proposition 2 predicts that reducing the availability of self-relevant information from the partner negatively affects the influence of one person on another more than reducing our availability to our partners. An example would be two people communicating by computer where one person has a camera and the other does not. Proposition 2 would predict that the person who can see their partner would have more access to self-relevant information and therefore be more influenced than the person who cannot see their partner. When impediments are equally experienced by both partners, influence of partners on each other should decrease relative to the number of these impediments.

Theories of status (Berger et al. 1977), power (Willer, Markovsky, and Lovaglia 1997; Thye 2000), and social identity (Tajfel 1979) provide mechanisms that lead to interpersonal influence, with status and power affecting influence through expectations of competence attached to characteristics of people, and social identity affecting influence through shared group membership. These mechanisms have even been shown to operate simultaneously to affect influence (Kalkhoff and Barnum 2001). We propose that each of these theories explain situations where people seek information to confirm and maintain identities. Anticipated mutual perceptions may provide a mechanism useful to each of these theoretical programs to increase our understanding of influence. In the next section, theory is developed to explain how anticipated mutual perception affects the relationship between status and influence.

Status Hierarchies and Anticipated Mutual Perception

Status is defined as a person's rank in a group based on prestige or honor (Berger et al. 1977). Status characteristics theory predicts how expectations of competence associated with individual characteristics result in behavioral inequalities between members of task groups (Berger, Cohen, and Zelditch 1972). Status characteristics may be diffuse or specific, with at least two states, one of which carries expectations for greater competence and social value than other states. When characteristics such as gender, race, age, or specific skills differentiate between people or are relevant to successful completion of a task, group members defer to those members whose characteristics suggest more competent contributions to successful task completion. Characteristic states are culturally defined; men, European-Americans, middle-aged people, etc. are given more opportunities to perform in U.S. society, and people with these characteristics have greater influence over other group members, receive more positive evaluations for their performances, and contribute more often than people with negatively evaluated characteristic states. This theory includes important scope conditions under which predictions of the theory are likely to hold. First, group members must be task-oriented, understanding the task to have a successful and an unsuccessful solution and preferring success on the task. Second, group members must be collectively-oriented, believing it necessary and proper to take other group members' contributions into account while working on the task (Kalkhoff and Thye 2006).

Given a task and collectively-oriented group, it can be assumed that the most self-relevant gestures made between group members will be evaluations of a person's relative ability at the group's task. Research on the status of sources finds that higher status people are seen as more competent sources of ability evaluations than lower status people (Webster and Sobieszek 1974; Fisek, Berger, and Norman 1995). Assume that self-relevant gestures from higher status people to lower status people are more likely to be perceived by lower status people as evaluations of competence than communications

flowing from lower status people to higher status people. This means that a greater proportion of information people receive from higher status partners will be perceived as self-relevant in task-oriented and collectively-oriented work groups, compared to information received from lower status partners. If this is the case, people will reflect on what higher status people think of them more often than they reflect on feedback from lower status people. In doing so, people use relative differences in status as a cue to the validity of evaluations. Evaluations from higher status sources will be perceived as more valid than evaluations from lower status sources. If evaluations from higher status sources are perceived as more valid, then people will attribute this validity to how aware a higher status source is of the person and form the expectation that higher status people are more aware of them than lower status sources. Our third proposition follows from this development.

> Proposition 3: People expect higher status partners to be more aware of them than lower status partners.

Neither social impact theory nor status characteristics theory requires that higher status people are thought to be more aware of their partners. Here, because of the assumption that higher status partners provide more self-relevant and valid information to group members than lower status partners, we expect higher status partners are thought of as more aware of fellow group members than lower status partners. This proposition has implications for modeling social influence as a process within ongoing interaction. If influence in task groups is partially due to the perceived awareness other people have of us, then behaviors that increase this perception may affect status orders even when expectations for competency at a task remain constant.

<u>Group Size and Shared Awareness</u>

Group size alters group member anticipated mutual perception in predictable ways, by increasing the number of people each individual group member must take into

account while working on a shared task. Increasing group size increases the need for group members to shift attention, reducing the time they spend attending to any single member of the group. As the amount of attention people expect from other group members decreases, the self-relevance and the validity of evaluations people receive from fellow group members will likely decrease. This suggests proposition 4.

> Proposition 4: As group size increases, the anticipated mutual perception between any pair of people decreases.

Decreases in anticipated mutual perception likely affect how often group members interact, impacting their dependence on one another and cohesion as a group. The following section explains theoretical assumptions and propositions relating anticipated mutual perception to factors important for relational cohesion in task groups of increasing size.

Anticipated Mutual Perception and the Frequency of
Interaction

Anticipated mutual perception (Soboroff and Kelley 2011) refers to the combined expectations of an person for their level of awareness directed toward another person and the level of awareness that specific other directs toward the person. Cooley (1902), writing of the looking glass self, proposed that social interaction involved people imagining how they appear to others, imagining how the other judged the person based on that appearance according to the perceived reactions of the other, and reflecting on these perceived judgments to decide whether to internalize them as a part of the self or reject them. Anticipated mutual perception captures the expectations people hold for this process from situation to situation, depending on the likely context of interaction and salient characteristics of their partners. Goffman (1963) proposed that interaction requires that people maintain mutual awareness in order for gestures given off by people to be perceived as meaningful to other people in their environment. Goffman's

conception of awareness was dichotomous; one either is aware of another and the other is aware of her or people are not co-present with one another. Here group member awareness is conceived of as a continuous variable. Research on social impact theory (Latane 1981; Latane and L'Herrou 1996) suggests that the intensity of another person's presence, related to the level of awareness we have of that person, has a linear relationship with the other person's influence over us. Mutually aware people will share a consistent understanding of a shared situation. Decreasing mutual awareness would result in lower expectations of interaction through a reduction in the number of gestures interpreted as meaningful within an interaction situation.

Research on computer-mediated communication supports these propositions. The amount of information available to people connected by computer networks directly affects their likelihood and frequency of interaction (Biocca, Harms, and Gregg 2001; Bailenson et al. 2005). Thus it can be assumed that as anticipated mutual perception between any pair of group members decreases, the frequency of interaction between those people decreases.

Decreasing frequency of interaction is implicated in Lawler, Thye, and Yoon (2008) as a basis for cohesive relationships in their theory of relational cohesion. The next section will explain proposition of this theory, and relate anticipated mutual perception to these propositions to explain how group size affects group member trust and cohesion.

<p style="text-align:center;">Relational Cohesion Theory</p>

Relational cohesion theory explains how people form dependence relationships that result in affective preferences for their partners. Lawler and Yoon (1996) assume that people are self-interested and initially form relationships to get something they need or want. The theory proposes that frequent exchanges between people result in positive emotions expressed between people, and that this positive emotional expression is highest

under conditions of equal and high mutual dependence. Higher mutually expressed positive emotion within the exchange context yields a higher likelihood of cohesion between people.

Larger groups have been found to have problems motivating group member contributions, satisfying members' needs, and facilitating interaction (Herbsleb, Mockus, Finhold, and Grinter 2000). Relational cohesion theory makes other predictions for group member experiences regarding interpersonal trust and cohesion. If increasing size reduces the frequency of interaction between members of groups, then relational cohesion theory would predict that larger groups will have lower trust, produce less positive emotions, and have less cohesion than smaller groups (Lawler, Thye, and Yoon 2000; 2008). Trust is particularly important for groups working on shared tasks when those groups face situations that are uncertain and may be risky for individual and group-level interests, given the assumption that people join groups for instrumental reasons (Boon and Holmes 1991; Kollock 1994).

The Impact of Shared Awareness on Trust

Trust is defined here as the positive expectation that fellow group members will act in each other's best interest in situations involving risk (Boon and Holmes 1991; Das and Teng 1998). Sociological research on trust commonly studies this process using theories of social exchange (Blau 1964; Homans 1974). Theories of social capital also propose that trust allows for the accumulation of benefits as a result of people being embedded in networks of social relationships (Coleman 1990; Putnam 1995; Portes 1998). Group processes research has framed trust within social exchange as a product of the potential for exchange relationships to become exploitative (Molm 2008; Lawler, Thye, and Yoon 2006; Emerson, Cook, and Yamagishi 1983; Willer, Markovsky, and Patton 1988). Risk is proposed to be necessary for trust to develop when it is paired with trustworthy behavior on the part of exchange partners. Research suggests trust is more

likely to result when group members express care for each other's exchange outcomes and consider their well-being (Tyler and Lind 1992). Trust has also been found to moderate group-level performance; groups with greater trust between members were more likely to engage in joint problem solving and performed better on shared tasks as a result (Dirks 1999).

The decision to cooperate with partners entails risk (Cook et al. 2005; Matsuda and Yamagishi 2001). Kollock (1994) proposed that trusting relationships help people to reduce uncertainty in risky situations. Trust between individuals forms a basis for patterns of interaction observed in task groups and is directly related to commitment and cohesion in groups (Lawler et al. 2008). Based on relational cohesion theory, assume that as the frequency of interaction between any pair of group members decreases, those actors' perceived trust and cohesion will decrease.

Evidence exists that relationships with power imbalance produce less trust even if exchange is frequent (Molm 2008). Therefore a scope condition is imposed on our theory that groups are formed without initial power differences between group members. When people frequently interact under this condition, members of smaller groups are expected to feel greater trust and cohesion with fellow group members than members of larger groups. This relationship was previously tested by Sato (1988), who theorized that people in smaller groups are more noticeable when they act cooperatively than people in larger groups. Cooperative action encouraged trustworthy behavior in other group members, and these behaviors are harder to notice in larger groups. An experiment using a standard social dilemma provided support for Sato's theoretical model. This suggests proposition 4.

> Proposition 5: As group size increases, the trust between any pair of people in the group will decrease.

Alternatively, it is possible that group size is not always negatively related to trust in groups. As noted, group size is positively related to productivity and effective problem

solving (Stewart 2006) and whether a group generates more good ideas (Bray, Kerr, and Atkins 1978). People may recognize the advantages provided by groups with more people. However, given the evidence that groups are less satisfying for members as group size increases, it is likely that at some point the number of group members counteracts the expectation that more members will increase group success. It may be possible to determine the limits of what people will consider to be a "small group," one in which group members are cohesive and trusting, but not so large that they seek to form coalitions that could lead to schisms within the group. Simmel (1924) proposes that eye contact underlies face-to-face communication. For each member of a face-to-face group to continuously monitor each other, they would need to see simultaneously the faces of all group members. It is possible to calculate the maximum group size that allows members to continuously monitor each other. In order to monitor each other, individual group members would need to keep all other group members within their field of vision. Standard tests of visual fields assume that clear binocular vision in in humans is limited to 120-124 degrees horizontally (UN.org).

A small group can be viewed as a polygon with sides representing the lines of sight between adjacent group members. As group size increases, the degrees in each angle of the polygon increase until they surpass the limit of peripheral vision. This means that out of either eye, a person's clearest angle of vision falls between 60-62 degrees. A small group can be represented by a circle where each person is represented by evenly spaced points on the arc. The following formula determines the visual field angle needed to take into account group members on either side of a person within the group of n size. First, the numbers of degrees in the circle are divided by the number of group members. This gives the angle needed by someone at the center of the circle to view any two individuals in the group (see Figure B1). The angles of the triangle formed by the center of the group and any two people on the arc of the circle must add up to 180 degrees.

Subtracting the angle of sight from the center and dividing by two gives the angle of vision necessary for either person to keep both the center of the circle and an adjacent person in the group within their line of sight. Multiplying this angle by 2 gives us the visual field angle that keeps in view both adjacent group members and the center of the circle. The simplified formula that results is as follows:

Visual Field Equation: 180-(360/n)

Substituting the number of group members for n using this equation allows calculation of the visual field required by people within a group to keep each other in clear view. Using the equation above reveals that groups of size seven have a necessary member visual field of 128.57 degrees. Six members is the largest value of n (visual field = 120 degrees) where the required visual field for group members falls within the limits of clear binocular vision for humans. Thus, the maximum size of a small group where every group member can see the face of every other group member at the same time would be six members. Assuming that physical proximity between adjacent group members may make up for line-of-sight awareness, one can also calculate small group size where group members adjacent to our neighbors are beyond our field of vision. This yields a group size of twelve members. These numbers correspond closely to older estimates that small groups reach a maximum size between seven and twelve members (Merton, Fiske, and Kendall 1956; Smith 1972). Groups between 6 and 12 members can be expected to be the largest groups manageable for visual attention capacities of each group member.

In support of this explanation, Dunbar (1993) proposes that human beings, like other primates, benefit from increasing group size in terms of group survival. However, he notes that while humans and non-human primates may have very large and geographically dispersed social relationships, larger primate groups tend to schism. The size of these sub-groups has been reported at between 3-5 members for groups providing

major sources of support, though this number may range higher for secondary groups that

work together to complete instrumental tasks, which may range from 9-15 members

(Dunbar and Spoor 1995). It seems reasonable that groups working on joint tasks would

need to provide some social support to members. Therefore, while instrumental in nature,

joint task groups are likely to range only slightly higher in preferred size than those

providing primarily social support. This suggests an alternative proposition:

> Proposition 5(a): Trust will reach its maximum in groups as they approach
> a size of six members.

Relational cohesion theory (Lawler, Thye, and Yoon 2000) proposes that

decreased trust and positive affect will reduce the cohesion of group members. If

increased group size reduces trust between members of groups, the following can be

proposed:

> Proposition 6: As group size increases, the perceived cohesion of group
> members will decrease.

As with Proposition 5, an alternative possibility is that groups will increase in

cohesiveness as they provide instrumental advantages to group members. Given that trust

and cohesion are likely related, the relationship of group size to trust will likely be similar

to the relationship of group size to cohesion. This also follows from work showing that

human support cliques tend to schism from larger networks. This provides the following

alternative proposition:

> Proposition 6a: Cohesion will reach its maximum in groups as they
> approach a size of six members.

Different types of tasks are expected to affect these processes, and relational

cohesion theory does not adequately predict how people's reactions to dyadic exchange

and interaction will affect their feelings regarding the groups in which those relationships

are embedded. As noted, it is likely that task type will have an effect on the expectations

of social support provided by group members. To better understand more general groups, Lawler, Thye, and Yoon (2008) developed a theory of social commitments.

<div align="center">Lawler, Thye, and Yoon's Theory of Social Commitments</div>

Most of the research on relational cohesion theory takes place in highly controlled exchange relationships in the laboratory, but recent theory by Lawler, Thye, and Yoon (2008) extends propositions of relational cohesion to more general situations in a theory of social commitments. The theory of social commitments explains how the positive emotional expressions of group members come to be attributed to the groups to which they belong. The theory moves beyond simple dyadic exchange contexts to explain how group members form commitment to groups with the following properties, representing the scope conditions of the theory of social commitments (Lawler, Thye, and Yoon 2008):

1. Groups consist of at least three people forming a network of relations.

2. People within the group have multiple opportunities to interact repeatedly in order to generate joint or individual benefits, and the social structure gives them incentives to at least consider interaction and exchange with one or more others.

3. People decide whom to interact with based on initial expectations of instrumental benefit.

4. Social interaction takes place within one or more social units.

5. The immediate or local unit is salient to the people within it.

6. There are larger or more distant social entities within which the group is nested.

The theory assumes that tasks worked on by groups are joint to some degree, meaning that the activity requires people to coordinate their behavior in response to the behavior or presence of others. Social interaction between people creates emotions, both positive and negative, that act as internal rewards and punishments for group members. Group members, assumed to seek positive emotions and avoid negative emotions, search

for the source or causes of these emotions, and interpret these emotions in reference to the situations or groups in which emotions are experienced.

The theory proposes 1) that people working on highly joint tasks where individual contributions are difficult if not impossible to separate and identify will feel a greater sense of shared responsibility, 2) that the stronger the sense of shared responsibility the more likely group members are to attribute emotions that result from group interaction to the social unit, 3) that attribution of positive emotion to a social unit increases a person's commitment to that unit and attributions of negative emotion decrease commitment, and 4) people are more likely to stay with social units to which they are committed (Lawler, Thye, and Yoon 2008).

Task jointness may be related to frequency of exchange. It stands to reason that people working on a shared task who interact more frequently are more likely to attribute not simply their emotions but the instrumental aspects of tasks (getting work done, meeting shared goals) to their groups. Assume that the greater the frequency of interaction between pairs of people, the more joint those people will perceive the task to be relative to pairs of people who interact less frequently. In this way, jointness of task may be both a structural *and* perceptual aspect of task situations. The following proposition reflects this development.

> Proposition 7: Perceived jointness of task will decrease as the number of group members increases.

If people interact less frequently as a result of lower shared awareness, they are less likely to attribute the outcomes of group work to the whole group. The less group members interact, the less easily they are going to be able to attribute the products of task activities to combined group member efforts. Because people attribute the final task product less to a combination of individual efforts, they are likely to question any individual member's commitment to group goals, including their own. In line with the theory of social commitments, we can make further propositions:

Proposition 8: As group size increases, the shared sense of responsibility between group members will decrease.

Proposition 9: As group size increases, individual group members will be less committed to the group.

<u>The Effects of Trust on Coalition Formation in Groups</u>

Uncertainty due to risk is one reason for building trusting relationships. Positive affect received from membership in groups is another (Tajfel 1979). Studies show that people are motivated to create and maintain positive social relationships (Leary 1990; Baumeister and Leary 1995), and people will form coalitions with other people in order to redistribute power in groups. Coalitions are one way people can form stable dyadic relationships in the context of a larger group, and can affect the distribution of power in those groups (Webster and Smith 1978). Lower trust within groups may promote coalition formation so people can avoid feeling exploited or ignored by the group. Coalitions represent a solution to the problem of trust in larger groups by increasing the frequency of interaction between a smaller set of people. This allows people within coalitions to obtain positive emotional outcome attributable to the coalition, but creates a nested unit within the overall group. Economic theories of coalition formation suggest that increasing group size promotes instability when conditions facing the group are uncertain, promoting coalition formation (Genicot and Ray 2003). It follows that increasing group size makes coalition formation more likely.

If the perceived jointness of tasks increases group member trust and cohesion, it is likely groups where interaction frequency between members is high will be less likely to produce coalitions than groups where interaction frequency between members is low. Group members will continue to attribute positive emotional and instrumental outcomes

to the group, resulting in less preference being given to a subset of the group by an individual person. This forms the basis for the next proposition:

> Proposition 10: The more joint people perceive the task to be, the less likely coalition formation will be within the group.

Effects of Coalition Formation on Social Identity

Coalitions represent distinct entities within groups, and their boundaries are often apparent to other group members (Genicot and Ray 2003). Boundaries between coalitions and the group as a whole can undermine group cohesion further, because boundary formation leads members of coalitions to prefer members of the coalition and evaluate non-coalition members less positively (Hogg 2003). When coalitions establish boundaries, conflict is more likely to arise within groups. Self-categorization theory, a theory within the social identity theoretical research program, proposes that the promotion of personal relationships, which are more likely within coalitions, are damaging to groups because they threaten group norms (Hogg and Terry 2000). The less coalition members interact with other group members, the more pronounced this effect is predicted to be. Cuchan, Croson, and Dawes (2002) found that trusting behavior decreases when people are asked to invest in direct exchange with people they do not consider to be part of their in-group. If coalitions form boundaries within groups, then trusting behaviors between group members will decrease, reducing cohesion further. Lawler, Thye, and Yoon (2008) propose that such coalitions also are likely to represent a unit to which people attribute positive emotions, increasing commitment to their coalition rather than to the group as a whole. As commitment to the group as a whole decreases,

people are more likely to leave the group, possibly with other members of their coalition. This leads to the following proposition:

> Proposition 11: As group size increases, the likelihood of any individual group member leaving the group increases.

If group size promotes less cohesion, but task jointness acts against this effect, tasks perceived to be more joint by group members should be able to create higher levels of commitment in group members than tasks perceived to be less joint. This would reduce the likelihood of coalition formation, and reduce the likelihood of group member defection. This yields the following propositions:

> Proposition 12: As perceived task jointness increases, the likelihood of people to form coalitions will decrease.

> Proposition 13: As perceived task jointness increases, the likelihood of people defecting from the group will decrease.

The theory explains 1) how anticipated mutual perception affects influence in task groups, and 2) how increasing group size lowers trust and cohesion in groups by lowering anticipated mutual perception prior to interaction as well as the mutual awareness of individual people during group interactions. The theory incorporates the mechanism of anticipated mutual perception into propositions from relational cohesion and the theory of social commitments to predict that members of larger groups will trust each other less, and be less cohesive than members of smaller groups. The assumption that frequency of interaction between group members can increase the perceived jointness of a task is added to this development to explain why some groups may be advantaged over others in developing cohesion and trust, even as group size increases. The more structurally joint a task is, or the more group members perceive their shared task outcomes to be joint, the more likely they are to perceive the group as cohesive and remain committed to the group.

Hypotheses

Hypotheses 1-3 were developed from theory linking anticipated mutual perception to influence between members of groups whose goals are not perceived to conflict. These hypotheses were tested in Study 1, an experimental study using the standardized experimental setting designed by Troyer (2001). Hypotheses 4-8 test propositions from theory linking group size to shared awareness, trust, and cohesion in task groups.

> Hypothesis 1: Partner influence will be greater when participants can see their partner than when partners are not visible.

According to proposition 2, a person's awareness of a partner should decrease when they are unable to see the partner. If a person's partner is in a separate room, or if it is more difficult to view the partner, the person will likely be less aware of them. According to proposition 1, less awareness will make the partner a less valid source of self-relevant information, and so the person will think about them less often. As a result, influence of the partner should decrease when they are less easily seen or not visible to a participant.

> Hypothesis 2: Partner influence will be greater when partners believe they are physically closer to one another.

Hypothesis 2 is a further test of proposition 2 and the assumption of social impact theory that people who are physically closer in space are more likely to influence one another. People in closer proximity to a partner are more likely to receive visual or other sensory cues from the partner and so will be more aware of them. As a result, people should change their behaviors in response to closer as opposed to more distant partners.

> Hypothesis 3: Participants will report lower trust, on average, for other group members as the size of the group increases.

> Hypothesis 3A: Participants will report equal or higher trust, on average, in groups of 4 compared to 3 members and in groups of 7 compared to 8 members, and members of groups with

more than six members will report lower trust than members of groups with fewer than six members.

Hypothesis 3 is based on proposition 4, that increasing group size will result in decreasing group member trust. If trust is lower as group size increases, then individual group members will likely report less agreement with statements suggesting that specific group members are trustworthy, and the average level of agreement with such statements regarding all fellow group members should be lower in larger than in smaller groups.

Hypothesis 4: Participants in smaller groups will report greater agreement with statements suggesting they share a common purpose and group identity with fellow group members, signs of cohesion, than participants in larger groups.

Hypothesis 4A: Participants will report equal or higher cohesion, on average, in groups of 4 compared to 3 members and in groups of 7 compared to 8 members, and members of groups with more than six members will report lower cohesion than members of groups with fewer than six members.

If proposition 5 is correct, then cohesion within smaller groups will likely be greater than cohesion in larger groups. If cohesion is greater in smaller groups, and cohesion is defined as a perception that group members share a common purpose and group identity, then members of smaller groups should agree more with statements such as "I feel that our group would stay together in the face of adversity" and "I feel that the members of our group share a common purpose."

Hypothesis 5: Participants in larger groups will nominate a smaller proportion of members for inclusion in a future group than members of smaller groups.

Propositions 6, 7, and 8 suggest that commitment of an individual group member to the group decreases as the number of group members increases. If people are more likely to form coalitions in larger rather than smaller groups, are less committed to fellow group members in larger groups, and feel less shared responsibility as group size increases, then members of larger groups are more likely to want a smaller group to work with on a subsequent task.

Hypothesis 6: Participants will report other group members are less aware of them as group size increases.

Hypothesis 7 is based on proposition 4 and the assumption that anything impeding communication reduces mutual influence in groups. If people in larger groups are more likely to feel that other people are not thinking about them, then they are likely to feel less influential and report feeling that others are not as aware of them than people in smaller groups.

Hypothesis 7: The greater the awareness participants report others have of them, the more cohesive, trusting, and committed they will report being.

Anticipated mutual perception, how often a person thinks about what another person is thinking about them, is the proposed mechanism underlying the effect of group size on perceived cohesion, trust, and commitment. This hypothesis tests the basic assumption that effects of increasing group size on these outcomes is mediated by the anticipated mutual perception experienced by group members. Anticipated mutual perception is likely reflected in the awareness a person reports having of another person, as well as the awareness they report the other person having of them. Given proposition 2, if impediments to communication from a partner affect influence more than impediments to communicating to a partner, then awareness participants report others having of them will likely have a greater effect on cohesion, trust, and commitment than how aware a person reports they are of others.

Theory developed by Soboroff and Kelley (2011) suggests that influence depends on expectations people hold for the validity of evaluations they receive from others. This can vary due to differences in status, social identity, or factor affecting social impact such as proximity or the availability of sensory information. One key proposition is that people are viewed as less valid sources for self-relevant information the less available they are to the person. Group size naturally changes proximity and the sensory availability of each group member to one another thus likely reducing the extent any

single individual has over their partners, all things being equal. Therefore, an initial test

to determine if proximity and availability of information about partners impact influence

is warranted. Also important is whether or not status characteristics operate to affect

influence at least partially through anticipated mutual perception. In situations where

higher status individuals are absent and not responsible for the final group decision,

influence granted to that higher status person in situations where disagreement between

their contributions exists may not occur out of a desire to uphold and express belief, but

due to the belief that the disagreement serves as a valid self-relevant evaluation of an

individual's own competence at the task. The following chapter presents an experimental

test of hypotheses 1-2 regarding assumptions and propositions related to the effects of

anticipated mutual perception on influence between people in task groups.

CHAPTER 4: ANTICIPATED MUTUAL PERCEPTION STUDY

METHODS

A variety of research methods produce evidence to support or undermine theoretical propositions, and all research methods can produce useful evidence. Controlled experiments are often used to test hypotheses derived from more formal theoretical development. I designed an experiment to test the first two hypotheses related to the anticipated mutual perception of people working with partners on shared tasks. Hypothesis 1 regards the influence that partners have over people they can see compared to people they cannot see. Hypothesis 2 regards the influence partners have over people physically close to them when compared to people in adjacent rooms, separated by a wall, or people who contributed to a group but were presently absent. Based on comments received regarding the experiment in Study 1, I extended the study to test an extended hypothesis 2. The extension concerns the influence high-status partners have over low-status partners when absent, having recorded their input for a group task earlier in the day.

Why Experiment?

Experimental studies are often useful as part of larger programs of research into important social processes that may be masked by the complexities of everyday life (Lucas 2003; Zelditch 1969). Rather than trying to recreate natural settings, experiments test a limited set of hypotheses in a setting specifically designed to observe a phenomenon. As George Herbert Mead stated, experiments require "constructing or finding an actual situation answering to the hypothesis" (Mead 1938; McPhail 1979). Experimental results are not meant to generalize directly to the complex situations found in everyday life. Instead they are used to test hypotheses based on theoretical propositions that, if supported, can help researchers understand social phenomena (Lucas 2003). Experiments can alter a single element of a social situation between conditions

and compare the behaviors of people within those conditions. Experiments are helpful for researchers interested in gathering evidence about the causal processes explained by a theory. Study 1 tested three hypotheses concerning situational factors expected to affect anticipated mutual perception and thus the influence of a partner over a participant. The setting allows me to measure the effect of these factors in a setting designed specifically to measure a partner's influence over a participant. Observing this process could be more difficult in naturally-occurring settings, where other factors known to affect influence likely co-occur. These factors include people's relative social status, shared group or social category membership, and persuasion tactics.

To test Hypotheses 1-2, other factors related to influence needed to be controlled. Experiments allow researchers to control extraneous factors by manipulating a single aspect of the situation in each condition. They also allow researchers to randomly assign participants to conditions to control for variations on individual traits that might affect a dependent variable. Researchers can then measure behavior and compare people's behavior and attitudes in different conditions. While experimental settings are often highly contrived, they are intended to recreate only required elements of situations necessary for testing hypotheses based on theoretical propositions (Lucas 2003; Lovaglia 2003; Zelditch 1969). Study 1 was designed to obtain evidence of a link between anticipated mutual perception and influence. Evidence for the relationship between anticipated mutual perception and influence increases confidence in remaining theoretical propositions based on that relationship. These include the propositions that members of larger groups will have lower trust, cohesion, and commitment than members of smaller groups, due to reduced anticipated mutual perception. Study 2 will test hypotheses based on those proposed relationships. Together, Studies 1 and 2 can accumulate evidence for a proposed relationship between anticipated mutual perception and outcomes of human interaction.

In order to accumulate knowledge, studies within theoretical research programs attempt to provide evidence to develop and revise theoretical propositions (Wagner and Berger 1985; Webster 2003). This evidence is provided through tests of hypotheses based on these propositions. Experiments to conduct limited tests of hypotheses can determine whether a theory's predictions hold in particular situations. These situations may reflect scope conditions that tell researchers the types of situations in which they can expect a theory to make accurate predictions. Scope conditions can help researchers design experiments by specifying the necessary elements for observing a phenomenon. As evidence testing hypotheses based on a theory accumulates, researchers may begin to generate hypotheses appropriate for studies in non-laboratory settings. These settings may at first be chosen for their consistency with scope conditions that guided the design of earlier laboratory studies. If research conducted outside the laboratory provides consistent evidence to that found in the laboratory, researchers gain confidence in the theory (Aronson et al. 1990). As more evidence outside the laboratory is gathered, scope conditions may be refined or expanded, improving the generality of the theory. Refinement of theory and testing of new hypotheses allow theories to grow (Lovaglia 2003). The methods researchers choose to test these hypotheses likely will reflect the variables researchers wish to measure or the processes they want to accurately describe. Based on evidence collected in Studies 1 and 2, future research using other methods can be proposed.

Laboratory experiments can lead to new hypotheses that require non-laboratory samples or settings to test. One study by Kelley (2008) used an experiment to collect evidence that supported a curvilinear relationship between a person's age and their social status. Based on this study, Kelley and colleagues (2009) proposed that expectations of competence related to age and gender interact so that people perceive men to make better leaders later in life than women. The hypothesis they developed was that people in the U.S. would likely report that the best age for a man to be a supervisor would be older

than the best age for a women to be a supervisor. To test this hypothesis they needed a more representative sample of the population than a convenience sample made up of college students. Time-Sharing Experiments in the Social Sciences (TESS), a program funded by the National Science Foundation, allows researchers access to a representative sample of U.S. households. Our study used a factorial survey design where half of the respondents were randomly assigned to answer questions about men and half were randomly assigned to answer questions about women. Each group was asked what the best age is for a either a man or a woman to be a supervisor. Results supported the hypothesis that the best age for a man to be a supervisor was older than that for a woman. The study also provided further evidence for the curvilinear relationship between age and status found by Kelley (2008), increasing confidence in that proposed relationship. Because the hypothesis Kelley and colleagues (2009) tested made predictions for people within a defined population, the need for a representative sample dictated the method used.

Sometimes researchers are not aware of all the factors that affect the processes they intend to study. This makes it difficult to know what controls to impose through experimental design. Settings that have been calibrated over many studies to produce desired conditions, such as that used in Study 1, are likely to provide adequate control for extraneous variables. However, studies with less constrained interactions, such as Study 2 described in Chapter 6, may result in each group member experiencing a unique situation. Uncontrolled variations in participant experiences can make it more difficult to interpret experimental results. The theory tested in Study 2 does not hinge on the content of interactions. However, processes that occur in freely interacting groups, such as the development of status differences, are likely to affect group member experiences in Study 2. Researchers often collect questionnaire data and demographic information to serve as statistical controls in models analyzing relationships between variables of interest. However, whenever using statistical rather than experimental controls, bias may be

introduced into analyses based on which variables are and are not included in statistical models. In such situations, qualitative data can provide a useful counterpoint to quantitative analyses. Qualitative data can point to relationships and processes that may be missed through even very rigorous quantitative analysis. For this reason, qualitative methods can be a very important part of an experimental design to reveal the subjective experiences of participants.

A study by Leicht and colleagues (n.d.) shows how useful qualitative data and its analysis can be for clarifying experimental findings. Leicht and colleagues investigated the effects of a person's gender identity on their efforts at gender-stereotyped tasks. Quantitative analysis suggested that gender-stereotyped identities, being instrumental and task-oriented or communal and people-oriented, affected peoples' performance on supposed ability tests for gender-stereotyped tasks. Men are more often stereotyped as having an instrumental identity, and women as having a communal identity. Analyses found that people with gender-stereotyped identities that were consistent with the task gender stereotype performed better on the test. However, when working on the task, group members' expectations related to gender appeared to determine who group members believed was competent. For example, a woman with a more "instrumental" identity than a man in the group was still likely to be rated as less competent at the task than that man. This suggested that identity had little to do with opportunities to contribute to a group or make impressions on group members. Yet Leicht and colleagues suggested that people ought to put efforts into tasks that fit with their identities, because performance on these tasks could confirm their self-concept. In an earlier paper, Leicht et al. (2007) suggested that the gender composition of a group might affect people's efforts on gender-stereotyped tasks. Groups had been allowed to vary randomly in gender composition to explore this possibility. At the conclusion of the study, too few all-male groups took part to conduct a reliable quantitative analysis of the relationship of gender composition to other important variables.

The authors turned to qualitative analysis of videotapes in order to observe differences between groups with differing numbers of men and women. A colleague analyzed videotapes made of each group that participated and read transcripts from interviews conducted after experimental sessions (Verploegh 2011). That colleague noticed that the gender composition of the group seemed to play a role in whether a person's gender identity affected their contributions to their group. A member of the majority gender was almost always the leader for the group, regardless of the gender stereotype of the task. This suggested that a person's ability to enact their own identities can depend on whether they have adequate social support to do so, though they will enact their identities when they are able. Future studies can control for gender composition or study its effects on task performance more systematically to refine theory of how gender identity affects performance in groups.

Qualitative methods therefore are useful for experiments, and these methods were used in the design of Study 2, described later in Chapter 6. Interviews conducted after study 2 and videotapes of experimental sessions will provide data for a future study. Qualitative data are also useful for generating new theory. Observation of naturally-occurring situations can give researchers an idea of a process they would like to understand with a theory. Interviews, participant observation and other ethnographic techniques, and analysis of recorded conversations and interactions are common sources of qualitative data. These methods provide rich data that allow researchers to "ground" theories in people's everyday experiences (Glaser and Strauss 1967). Systematic observation conducted in naturally-occurring setting helps researchers identify patterns and catalogue situational elements that allow for or restrict a particular type of social process. As such, the conditions and relations a theory might seek to explain can be specified through qualitative analysis. All methods can thus provide evidence useful for developing theory.

A wide variety of methods inform the theory developed in Chapter 3 and the hypotheses based on that theory. These range from research programs that study status, social identity, and perceived co-presence using primarily experiments (Berger et al. 1977; Berger and Fisek 2006; Tajfel 1979; Tajfel and Turner 1982; Blascovich et al. 2003) to principles of symbolic interaction and dramaturgy based on ethnographic research (Goffman 1959; 1963). Taken together, these programs of research have helped develop the concept of anticipated mutual perception, how often a person thinks about what others think about them. This past research also suggests how anticipated mutual perception is likely related to influence in groups: it reflects how valid we think another person is to evaluate us. The studies presented here use experiments to test hypotheses based on causal relationships proposed by my theory. These experiments may lead to studies with different methods, and can aid the process of untangling complex processes related to interpersonal influence in everyday life.

<u>Design</u>

I created a five condition experiment to test hypotheses about the relationship between anticipated mutual perception and influence. These conditions used the "contrast sensitivity task" protocol from Troyer's (1999) version of the standard experimental setting for status characteristics research. This setting is designed specifically to allow the measure of influence of a partner over a participant while working on an ambiguous task. The setting also uses computerized instructions to help participants believe their goals do not conflict with the goals of their partners. This version was adapted and status differences between partners omitted to test hypotheses 1-3. Hypotheses 1 regards the influence a partner will have over a participant when the participant can see their partner. Hypothesis 2 concerns the influence a partner will have when the participant and the partner are separated by place and time.

Conditions in the Anticipated Mutual Perception Study

Five conditions were used to test Hypotheses 1 and 2 (see Figure B2):

Condition 1

In Condition 1, participants believed they were working with the partner in the same room, though the partner's answers to the contrast sensitivity task were the same as those the participants viewed in all other conditions. Participants in Condition 1 were positioned so that they were sitting back to back and were unable to see their partner without turning around. Participants were also told they should not speak to one another, because researchers were only interested in how well they worked together over the computer network.

Condition 2

In Condition 2 participants were told their partner was in an adjacent room working with the participant over the computer network. In this condition, participants were seated at a workstation identical to the one used in Condition 1. However, they were told they were separated from their partner by a wall and that at no time would they see their partner while working on the task.

Condition 3

In Condition 3 participants were seated in the same workstation as participants in other conditions and were told their partner was in an adjacent room. Unlike Condition 2, participants in condition 3 were told they could see their partner on a television monitor placed in the participant's room. The participant was required to turn their head 90 degrees to view this monitor. Actually, participants were only watching a recording of a confederate partner that had been made with a camera positioned directly behind the confederate. This recreates the view of a partner the participant would have if they turned to look at their partner in Condition 1 during the task.

Condition 4

Condition 4 was similar to Conditions 2 and 3 in that partners were alone in a room working at a computer workstation and were told their partner was in an adjacent room, separated by a wall. However, participants were informed that their partner could view the participant on a television monitor in the partner's study room. The participants in this condition were shown a camera positioned directly behind them in their own room and told this camera provided their partner a live feed for viewing the participant.

Condition 5

In condition 5, participants were told their partner had experienced a scheduling conflict and was neither in the laboratory or able to interact with them directly. Participants were told the partner had arrived earlier, provided their own answers to the decision-making task, and that the participant should use these answers to make the final group decision on their own. Participants were told the partner's answers had already been fed into the computer and would be visible to the partners as they went through the study, as though the partner were entering answers in real time.

<div align="center">Conditions in the Study 1 Extension</div>

Two conditions extended Study 1 to test the extended Hypothesis 2 regarding how the status of an absent partner is related to partner influence over a participant:

Condition 6

Condition 6 replicated Condition 5 of Study 1, with participants being told their partner was absent but had left answers to the task for the participant to consider. As in Condition 5, participants were told their partner had experienced a scheduling conflict and was neither in the laboratory or able to interact with them directly. Participants were given information that their absent partner was a graduate student and had a 4.33 high school grade point average. They then completed the contrast sensitivity task with instructions that they would make the final group decision on their own.

Condition 7

Condition 7 replicated Condition 5 of Study 1, with participants being told their partner was absent but had left answers to the task for the participant to consider. As in Condition 5, participants were told their partner had experienced a scheduling conflict and was neither in the laboratory or able to interact with them directly. Participants were given information that their absent partner was a high school student and had a 1.8 high school grade point average. They then completed the contrast sensitivity task with instructions that they would make the final group decision on their own.

Use of the Contrast Sensitivity Task as a Context for

Measuring Influence

The main dependent variable of interest in Study 1 is the difference in partner influence over a participant between conditions. Thus a setting in which influence can be reliably measured is needed. This setting must conform to the scope condition of the theory relating anticipated mutual perception to influence, which states that partners do not perceive their personal goals to be in conflict. Researchers studying the relationship between status characteristics and influence developed a standard experimental setting that meets both of these criteria (Berger et al. 1977; Troyer 2001; Kalkhoff and Thye 2006). This setting was designed to provide instructions to partners that encourage them to believe that cooperation with a partner, rather than competition, will yield maximum success on a valued task. Thus, participants within this setting are encouraged to believe their partner's goals are aligned with their own. The different tasks used in this setting also allow influence to be measured by providing participants the chance to change their answers to each of a series of problems after seeing they have disagreed with a partner. Below the purpose of this setting is described and its appropriateness for use in Study 1 explained.

The standard experimental setting was developed in conjunction with the formalization of status characteristics theory (Berger et al. 1977; Berger 2007). That theory explains how inequalities between members of task groups emerge in relation to differences between those members on socially meaningful characteristics. Characteristics such as gender, age, beauty, and race have different states and these states may each be differently socially valued. If one state of a characteristic like age, such as being middle-aged, is more highly valued than another state, such as being a young adult, and middle-aged people are expected to be more capable at a broad range of tasks, then middle-aged people are expected to have more influence over young adults than vice-versa when they work on a task together. The standard experimental setting allows researchers to vary the characteristics of a participant and their partner. It also allows other sources of behavior change, such as power difference between partners, to be eliminated from the setting. Participants work together on the binary-choice task, and changes in participant answers likely represent influence due to the freedom of participants to stay with their initial responses to the task. Influence within this setting can then be interpreted as resulting from the difference between a participant and their partner on a socially meaningful characteristic. This setting has been used to establish a number of characteristics, such as those listed above, as status characteristics. However, the theory places specific conditions on when these characteristics will result in differential influence, opportunities to contribute to groups, or evaluations for a person's contributions to the group from other members. These *scope conditions* require that participants be both task-oriented and collectively-oriented. Task orientation refers to participants recognizing the task they are working on has a correct solution, and group members value success on the task. Collective-orientation refers to participants considering it necessary and legitimate to consider each other's input when working on the task. All of the instructions given to participants within the setting are meant to

reinforce these scope conditions and introduce participants to the format of the specific binary choice task chosen by researchers for the study.

Though the specific task may differ for a particular version of the standard experimental setting, all versions of the setting have some basic features in common (Berger 2007; Kalkhoff and Thye 2006). First, a participant is told that they will be working on a task meant to help understand a newly discovered ability likely unrelated to other known skills the participant may possess. Second, the participant believes the task is personally meaningful, having a correct solution that requires the newly discovered ability, which the person or their partner may or may not possess. Third, the participant believes that success on the task requires both the participant and their partner to agree on the correct solution to each of a series of decisions, submitting those correct solutions independently for each decision. The more often the participant agrees with their partner on a correct solution and they both submit that solution, the greater success they will have as a group. These instructions encourage participants to take their partner's answers into account by emphasizing that the participant and their partner must cooperate to achieve the highest level of success. Fourth, the setting attempts to convince participants they should value success on this task by providing explicit performance standards, and informing the participant that their performance on the task will be compared with other groups' performances. Each of these conditions is reinforced in a series of instructions delivered by either a research assistant, a confederate referred to as "Dr. Gordon," or a series of text screens delivered via computer. Finally, participants are introduced to a decision-making task where they decide which of two solutions to a problem is more likely to be correct, a binary-choice task. On this task, the participant submits answers to a series of problems, views their partner's answers, and is given the chance to change their own answer. The proportion of times participants change their answers is the measure of influence in these settings.

The version chosen here uses the "contrast sensitivity task" as the binary choice task for Study 1. Figure B3 (below) shows the screen on which participants are introduced to the contrast sensitivity task in Troyer's (1999) computerized protocol. Participants are told that in each round of the task they will view two rectangles, each subdivided with smaller black and white rectangles. They are prompted to use their mouse to click the circle next to the light bulb illustration for their initial choice. This represents their decision of whether the top or bottom rectangle has more white area. This "lights up" the light bulb next to their choice. Below their initial choice, they see a set of light bulbs representing their fictitious partner's initial choice. After a pre-programmed time delay, their partner's choice is revealed in the same manner as the participant's, by one of the light bulbs lighting up (Figure B4). Participants are then asked to designate their "final choice" by clicking on the circle next to one of the light bulbs, either for the top or bottom rectangle, below their partner's initial choice. Participants may stay with their initial response, or they may change their response to match their partner's. In Figure B5, the participant has chosen to remain with their initial response. This choice would be designated a "stay response" and represent a rejection of partner influence within this setting.

After the computer introduces the task using practice screens like those in Figures B2-B4, participants are given instructions that summarize the task and reinforce scope conditions. Participants are informed of the number of rounds the experiment will include, and that only their final decisions count toward the team score in each round. Participants also view standards, presented in text form over several screens, for judging their possible performance on the task (See Figure B6). These screens are meant to reinforce the value of performing well on the task, by reminding participants their group is being evaluated relative to other groups that have already participated. The standards screens also inform the participant of the necessity and legitimacy of considering

information from their partner, as their group score is the only thing researchers are interested in. This is meant to reinforce participant collective orientation.

Study 1 used a modified version of Troyer's (1999) computer-mediated setting and the included program for the "contrast sensitivity" task. Troyer's version was developed in response to questions regarding the effects of protocol differences on measured influence within different versions of the standard experimental setting. Troyer (2002) found that subtle changes in the presentation of information to participants, such as stating "Your partner disagrees" on the choice screens in the Foschi et al. (1990) computerized setting, affected how much influence people gave to partners, independent of status differences. By introducing new elements into the setting, these changes made it difficult to compare influence levels between studies using the Foschi et al. (1990) protocol and research using other versions of the setting. However, Troyer (1999) recognized that a computer-mediated setting was a flexible and affordable way for researchers to quickly accumulate empirical evidence related to a theory. Troyer's (1999) version of the setting altered Foschi's setting to more closely recreate the original setting used in early status characteristics research. Importantly, the setting was used by Kalkhoff, Younts, and Troyer (2008) to replicate earlier studies and provide support for the finding that gender is a status characteristic. This provided evidence that the elements thought necessary for detecting influence in the original setting had been successfully recreated in Troyer's (1999) version.

The setting used in Study 1 is the same as that used by Kalkhoff, Younts, and Troyer (2008) to study the effects of communication medium on influence. Using this setting, they found partner visibility to affect influence between partners regardless of status differences. However, they did not provide a theory to explain this effect and found it using post-hoc statistical analysis. Here theory has been developed to explain the relationship between partner visibility and influence through the mechanism of anticipated mutual perception. This theory has led to the hypothesis that participants who

can see their partners will be more influenced than participants who cannot see their partners, in the absence of status differences between partners. This is in-line with the findings of Kalkhoff, Younts, and Troyer (2008), and so I use the setting they used in order to allow comparisons between their findings and findings from this study.

Study 1 is concerned with how the closeness of a partner and whether the partner is visible will affect influence. Therefore, no status differences between partners are included in Conditions 1-5. Instructions regarding the visibility of partners and their physical closeness are delivered by instructions from a research assistant rather than by changes to the computerized setting. This was done to keep the computerized setting as consistent as possible with the one used in Kalkhoff, Younts, and Troyer (2008), while still allowing variations between conditions. One difficulty with using this setting is that the setting itself was designed with the explicit purpose of eliminating, as much as possible, sources of influence that are not based in status differences between participants. However, recent meta-analyses by Kalkhoff and Thye (2006) and Thye and Kalkhoff (2010) have found that influence within the setting is still affected by situational elements unrelated to status. These include the communication medium being used, the visibility of partners, and the extent to which scope conditions were met within a given study. Troyer (2002) suggests that changes in the setting making participants more aware of partners, such as being visible, are likely to affect participant collective orientation. If people think more often of people thinking about them when they are made more aware of those people, then this may suggest a link between anticipated mutual perception and the scope conditions necessary for status to affect influence. Further, a partner's high status may draw attention to them, making participants think more often of what the high status person thinks of the participant even when the partner is absent. If so, collective orientation may be generated by status differences between people separated by place and time.

Overall, this setting provides a platform for creating conditions consistent with the theory presented above. The instructions provided in the setting promote scope conditions consistent with the theory and the task allows influence to be measured as the voluntary change in a person's behavior in response to disagreement with their partner. Further, the use of this setting allows for comparisons with past research to potentially relate anticipated mutual perception to research on status.

<div align="center">Independent variables</div>

Closeness of the Partner. Participants were randomly assigned to conditions that varied how close participants were to their partners. Participants in Condition 1 were closest to their partners, and worked in the same room as a confederate partner. Participants in Conditions 2, 3, and 4 were less close to their partners and were told their partner was in an adjacent study room. Participants in Condition 5 were the least close to their partners, and were informed their partner had left answers to the task but was currently absent from the laboratory.

Visibility of Partner. Participants were randomly assigned to conditions where they were either able to see or not see their partner. Condition 1 (same room) and Condition 3 (adjacent room, partner on monitor) allowed participants to see their partner from behind when working on the contrast sensitivity task. Partners were not visible in Conditions 2, 4, 5, 6, or 7.

Partner Status. Conditions 6 and 7 introduce a status difference between the participant and an absent partner. In Condition 6, participants are told that the absent partner is a graduate student who achieved a 4.33 high school G.P.A. In Condition 7, participants were told that their partner was a younger high school student with a 1.33 high school G.P.A. If higher status partners are influential even when absent, this supports the assumption that people can be influenced so long as they believe their goals

are not in conflict with their partner and the partner is seen as a valid source of self-relevant information.

Dependent Variables

Influence. Each participant took part in the "contrast sensitivity" task. They were instructed to look at two rectangles divided up into a random pattern consisting of an equal number of smaller black and white rectangles. After being told that the number of black and white rectangles were not equal between the two rectangles, participants were asked to determine the rectangle with the most white area. In each of 25 rounds, participants decided on one rectangle and received information regarding their partner's answer. In 20 of 25 rounds, the computer informed the participant that their partner disagreed with their choice. Influence in this study was measured as the proportion of times the participant stayed with their original answer over the 20 rounds of disagreement with their partner. We designate this measure p(s) for proportion of stay responses.

General Expectation States scale. The general expectation states scale consists of six items that measure general expectations for a partner's value and likely competent contributions to task success. These measures include how *capable* the participant believes their partner to be, how generally *competent* the partner is, how highly the partner rates on things that *count* in this world, how likely the partner is to have *abstract* reasoning ability, how highly the partner likely rates in *reading ability*, and how competent at *computer* tasks a partner rates. The last two measures are excluded from our analysis, as the experimental protocol makes it clear that all partners have demonstrated ability at the task (done over the computer) and that the task requires reading ability. All measures are rated on 9-point semantic differential scales, with the most negative ratings anchored at 1 and most positive ratings anchored at 9. The measures for *Capable, Competent, Count,* and *Abstract* were summed and averaged to produce a composite measure of participant expectations for the value and competence of

their partners. Expectations for competence and value have been shown to be related to status in task groups. People expected to be more competent and of greater value to the group relative to other group members have been shown to be more influential in task groups such as those created here. These items were used to explore whether simply being closer to or seeing another person affects these expectations for that other person.

Awareness of Partner and Partner's Awareness of Participant. This variable was measured with two post-experiment questionnaire items rated on 9-point semantic differential scales. Participants were asked to rate how aware their partner was of them while working on the task, and how aware they were of their partner while working on the task.   These items serve to measure two aspects of anticipated mutual perception.

Control Variables

Control Variables. Participants provided information on their year in school (Freshman—Graduate), ethnic background (1=African American, 2=European American, 3=Hispanic non-European, 4=Asian American, 5=Pacific Islander, 6=Other), Father and mother's educational attainment (1= Less than high school, 2=high school, 3=Associates Degree, 4=BA, BS, 5=Graduate or Professional Degree), Family income, and High school GPA. These variables were used as covariates in MANOVA analyses of differences in influence and expectation states based on condition assignment.

Procedure

Participants signed up to participate on an automated scheduling website for a one-hour timeslot. When they arrived at the laboratory, participants were met by a research assistant who gave them an informed consent document. In Condition 1, unlike the other four conditions, the research assistant also greeted a trained confederate partner as if the confederate had also signed up for the same timeslot. In Conditions 2, 3 and 4, the research assistant informed the participant they would not meet their partners before working together and the partner would work in another room. In Condition 5, the

research participant informed the participant that their partner had had a scheduling conflict and could not make it to the same time as the participant. The research assistant told participants in Condition 5 that the partner had come in earlier to fill out their answers to the task they would have worked on together. The participant was told they would be provided these answers by the computer as they worked on the task, but that since their partner was not present the participant would be responsible for submitting the group's final answers for each round of the task.

After participants filled out informed consent documents, they were led to a study room. In each condition the participant saw two desks back to back, each with a computer monitor, keyboard, and mouse positioned on top of the desks. The participant was directed to sit in a red chair at the right-hand desk as they entered the room. In condition 1, the confederate was directed to sit in a green chair directly behind and facing away from the participant. After participants were seated, they were thanked for participating and told researchers wanted to gather some basic information from them. Participants were given a demographic information questionnaire on which they were asked to provide information on their age, year in school, parents' educational attainment, family income, race, gender, and high school grade point average. Participants were told that when they had finished these questionnaires, they should slide a red card provided by the research assistant and marked "Attention Assistant" under the door to signal to the research assistant that they were ready to move on with the study. The research assistant then left the room, asking the participant (and the confederate in Condition 1) not to touch the computers until directed to do so by the research assistant. At this point in conditions 2, 3, and 4, the research assistant made noise as if they were leading the partner to an adjacent room, opening and closing the door next to the participant's study room loudly.

When the red "Attention Assistant" card appeared in the hallway, the research assistant re-entered the room and informed the participant they would be working on a

study investigating how well people work together over computer networks. In Condition 1, they were told not to speak to the partner sitting behind them, but to interact only over the computer network when prompted to do so by the computer, as face to face interaction was not of interest to researchers. In Conditions 2, 3, and 4, participants were told their partners were placed in another room because face-to-face interaction was not of interest to researchers. In Condition 5, participants were informed simply that researchers were only interested in how people worked over computer networks, so their partner's answers were going to appear to them as if the partner were in the laboratory entering the answers in real time. In this way, participants were told, researchers could maintain conditions similar to those the participant would have faced if their partner was present, even though the partner was not available during the study and the final group decision was the responsibility of the participant. Participants were then told they would work with their partner (or using their partner's answers in Condition 5) to complete the "Contrast Sensitivity Task."

Participants were told the contrast sensitivity task was a task researchers were interested in studying more extensively due to the fact that people did better working with others on the task then when working alone. Participants were told they would be asked to judge a series of rectangles and determine which of two rectangles presented over 25 rounds contained more white area. Participants were informed that the task was unrelated to other known abilities such as mathematics ability or artistic ability, and information suggesting people performed better when working with others on the task than when working alone was reiterated. Participants were then informed that the computer would provide them with all the instructions needed to complete the contrast sensitivity task.

The research assistant then directed participants to turn to face the computer. They viewed a screen reading "Welcome to the Center for the Study of Group Processes." Below this was a button reading "Connect to Network." After clicking on this button, the participant viewed a series of screens on which contrast sensitivity was

explained as a perceptual ability unrelated to other known abilities but performed better by groups than individuals. They were informed that they and their partner would work together on a task asking them to judge the amount of white area in a pair of rectangles and determine which rectangle, the top or the bottom, contained more white area. In reality, both rectangles contained the same amount of white area. Participants then viewed examples of these images. Under these images, participants read that they would work with their partner for 25 rounds. In each round, they would choose the rectangle they believed contained the most white area. This would cause a computer image of a light to light up next to their answer, marked either "Top" or "Bottom." After submitting their answer, they would see their partner's answer below their own, in an identical field. The participant would then be prompted by the computer to make a final determination. The participant read instructions telling them that this method of sharing information had been found to more likely result in a correct answer than individuals working alone, on average. Following these instructions, participants went through two practice rounds, following instructions by the computer on how to answer the questions.

After the practice rounds, participants read instructions explaining that an optimal score would depend on both they and their partner arriving at the correct answer. Participants were thus instructed that both they and their partner were equally responsible for their team's performance. On the following screens the participants then saw standards for poor versus superior performance on the task, supposedly gathered from similar studies run across the United States. The purpose of these instructions was to increase the participant's motivation to do well on the task, believe that a correct answer on the task was possible, and believe considering their partner's answers was necessary and legitimate to perform as well as possible on the task. Importantly, it let the participant know that their partner's interests were not opposed to their own.

A summary of instructions was then provided to participant, immediately after which the participants began to work on the contrast sensitivity task. In 20 of 25 rounds,

the computer was pre-programmed to give the opposite answer to that provided by the participant. Partner influence was measured by the proportion of rounds, out of 20, that the participant rejected the partner's answer and remained with their initial answer to the task.

Following the last round of the contrast sensitivity task, participants were prompted by the computer to slide the red "Attention Assistant" card under the door. The research assistant entered the room, and brought a final questionnaire for the participant to fill out. On this questionnaire, participants were asked to rate their partner's competence on the task and value to the group. They were also asked to rate how aware they believed their partner was of them during the task, how aware they were of their partner, and to rate the partner on the partner's trustworthiness, honesty, and respectability. After filling out this form, the participant was interviewed and debriefed. During the interview, the participant was asked how important it was for them to do well on the task, how much attention they paid to their partner's answers during the task, whether they doubted if their partner was real, and if so, why, and if anything seemed odd about the task. During the debriefing, participants were informed their partners were not real, and in Condition 1 were introduced to the confederate partner. In all conditions the partner learned that their partner's answers were actually generated by the computer. After being debriefed, the participant filled out a pay voucher and exited the laboratory.

Study 1 Extension Methods

The extension study tests an extension of Hypothesis 2, that p(s) scores for an absent high-status partner will be lower than for an absent lower status partner. This hypothesis was based on comments I received from a presentation of Study 1. It was suggested that absent partners are not likely to be influential in the setting I chose to measure influence. It was argued the participant had no incentive to change their answer in Condition 5 because they were told they were solely responsible for the group's

answers. Therefore, it was proposed that group members were not collectively-oriented. These comments suggested that absent partner contributions would not be considered by participants when completing the task. If this is true, an absent partner who is higher status than the participant should have no more influence than an absent equal-status partner. Thus, two additional conditions test whether a status difference between a participant and an absent partner results in changes in influence. According to the theory above, however, a person's status likely affects the validity of information that person provides to others. If so, the status of an absent person should affect whether that person is influential anytime a person is working on a task and they do not believe their goals conflict with the absent person. Previous research has shown that higher status people are seen as more competent to evaluate other people's performances, even when they are not directly engaged in a task (Webster and Sobieszek 1974). This study recreates the absent partner setting of Condition 5 from Study 1 and introduces differences in status between the participant and their partner.

Design

Study 1 was extended to investigate whether an absent partner would have more influence if the partner were high status then if the partner were low status. Two experimental conditions varied the education level and academic achievement of an absent partner relative to the participant. In Condition 6, the partner was a high-status graduate student with a 4.33 high school G.P.A. In Condition 7, the partner was a younger high school student with a 1.33 high school G.P.A. Participants were recruited through the Sona Systems website and randomly assigned to one of these two conditions. Study procedures were similar to Condition 5 in Study 1, where the higher or lower status partner was absent but had left their work to be used by the participant. This allows a test of the hypothesis that higher status partners will be more influential than lower status

partners so long as participants are task oriented and believe their goals are not in conflict with those of their partner.

Participants were given profiles of their partners, and as in Study 1, took part in the contrast sensitivity task. Influence was again the main dependent variable in this study. As in Study 1, influence was measured as the proportion of rounds, out of 20, that the participant rejected their partner's answers in favor of their own when they disagreed. As in study 1, participants rated their partners on competence and value to the group.

Procedure

Participants signed up to participate on an automated scheduling website for a one-hour timeslot. When they arrived at the laboratory, participants were met by a research assistant who gave them an informed consent document. Prior to their arrival, the research assistant had flipped a coin to assign the participant to Condition 6 (higher-status partner) or Condition 7 (Lower status). As in Condition 5 in study 1, the research assistant informed the participant that their partner had a scheduling conflict and could not make it to the same time as the participant. The research assistant told participants that the partner had come in earlier to fill out their answers to the task they would have worked on together. The participant was told they would be provided these answers by the computer as they worked on the task, but that since their partner was not present the participant would be responsible for submitting the group's final answers for each round of the task.

After filling out informed consent documents, participants were led to a study room. In each condition the participant saw two desks back to back, each with a computer monitor, keyboard, and mouse positioned on top of the desks. The participant was directed to sit in a red chair at the right-hand desk as they entered the room. Unlike in study 1, the participant was given a sheet on which they read that their partner was either a higher-status graduate student partner who supposedly had a 4.33 high school

G.P.A. (Condition 6) or a lower status, younger high school student with a lower 1.33 high school G.P.A (Condition 7). This represented the status manipulation in this experiment. Participants were then asked to fill out a similar sheet prior to filling out a demographic information form and before reading instructions for completing the contrast sensitivity task. All computer instructions and images remained consistent with the procedures for Condition 5 in study 1.

As in study 1, following the last round of the contrast sensitivity task, participants were prompted by the computer to slide the red "Attention Assistant" card under the door. The research assistant entered the room, and brought a final questionnaire for the participant to fill out. On this questionnaire, participants were asked to rate their partner's competence on the task and value to the group. They were also asked to rate how aware they believed their partner was of them during the task, how aware they were of their partner, and to rate the partner on the partner's trustworthiness, honesty, and respectability. After filling out this form, the participant was interviewed and debriefed. During the interview, the participant was asked how important it was for them to do well on the task, how much attention they paid to their partner's answers during the task, whether they doubted if their partner was real, and if so, why, and if anything seemed odd about the task. During the debriefing, participants were informed their partners were not real, and that their partner's answers were actually generated by the computer. After being debriefed, the participant filled out a pay voucher and exited the laboratory.

The two studies described here test two hypotheses related to assumptions of a theory relating anticipated mutual perception to influence in task groups. Study 1 varied the physical closeness and visibility of a confederate partner to test the hypothesis that people will be influenced more by visible and close partners than by partners who are farther away and cannot be seen. Two conditions extended Study 1 to test the extension of Hypothesis 2 that a higher status absent partner will have greater influence than a lower status absent partner, even when the absent partner does not share responsibility for

group outcomes. Study 1 is designed to provide evidence of whether the availability or immediacy of a partner increases that partner's validity as a source of self-relevant information. The two conditions extending Study 1 are designed to check whether it is possible for someone who is unavailable and not immediate in time and space to have influence. Study 1 could provide support for propositions underlying the process by which group size affects trust and cohesion. The extension of Study 1 could suggest that high status may overcome lowered immediacy and availability because high-status people's evaluations are thought to be more valid.

Analysis

The main dependent variable of interest is the level of influence partners have over participants in each of the experimental conditions. Influence here is measured as the proportion of disagreement rounds, out of 20, on which participants stayed with their initial response. This will be represented as p(s), or the proportion of stay responses. P(s) ranges from 0-1, with higher values representing less influence of a partner, and lower values representing more influence. If a participant were to change their answer on 10 of the 20 rounds, this would yield a p(s) score of .50. To put this in perspective, past meta-analyses have estimated the likely p(s) for equal status partners in the standard experimental setting to be .64 (Troyer 2002). This means that when no status difference exists between participants and their partners, the participant is likely to reject their partner's solution roughly two-thirds of the time.

Tests of Hypothesis 1

P(s) will be calculated for each participant and averaged within each condition. Independent samples t-tests are used to compare conditions on average p(s) scores. In order for t-tests to assess whether the visibility of a partner significantly affects their level of influence over a participant, mean p(s) scores will be compared between conditions 3 (partner in adjacent room, visible on monitor) and condition 2 (partner in adjacent room,

not visible and cannot see the participant). If mean p(s) is significantly higher for Condition 3 than Condition 2, then Hypothesis 1 will have received support.

Tests of Hypothesis 2

Hypothesis 2, that participants separated from their partners by place and time will be less influenced than participants who are physically close to their partners is also tested by comparing mean p(s) between conditions. As a direct test of whether physical closeness is related to influence, Condition 1 (Partner in the same room) and Condition 3 (Partner is in an adjacent room, visible on a monitor) are compared. A comparison of these two conditions holds the participant's ability to see their partner constant, varying only physical distance. T-tests will be used to make this comparison. If a significantly higher p(s) is found in Condition 1 than in Condition 3, then the hypothesis that physical closeness increases the influence of a partner over a participant will receive support. Further, comparisons between Conditions 1, 2, 3, and 4 with Condition 5 should yield significant differences, as Condition 5 (partner absent) does not allow participants to see their partners or be close to them in time and place.

Tests of Hypothesis 2, Extended

The possible lack of collective orientation in Condition 5, due to instructions given to participants that they are solely responsible for the group's answers, raises the question of whether or not influence is possible in Condition 5. According to the theory, participants ought to be influenced only when they feel their goals are not in conflict with their partner. A question raised is whether participants viewed the absent partner as really being a member of their group. P(S) scores that are significantly different from 1.0 are only somewhat supportive of influence being possible in Condition 5. It is possible that some people simply change their answers when given contradictory solutions to the contrast sensitivity problems. However, if influence is possible, that is participants were collectively-oriented, it should be sensitive to changes in participant status. The

extension of Hypothesis 2, that a higher-status absent partner would have more influence than a lower-status absent partner will test this possibility. Condition 6 (high-status absent partner) will be compared to Conditions 7 (low-status absent partner) and Condition 5 (equal-status absent partner) to test this possibility. If t-tests reveal significant differences in p(s), with high-status partners having more influence than equal- or low-status partners, then extended hypothesis 2 will be supported. If no difference is found, then it is unlikely that comparisons of other experimental conditions with Condition 5 in Study 1 are interpretable in light of the theory above.

CHAPTER 5: RESULTS OF THE ANTICIPATED MUTUAL

PERCEPTION STUDY

Statistical analyses yielded results reported here based on comparisons of measures of influence and participant attitudes. Conditions 1-6 of the Anticipated Mutual Perception Study varied the visibility, closeness, or status of partners. Comparisons of partner influence over participants in each condition can reveal if partners are more influential when they are visible, close to the participant, or higher status than the participant when not present, having left their work for the participant to use. These analyses tested Hypotheses 1-3.

Criteria for Inclusion of Experimental Sessions for

Analysis

Prior to hypothesis testing, research assistants reviewed logs from post-experimental interviews to determine which sessions to analyze based on pre-determined criteria. Sessions were excluded from analysis if (1) participants did not care about doing well at the task, (2) participants believed partners were not real or (3) participants had past knowledge of the experimental setting. Participants with past experience with the setting would have known that partners and the task were not real.

Two research assistants checked log books using these criteria and found seven sessions warranting exclusion. Two had received incorrect instructions or computers error resulted in data loss. Three reported not caring about task success. One reported not paying attention to partner answers. One believed himself to be significantly older than his partner, a likely status difference that could affect influence in this setting. Thirty undergraduate males participated in an extension of Study 1. Five participants were excluded due to equipment failure. Excluding data from these sessions reduces statistical power, warranting caution in conclusions drawn from comparisons between conditions. However, it also assures comparisons are made between sessions where participants

experienced theoretically necessary conditions, with conditions varying only the independent variables.

Study 1 Preliminary Analyses and Planned Hypothesis

Tests

Independent samples t-tests were used to compare conditions on measures of influence. Given the different sample sizes in each condition, SPSS was used to provide t-statistics assuming both equal and unequal variances between conditions. Levene's test for equality of variances did not find that variance was significantly different between conditions during hypothesis testing, hence only t-statistics assuming equal variances are reported below.

Questionnaire items measuring participants' perceptions of their partners were also collected. Comparisons between conditions in the extension of Study 1 were made using ANOVA. This test is appropriate when testing for differences between conditions on multiple dependent measures that are likely correlated with each other. The General Expectation States Scale was adapted from Kelley (2008), Lovaglia and Houser (1996), and Webster and Rashotte (2005). These studies suggest that these items correlate with each other, though a factor analysis was used to determine whether these items loaded on a single factor in this study, given that status information was not provided in conditions 1 through 5. It is possible that in the absence of status differences between participants and partners, the general expectations for one's partner may vary for a number of reasons unaccounted for by the theory presented here. Cronbach's alpha was also calculated to determine the reliability of these measures as indicators of general expectations of social value and competence.

Factor Analysis and Reliability Tests of Questionnaire

Measures

Both an exploratory and confirmatory factor analysis were conducted to determine if the measures in the General Expectation States Scale likely indicate participants' general expectations of the competence and social value of fellow group members in Study 1 and its extension. Exploratory factor analysis of these measures in Study 1 allowed assessment of how much variance was shared between these measures when status was not varied between a participant and their partner. If a single factor is obtained, this means that these measures are likely still indicating expectations of competence and social value that participants attribute to other group members. In the extension, the goal of confirmatory factor analysis is to determine if measures that are theoretically expected to indicate a single underlying factor co-vary to a high extent. In this case, it is expected that the factors will reflect a single underlying construct, expectations of competence and value that will allow us to further examine whether reported attitudes related to status differences were formed by participants.

To analyze the General Expectation States Scale in Study 1, I used SPSS Principal Components Factor Analysis. I used self-reports from Conditions 1 through 5, in order to determine if the measures in the GES scale loaded on a single factor. The result was the extraction of a single factor with eigenvalue = 3.875. Factor loadings ranged from .730 to .859. Approximately 64.6% of shared variance between measures was accounted for by a single factor. This indicates that the General Expectation States Scale was likely reflecting a single underlying factor for participants within Study 1. Cronbach's alpha was also computed to determine the reliability of these measures as indicators of a single construct. Reliability analysis yielded a Cronbach's alpha of .890. This indicates the General Expectation States Scale is reliable in Study 1.

A confirmatory factor analysis was performed on these measures taken during the extension of study 1 where participants worked with either a higher-status or lower-status

partner. Principal components extraction was again used, this time restricting the model to a single factor solution. A single factor solution was obtained, with eigenvalue = 4.230. A higher proportion of shared variance (70.497%) was accounted for by a single factor, compared to when no status difference was salient to participants in Conditions 1-5. This was expected due to the scale being designed to measure expectations that arise when status differences exist within groups, though it suggests that competence and value are attributions made in groups working on shared tasks in general. These findings increase confidence that the measures in the GESS may generally reflect expectations of competence and social value. Cronbach's alpha was again computed to determine the reliability of these measures as indicators of a single construct. Reliability analysis yielded a Cronbach's alpha of .913. This indicates this scale was very reliable in the extension of Study 1.

<div align="center">Hypotheses Test Results</div>

To test Hypothesis 1, that visible partners would have more influence than invisible partners Conditions 3 and 2 were compared, because partners in both conditions were believed by participants to be in the next room. Participants in Condition 3 rejected their partners' influence 50% of the time; in one out of every two rounds the participant changed their answer to match the partner. Partners in condition 3 who appear on a participant's monitor were thus significantly more influential than partners in condition 2 (t=2.517, p<.021, two-tailed).[1] The small sample size for condition 3 may make these results less reliable than results from larger sample. However, these results suggest that being able to see a partner had a greater impact on influence than being close to the partner.in analyses. Hypothesis 1 receives support from Study 1.

---

[1] These findings are consistent with findings from Kalkhoff and Thye (2006; 2010) showing that protocol differences in expectation states research can affect partner influence regardless of a status manipulation within the experiment.

Hypothesis 2 predicted that partners closer in space and time would have greater influence over participants than partners who were further away. As a test of Hypothesis 2, mean p(s) scores in conditions 1 and 2 were compared using an independent samples t-test. Recall that p(s) is the proportion of times out of the 20 disagreement trials that participants rejected their partners answers. This is the measure of influence in the experimental setting. Participants in Condition 1, working with a partner in the same room, rejected their partners' influence in approximately 56% of the 20 disagreement rounds. Participants in Condition 2, working with a partner in the next room separated by a wall, rejected their partners' influence approximately 63% of rounds (see Table A2). The difference between conditions approaches significance and was in the predicted direction (t=1.683, p<.054, one-tailed).

In condition 5, the participant is distant in terms of both time and space, being absent but leaving information for the participant to use on the task. Partners in condition 5 had significantly lower influence than participants in condition 1, where the partner was in the same room as the participant (t = 3.057, p<.006, two-tailed). Partners in condition 5 also had lower influence than partners in condition 2, who were in an adjacent room and could not be seen (t = 2.399, p<.025, two-tailed), and partners in condition 3, who were in an adjacent room but could be seen on a monitor by the participant (t = 3.317, p<.004, two-tailed). These findings support hypothesis 2.

A difference, other than distance and time, exists between condition 5 and other experimental conditions. In condition 5, the partner was not responsible for the final answers given by the group on the contrast sensitivity task. Participants may have viewed the task as non-collective and thus perceived their goals to be unaligned with their partners'. Thus, in this condition[2] it is difficult to know if lower partner influence was

---

[2] Participants were told they were solely responsible for the final group answer in this condition, making interpretation in the framework of the standard experimental setting for status characteristics research problematic. However, given a new scope condition for the theory

due to the lack of awareness of one's partner or the perception that the partner was a less valid source of information. A further experimental test investigated whether absent partners could be seen as valid sources of self-relevant information.

Study 1 Extension Results

If participants were not collectively oriented in condition 5 because their partners were absent, the lack of collective orientation would be expected to produce equally high p(s) scores regardless of whether the absent partner were high or low status. If collective orientation does exist, then higher status partners should have lower p(s) scores than lower status partners when they are absent. This would replicate findings from a large literature on status expectations and influence and increase confidence that comparisons between absent partner conditions and other experimental conditions provide support to the theory. This led to a new hypothesis:

> Hypothesis 2 Extended: P(s) will be lower for an absent higher-status partner than it will be for an absent lower-status partner.

In order to test whether an absent higher status partner would have greater influence than a lower-status partner when they leave their contributions for use by participants, an extension of study 1 was conducted. Condition 6 provided participants with information from a higher-status partner, while condition 7 provided participants with information from a lower-status partner. All other conditions were similar to those in Condition 5, with participants believing they were responsible for the group's final decision. Thirty undergraduate males participated in this extension study. Seven participants were excluded due to equipment failure. Equipment failure occurred when participant data were either lost, the computer provided incorrect instructions, or the

---

developed here allowing it to apply to any setting where person's goals are not perceived to be in conflict, these comparisons are theoretically warranted.

incorrect computerized protocol was provided for participants by a research assistant that excluded necessary instructions for the task.

Influence as measured by p(s) scores was used to test the extension of Hypothesis 2. These scores are reported in Table A3. The extension of Hypothesis 2 states that higher status partners will have more influence over participants than lower status partners. Again, independent-samples t-tests were conducted comparing the mean p(s) scores in Condition 6 to those obtained in Condition 7. The extension of Hypothesis 2 was supported (t=3.523, p<.002, two-tailed), with lower-status participants rejecting their higher-status partners' answers less often than higher-status participants paired with lower-status partners. Higher status partners also were given significantly greater influence than the equal-status partner from Condition 5 of Study 1 (t=3.848, p<.001, two-tailed). No difference was found in the influence of equal-status and lower status partners.

As predicted by the extension of Hypothesis 2, higher status partners are rated higher on the General Expectation States Scale items than equal-status partners or lower status partners. These items were summed and averaged to form the GES index. Participants in Condition 6 on average rated their partners higher on the GES index (M = 6.72, s.d. = 1.09) than participants in Condition 7 (M = 4.50, s.d. = 1.62). ANOVA found that *Condition* was significantly related to p(s) scores ($F(1, 22) = 15.447$, p<.001). An independent samples t-test determined that this difference is in the predicted direction and significant (t = 3.930, p<.001, two-tailed). This suggests that participants formed attitudes about partner competence and value consistent with the status difference between themselves and their partner, even when the partners were absent.

Even in this setting, influence occurred more often when a partner was higher-status than when the partner was lower status. This supported the assertion that partners can view absent partners as having non-conflicting goals and see them as self-relevant sources of information. The extension of Hypothesis 2 receives support. Higher status

individuals are likely to be seen as more competent and socially valued than lower-status individuals. This means that higher-status partners were likely more relevant sources of information for group members, even when they were absent.

In an exploratory analysis of emotions and attributions made regarding differences in experiences between participants in the higher and lower-status confederate conditions, ANOVA revealed that partner status was significantly correlated with believing the partner was interested in success at the task (F (1, 23) = 5.349, p<.05). An independent samples t-test confirmed that higher-status partners were seen as more interested in task success than lower status partners (t = 2.313, p = .030, two-tailed). This could mean that disagreements with higher status partners were more relevant to participants, increasing how often participants considered their partner's answers to the task.

Study 1 Discussion

Study 1 and its extension provide results supporting the hypotheses that being physically closer to a partner and being able to see a partner gave partners greater influence over participants. The extension tested whether participants can be collectively-oriented even when separated by place and time. Past research by Troyer (2001) has already found evidence that protocol variations affecting information about partners can affect the baseline level of influence in a study through a protocol's impact on scope conditions. The extension of Study 1 provided evidence that participants could be influenced by their partners even when the partner was not present, though this influence is likely less than similar people who are physically closer. For this to be the case, higher-status absent partners would likely have to be seen as more relevant sources of information for the task than lower-status partners.

No significant differences were found in post-experiment scales rating the awareness of partners, our proxy for anticipated mutual perceptions. Conditions in Study

1 represent distinct manipulations of physical closeness and visibility of partners. The predicted differences in influence were found between conditions, so it is likely that the post-experiment awareness items were inadequate to measure anticipated mutual perceptions within this study. It is also possible that the timing of these questions, following instructions meant to create collective orientation, may have affected self-reports of how awareness.

Proximity, visual cues, and status differences can all affect the influence of one person on another and how aware people feel others are of them within social settings. Face to face interactions may also vary on these dimensions. Larger groups will increase the distance between some group members, reduce the availability of visual cues from other group members, and the status hierarchies that develop in face to face settings are likely to focus people's attention on specific others.

CHAPTER 6: GROUP SIZE, COHESION, AND TRUST STUDY

METHODS

Experimental methods were used in Study 2 varying the number of group members working on a shared investment task. Hypotheses 3-7 regard the relationship of group size to perceptions of trust, cohesion, commitment to the group, and group members' mutual awareness. The theory proposes these processes occur within ongoing interaction. Thus, participants were allowed to interact freely in a face-to-face setting. Several questionnaires were given to measure group member perceptions to test Hypotheses 3-7. Participants worked together with other group members in a setting that conforms to sufficient conditions, identified in Chapter 3, for the development of trust, cohesion, commitment, and mutual awareness.

Required Design Elements to Allow Tests of Hypotheses in

the Group Size Experiment

Hypotheses 3-7 are based on theoretical propositions relating group size to trust, cohesion, commitment, and anticipated mutual perception. Thus an experiment to test these hypotheses requires participants to experience conditions determined by the theory to be sufficient for these processes to occur. Based on the scope condition under which anticipated mutual perception is expected to allow mutual influence, group members were led to believe that their interests coincide. I also adopted the following scope conditions from the theory of social commitments (Lawler, Thye, and Yoon 2008):

1. Groups consist of at least three people forming a network of relations.

2. People within the group have multiple opportunities to interact repeatedly in order to generate joint or individual benefits, and the social structure gives them incentives to at least consider interaction and exchange with one or more others.

3. People decide whom to interact with based on initial expectations of instrumental benefit.

4. Social interaction takes place within one or more social units.

5. The immediate or local unit is salient to the people within it. There are larger or more distant social entities within which the group is nested.

The theory of social commitments explains how macro-structure creates opportunities for frequent interactions between members of smaller groups within that structure. By creating opportunities for more frequent interaction, positive emotions generated in these smaller groups promote cohesion between individual members and lead them to attribute their positive emotions to the group and structure within which it is nested. This means the experiment needed to provide participants with at least two others with whom they could choose to interact repeatedly. These interactions take place in a setting where participants believe their group is one of several working on the same activity.

Lawler, Thye, and Yoon ground the theory of social commitments on past research in social exchange. This research focused on the conditions under which cohesion developed within exchange (see Lawler and Yoon 1993; 1996), and the emotions created within ongoing exchange relationships (Lawler 2001). These studies relied on highly controlled experiments and tended to focus only on exchanges involving two individuals. While exchanges in these studies are for resources or points, the theory is applicable to exchanges of all types. This includes information, emotional support, money, etc. In this sense, all interactions may be thought of as an exchange. The interest in this study is not in the amount of some resource being exchanged, but in the outcomes of exchange for members of the group. As such, the quality, rather than the quantity, of interaction, is of greatest interest in this study. Therefore I chose to allow groups to interact freely, without imposing controls on how often they could interact with any one group member, or on how many group members they could address at a given time. This

kind of free interaction is more similar to that which might be seen in naturally-occurring task groups.

This decision may have drawbacks. First, it makes it difficult to assess who a person's intends to address in any given moment. A comment intended for a single person may be taken as a statement to the entire group. Moreover, the information people have about their partners can vary between groups. This includes differences in status characteristics, interaction strategies, and personality that may affects trust, cohesion, and commitment independent of group size. Statistical controls for people's baseline levels of generalized interpersonal trust will be used in analyses to account for some of these issues. However, future analyses of videos made of each group may be necessary in order to assess how interaction or self-presentation strategies played a role in promoting or undermining trust, cohesion, or commitment.

Experimental Design

A four condition experiment varying group size was used to test each of the hypotheses derived from the theory. Undergraduate participants were randomly assigned to groups of 3, 4, 7, or 8 members. These group sizes were chosen based on the proposition that groups larger than six members will report differences in trust, cohesion, and commitment relative to groups with fewer than six members. Participants then worked with their groups on an investment task. Participants worked separately to create proposals for a group investment, then together to develop a single proposal to divide money to invest in four businesses on the NASDAQ stock exchange. All participants were male to control for known differences in men's and women's interaction patterns in groups, particularly those behaviors that result in status hierarchies (see Shelly et al. 2010). Status hierarchies are 1) expected to emerge and 2) are likely to focus group member awareness. Thus differences between same-sex and mixed-sex groups' status hierarchies require experimental control. Future research can investigate how gender and

sex composition affects the development of trust and cohesion in mixed-sex and all-women groups.

Group members were undergraduates at the University of Iowa, contacted through a mass email informing them of an opportunity to be involved in a group decision-making task. Participants signed up for timeslots on the Sona Systems scheduling website. These time slots varied in the number of participants able to sign up for each session. Overscheduling participants was done to ensure the number of participants needed for larger groups. Participants were then chosen from those people who signed up and were first to appear for the session. Those who showed up for sessions but did not participate were paid a show-up fee of $5.00 and informed they could sign up for future sessions. Participants who began study procedures were each paid $15.00.

Other variables, such as how separable each person's contributions were during the task—referred to as task *jointness*, were not varied for this initial test of hypotheses. This study formed problem solving groups required to decide on investments based on limited information and with uncertain outcomes attached to their decisions. As a result, this task will likely be perceived by group members as highly joint, since individual member contributions are not easily separated and the group shares accountability for the group's performance. Future studies can assess how variation in task jointness affects the processes theorized here. It is likely that the effects of group size on cohesion, trust, and commitment are affected by the extent to which tasks are joint, with more joint tasks mitigating some of the negative effects of group size on cohesion, trust, and commitment. This study investigates whether group size will affect these outcomes even in tasks that are likely perceived as joint.

Independent Variables

A laboratory experiment varied the size of groups, with participants randomly assigned to groups of 3, 4, 7, or 8 participants. Groups worked together on an investment

task in which their group was required to decide how to invest in a set of businesses using stock information provided by researchers. The task involved both individual and group interaction phases, but all decisions made regarding investments were made by the group and participants believed they would share equally in the group's performance outcomes. Hence, this task would be considered highly joint in the context of the theory of social commitments (Lawler, Thye, and Yoon 2008). Hypotheses predict a main effect of group size on ratings of group member awareness, trust, perceptions of cohesion, coalition formation, and participant defection from the group. Alternative hypotheses suggest that cohesion and trust will be higher in groups nearer to six members than in groups smaller or larger.

Dependent Variables

Shared awareness. Shared awareness was measured by the modified shared awareness scale (Biocca et al. 2001) to determine how aware participants were of their partners and how aware participants believe their partners were of them. Participants were asked how much they agreed with the following statements: I often felt as if I was alone, I think other group members often feel alone, I hardly notice other group members, other group members didn't notice me in the room, I was aware of others in the environment, others were often aware of me in the room. A 1 represents no agreement with the statement, and 9 represents absolute agreement. By addressing both dimensions of shared awareness, feelings regarding isolation or inclusion, this scale can be used to judge whether perceptions of shared awareness affected cohesion and trust.

Trust. The modified dyadic trust scale included 6 items measured on 9 point semantic differential scales (Larzelere and Huston 1980). Participants were asked how much they agreed with the following statements: Other group members are likely to be primarily interested in their own welfare, other group members are likely to be perfectly honest and truthful with me, other group members will be truly sincere in their promises,

I feel that other group members won't show me enough consideration, other group members will treat me fairly and justly, I feel that other group members can be counted on to help me. A value of 1 represented no agreement with the statement, and a value of 9 represented absolute agreement.

Cohesion. Cohesion was measured with 6 items measured on 9 point semantic differential scales. Participants were asked how much they agreed with the following statements: I feel that our group would stay together in the face of adversity, Members of our group are likely to leave the group if given a chance, Members of my group are more likely to voice their opinion when they disagree with others than to remain silent, I feel that the members of our group share a common purpose, If given the chance to leave my group I would choose to stay, and Disagreement would not lead to my group breaking apart. A value of 1 represented no agreement with the statement, and a value of 9 represented absolute agreement with the statement.

Commitment. Commitment is measured in two ways. Whether a person joined a coalition will be noted during phase 2 of the study by their round 2 investment sheets, on which they are required to put the identifying letter for each coalition partner. Due to possible conformity pressures during the experiment, I also ask them to provide the letters of those that they would ask to join a future coalition to work on another task. The proportion of group members nominated for inclusion in the future group will be used as a person's intended coalition. Commitment to the group as a whole is held to be reduced the fewer group members are nominated for inclusion in a future group.

Control Variables

Demographic variables such as age, parent's levels of education, year in school, high school G.P.A., and race/ethnicity were measured with a questionnaire prior to the beginning of study procedures. Participants were also given three questions adapted from

Cheshire, Gerbasi, and Cook (2010) to measure general interpersonal trust. These items included the following items:

How dependable do you feel most people are?

How reliable do you feel most people are?

How trustworthy do you feel most people are?

These items were measured on 9 point semantic differential scales, anchored by 1 = not at all (dependable/reliable/trustworthy) to 9 = Very (dependable/reliable/trustworthy).

<center>Procedure</center>

Participants took part in the study as members of three, four, seven, or eight person groups. When participants arrived at the laboratory, they were met as a group by a research assistant. The research assistant determined the order in which participants arrived for the study and gave each participant a clipboard with an informed consent document and a nametag with a participant letter (A-H). Letters were assigned to participants in the order in which they arrived, (A to the first to arrive, B to the second, etc.). The research assistant informed the participants they would know each other by the letter on their nametag, and should refer to each other by their participant letters for purposes of the study. Participants were also informed at this time that the experimental session would be videotaped for future analysis. Participants were given three minutes to review the informed consent document, after which the research assistant obtained the participants' verbal consent.

Participants were then directed to pin their participant letter to their shirts and follow the research assistant to the study room. Upon entering the study room, participants were instructed to find the chair along the walls of the room with a letter matching their nametag. Participants were positioned to face the walls of the room while working alone as individuals on various parts of the study (See Figure B7).

Participants were then asked to fill out demographic information questionnaires that had been placed on their chairs that included three questions meant to measure their general interpersonal trust (Cheshire, Gerbasi, and Cook 2010). After participants filled in their demographic information, the research assistant proceeded to instruct the participants about phase 1 of the study.

Phase 1

Participants were informed that they would be working together as a group on the Group Investment Simulation Task. Participants were told that the group's goal was to divide up a fund of $2500.00 as if the participants were trying to decide how best to invest in businesses on the NASDAQ stock exchange as part of an investment group. Participants were told they were being evaluated for leadership ability, effective participation, and effective investing. Groups were led to believe they would be compared to other groups taking part in the study to determine which groups were most effective investors, and that they were therefore competing to make the wisest investments. To reinforce that group members were jointly responsible for group outcomes, participants were told that people who worked together on the task had been shown by previous research to do much better on the simulation than people making investments alone without the aid of a group. The research assistant read from a script encouraging participants to work together to come up with the best task solution.

Participants were then directed to view the contents of a box on a circular table in the middle of the study room. In this box was a binder containing profiles of four actual businesses on the NASDAQ stock exchange. The research assistant explained that these profiles provided stock and profitability information about each business, as well as a short "biography" of the company, its products, and its history. Participants were told this information would help them to make the best investments and should be used throughout the remainder of the study. Participants were then directed to move to chairs

positioned around the circular table, each chair labeled with a letter corresponding to a participant's nametag. They were instructed to sit at this table while viewing the stock information. At this time the research assistant told them they would be given 10 minutes to review the information, and the research assistant left the room.

After 10 minutes, the research assistant returned and instructed participants to return to their chairs on the periphery of the room and take the "Individual Proposal Form—Phase 1" from the manila folder under their chairs. They were instructed to individually rank the four businesses they had viewed in order from the one they believed would be most profitable to the one they felt would be least profitable, and to propose an amount from the pool of $2500.00 to invest in each business. Participants were told to take no more than 5 minutes to rank the businesses and instructed they could look over the business information again without working together to form their proposals.

After leaving the room for 5 minutes, the research assistant returned and instructed the participants to once again sit at the circular table. Participants were told to retrieve the "Investment Portfolio Proposal Voting Record" sheet from the materials box. They were told to choose someone who would record votes for individual proposals, and that the sheet would be used to tally votes for the best proposal. Participants were told to listen to each other's proposals and vote on a provided piece of scratch paper for the proposal they felt would be most profitable for the group. After votes were recorded, they were told they should mark the participant letter of the person with the winning proposal on the record sheet in the space at the top of the page marked "phase 1 winning proposal" and tally the number of votes each individual proposal received, if any in a column on the right side of the sheet. They were then informed they should slide a red card provided to them under the door to inform the research assistant when they had completed phase 1.

Interphase Ratings

Between phase 1 and phase 2 participants were instructed to retrieve interphase rating questionnaires from the manila envelopes under their chairs at the periphery of the room. They also were told to use enclosed partner evaluation forms to evaluate each of their partners individually on their competence and value to the group. Interphase questionnaires included the modified dyadic trust scale, the modified awareness scale (Biocca et al. 2001), and measures of group cohesion. Participants were also instructed to fill out a partner evaluation form for themselves to rate their own competence and value to the group on phase 1 of the study.

Phase 2

After filling out interphase questionnaires, participants were told they would proceed with phase 2 of the experiment. Participants were informed they might choose to work with one or more partners on developing a new proposal. Participants were told that forming a coalition with a partner would improve their chances of having their proposal accepted by the group. Participants who choose to work with partners could submit a single proposal to the group. They were asked to place their participant letters on a sheet with their proposal to signify their status as a coalition. Participants were informed their coalition was required to reach consensus on the investments they proposed to the group. All other procedures remain consistent with phase 1, though votes by coalitions had to be unanimous for all members of the coalition to be counted on the voting record sheet.

After completion of phase 2, participants fill out the modified dyadic trust scale, the modified awareness scale, and measures of group cohesion. After filling out these questionnaires, participants filled out the "final phase questionnaire" and rated each partner on their general competence and value to the group on phase 2. Participants read they would be able to take part in a final exercise, phase 3, on a different date. On the

final phase questionnaire, participants were asked 5 questions: How much they would like to work with a larger group than the one they worked with today, how much they preferred to work with a smaller group than the one they worked with today, how many of the people from the group they worked with today would they want to work with in phase 3, how willing they would be to work with the same group on a different task, and who they would want to ask to form a new group from the group they worked with today, separated from the members they did not want to work with. After filling out this questionnaire, the research assistant returned and asked exit interview questions to which participants responded on provided sheets of paper. These questions included the following open ended questions:

1. Which members of the group did you get along with the best, and why did you feel you got along with these people better than others?

2. Who did you feel you could trust most in the group, trust the least, and why?

3. If given the chance to work on this experiment again, how many people would you prefer to work with? What size of group would you not like to work with?

4. Did a leader emerge in your group, and if so can you remember who it was?

5. How interested were you in succeeding on the group task, and how important was making a good decision on the investment task to you?

6. How well do you feel others listened to you or gave your points of view consideration?

After completing these questions, participants were debriefed and informed about the purposes of the study and that they were done participating. Participants were given a pay voucher and contact information for the researchers before being shown out of the laboratory.

Analyses for Hypothesis Testing

Five hypotheses will be tested based on self-report measures provided by participants in each condition. Hypothesis 3 predicts that participants will report lower trust, on average, for other group members as the size of the group increases. Hypothesis 3A predicts that larger groups will report lower trust than smaller groups, 3-person group members will report equal or less trust than 4-person groups, and 8 person group members will report equal or lower trust than 7-person groups. Hypothesis 4 predicts that participants in smaller groups will report greater agreement with statements suggesting they share a common purpose and group identity with fellow group members, signs of cohesion, than participants in larger groups. Hypothesis 4A predicts that larger groups will have lower cohesion than smaller groups, 3-person group members will report equal or less cohesion than 4-person groups, and that 8 person group members will report equal or less cohesion than 7 person groups. Hypothesis 5 predicts that participants in larger groups will nominate a smaller proportion of members for inclusion in a future coalition than members of smaller groups. Hypothesis 6 predicts that participants will report other group members are less aware of them as group size increases. Hypothesis 7 predicts that increases in the awareness participants report others having of them will be correlated with greater perceived cohesion, trust, and commitment intentions.

Tests of Hypotheses

OLS regression will be used to test for predicted differences in dependent measures of trust, cohesion, coalition formation, and mutual awareness by group size. Questions indicating how generally reliable, dependable, and trustworthy participants perceive others to be will be summed and averaged. This index, *general interpersonal trust*, will be recoded as a dummy variable, where 1 = more trusting and 0 = less trusting, based on a median split. This variable will be entered as a control variable in OLS regression models.

Tests of Hypotheses 3-6

Hypotheses 3-6 predict that members of larger groups will report lower perceived trust, cohesion, mutual awareness, and nominate fewer group members for a future coalition. Alternative hypotheses predict that participants will report equal or higher trust, on average, in groups of 4 compared to 3 members and in groups of 7 compared to 8 members. This suggests a possible curvilinear relationship between group size, trust, and cohesion, with maximum trust and cohesion in groups of intermediate size compared to very small or very large task groups. Dummy variables will be created to represent each group size, with groups of size 4 as the reference category. These group size variables will be regressed on the modified dyadic trust scale, cohesion scale, and proportion of group members nominated for inclusion in a future group.

Test of Hypothesis 7

Hypothesis 7 regards the impact of mutual awareness on reported measures of trust, cohesion, and the proportion of group members nominated for a future coalition. These measures will be entered as dependent variables in a stepwise regression. Independent variables in Step 1 models will be the size of the group and whether a participant was more or less trusting. Step 2 models will include a term for participant self-reports of mutual awareness, based on the scale items from Biocca et al. (2001). Hypothesis 7 will receive support if mutual awareness scale scores are significantly related to each of the dependent measures and inclusion of the mutual awareness scale scores in the model reduces the impact of group size on these measures.

Results demonstrating support for these hypotheses would suggest that the process of mutual influence within groups working on shared tasks is partly related to how aware group members are of each other and their contributions. Support for hypotheses 3-7 would show that group members are more likely to form cohesive bonds and commitment to groups in which they are able to maintain awareness of others and

expect others to be aware of them. This would provide support for Lawler, Thye, and Yoon's (2008) theory, in showing that people will commit to groups within a larger social structure so long as that group provides a setting that can generate positive feelings.

CHAPTER 7. GROUP SIZE STUDY RESULTS

This chapter describes results of analyses that tested hypotheses 3-7. Experimenter error resulted in appreciable data loss within the seven-person group condition. More experimental sessions were run to collect data. These sessions resulted in more data on individual questionnaire items used to construct variables for trust, cohesion, and shared awareness. The extra sessions also resulted in enough data to conduct hypothesis tests. OLS regression analyses were used to test hypotheses 3-7 and to determine if shared awareness measures may account for a relationship between group size and trust, cohesion, or commitment. I begin by describing the convenience sample of undergraduates who participated in the study.

Participants

112 male undergraduates participated in one of four experimental conditions. Four participants were excluded due to exiting the study early. The majority of participants, 78.6%, were of European, non-latino, descent, with college educated mothers (68.4%) and fathers (62.1%). Sophomores and freshman made up the majority of the sample, 52.3% of the total. Average participant age was 20.36 years, and the average high school grade point average for participants was 3.54 on a 4-point scale. The 3-person and 4-person groups contain larger percentages of the sample as a result of the difficulty in recruiting adequate numbers of participants to run 7- and 8-person group sessions. When too few participants arrived at the laboratory to run 7- and 8-person groups, 3- or 4-person groups were run with those participants that showed up for the session.

Eighteen participants reported being born in a country other than the U.S. The majority of these participants were from China. Cultural differences have been shown to affect how participants respond to situations involving trust (Yamagishi and Yamagishi 1994). Exploratory analyses compared participants born in the U.S. to those born outside

the U.S. on dependent measures. T-tests revealed that participants born in the U.S. reported significantly higher awareness of others after phase one of the experiment. Other differences are close to significant as well. Participants born outside the U.S. reported lower levels of trust overall after each phase of the experiment than U.S. born participants. Participants born outside the U.S. also rated other participants as being less aware of them than U.S. born participants. Thirteen of eighteen participants born outside the U.S. were in 3 and 4 person groups. Here I present findings including all participants, regardless of whether they were born in the U.S.

Descriptive Statistics

Phase 1 and phase 2 measures were taken approximately 25 minutes apart during an hour long experiment. These measures came after several opportunities for participants to freely interact. Comparisons of phase 2 and phase 1 ratings of trust and cohesion measures would be expected to show an increase in positive sentiments or reduced negative sentiments towards the group by participants. Sample sizes differed by condition due to difficulty in scheduling large groups. Thirty participants took part in three-person groups (26.8%), Thirty-six in groups of size four (32.1%), 21 in groups of size seven (18.8%) and twenty-five in groups of size eight (22.3%). Means (s.d.) for all measures are given in Tables A4. Means and standard deviations for scales constructed from these measures are found in Table A5.

Descriptive statistics suggest general trends. Members of seven- and eight-person groups generally reported lower trust, cohesion, proportion of group members kept for a future task, and shared awareness than members of three- and four-person groups. This is in line with hypotheses 3-6. It can also be seen that members of three person groups reported lower overall trust in fellow group members than members of 4 person groups, and that members of eight-person groups reported lower trust than members of 7 person groups. Shared awareness measures and the proportion of group members kept for a

future task follow a similar trend. This supports alternative hypotheses suggesting that positive feelings toward groups do not necessarily have a negative linear relationship with group size. In order to test whether these differences are significant, OLS regression will be used to assess the relationship of group size to these measures. First, I begin with an analysis of the reliability of scale items used in these regressions.

Dependent Variables Constructed for Analyses

The modified dyadic trust included six measures. Cronbach's Alpha was calculated, revealing a low level of reliability (a = .622) when including each measure, after reverse coding two items (others primarily interested in their own welfare, others won't show me enough consideration). Removing the first of these items resulted in a Cronbach's alpha of .743. A principal components factor analysis revealed that the item "others are primarily interested in their own welfare" loaded on a separate factor. Though removing both items improves reliability, the reverse coded variable for "others won't show me enough consideration" loaded with other trust scale items. Therefore, the modified dyadic trust scale used as a dependent measure in these analyses consists of five items, rated on 9-point semantic differential scales. These measures were: Others will be honest and truthful with me, Others will treat me fairly and justly, Others can be counted on to help me, Others will be sincere in their promises, and Others won't show me enough consideration (reverse-coded). Ratings for these five items were summed and averaged to form the Modified Dyadic Trust Scale. All items on the cohesion scale loaded on a single factor, and reliability for the cohesion scale was moderate (Cronbach's alpha = .782). Therefore all items were summed and averaged as the Cohesion scale used in OLS regressions.

Hypothesis Tests

Hypotheses 3—5 were tested using OLS regression. Conditions were entered as dummy variables in these regressions, with groups of size 4 as the comparison category.

Group size dummy variables were regressed on the modified dyadic trust scale scores, cohesion scale scores, and proportion of group members nominated for inclusion in a future group task. Initially, a continuous variable representing participants' level of general trust at the beginning of the experiment was included as a control variable in these models. However, general interpersonal trust did not have a significant relationship with the dependent variables, and so are excluded from tests of hypotheses 3—5.

<div align="center">Test of Hypothesis 3 and 3A Regarding Reported Trust of</div>

<div align="center">Group Members</div>

Hypothesis 3 predicted that members of larger groups would report lower trust and cohesion than members of smaller groups. Regression analyses for tests of Hypotheses 3—5 are presented in Table A6. This hypothesis receives support. Compared to members of 4-person groups, members of eight-person groups were reported significantly lower trust (b = -.661, S.E.=.315, p<.039, two-tailed). Also, members of 7-person groups reported lower trust than members of 4-person groups, though the relationship is only marginally significant (b = -.686, S.E.=.430, p<.053, one-tailed). When 8-member groups are used as the reference category, members of 3 person groups also reported higher levels of trust (b = .628, S.E. = .325, p<.028, one-tailed). No significant difference is found between 3-person and 4-person groups on trust. Also, no difference was found between 8 and 7 person groups on levels of reported trust when groups with 7 members were used as the reference category. This is consistent with Hypothesis 3A, in that there is no evidence in this sample for a direct linear relationship between group size and trust.

<div align="center">Test of Hypothesis 4 and 4A regarding Reported Cohesion</div>

<div align="center">of Group Members</div>

OLS regression revealed no significant differences between conditions on measures of cohesion, though members of eight and seven-person groups reported lower

cohesion on average than members of 3 and 4 person groups. To further investigate possible relationships between group size and cohesion, Mann-Whitney U tests compared conditions on individual measures of cohesion used to construct the cohesion scale. To control for possible effects of general interpersonal trust, participants were coded as either more or less trusting. A median split was used to categorize participants based on their general interpersonal trust scores. Comparisons revealed that among participants who were more trusting, significant differences existed on one measure. No differences were found between conditions among less trusting group members. Members of eight-person groups reported that fellow group members were more likely to leave the group than members of three-person groups ($U = 82.5$, $p<.041$) and members of 4-person groups ($U = 138.5$, $p<.02$). While this provides some support to Hypothesis 4, overall there is little evidence of a general relationship between group size and reported cohesion.

<div align="center">Tests of Hypothesis 5 Regarding Proportion of Group

Members Nominated for Inclusion in a Future Group Task</div>

Hypothesis 5 received support. Members of seven-person groups nominated a smaller proportion of group members for inclusion on a future task than members of four-person groups ($b = -.280$, S.E. $= .086$, $p<.001$, two-tailed). Members of eight-person groups also nominated a smaller proportion of group members ($b = -.384$, S.E. $= .076$, $p<.000$, two-tailed) when compared with members of four-person groups. While there is not a significant difference between the proportion of group members included in three-person groups as opposed to four-person groups, three-person groups on average nominated a smaller proportion of group members ($b = -.041$, S.E. $=.073$, $p<.288$, one-tailed). There was no significant difference between the proportion nominated by seven-person groups and eight-person groups. The intercept term indicates that members of 4-person groups nominated approximately 93 percent of group members, indicating that

they preferred groups of 4, including the self, while on occasion preferring a 3-person group. Coefficients for the eight-person group dummy variable indicate that on average, members of eight-person groups preferred to include approximately 55% of the group together.

Tests of Hypothesis 6 Regarding Shared Awareness

Ratings

Hypothesis 6 predicted that participants would report other group members were less aware of them in larger groups than in smaller groups. Hypothesis 6 received support from OLS regressions of group size on measures of how aware participants perceived other group members were of them (see Table A7). Participants in eight-person groups reported that other group members were aware of them less than participants in four-person groups (b = -.742, S.E. = .361, p<.043, two-tailed). Comparisons of seven and four-person groups on this measure are in the predicted direction, but the effect is not significant (b = -.455, S.E. = .403, p<.13, one-tailed). There were no differences between members of eight and seven-person groups on measures of how aware other group members were of the participant. Similarly, no differences were found between three and four person group member reports.

Measures of how aware participants were of their partners also supported Hypothesis 6. Members of seven person groups reported they were less aware of their partners than members of four-person groups (b = -.928, S.E. =.338, p<.007, two-tailed), as did members of eight-person groups (b = -1.213, S.E. = .287, p<.000, two-tailed). No significant differences were found between members of three- and four-person groups or between members of seven- and eight person groups on these measures.

I explored the possibility that dispositional trust affected measures of shared awareness. For both measures, awareness of partners and partner's awareness of the participant, those who reported having a more trusting disposition reported significantly

higher shared awareness. However, these scores do not affect the impact of group size on awareness measures.

<center>Test of Hypothesis 7: Impact of Shared Awareness on</center>

<center>Trust, Cohesion, and Commitment</center>

Hypothesis 7 predicted that participant reports of shared awareness would be positively related to the reports of group cohesion, trust, and commitment to fellow group members. To test Hypothesis 7, the average of partners' reported awareness of the participant was regressed on each of these variables. Here I sum and average measures for the modified dyadic trust scale and the cohesion scale. It should be noted that a large amount of data was lost in the seven-person group condition for cohesion scale scores. OLS regressions were used, and these results appear in Table 8. These regressions also controlled for whether or not participants were coded as more or less trusting. Results in Table A8 represent dependent measures taken after phase 2.

Regression analysis reveals a significant impact of condition on the levels of trust reported by participants after phase 2 of the experiment. Membership in a larger group correlated with lower dyadic trust scale scores. This relationship is no longer significant when phase 1 partner awareness is entered as an independent variable in the model. Reported partner awareness of the participant is significantly and positively associated with dyadic trust scale scores at the end of phase 2 (b = .453, S.E. = .178, p<.014, two-tailed).

No significant effect of group size on cohesion was found when modeling the effects of average group member GES scale scores and whether the participant was coded as more or less trusting. When awareness measures are entered into the model, a positive and significant relationship is found between being aware of one's group members and reported levels of group cohesion (b = .651, S.E. = .249, p<.012, two-tailed). The more

aware participants reported being of fellow group members, the more cohesive the group was perceived to be.

No significant effect was found of average reported partner awareness on the proportion of group members nominated for inclusion on a future task. Including this variable in the model did not reduce the significant effect found for group size. A significant effect is found of how aware participants are of their partners on the proportion of group members nominated for inclusion in a future task group. Participants nominated a larger proportion of group members the more aware they were of other group members (b =.096, S.E.=.050, p<.029, one-tailed). Findings here suggest that aspects of shared awareness affect trust and commitment to groups.

Expectations of Competence and Value as Likely

Correlates of Cohesion

Little evidence was found that group size affected reports of cohesion in this study. It is possible that cohesion is also a product of collective efficacy. Collective efficacy is based partly in how competent participants believe their group members to be and how successful they believe the group will be on the task. If group members perceived their group as likely to be successful on tasks in general, they may be more likely to report greater cohesion. The higher the average ratings of fellow group members on the General Expectation States scale, the higher the likely collective efficacy and the more cohesion is likely to be reported. There is a significant and positive correlation between GES scale scores and cohesion within groups (Pearson's r = .474, p<.000, two-tailed). Higher GES scale scores would also be expected to increase shared awareness, as people are likely to pay more attention to those who they expect to contribute to success (see Results of Study 1, Chapter 5).

If higher expectations of group competence increase shared awareness, and thus increase cohesion, this may counteract the negative effect of group size on shared

awareness and cohesion. This would be especially true if groups that are larger are more likely to include members with competencies perceived to help the group succeed. To test this possibility, General Expectation States scale scores and the group size were regressed on awareness measures. The results show that General Expectation States scale scores positively and significantly predicted shared awareness, and that the direction of this effect was opposite to that of group size for both awareness of others (b = .666, S.E. = .114, p<.000, two-tailed) and other's awareness of the participant (b = .496, S.E. = .169, p<.005, two-tailed). In a stepwise OLS regression model predicting cohesion, the amount that participants reported they were aware of their partners significantly and positively predicted the level of cohesion reported (b = .606, S.E. = .236, p<.013, two-tailed), as would be predicted by the theory. However, when General Expectation States Scale scores are entered in the model, the effect of GES scale scores, while only marginally significant (b = .582, S.E. = .308, p<.065, two-tailed) renders the effect of awareness of partners insignificant (b =.287, S.E. = .286, p<.321, two-tailed). Therefore the theory receives support in that shared awareness is related to cohesion, but the negative effect of group size may be offset by greater expected competency and value of group members. Likewise, smaller groups may generally be more cohesive, but lower expectations for individuals' average contributions would likely reduce cohesion within the group.

CHAPTER 8. DISCUSSION

The purpose of this research was to test hypotheses relating group size to indicators of trust, cohesion, and commitment from group members working on a joint task. Study 2 also provided evidence that members of groups beyond 4-6 members are less committed to the group as a whole than smaller groups, and members of groups with fewer than 4 members are no more committed. These hypotheses were based on theoretical developments linking group size to perceptions of mutual awareness between group members and linking these perceptions to the process of social commitment formation described by Lawler, Thye, and Yoon (2008).

Results of analyses provided some support for hypotheses. Participants in larger groups reported lower trust, shared awareness, and inclusion of fellow group members in future task groups than participants in smaller groups. These findings support Hypotheses 3, 5, and 6. However, cohesion was not found in this study to have a significant relationship with the size of task groups. Hypothesis 4 received no direct support. An extended analysis revealed that cohesion is not simply a matter of shared awareness, but also of the expected competencies of group members. This is important because it suggests cohesion is a result both of positive feelings toward a group based on the quality of relationships, and a result of feeling the group can succeed at shared tasks. It may be the case that cohesion may be high, even when individual group members feel they themselves matter little to the success of the group. In situations where tasks are highly joint, where all group members are responsible and accountable for group outcomes, this may be problematic. Group members with little belief in their own competencies may avoid contributing in order to not disrupt group cohesion. This problem is more likely as groups increase in size, as the likelihood of a highly competent group member being included in the group increases.

It is important to recognize that commitment to a group differs from cohesion. Cohesion involves beliefs that the group recognizes and cares for each individual member, and that they will stick together in times of difficulty. Commitment is identification with and intent to behave to maintain a set of relationships. Participants in Study 2 showed decreased commitment to groups as a whole as the size of groups increased. Instead, commitment to a set of fellow group members appears to level off around 4-6 members. Therefore Hypothesis 5 received support. This suggests that when working on a joint task with a set of similar individuals, members of groups larger than six may begin to exclude a subset of the group from joint decisions.

Importantly for the theory, Hypothesis 6 was supported. Reported shared awareness was found to decrease as group size increased. It should also be noted that group members reported that others were aware of them less often in each condition when compared to the four-person group condition. Theory developed here predicted that six-person groups are the upper limit for every group member to account for every other group member. Given increased likelihood of competent group members being included as group size increases, the negative effect of group size on shared awareness should only be seen in groups larger than six. This is somewhat supported by the lack of significant difference, and absolute lower average shared awareness, reported by members of three-person groups as compared to those in four-person groups. However, groups with seven members reported being no less aware of each other than groups of four members. It was only when comparing members of eight-person groups with smaller groups that these differences were found. Again, this may be partially accounted for by the presence of more competent group members in seven-person groups. Average partner General Expectation State scale scores were not significantly different when comparing seven-person groups to four-person groups. Members of eight-person groups were reported to be significantly less competent and valuable than members of four-person groups, possibly owing to the effect of group size in lowering awareness of other group members.

Hypothesis seven predicted that shared awareness would account for the effects of group size on trust, cohesion, and the proportion of group members kept for a future task. OLS regressions revealed that measures of shared awareness did account for some of these effects. Interestingly, different aspects of shared awareness were shown to affect different measures. The impact of group size on trust was partially accounted for by how aware participants believed other group members were aware of them. However, both cohesion and the proportion of group members kept were significantly predicted by how aware participants reported they were of fellow group members.

Dispositional trust was not found to be significantly related to trust, cohesion, or commitment measures. However, it did have a positive and significant relationship with shared awareness measures. When this relationship is accounted for, no weakening of the relationship between group size and shared awareness is observed. It is possible that people who perceive themselves as more trusting are more likely to report their awareness of others and believe that others will be aware of them.

Taken together, these findings suggest that group size affects relational cohesion processes, and that it does so through its relationship to group member shared awareness. Overall, the process of group interaction is seen to produce feelings of trust and cohesion that result in commitment behavior. Chapter 9 discusses the implications of these findings for understanding interactions as a process of mutual influence.

CHAPTER 9. CONCLUSIONS

Trust, cohesion, and commitment are group processes based in ongoing interactions between group members. Interaction can be thought of as a process whereby individuals influence each other's thoughts and feelings in both emerging and ongoing relationships. Theory developed here explains that increasing group size decreases group members' capacity to monitor other people's behavior. This affects how aware group members are of each other and how much they expect others to be aware of them. As a person's ability to monitor other people decreases, the average number of interactions that person is likely to initiate toward other group members is likely to decrease. Reductions in interaction frequency are proposed by relational cohesion theory and the theory of social commitments to result in decreased generation of positive affect attributed to one's group. In turn, individuals within the group are less likely to feel the group is cohesive, will likely report lower trust in fellow group members, and are less likely to exhibit commitment to the group as a unit. The theory presented here, and the findings of Studies 1 and 2 suggest that groups will reach a natural limit in size, based on their goals and physical configuration.

Study 1 was conducted to determine if a person's ability to monitor an interaction partner would affect the level of influence their partner had on them. A follow-up study was also conducted to determine if status differences might order the attention individuals give to other group members, regardless of whether their partners were immediately available for interaction. Findings from these preliminary studies support a link between ability to monitor a partner and influence. Being able to see a partner was related to significantly higher levels of influence in task groups. Social status also appears to order people's attention to socially meaningful information; participants in the Study 1 extension were significantly more influenced by an absent higher status partner than by an absent lower status partner. This suggests participants were influenced even by the

contributions of people they were unable to interact with directly, especially if those individuals were higher status than the participant and thus expected to provide more valid self-relevant information for the participant. If people's performance expectations affect how much attention is paid to them during group interaction, then knowing the evaluations people give to fellow group members is likely to be important for isolating the effects of group size on people's feelings of cohesion and trust.

Study 2 varied the size of groups engaged in a joint task where each group member shared in group decision outcomes and were equally responsible for decisions leading to those outcomes. Participants worked in groups of 3, 4, 7, or 8 members on the "Group Investment Simulation Task." Participants worked independently to create a proposal for how the group would invest a pool of money in four actual businesses listed on the NASDAQ stock exchange. Then they worked together with fellow group members to come to a consensus on how best to invest the group's money after discussing their individual proposals. Participants evaluated themselves, their fellow group members, and the group as a whole between phases and at the end of the study.

This investigation provided evidence that group size affects the development of individual perceptions of trust, cohesion, and commitment when people work together on joint tasks. Larger groups were associated with lower reported interpersonal trust between group members. Some support was also found for the hypothesis that members of larger groups would nominate a smaller proportion of members for inclusion in a future group as a measure of commitment to fellow group members. In a comparison of 4 and 8 person groups, members of 4 person groups tended to nominate either all of their fellow group members of the majority of them for inclusion in a future task. Members of 8 person groups tended to nominate a similar number of group members, resulting in a significantly smaller proportion of group members nominated. Again, as was seen for analyses of the effects of group size on trust, it appears that group members prefer a smaller group, between 4 and 6 members. The size of this group may be anchored based

on one's own previous experience. Based on people's preferences for including specific group members, it appears that members of both large and small groups prefer groups between 4 and 6 members. This is consistent with predictions. It appears likely that there is a maximum group size beyond which is it significantly more difficult for group members to form trusting relationships with each other group member. This in turn is likely to be affected by the type of task on which the group is working.

Analysis of group member reports of group cohesion provides support for the effects of group size on relational cohesion, as well as the proposition of relational cohesion theory that frequency of interaction has a positive impact on group cohesion. Smaller groups were significantly more cohesive according to group member ratings than larger groups early in a group's history, but over the course of the full experiment differences between smaller and larger groups diminished as group member tended to rate their groups as more cohesive. By the end of the study, no effect of group size on cohesion is observed.

The process of developing trust and perceived cohesion in groups is proposed to stem from a person's expectation that other members of their group are thinking about them and their contributions to the group. Perhaps most importantly for the theory developed here, participant's reported perceptions that others were aware of the participant significantly predicted how much trust participants reported. Reports of how aware a participant's fellow group members were of the participant accounted for the effects of group size on the amount of interpersonal trust reported by group members. Other group member's awareness of the participant also appears to be important in establishing cohesion earlier in the experiment, though the most robust predictor of cohesion within the group was the average expected competence of one's fellow group members. These expectations significantly impacted reported cohesion within groups. It appears that not only is it important for people to be taken into account by their group, but that the group itself must be seen as capable of competent action.

Surprisingly, the reported perceptions that others were aware of the participant were not significant predictors of the proportion of group members the participant nominated for inclusion in a future task, though increases in group size yielded decreasing proportions of group members nominated for inclusion. In fact it was the perceived awareness of *others* reported by the participant that significantly and positively predicted the proportion of group members the participant nominated for inclusion. While people may trust and feel camaraderie with those who take them into account, this finding suggests that it is one's own ability to take others into account that affects our commitment to relationships with those others.

Further research is suggested by these findings. The type of tasks groups engage in may affect whether people can easily identify individual contributions. Varying the type of task to include additive or purely social tasks may alter the ways in which shared awareness, positive affect, and commitment are experienced. This is important to understand, as organizations are likely to include groups working together on shared tasks but which also place a premium on individual contributions and evaluations of productivity.

It is also apparent that cohesion is a product of multiple processes. Awareness of other group members appears to be a necessary condition for cohesion, and this is found to be negatively related to group size. However, larger groups are also more likely to include competent members, which will increase shared awareness as people focus on those group members' contributions. Therefore cohesion may appear high even when individual group members feel left out and possibly frustrated with their own efforts within the group. These negative feelings would then be attributed to the group, with negative consequences for collective identity formation and commitment to the group. The impact of status and power differences on cohesion and commitment may be better understood if group size is taken into account. Larger groups may be cohesive and committed to the extent that group members work to increase the skills and contributions

of all members, raising the average expectations for group members. Smaller groups may be less cohesive to the extent that group members rely or are dependent on a single individual to lead, while other group members are kept out of decision-making. The relationship between group size, expectations of group member competence, and cohesion requires further explanation and research.

These studies represents a return to basic attempts at understanding the process of group development as a result of structural factors such as group size, the physical environment, or the method of communication employed by members. As such, it represents a continuation of classic research programs to understand how a person's physical limitations or a group's environmental limitations affect the formation of hierarchies, formal rules, group identities, and shared affect. Future work will also be able to investigate how variations in the jointness of tasks or gender composition affect the processes of mutual awareness, trust, cohesion, and commitment. Much theory today poses problems of interaction as problems in dyadic relationships. However, these relationships are nested within larger webs of affiliation likely to change the nature and quality of interpersonal interaction.

In short, this research has used experimental methods to provide support for the proposition that we are influenced and attentive to those we expect to be thinking of us. As these perceptions increase, our trust in significant others and feelings of group unity and competence also increase. It is not possible from this study to know whether people who are more aware of others attribute greater competence to them, and so are more willing to commit to relationships with those people. It seems perhaps more likely given the many studies showing how quickly group hierarchies develop that people's expectations of other's competence orders future attention to others, which in turn increases commitment. Yet it is telling that increasing group size results in decreased reports of commitment to others. Further, this effect is at least partially attributable to the effect of group size on participants' awareness of fellow group members. As we come to

value others for their attention to us, so too do we turn our attention to them, committing ourselves to those relationships. As groups grow, some individuals face the prospect of losing their voice and having their contributions ignored, leading them to seek fewer, perhaps more attentive significant others with whom to further develop relationships.

APPENDIX A. TABLES

Table A1. Number of Participants in Each Condition.

Condition	N of Cases
1: Partner in Room	9
2: Unseen Partner-Next Room	14
3: Partner on Monitor	7
4:Participant on Camera	11
5: Partner Absent	12
6: High Status Partner Absent	13
7: Low Status Partner Absent	12

Table A2. Participant p(s) scores and GES scale scores by Condition (N = 50), Study 1.

Condition	Mean P(S)	General	Capable	Count	Abstract	Reading Ability	Good with Computers	Aware Of Partner	Partner Aware of Person
1: Partner in Room	.56 (.092)	6.33 (1.58)	7.11 (1.36)	6.63 (1.77)	6.38 (1.51)	6.88 (1.45)	7.00 (1.69)	7.56 (1.42)	6.67 (1.50)
2: Unseen Partner-Next Room	.63 (.099)	5.79 (1.12)	6.00 (1.04)	5.92 (1.44)	5.79 (1.37)	6.77 (1.58)	6.71 (1.59)	6.86 (2.21)	6.07 (1.98)
3: Partner on Monitor	.50 (.122)	6.43 (.976)	7.29 (.951)	6.86 (2.19)	6.57 (.976)	6.71 (1.59)	7.43 (1.13)	6.43 (2.64)	5.29 (3.15)
4:Participant on Camera	.60 (.101)	5.91 (1.22)	6.18 (1.33)	6.09 (1.30)	6.00 (1.48)	5.60 (1.65)	6.91 (1.51)	7.27 (2.00)	7.18 (1.60)
5: Partner Absent	.77 (.158)	5.10 (1.29)	5.80 (.919)	5.67 (1.50)	4.22 (1.39)	5.67 (1.80)	6.80 (1.14)	6.20 (2.44)	4.60 (2.27)

Table A3. Participant p(s) scores in Extension Study compared with Condition 5, Study 1.

Condition	Mean P(S)
High Status Partner Absent	.53
	(.139)
Low Status Partner Absent	.71
	(.113)
Equal Status Partner Absent (Study 1)	.77
	(.159)

Table A4. Means (S.D.) for Dependent Measures in Study 2.

	3 Person Groups		4 Person Groups		7 Person Groups		8 Person Groups	
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
I Felt Alone	2.39 (1.95)	2.29 (2.11)	2.00 (1.73)	1.86 (1.87)	2.58 (1.89)	2.16 (1.54)	2.18 (1.50)	1.90 (1.61)
Others Felt Alone	2.17 (1.59)	1.92 (1.35)	2.90 (2.13)	2.45 (2.34)	2.89 (1.49)	2.63 (1.74)	2.82 (1.65)	2.81 (1.99)
I hardly noticed others	1.65 (1.53)	1.71 (1.20)	1.86 (1.68)	1.38 (.979)	2.11 (1.49)	2.16 (1.34)	2.18 (1.76)	2.14 (1.82)
Others didn't notice me	1.70 (1.22)	2.04 (2.00)	1.38 (.820)	1.55 (1.35)	2.21 (1.78)	2.26 (1.45)	1.68 (1.04)	1.86 (1.62)
I was aware of others	8.13 (1.39)	8.13 (1.15)	8.10 (1.72)	8.48 (.871)	8.21 (.855)	7.74 (1.37)	7.27 (1.28)	7.48 (1.86)
Others were aware of me	7.96 (1.26)	8.08 (1.69)	8.31 (1.07)	8.00 (1.69)	7.05 (2.15)	7.21 (1.55)	6.86 (1.70)	7.57 (1.25)
Others interested in own welfare	5.09 (2.59)	5.46 (2.32)	4.48 (1.99)	5.69 (2.21)	4.84 (2.48)	4.63 (2.39)	5.14 (2.01)	5.62 (1.86)
Others honest and truthful	6.35 (2.21)	7.04 (1.27)	6.62 (1.52)	7.41 (1.48)	6.79 (2.27)	6.58 (1.50)	5.86 (1.67)	6.24 (1.45)
Others sincere in promises	6.22 (1.76)	7.17 (1.24)	6.69 (1.34)	7.48 (1.43)	6.21 (2.12)	6.42 (1.35)	5.64 (1.00)	6.62 (.740)

Table A4—Continued.

Others Won't Show me Consideration	2.17 (1.37)	2.25 (1.85)	1.76 (1.15)	2.45 (1.82)	3.32 (1.80)	2.79 (1.58)	2.68 (1.39)	3.00 (2.00)
Other Group Members would treat me Fairly and Justly	7.26 (1.48)	7.75 (1.39)	8.03 (1.09)	7.76 (1.30)	7.26 (1.15)	7.63 (1.07)	6.95 (.950)	6.52 (2.04)
Others Can be Counted on to Help Me	6.83 (1.72)	7.74 (.933)	7.50 (1.41)	7.24 (1.73)	5.75 (1.82)	6.86 (1.07)	6.10 (1.02)	6.50 (1.50)
We would stay together through adversity	6.94 (1.47)	7.21 (1.72)	6.42 (1.61)	7.14 (1.56)	5.33 (2.46)	6.57 (1.40)	5.00 (1.81)	6.22 (1.56)
Members would leave if given the chance	3.72 (2.30)	3.53 (2.27)	3.83 (2.51)	3.29 (1.93)	4.42 (1.78)	5.00 (2.16)	4.50 (2.01)	3.78 (1.77)
Members more likely to voice opinion than remain silent	5.89 (2.14)	6.05 (2.61)	5.29 (2.33)	6.52 (1.57)	4.92 (2.19)	6.00 (1.83)	5.15 (1.76)	6.06 (1.59)
Group Members Share a common Purpose	7.39 (1.72)	7.63 (1.46)	7.33 (1.55)	7.48 (1.54)	6.17 (2.17)	7.14 (1.68)	6.30 (1.34)	6.72 (1.53)
I would stay if given the chance to leave	7.33 (2.17)	6.68 (1.95)	7.04 (2.22)	7.29 (1.74)	6.58 (2.15)	7.29 (2.06)	5.85 (2.48)	6.50 (2.12)
Disagreement would not lead group to break apart	7.39 (1.69)	7.16 (1.77)	6.75 (1.96)	6.86 (2.06)	6.17 (1.80)	6.43 (2.15)	6.05 (1.73)	6.00 (2.11)

Table A5. Means (s.d.) and Sample Size for Dependent Measures by Condition.

	3 Person Groups	4 Person Groups	7 Person Groups	8 Person Groups
Trust Scale	7.11 (1.20)	7.45 (1.24)	6.78 (1.13)	6.59 (1.12)
Cohesion Scale	6.81 (1.41)	6.68 (1.08)	6.48 (1.36)	6.31 (1.20)
Proportion Kept	.890 (.382)	.926 (.241)	.646 (.285)	.578 (.213)
Partner Awareness	7.91 (1.14)	7.84 (1.01)	7.38 (1.14)	7.09 (.968)
Awareness of Partner	7.97 (.874)	8.01 (.834)	7.08 (.937)	6.79 (1.04)
Partner Avg. GES Scale Scores	7.23 (.848)	7.58 (.751)	7.27 (.826)	6.57 (.680)

Table A6. OLS Regression Models Testing Hypotheses 3—5.

	Modified Dyadic Trust Scale	Cohesion Scale	Proportion of Group Nominated for a Future Task
Group Size 3 members	.088	.230	-.007
	(.315)	(.400)	(.076)
Group Size 7 members	-.648	1.222	-.260*
	(.792)	(.959)	(.136)
Group Size 8 members	-.710*	-.581	-.347***
	(.369)	(.482)	(.087)
Intercept	7.248***	6.611***	.927***
	(.216)	(.283)	(.050)
R^2	.086	.053	.215
df	61	57	77

Notes: [†]p<.10, ***p<.001, **p<.01, *p<.05 (one-tailed)

Table A7. OLS Regressions of Independent Variables on Shared Awareness Measures.

	Awareness of Partner Scale	Partner Awareness of the Participant Scale
Group Size 3	-.042	.063
	(.230)	(.283)
Group Size 7	-.928**	-.505
	(.339)	(.480)
Group Size 8	-1.258***	-.851*
	(.296)	(.391)
Intercept	8.008***	7.839***
	(.159)	(.193)
R^2	.241	.085
df	82	73

Notes: [†]p<.10, ***p<.001, **p<.01, *p<.05 (one-tailed)

Table A8. OLS Regression Models Predicting Dependent Measures to Test Hypothesis 7.

	Modified Dyadic Trust Scale (Phase 2)		Cohesion Scale (Phase 2)		Proportion of Group Nominated for a Future Task	
Ind. Variables	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Group Size 3	.088	-.117	.284	-.004	-.007	-.014
	(.315)	(.289)	(.380)	(.356)	(.076)	(.073)
Group Size 7	-.648	-.568	1.254	1.288†	-.260*	-.243*
	(.792)	(.716)	(.922)	(.838)	(.136)	(.132)
Group Size 8	-.710*	-.541	-.182	.269	-.347***	-.251**
	(.369)	(.361)	(.440)	(.424)	(.087)	(.092)
Awareness of Others (Phase 1)	--	.028	--	.651**	--	.096*
		(.198)		(.249)		(.050)
Others' Awareness of Participant (Phase 1)	--	.453**	--	-.062	--	-.002
		(.178)		(.226)		(.046)
Intercept	7.248***	3.630***	6.579***	2.215*	.927***	.201
	(.216)	(1.069)	(.272)	(1.279)	(.050)	(.283)
R^2	.086	.281	.053	.246	.215	.289
df	61	61	57	57	77	77

Notes: †$p<.10$, ***$p<.001$, **$p<.01$, *$p<.05$ (two-tailed)

APPENDIX B. FIGURES

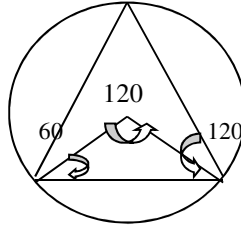Figure B1. Line of Sight angles for Participants in a 3 person group.

Figure B2. Position of Participant and Confederate by Condition, Study 1 (N = 73).
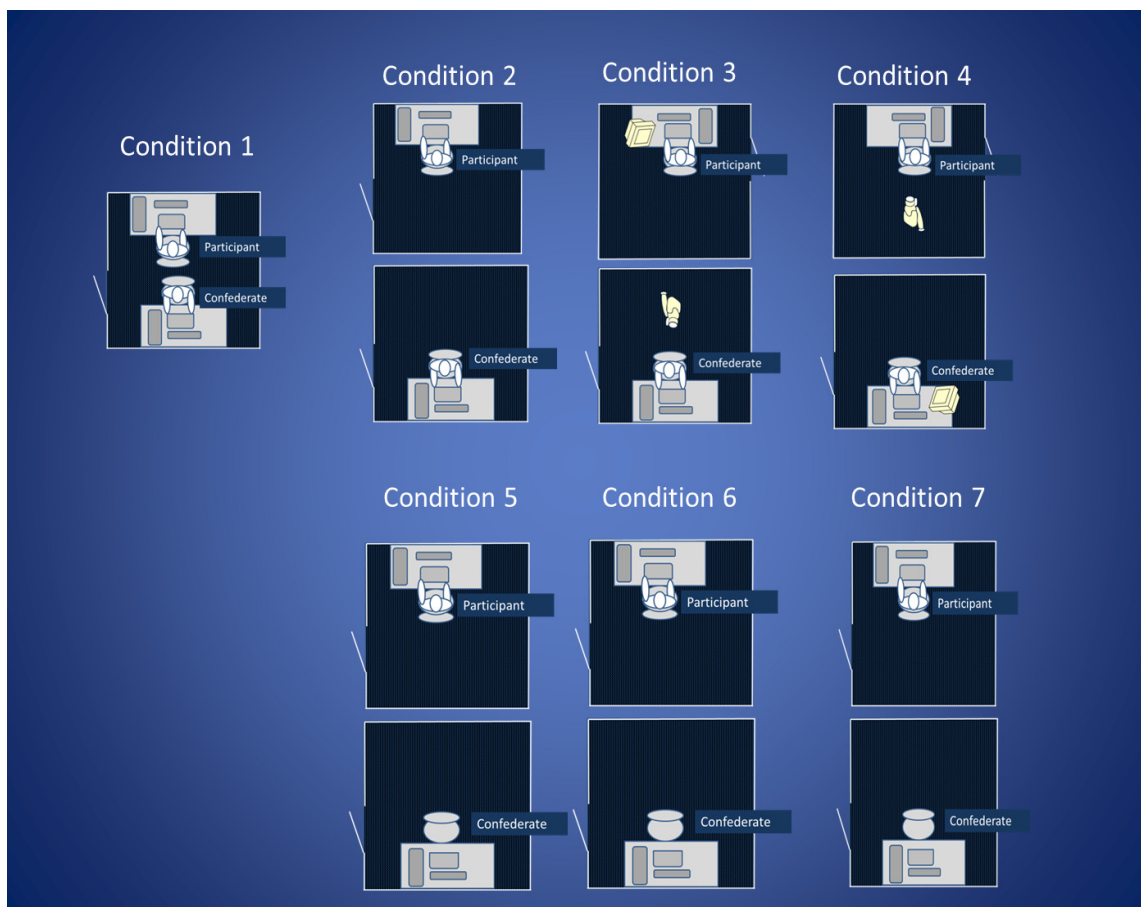
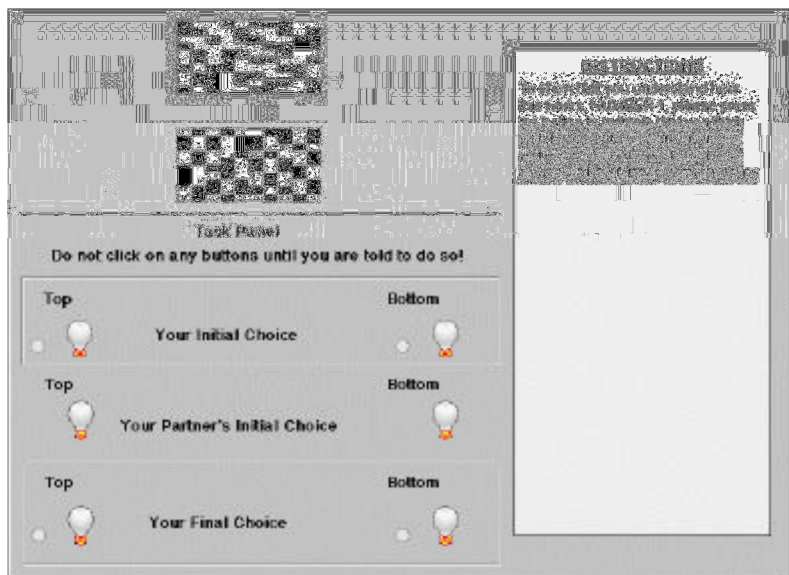Figure B3. Participants' Introduction to the Contrast Sensitivity Task.

Figure B4. Participants Make their Initial Choice and View their Partner's Initial Choice.
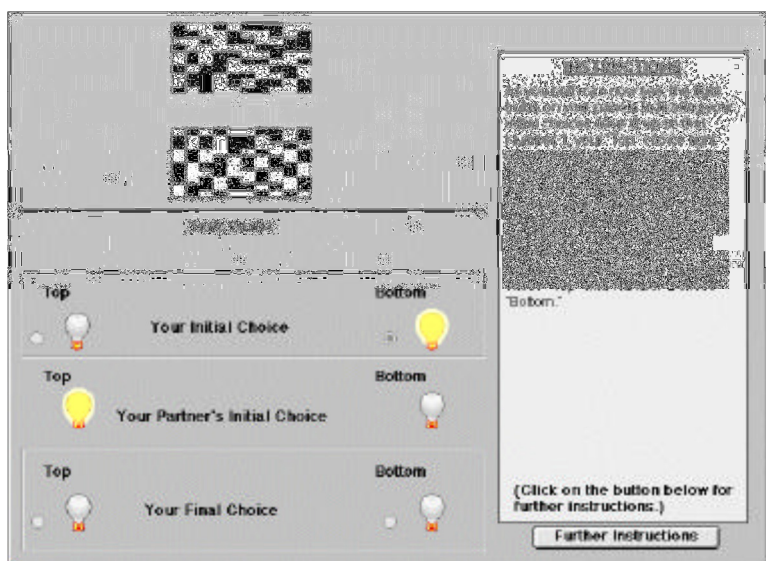
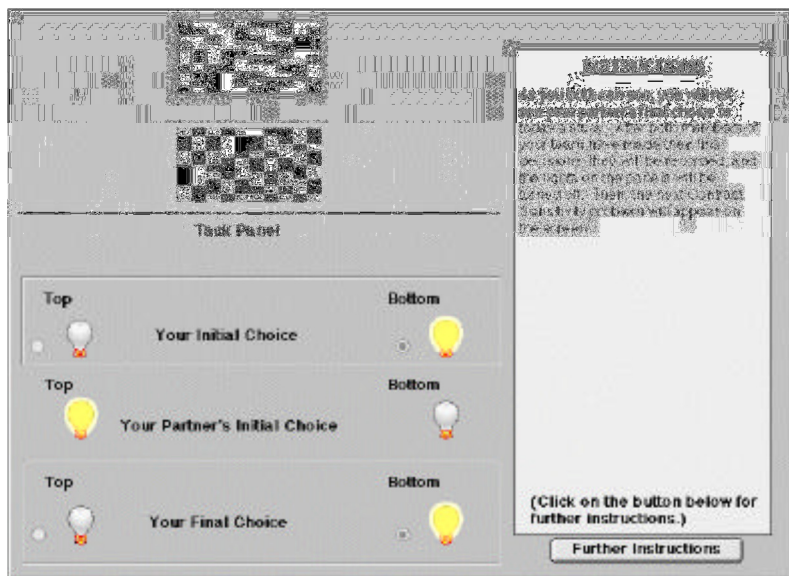Figure B5. Participant Makes a Final Choice.

Figure B6. Screenshot of National Performance Standards for Contrast Sensitivity Task.
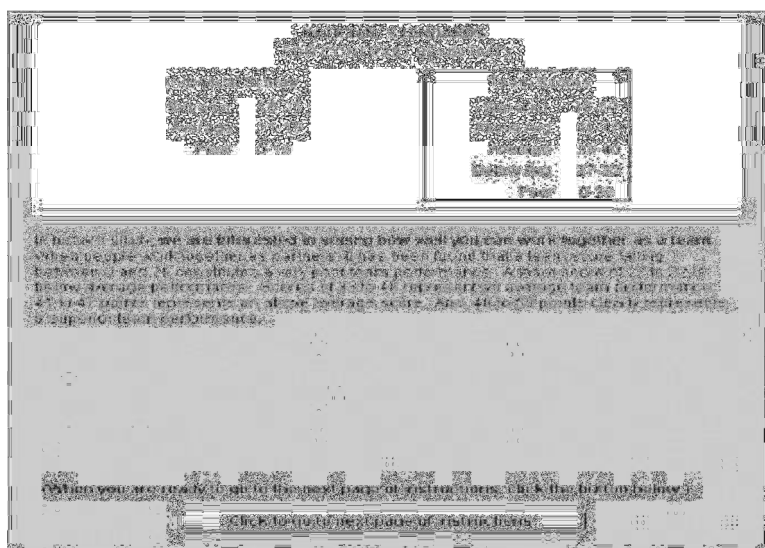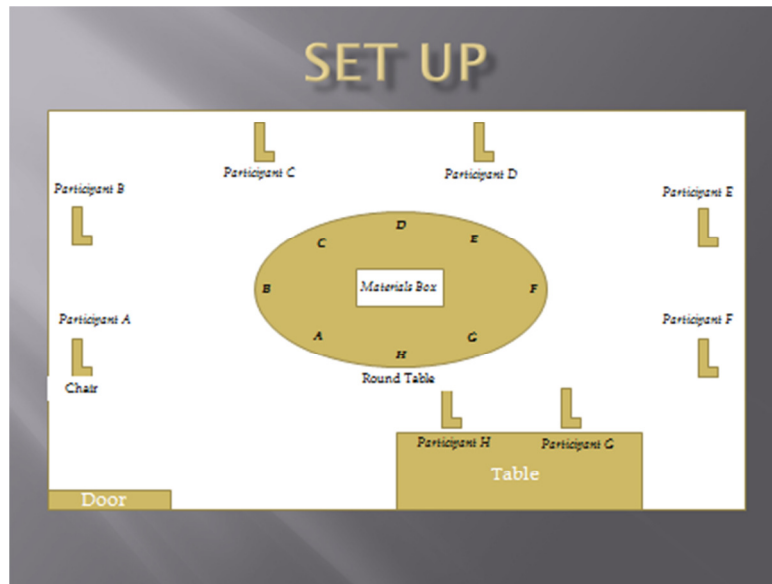
Figure B7. Configuration of Large Group Room, Study 3.

APPENDIX C. EXPERIMENTAL PROTOCOL

Experimental Protocol: Group Size, Trust, and Cohesion in Work Groups
Set Up:

1. Arrive at least 15-20 minutes before session time. If the session is not set up, it is recommended that you arrive 30-40 minutes before the session time.
2. Make sure that the Alpha Waiting Room is unlocked, and that the lights are on.
3. Unlock the Large Group room. The large group room is located at the end of the short hallway in which Christopher and Shane's offices are located. Make sure there are eight chairs in the room, the large round group table, and the **materials box**.
4. Make sure the materials box contains the company bio binder; this binder is to have the information for each company, as well as the Round 1 and Round 2 Voting Sheet. Place this on the top level of the materials box. On the bottom level of the materials box, make sure that there are plenty of pieces of scratch paper.
5. Make sure the red "attention assistant card" is on the round center table next to the materials box.
6. Put a video tape in the camera on the desk in the corner of the room. Turn on the camera and check to make sure the center middle table is fully centered in the picture on the pull-out display.
7. In the **schedule,** find the next session number to see how many participants there will be. There are instances in which the number of participants scheduled will not match the number of participants that actually show up; do not worry about this, and set the session up for the number of scheduled participants. On the next page, you will see a diagram of how to do this.
    a. 3 participants – Tape the papers with the assigned letters (A,B,C) on the back of the first three chairs (moving clockwise), starting alphabetically with the first chair. Do the same thing on the round center table; beginning on the left side of the table (as you enter the room) and rotating clockwise, tape the papers with the assigned letters (A,B,C). Make sure that there is even space between each letter. Following this, place the demographic sheets on the appropriate chairs.
    b. 4 participants – Tape the papers with the assigned letters (A,B,C,D) on the back of the first four chairs (moving clockwise), starting alphabetically with the first chair. Do the same thing on the round center table; beginning on the left side of the table (as you enter the room) and rotating clockwise, tape the papers with the assigned letters (A,B,C,D). Make sure that there is even space between each letter. Following this, place the demographic sheets on the appropriate chairs.
    c. 5 participants – Tape the papers with the assigned letters (A,B,C,D,E) on the back of the first five chairs (moving clockwise), starting alphabetically with the first chair. Do the same thing on the round center table; beginning on the left side of the table (as you enter the room) and rotating clockwise, tape the papers with the assigned letters (A,B,C,D,E). Make sure that there is even space between each letter. Following this, place the demographic sheets on the appropriate chairs.

    d.   6 participants – Tape the papers with the assigned letters (A,B,C,D,E,F) on the back of the first six chairs (moving clockwise), starting alphabetically with the first chair. Do the same thing on the round center table; beginning on the left side of the table (as you enter the room) and rotating clockwise, tape the papers with the assigned letters (A,B,C,D,E,F). Make sure that there is even space between each letter. Following this, place the demographic sheets on the appropriate chairs.

    e.   7 participants – Tape the papers with the assigned letters (A,B,C,D,E,F,G) on the back of the first six chairs and on the square table in front of the first empty seat (moving clockwise), starting alphabetically with the first chair. Do the same thing on the round center table; beginning on the left side of the table (as you enter the room) and rotating clockwise, tape the papers with the assigned letters (A,B,C,D,E,F,G). Make sure that there is even space between each letter. Following this, place the demographic sheets on the appropriate chairs.

    f.   8 participants – Tape the papers with the assigned letters (A,B,C,D,E,F,G,H) on the back of the first six chairs and on the square table in front of the two empty seats (moving clockwise), starting alphabetically with the first chair. Do the same thing on the round center table; beginning on the left side of the table (as you enter the room) and rotating clockwise, tape the papers with the assigned letters (A,B,C,D,E,F,G,H). Make sure that there is even space between each letter. Following this, place the demographic sheets on the appropriate chairs.

8. Go back to the control room and begin filling out the logbook for the session. Record the session number, the date, the time, the experimenter(s), the condition number (based on the number of participants), and anything odd or worth noting, both before and during the experiment. See previous entries for further aid.

    a.   Condition 1 – 3 participants
    b.   Condition 2 – 4 participants
    c.   Condition 3 – 5 participants
    d.   Condition 4 – 6 participants
    e.   Condition 5 – 7 participants
    f.   Condition 6 – 8 participants

9. Create 2 folders for each participant
    a.   Phase 1 folder
    b.   Phase 2 folder

10. Make sure that for each participant, the Phase 1 folder contains the following papers, in order:
    a.   Phase 1 proposal form
    b.   Interphase questionnaire
    c.   Partner evaluation forms for both the actual participant and everyone else
        i.   For example, if you are running condition 1, make sure that every Phase 1 folder contains partner evaluation forms for participants A, B, and C. If you are running condition 2, make sure that every

Phase 1 folder contains partner evaluation forms for participants A, B, C, and D. And so on…

11. Prepare **Phase 2** questionnaires to pass out after phase 2 task.
    a. Interphase questionnaire
    b. Partner evaluation forms for both the actual participant and everyone else
        i. For example, if you are running condition 1, make sure that every Phase 1 folder contains partner evaluation forms for participants A, B, and C. If you are running condition 2, make sure that every Phase 1 folder contains partner evaluation forms for participants A, B, C, and D. And so on…
    c. Final phase questionnaire
12. Prepare name tags
    a. Condition 1 – A,B,C
    b. Condition 2 – A,B,C,D,
    c. Condition 3 – A,B,C,D,E
    d. Condition 4 – A,B,C,D,E,F
    e. Condition 5 – A,B,C,D,E,F,G
    f. Condition 6 – A,B,C,D,E,F,G,H
13. For each participant, construct a clipboard. The clipboard should have the following items:
    a. An Informed Consent Form
    b. A pen. Make sure that the pens work.
    c. The appropriate name tag

When Participants Arrive:

Note: If the number of participants scheduled doesn't match the number in the waiting room, wait five minutes to begin. Inform participants you are waiting for one more person, but those who showed up they can still participate.

After waiting, if the scheduled number of participants still doesn't match the number in the waiting room, inform the participants that it will be just a few more minutes, as you have to set up the experiment for the correct amount of people. NOTE THIS IN THE LOG BOOK, AND ENTER THE APPROPRIATE CONDITION.

Take the clipboards with the consent forms and the name tags on them to the Alpha Waiting room. Say the following (from memory if possible):

"Hi, are you all here for the *Work Group* sociology study? Great. I'm _____ and I will be working with you today.

May I ask who was the first one to arrive?" Hand this person the clipboard with name tag A.

"The second?" Hand this person the clipboard with name tag B.

Continue this process until all of the appropriate clipboards have been handed out.

"These are informed consent documents. Please read them over, and if everything looks okay, I can come back and get your verbal consent. Please note that we will be making an audio and video recording of your work today. These recordings will be destroyed when we are done analyzing them for our research."

Give participants **3 minutes** to read and fill out consent forms.

When you return to the waiting room, say:

"Okay, did everything look okay? Do you agree to participate?" (If yes, then proceed. If not, simply address their concerns. If you are unable to accomplish this, or do not know how to accomplish this, please seek out Christopher, Shane, or a senior research assistant for help.)

"Please keep your clipboards and pens, and place the name tags to your shirt or jacket. Please make sure that they are fashioned in such a way so that everyone will be able to see them. This way, you will be able to know each other by using your participant letters during today's task. I will collect the consent and information forms and be back in a minute."

Leave the room and return the informed consent forms to the control room. Go into the study room and hit record on the camera (this is the red button). Wait for the green light on the display to turn red before returning to the Alpha waiting room to get the participants. When you arrive in the alpha waiting room, say the following:

"Alright. Is anyone in need of a quick restroom break before we begin? (If yes, then allow the participant to go to the restroom, and then begin the experiment. If not, then begin the experiment.) **If you will follow me, I will now take you to the room that we will be working in today. If you'd like, you are more than welcome to bring any of your belongings with you, although I assure you that they will be perfectly safe exactly where they are. I would also like to ask each of you to please turn of your cellphones, as they may distract your group from completing the task to the best of its ability."**

When participants enter the room:

"This is the room we will be working in today. As you can see, the signs on the back of the chairs along the walls correspond to the name tags that I just gave you. Please find your seat and stand by it. Wait for participants to find their seats. Say, **"Okay, first we would like to collect some information about each of you. On your seat you will find a demographic information sheet. This questionnaire is just to give us some basic information about each of you. When I leave the room, please sit down and fill them out to the best of your ability. If you do not feel comfortable giving an answer to a question, you may move on to the next question. Please keep in mind that we are most interested in your first response. I will now give you three minutes to fill out these questionnaires. When three minutes are up, I will return to the room and we will begin today's study."**

Leave the room. Check the clock in the control room. After three (3) minutes, return to the room. Knock on the door, enter, and say,

"Thank you all for agreeing to participate in today's study. Today, you will be working together as a group on the Group Investment Simulation Task. Your group will be deciding how to divide up a fund of $2,500.00 as if you were investing in businesses as part of an investment group. We will be evaluating your group for leadership ability, effective participation, and effective investing. We will also be comparing your group to other groups in the study to determine which group was most effective on the task, so you are competing to make the wisest investments, both in what you invest in and how much you invest in a set of businesses."

"We find that people who work together on the task do significantly better than people who work alone. It is important that you work together and share ideas to come up with the best solution to the task. "

"Please notice the materials box on the table in the center of the room. Profiles for four businesses have been put in this box. This includes a "bio" on the company, as well as stock and profitability information for the years immediately preceding the recent recession. For the next 10 minutes, your group can look over these profiles. Please sit at the center table as close to the sign with your participant letter as possible while you look over the business profiles. Think about which businesses you believe would be a wise investment given the state of the economy today. When you are done looking over the profiles, choose someone from your group to slide the red "attention assistant" card under the door. If the card does not appear within 10 minutes, I will return and we will move on with the task. Are there any questions for me now? Remember, working together is an important part of the task because we are comparing you to other teams, and we will be evaluating your group for leadership potential and effective contributions and decision-making."

Leave the room and watch for the red card. When it appears, or after 10 minutes have elapsed, re-enter the room and say,

"Now that your group has looked over the profiles you must make a decision. In the folders under your seat you will find a form for your personal proposed investment. Please sit in your chair and do this part on your own. Rank the four businesses you reviewed in terms of their investment potential, and how much money you think your group should invest in them, out of the $2500.00 pot. Please take no more than 5 minutes for this part of the task. I will return after 5 minutes have elapsed, or when the red "attention assistant" card appears under the door to signal to me that you are all done with this part of the study."

Leave the room and when the red "attention assistant" card appears, enter and say,

"Now you will work together to decide how to invest your money. Please sit at the center table for this part of the task. As a group, you will compare rankings and amounts from your individual lists. As a group, you will then vote for the best proposal. Please write your vote down on a sheet of scratch paper using the participant letter of the person whose proposal you support and put it in the small box provided. Choose someone to record the votes on the voting sheet provided in the materials box. This person will read all the votes out loud. In the event of ties, please vote again. Write the letter of the person whose proposal was accepted, as well as the letters of the participants receiving votes. Also include the amounts your group has decided to invest in each of the businesses on the voting sheet. You will have 10 minutes for this portion of the task. Are there any questions?

Leave the room and get copies of the interphase questionnaire. Return after 15 minutes have elapsed.

"Now that you are complete with the first investment phase we want to get your impressions of how things are going. Please return to your designated seats along the wall. In the manila folders under your chair you will find the interphase questionnaire as well as participant evaluation forms. "Please put your participant number at the top of all of these sheets. These questionnaires ask you about your

impressions of your group and partners. Note that one sheet corresponds to your own participant letter. Please also evaluate yourself on this sheet. Please do NOT discuss your answers with your teammates. Take all of these sheets out of your manila folder and hand that folder to me. (Collect Folders).

      Your initial impressions are most important to us. I will give you 10 minutes to complete these questionnaires. If you finish before the 10 minutes are done, someone can slide the red "attention assistant" card under the door. When they are complete, we will move on with the study. Are there any questions?"

      Go back to the control room. Prepare interphase questionnaires and final phase questionnaires for Phase 2. Place these questionnaires in the folders you collected. Prepare payment slips. Make sure to have scratch paper and have the debriefing sheet with questions ready. Be sure to get enough of Shane's business cards to hand out to participants after the study. After 10 minutes have gone by, return to the room. Enter the room and say,

      "Now we will move on to phase 2. Think about the investments your group decided to make in phase 1. Only this time, you can work together with 1 or more other people in your group. When it comes time to vote for the proposed investment, your group will cast a single vote that counts for the number of votes the people in your group could have cast separately. In other words you would be forming a voting bloc, but you all must agree on how to vote when the time comes. Prepare new proposals for a back-up investment plan. In other words, if your investments in phase 1 were to do worse than you expect, how would you change your investment plan? Once again rank each business and decide how much to invest in them. Since you've done this already, please only take 2-4 minutes to decide how you want to invest the money. If you choose to work with a partner or partners, please put all of their participant letters on the Phase 2 proposal form. I will return when the red card appears or when 4 minutes have elapsed."

      Go back to the control room. Return to the room after three minutes have elapsed or when the red card appears.

      "Again you will vote on proposals. You may use the same person to collect and read the votes or choose a different person. Share your investment ideas and then vote anonymously by placing your scrap paper in the small box. The recorder can then record those proposals getting votes. Remember that if you and partners submitted a proposal as a group, your group must choose 1 person to vote for the group and must come to a decision on how to vote. Your vote will count for the number of votes your group would have cast as individuals. So, if your group has 2 members, your group vote counts as 2 individual votes. 3 member group votes count for 3 individual votes and so on. Again, vote between top vote-getting proposals in the case of ties. Once you have recorded the winning proposal, return to your chairs along the wall. You will have 10 minutes for this phase. I will return when the red card appears or when 10 minutes have elapsed."

      Leave the room and get the folders with the interphase questionnaires as well as the final phase questionnaires. Return to the room when the red card appears or if 10 minutes have elapsed. Say,

"Phase 2 is now complete. Please place the voting record in the materials box. Please return to your seats and fill out these questionnaires. (Hand out Folders with final set of questionnaires)**.**

For phase 3, we would like to know a little more about your experiences. Phase 3 will not take place today, but will be the final phase of our research. Some or all of you may be given the opportunity to participate in the third phase at a later date. Please fill out the final phase questionnaire at this time. I will give you all 8 minutes to complete these questionnaires. Remember that we are most interested in your initial impressions. When you are all finished, I will return and we will move on. **Please slide the red "attention assistant" card under the door when you are finished. Again, be sure to put your participant letter on the top of all of these sheets.**

Go back to the control room. Retrieve the debriefing script, lined paper, pay voucher forms, and business cards. Return after the red card appears or after 8 minutes have elapsed. Say,

"Time is up. Thank you all for participating in today's study. If you would like to come back and go through the study again, you are welcome to sign up. You may or may not be working with some of the same people, and your group may or may not be larger or smaller than the group you worked with today. I would like to discuss with you the purposes of today's study, answer any questions you may have, and get each of your impressions on some short questions. You may write your answers to these questions on this scratch paper." Hand out paper.

Go through debriefing script and questions. When they are finished, pick up the lined paper and say,

"Okay, thank you for your answers. These are pay vouchers. Show them pay vouchers. **You will all be paid $10.00 for participating in today's study. Please fill out the form and you will receive a check from the university in 1 to 2 weeks. If you do not receive your check, please check with our main office, W140 Seashore Hall. I also have a business card for each of you. Shane Soboroff is the principal investigator for this study. You may contact him if you have any questions about your participation. His phone number and email address are on the card. Are there any questions?** If so, answer them to the best of your ability.

"Thank you for participating in today's study. Your participation for today is complete. I will now show you the way out of our lab."

After participants have left, return to room. Collect all questionnaires and the voting record. File these in the designated folder for the study session in the control room. Make sure participant letters are printed on each questionnaire so we know which person filled them out. Return materials in the group room to start up conditions and finish filling out the log book.

REFERENCES

Abrams, D. 1990. "Political Identity: Relative Deprivation, Social Identity, and the Case of Scottish Nationalism." *Economic and Social Research Council* 16-19 Initiative Occasional Paper No. 24. Social Statistics Research Unit, City University: London.

Bailenson, Jeremy, Kim Swinth, Crystal Hoyt, Susan Persky, Alex Dimov, and Jim Blascovich. 2005. "The Independent and Interactive Effects of Embodied Agent Appearance and Behavior on Self-Report, Cognitive, and Behavioral Markers of Co-presence in Immersive Virtual Environments." *Presence*. Vol. 14(4): 379-393.

Bales, Robert F. 1950. *Interaction Process Analysis*: *A Method for the Study of Small Groups.* Chicago: University of Chicago Press.

Bales, Robert F. and Edgar Borgatta. 1966. "Size of Group as a Factor in the Interaction Profile." In A.P. Hare, E. Borgatta, and R. Bales (Eds.), *Small Groups: Studies in Social Interaction.* Pp. 495-512. New York: Knopf.

Balser, D.B. 1997. "The Impact of Environmental Factor on Factionalism and Schism in Social Movement Organizations. *Social Forces.* Vol. 76(1): 199-228.

Baumeister, Roy F. and Mark R. Leary. 1995. "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation." *Psychological Bulletin*. Vol. 117(3): 497-529.

Berger, Joseph, Thomas L. Connor, and M. Hamit Fisek. 1974. *Expectation States Theory: A Theoretical Research Program.* Cambridge, MA: Winthrop.

Berger, Joseph, Thomas L. Connor, and William L. McKeown. 1969. "Evaluations and the Formation and Maintenance of Performance Expectations." *Human Relations.* Vol. 22(6): 481-502.

Biocca, Frank, Chad Harms, and Jenn Gregg. 2001. "The Networked Minds Measure of Social Presence: Pilot Test of the Factor Structure and Concurrent Validity." *Paper presented at the International Workshop on Presence, Philadelphia, PA.*

Boon, Susan D. and John G. Holmes. 1991. "The Dynamics of Interpersonal Trust: Resolving Uncertainty in the Face of Risk." In Robert A. Hinde and Jo Groebel (Eds), *Cooperation and Prosocial Behavior.* Cambridge, UK: Cambridge University Press.

Brann, P, and M. Foddy. 1988. "Trust and the Consumption of a Deteriorating Resource." *Journal of Conflict Resolution*. Vol. 31: 615-630.

Bray, Robert M., Norbert L. Kerr, and Robert S. Atkin. 1978. "Effects of Group Size, Problem Difficulty, and Sex on Group Performance and Member Reactions." *Journal of Personality and Social Psychology*. Vol. 36(11): 1224-1240.

Buchan, Nancy R., Rachel T.A. Croson, and Robyn M. Dawes. 2002. "Swift Neighbors and Persistent Strangers: A Cross-Cultural Investigation of Trust and Reciprocity in Social Exchange." *The American Journal of Sociology*. Vol. 108(1): 168-206.

Celeste Campos, Steven Hitlin, and Shane D. Soboroff. 2007. "Standing on Air: Copresence as an Implicit Social Psychological Concept." Presentation at the annual meeting of the Midwest Sociological Society, Chicago, IL.

Carpenter, Jeffrey P. 2007. "Punishing Free-Riders: How Group Size Affects Mutual Monitoring and the Provision of Public Goods." *Games and Economic Behavior.* Vol. 60(1): 31-51.

Cook, Karen S., Toshio Yamagishi, Coye Cheshire, Robin Cooper, Masafumi Matsuda, and Rie Mashima. 2005. "Trust Building Via Risk Taking: A Cross-Societal Experiment." *Social Psychology Quarterly.* Vol. 68(2): 121-142.

Das, T.K. and Bing-Sheng Teng. 1998. "Between Trust and Control: DevelopingConfidence in Partner Cooperation in Alliances." *Academy of Management Review.* Vol.23(3): 491-512.

Dirks, Kurt T. 1999. "The Effects of Interpersonal Trust on Work Group Performance." *Journal of Applied Psychology*. Vol. 84(3): 445-455.

Fern, Edward F. 1982. "The use of Focus Groups for Idea Generation: The Effects of Group Size, Acquaintanceship, and Moderator Response Quantity and Quality." *Journal of Marketing Research*. Vol. 19(1): 1-13.

Fischer, Paul H. 1953. "An Analysis of the Primary Group." *Sociometry.* Vol 16(3): 272-276.

Genicot, Garance, and Debraj Ray. 2003. "Group Formation in Risk Sharing Arrangements." *The Review of Economic Studies.* Vol. 70(1): 87-113.

Glanville, Jennifer L. and Pamela Paxton. 2007. "How do We Learn to Trust? A Confirmatory Tetrad Analysis of the Sources of Generalized Trust." *Social Psychology Quarterly*. Vol. 70(3): 230-242.

Goffman, Erving. 1963. *Behavior in Public Places: Notes on the Social Organization of Gatherings*. New York: The Free Press.

Grant, Peter R. and Rupert Brown. 1995. "From Ethnocentrism to Collective Protest: Responses to Relative Deprivation and Threats to Social Identity." *Social Psychology Quarterly.* Vol. 58(3): 195-212.

Gully, Stanley M., Dennis J. Devine, and David J. Whitney. 1995. "A Meta-Analysis of Cohesion and Performance." *Small Group Research*. Vol. 26(4): 497-520.

Herbsleb, James D., Audris Mockus, Thomas A. Finholt, and Rebecca E. Grinter. 2000. "Distance, Dependencies, and Delay in a Global Collaboration." *Proceedings of the 2000 ACM Conference on Computer Supported Cooperative Work.* New York: ACM.

Hiltz, Starr Roxanne, Kenneth Johnson, and Murray Turoff. 2006. "Experiments in Group Decision Making Communication Process and Outcome in Face-to-Face Versus Computerized Conferences." *Human Communication Research.* Vol. 13(2): 225-252.

Hogg, Michael. A.1996. "Social identity, self-categorization, and the small group." Pp. 227-253 in E. H. Witte & J. H. Davis (Eds.), *Understanding group behavior*: *Volume 2: Small group processes and interpersonal relations*. Mahwah, NJ: Lawrence Erlbaum Associates.

Hogg, Michael A. 2001. "A Social Identity Theory of Leadership." Personality and Social Psychology Review. Vol. 5(3): 184-200.

Hogg, Michael A. 2003. "Social Identity." Pp. 462-479 in Leary and Tangney (Eds), *Handbook of Self and Identity*. New York: Guilford.

Hogg, Michael A. and Dominic Abrams. 2007. "Intergroup Behavior and Social Identity." Pp. 335-360 in Hogg and Cooper (Eds), *The Sage Handbook of Social Psychology*. Los Angeles, CA: Sage.

Hogg, Michael A., and Deborah J. Terry. 2000. "Social Identity and Self-Categorization Processes in Organizational Contexts." *The Academy of Management Journal*. Vol. 25(1): 121-140.

Husbands, C. T. 1988. "Extreme right-wing politics in Great Britain: The recent marginalisation of the national front." *West European Politics*. Vol. 11: 65-79.

Jorgensen, Danny L. 1995. "Dissent and Schism in the Early Church: Explaining Mormon Fissiparousness," *Dialogue: A Journal of Mormon Thought.* Vol. 28(3): 15-39.

Kalkhoff, Will and Christopher Barnum. "The Effects of Status-Organizing and Social Identity Processes on Patterns of Social Influence." *Social Psychology Quarterly*. Vol. 63:95-115.

Kalkhoff, Will and Shane R. Thye. 2006. "Expectation States Theory & Research: New Observations from Meta-Analysis." *Sociological Methods and Research.* Vol. 35:219-249.

Kalkhoff, Will, C. Wesley Younts, and Lisa Troyer. 2008. "Facts and Artifacts in Research:

The Case of Communication Medium, Gender, and Influence." *Social Science Research.* Vol. 37:1008-1021.

Kelley, Harold H. and J. W. Thibaut. 1954. "Experimental Studies in Group Problem Solving Process." Pp. 735-785 in Lindzey (ed), *Handbook of Social Psychology*. Reading, MA: Addison Wesley.

Kerr, Norbert L. 1989. "Illusions of Efficacy: The Effects of Group Size on Perceived Efficacy in Social Dilemmas." *Journal of Experimental Social Psychology*. Vol. 25(4): 287-313.

Kollock, Peter. 1994. "The Emergence of Exchange Structures: An Experimental Study of Uncertainty, Commitment, and Trust." *The American Journal of Sociology*. Vol. 100(2): 313-345.

Korsgaard, M. Audrey, David M. Schweiger, and Harry J. Sapienza. 1995. "Building Commitment, Attachment, and Trust in Strategic Decision-Making Teams: The Role of Procedural Justice." *The Academy of Management Journal*. Vol. 38(1): 60-84.

Larzelere, Robert E., and Ted L. Huston. 1980. "The Dyadic Trust Scale: Toward Understanding Interpersonal Trust in Close Relationships." *Journal of Marriage and Family.* Vol. 42(3): 595-604.

Latane, Bibb. 1981. "The Psychology of Social Impact." *American Psychologist*. Vol. 36(4): 343-356.

Laughlin, Patrick R., Erin C. Hatch, Jonathan S. Silver, and Lee Boh. 2006. "Groups Perform Better Than the Best Individuals on Letters-to-Numbers Problems: Effects of Group Size." *Journal of Personality and Social Psychology*. Vol. 90(4): 644-651.

Lawden, Mark. 2000. "Epilepsy Surgery, Visual Fields, and Driving." *Journal of Neurology, Neurosurgery, and Psychiatry.* Vol. 68(6): 6.

Lawler, Edward J. 2001. "An Affect Theory of Social Exchange." *American Journal of Sociology* 107(2): 321-52.

Lawler, Edward J. and Jeongkoo Yoon. 1993. "Power and the Emergence of Commitment Behavior in Negotiated Exchange." *American Sociological Review* 58: 465-481.

Lawler Edward J. and Yoon. 1996. "Commitment in Exchange Relations: Test of a Theory of Relational Cohesion." *American Sociological Review* 61:89–108.

Lawler, Edward J., Shane Thye, and Jeongkoo Yoon. 2008. "Commitment in Structurally Enabled and Induced Exchange Relations." *Social Psychology Quarterly.* Vol. 69(2): 183-200.

Edward J. Lawler, Shane R. Thye, and Jeongkoo Yoon. 2000. "Emotion and Group "Cohesion in Productive Exchange." *American Journal of Sociology* 106: 616-57.

Lau, D.C., and J.K. Murnighan. 2005. "Interactions Within Groups and Subgroups: The Effects of Demographic Faultlines." *Academy of Management Journal.* Vol. 48(4): 645-659.

Leary, Mark R. 1990. "Responses to Social Exclusion: Social Anxiety, Jealousy, Loneliness, Depressin, and Low Self-Esteem. *Journal of Social and Clinical Psychology.* Vol. 9(2): 221-229.

Levine, J.M. and R.L. Moreland. 1990. "Progress in Small Group Research." *Annual Review of Psychology.* Vol. 41: 585-634.

Liebman, Robert C., John R. Sutton, and Robert Wuthnow. 1988. "Exploring the Social Sources of Denominationalism: Schisms in American Protestant Denominations, 1890-1980. *American Sociological Review*. Vol. 53(3): 343-352.

Mamiya, Lawrence H. 1982. "From Black Muslim to Bilalian: The Evolution of a Movement." *Journal for the Scientific Study of Religion.* Vol. 21(2): 138-152.

Matsuda, Masafumi, and Toshio Yamagishi. 2001. "Trust and Cooperation: An Experimental Study of PD with Choice of Dependence." *Japanese Journal of Psychology.* Vol. 72(5): 413-421.

Merton Robert K., Fiske M. and Kendall P.L. 1956. *The Focused Interview*. Glencoe, IL: Free Press.

Mueller, Jennifer S. 2011. "Why Individuals in Larger Teams Perform Worse." *Organizational and Human Decision Processes*. Vol. 117: 111-124.

Parks, C.D., and L.G. Hulbert. 1995. "High and Low Trusters' Responses to Fear in a Payoff Matrix." *Journal of Conflict Resolution*. Vol. 39: 718-730.

Prentice-Dunn, S. and R.W. Rogers. 1989. "Deindividuation and the Self-Regulation of Behavior." Pp. 87-108 in Paulus (Ed), *The Psychology of Group Influence*. Hillsdale, NJ: Lawrence Erlbaum.

Sampson, Conor. 2007. "Vision and Light." Lecture. McGill University School of Architechture. Accessed on 7/28/09 at http://www.arch.mcgill.ca/prof/sampson/arch447/fall2007.

Sani, Fabio. 2005. "When Subgroups Secede: Extending and Refining the Social Psychological Model of Schism in Groups." *Personality and Social Psychology Bulletin*. Vol. 31(8): 1074-1086.

Sani, Fabio, and John Todman. 2002. "Should We Stay or Should We Go? A Social Psychological Model of Schisms in Groups." *Personality and Social Psychology Bulletin*. Vol. 28(12): 1647-1655.

Sato, Kaori. 1988. "Trust and Group Size in a Social Dilemma." *Japanese Psychological Research*. Vol. 30(2): 88-93.

Simmel, Georg. 1908 [1950]. *Soziologie, Untersuchungen uber die Formen der Vergesellschaftung*. In Kurt Wolff (Ed.), *The Sociology of Georg Simmel*. New York: Free Press.

Simmel, Georg. 1924. "Soziologie." In Robert Park and E.W. Burgess (Eds), *Introduction to the Science of Sociology*. Pp. 358. Chicago: University of Chicago Press.

Smith, Joan MacFarlane. 1972. "Group Discussions." In *Interviewing in Market and Social Research.* London: Routledge.

Stolle, Dietlind. 1998. "Bowling Together, Bowling Alone: The Development of Generalized Trust in Voluntary Associations." *Political Psychology*. Vol. 19(3): 497-525.

Tajfel, Henri. 1982. *Social Identity and Intergroup Relations.* Cambridge, UK: Cambridge University Press.

Tajfel, Henri and Jonathan C. Turner. 1979. "An intergrative theory of intergroup conflict." In Austin, W. G. and Worchel, S. (Eds), *The Social Psychology of Intergroup Relations*, Brooks/Cole, Monterey, California.

Tajfel, Henri, M.G. Billig, R.P. Bundy, and Claude Flament. 1971. "Social Categorization and Intergroup Behavior." *European Journal of Social Psychology.* Vol. 1(2): 149-178.

Troyer, Lisa. 2002. "The Relation Between Experimental Standardization and Theoretical Develoopment in Group Processes Research." In Szmatka, Lovaglia, and Wysienska (Eds), *The Growth of Social Knowledge: Theory, Simulation, and Empirical Research in Group Processes.* Westport, CT: Praeger.

Tyler, Tom R. and E. Allan Lind. 1992. "Procedural Justice." In Sanders and Hamilton (Eds), *Handbook of Justice Research in Law.* New York: Kluwer.

Valacich, Joseph S., Alan R. Dennis, and J.F. Nunamaker. 1992. "Group Size and Anonymity Effects on Computer Mediated Idea Generation." *Small Group Research.* Vol. 23(1): 49-73.

Webster, Murray, and Le Roy F. Smith. 1978. "Justice and Revolutionary Coalitions: A Test of Two Theories." *American Journal of Sociology.* Vol. 84(2): 267-292.

Wells, William D. 1974. "Group interviewing." In R Ferber (ed.), *Handbook of Marketing Research.* New York: McGraw Hill.

Wheelan, Susan A. 2009. "Group Size, Group Development, and Group Productivity." *Small Group Research.* Vol. 40(2): 247-262.