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THE INFLUENCE OF INTERPERSONAL BEHAVIORS AND

SOCIAL CATEGORIES ON

LANGUAGE USE IN VIRTUAL TEAMS

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LANGUAGE USE IN VIRTUAL TEAMS

by

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2012

Dedication

Canim Anneme

Acknowledgements

I would like to express my deepest gratitude to my advisor, Dr. Jorge Peña, for guiding me through the challenges of writing this dissertation. Encouraging me to address the most intriguing questions in research, you always motivated me to do my best. Without your guidance, I would not be the scholar I am right now. Thank you for everything.

I thank the members of my dissertation committee Dr. James Pennebaker, Dr. Matt McGlone, Dr. Larry Browning and Dr. Jeffrey Hancock for all their support in the completion of this dissertation. Dr. James Pennebaker helped me understand the importance of bringing my own voice into research and act like the "Queen" of what I study. I am very grateful for Dr. Matt McGlone's invaluable feedback on my dissertation. Also, Thanks to Dr. Larry Browning for his insightful comments. Finally, I want to thank Jeffrey Hancock for being a part of this rewarding journey. He keeps inspiring me with his own research.

I would never be able to finish this dissertation if I did not have the support of my great friends and colleagues. First, I would like to thank my lovely friend, Kate who patiently listened to me and supported me through the most difficult times of my doctoral experience. Being far away from my home country, I found the warmth and compassion of my family in the Connolly's house. I am so grateful for your friendship that I cannot find words to express it. I also want to thank my great friend Hilal Atasoy who has been the best partner in crime for the last 13 years of my life. Thank you for always being

there for me. I feel very lucky to have your friendship. I also want to thank everyone in the Pennebaker Lab for welcoming me in their weekly meetings and helping me with their invaluable comments. It was a true joy to have met you all.

Finally, I want to thank my mom who supported me with her prayers from thousands miles away. Annecim, hayatimda yaptigim herseyde bana sonuna kadar inandigin icin tesekkur ederim. Senin dualarin ve destegin olmadan bunlari basaramazdim. Iyi ki varsin, iyi ki benim annemsin.

The Influence of Interpersonal Behaviors and Social Categories on Language Use in Virtual Teams

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As increasing number of organizations are using virtual teams, communication scholars have started to pay more attention to these relatively new forms of work. Past studies explored interpersonal (i.e., trust, attraction) and group dynamics (i.e., conformity, subgrouping) in virtual teams. Despite the documented effects of interpersonal behaviors and social categories on virtual group dynamics, there is a substantial gap in how these two factors influence language use in virtual teams. To shed light on this neglected area of research, this dissertation examined how teammates' interpersonal behaviors and social categories affected language use in virtual team collaborations. 164 participants interacted in four-person teams using a synchronous chat program. The age of participants ranged from 18 to 24. 58% of participants were female and 42% were male. Participants used Windows Live Messenger to complete Straus & McGrath's (1994) decision making task. Upon completing the task, participants filled out social attraction and social identification scales to be used for manipulation checks. Decision making

sessions for each group were saved and Linguistic Inquiry and Word Count Program (LIWC) was used to examine language use. Linguistic style accommodation was measured using language style matching (LSM) metric. LSM measured the degree to which group members used similar language patterns. It was calculated by averaging the absolute difference scores for nine *function word* categories generated by LIWC. Similarly, linguistic markers such as word counts, negations, assents, and pronouns were acquired through LIWC output. The results suggested that having a dissenting member in the group was associated with higher linguistic style accommodation compared to having an assenting member. This result contradicted with the assumptions of communication accommodation theory (Giles, Mulac, Bradac, & Johnson, 1987), yet provided evidence for the validity of minority influence theory (Moscovici, Lage, & Naffrechoux, 1969) in virtual teams. Unexpectedly, there was no significant effect of social categories on linguistic style accommodation. The results also showed that negative behaviors were strongly associated with increased word counts, negations and the second person singular pronouns, whereas positive behaviors were associated with increased use of assents, tentative language, first person plural and singular pronouns.

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Chapter 1 - Introduction

The nature of work teams has drastically changed over the last decade as contemporary organizations discovered the value of virtual teams. Virtual teams are geographically dispersed work groups that communicate primarily via information and communication technologies (Polzer, Crisp, Jarvenpaa, & Kim, 2006). These teams perform a significant amount of work in today's organizations (Chudoba, Wynn, Lu, & Watson-Manheim, 2005). Examining virtual team processes can inform the research in organizational communication and technology while offering practical implications for management practices.

Much of the recent research in virtual teams have focused on understanding interpersonal (i.e., trust, attraction) and group dynamics (i.e., conformity, subgrouping). Several studies have examined the effects of interpersonal behaviors on social processes such as attribution (Bazarova & Walther, 2009), social attraction (Wang, Walther, & Hancock, 2009), trust development (Jarvenpaa & Ives, 1994) and interpersonal liking (Walther, Bunz, & Bazarova, 2005). On the other hand, research studies framed in the group level approaches have investigated the effects of social categories on conformity (Postmes, Spears & Lea, 1998), attraction (Lea, M., Spears, R., & de Groot, D., 2001), and subgroup formation (Polzer et al., 2006).

As documented by these studies, interpersonal behaviors and social categories have a strong influence on perceptual and behavioral processes of virtual teams. Despite the already known effects of these factors on virtual group dynamics, there is a

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substantial research gap with respect to their influence on language use in virtual teams. Although a few studies looked at the relationships between language use and social dynamics in virtual teams (Gonzales, Hancock, & Pennebaker, 2010; Leshed, Perez, Hancock, Cosley, Birnholtz, Lee, McLeod, & Gay, 2009; Scissors, Gill, & Gergle, 2008), there is scant research examining how language is employed in virtual team collaborations. More specifically, there is little research documenting how language use in virtual teams is affected by interpersonal and group level factors. The importance of written language as a primary tool of communication in virtual teams creates a strong need for understanding how technology shapes social interactions and how adaptation to the technology affects social processes (Walther, 2004). For example, recent studies show that increasing the awareness of language use among team members may enhance the quality of virtual team collaborations (Leshed et al., 2009). As such, the primary goal of this dissertation is to examine how teammates' interpersonal behaviors and social categories affect language use in virtual team collaborations.

Consider the role of interpersonal behaviors in face-to-face teams. For example, dissenting members can contribute to decision quality by prompting group members to reconsider their arguments and to think about the solutions more thoroughly (Nemeth & Rogers, 1996). However, we do not know much about how dissenting members affect group discussions in virtual teams. Do dissenting virtual teammates force other members to think more critically about their arguments compared to assenting members? We also know very little about the effects of social categories on how group members use

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language to voice their opinions and discuss alternative solutions during decision making processes. For instance, do group members imitate or mimic the language of their in-group members rather than out-group members? To answer these questions, the following chapter will review theoretical frameworks and empirical findings informing the effects of interpersonal behaviors on language use in virtual teams. Also, previous theoretical and empirical studies about the effects of social categories on language use will be discussed and relevant predictions will be drawn. The third chapter will outline the methods for the data collection and analysis.

Chapter 2 - Theoretical Frameworks and Hypothesis Generation

This chapter will first review the theoretical frameworks and previous empirical

findings on the relationship between interpersonal behaviors and language use. Relevant

hypotheses will be proposed based on the reviewed theoretical assumptions. The second

part of this chapter will review the literature on the effects of social categories on

interpersonal behaviors, and subsequently advance a hypothesis.

Interpersonal Behaviors and Language Use

How do virtual team members relate to each other and develop relationships? To

address this question, social information processing theory (SIPT; Walther, 1992)

suggests that the relational development in virtual teams is based on the frequent

exchange of sociemotional and task messages. According to SIPT, though virtual team

members may not form accurate impressions during initial interactions, over time,

exchange of social information leads to more accurate impressions and well-developed

relationships (Walther, 1992).

Traditionally, SIPT focused on the effects of temporal factors such as the rate of

social information processing and the frequency of communication on impression

formation and relationship development in virtual teams (Walther, 1992). However,

recent applications of SIPT expanded the theory's predictions to the study of how

interpersonal behaviors in short-term virtual team interactions may affect perceived

interpersonal attraction (Walther, Loh, Granka, 2005; Wang et al., 2009). For instance, a

recent study comparing the effects of interpersonal behaviors and social categories on

interpersonal attraction showed that virtual team members rated positively behaving members as more attractive compared to negatively behaving members regardless of their group membership (Wang et al., 2009).

While the recent applications of SIPT makes predictions regarding the effects of interpersonal behaviors on attraction, communication accommodation theory (CAT; Giles, Mulac, Bradac, & Johnson, 1987) explains how mutual attraction affects communication style of team members. CAT argues that interpersonal connectedness or shared understanding is conveyed through linguistic and non-verbal accommodation between two individuals or among group members. According to CAT, people converge their speech patterns and nonverbal behaviors toward people they like, whereas diverge from people they do not like or associate with (Giles et al., 1987). Similarly, when a group member tells a story, others participate in the development of this story creating fantasy chains as a sign of shared consciousness (Bormann, 1972). In other words, as a form of communication accommodation, fantasy chains - stories that are repeated among group members - create symbolic convergence through which group members coordinate their behaviors and adapt to one another (Bormann, 1981). In congruence with these assumptions, the coordination in communication among group members reflects mutual attraction among group members (Giles et al., 1987). In summary, both CAT (Giles et al., 1987) and SIPT (Walther, 1992) converges on the prediction that interpersonal behaviors affect how people communicate with each other in virtual environments.

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Note that communication accommodation at the linguistic level has been referred by many names, including *linguistic style matching* (Niederhoffer & Pennebaker, 2002), *lexical mimicry* (Scissors, Gill, & Gergle, 2008), and *verbal mimicry* (Gonzales et al., 2010). Also, a recent study has introduced the concept of *linguistic style accommodation* as a framework to represent communication accommodation in the context of *Twitter* conversations (Danescu-Niculescu-Mizil, Gamon, & Dumais, 2011). The present dissertation intends to keep the focus on communicative functions of language, and therefore, will use *linguistic style accommodation* to refer to the extent to which virtual team members accommodate their text-based communication. As such, linguistic style accommodation will reflect the extent to which virtual collaborators accommodate, mimic, synchronize and match the language of other collaborators.

As linguistic style accommodation captures the linguistic similarities among virtual collaborators, it provides important information about interpersonal and group dynamics. For instance, a recent study examining the relationship between linguistic style accommodation and group cohesion found that group cohesion was positively related to linguistic style accommodation (Gonzales et al., 2010). The participants of this study worked in virtual and face-to-face groups to complete an information search task. The primary goal of this study was to develop an efficient metric to measure linguistic style accommodation, and use this metric to examine group cohesion and performance. Researchers calculated the proportions of linguistic features each group member used with the rest of the group. The results of this study confirmed that linguistic style

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accommodation was associated with group cohesion (Gonzales et al., 2010). That is, regardless of the media participants communicate in (i.e., virtual or face-to-face), linguistic style accommodation predicted increased interaction satisfaction. The researchers concluded that, when group members liked one another, they accommodated each other's language (Gonzales et al., 2010).

There is additional evidence that virtual teammates accommodate their language towards collaborators that exhibit positive attributes. In an examination of the association between linguistic style accommodation and perceived trust in virtual teams, Scissors and associates (2008) found a positive relationship between positive behaviors and linguistic style accommodation. Participants of this study cooperated in 28 rounds of a social dilemma investment game and chatted via instant messenger with their partners after every 5 rounds. The researchers examined linguistic style accommodation between partners at the level of lexical and syntactic structure, emotion-related character use and text-chat abbreviation. Their findings showed that linguistic style accommodation was a significant predictor of trust. For instance, there was higher linguistic style accommodation between high-trusting partners compared to low-trusting partners (Scissors et al., 2008).

As informed by previous empirical studies (Gonzales et al., 2010; Scissors et al., 2008), linguistic style accommodation is a reflection of positive interpersonal behaviors (i.e., attraction, trust) in virtual teams. Also, many theoretical approaches (i.e., CAT, SIPT) concur on this prediction. Accordingly, it is predicted that virtual team members

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will accommodate the language of likable group members rather than dislikable group members:

>H1a: Collaborators will have higher linguistic style accommodation with positively behaving confederates compared to negatively behaving confederates.

While the majority of existing studies confirm the above prediction, there is a distinct possibility that negative behaviors may generate more linguistic style accommodation if negative or dislikable behaviors function as a minority influence. The original formulation of minority influence theory (Moscovici, Lage, & Naffrechoux, 1969) suggests that the minority member generates a validation process through which group members examine the decision making task more thoroughly. Later formulations of the theory argue that minorities not only stimulates a reconsideration of decisions, but also create a divergent thought process (Nemeth 1986, 1995). For instance, the minority member stimulates a search for more information and a multiple-perspective approach to solutions, leading to decisions of better quality (Nemeth & Rogers, 1996). Interestingly, even though minorities are appreciated for their involvement with the task and contribution to decision making processes, they are generally disliked by the majority members (Nemeth & Wachtler, 1974). Despite its prevalence in face-to-face group research, minority influence theory has not been widely applied to virtual teams. Yet, this framework has clear implications for how virtual team collaborators use language in the group decision making. For example, since minority influence will engage a validation process during group discussions, it will prompt majority group members to reexamine

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their arguments, generate counterarguments and provide a rationale for their decisions (Nemeth & Rogers, 1996). Given that the minority influence will increase the interpersonal engagement and focus on decision making task, it will also affect the language use of group members. As the validation processes will require all group members to get more involved and think through their decisions, it is possible that there will be increased linguistic style accommodation among group members showing mutual engagement and shared task focus. Towards this end, the following hypothesis summarizes the effects of negative interpersonal behaviors, in particular the behaviors with a dissenting flavor, on language use:

H1b: Collaborators will have higher linguistic style accommodation with negatively behaving confederates compared to positively behaving confederates.

Not only linguistic style accommodation, but also the quantity of words used in communication is influenced by minority influence. A recent study shows that word production is positively related to peer evaluations of participation and task focus in group discussions (Leshed, Hancock, Cosley, McLeod, & Gay, 2007). Based on the assumption that negatively behaving, dissenting collaborators will presume the role of the minority by challenging the majority's opinions, and thereby, generating more arguments and discussion of disagreements, the word count in the negative confederate's group will be higher than the positive collaborator's group. Thus:

H2: Groups with negatively behaving collaborators will generate more words compared to groups with positively behaving collaborators.

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Minority influence effects are not limited to the length of discussions. It also manifests in the tone of language. For example, research shows that minorities may have rigid or flexible communication styles leading to different degrees of social influence (Nemeth & Wachtler, 1974). In virtual teams, minority influence might manifest in the use of linguistic markers that indicate strong interpersonal engagement with the task. One linguistic marker of interpersonal engagement is the use of negations. Virtual team members use negations to express disapproval or to provide direct responses in group discussions (Tausczik, 2009). One interesting finding shows that participants use more negations when instructed to behave negatively compared to participants instructed to behave positively (Hancock, Landrigan, & Silver, 2007). This finding supports the idea that participants' language differs based on the valence of behaviors they act out (Hancock et al., 2007). As such, influenced by the minority role, group members in the negative condition will be expected to use more negations compared to those in the positive condition. To that extent, the following hypothesis is proposed:

H3: Groups with negatively behaving collaborators will generate more negations compared to groups with positively behaving collaborators.

When group members simply exchange pleasantries without challenging or discussing each other's arguments thoroughly, they use a great number of assents (i.e., *agree, OK, yes*). In contrast with negations, assents indicate positive feedback and agreement (Leshed et al., 2009). However, using assents in group discussions might also be an indication of groupthink. For instance, a recent study found that assents were

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associated with low participation and task focus in virtual teams (Leshed et al., 2007).

Groupthink occurs when group members value mutual attraction and social harmony more than their performance results (i.e., high-quality decisions) (Janis, 1982). Group members avoid discussing the shortcoming of their arguments and converge on lower quality decisions (Janis, 1982). Deleterious effects of groupthink on decision making can be avoided by means of dissent in the form of assigning a devil's advocate or including outside views (Janis, 1982). Providing a stimulant for divergent views, the minority influence not only prevents the consequences of groupthink, but also contributes to the decision making processes (Nemeth, 1996). As documented by previous studies, while assents might be indicators of group consensus, they also signify groupthink (Leshed et al., 2007). There is a strong possibility that in the absence of dissenting group members, groups will be more prone to groupthink. Since positively behaving group members will avoid divergent thinking processes to maintain social harmony and mutual attraction among group members, they will frequently use assents to show their agreement with the majority decisions. In line with this reasoning, the following hypothesis is advanced:

> H4: Groups with positively behaving collaborators will generate more assent
> words compared to groups with negatively behaving collaborators.

Interpersonal behaviors affect not only the use of assents, but also the use of first-person plural (i.e., we, us), first-person singular (i.e., I, me) and second-person singular (i.e., you) pronouns in group interactions. Interestingly, most of the previous studies neglect the study of interpersonal effects on the use of personal pronouns, and favor the

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influence of social identities. For instance, a study documented that the use of first-person plural pronouns (i.e., we, us) in online discussions increased after a traumatic event (i.e., death of Princess Diane) showing an increased sense of shared social identity (Stone & Pennebaker, 2002). Similarly, a study examining the linguistic markers for celebrating a college sports team's victory reported that students used the pronoun *we* more frequently when talking about their victory compared to a lost game (Cialdini, Borden, Walker, Freeman, & Sloan, 1976). These findings clearly illustrate how perceptions of social identity surface via first-person plural pronouns (i.e., we) in group discussions.

In contrast with these studies, recent research findings report a negative relationship between the use of pronoun *we* and group cohesion (Gonzales et al., 2010). That is, the groups that used more first-person plural pronouns (i.e., we) were less cohesive. This was counter to the original prediction of researchers that the use of pronoun *we* would be positively related to group cohesion. Gonzales and colleagues (2010) rationalize this unexpected finding arguing that perceptions of low group cohesion may lead to using *we* as a rhetorical device to increase group cohesion. This finding only makes sense if people are assumed to use the pronoun *we* with an affiliation motive (Cialdini et al., 1976). For instance, disagreements over ideas and interpersonal conflict may create friction and tension among group members, and in turn, impair group relationships. However, if group members are motivated to affiliate with one another, they may use more first-person plural pronouns compared to groups who already have high cohesion. Although this rationale is plausible in light of the principle of affiliation

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motive, it assumes that group members are strongly motivated to create a shared social identity which might not be the case in zero history, temporary virtual teams.

Another explanation for the use of pronoun *we* can be found in the discourse functions of this pronoun. A study done on the use of pronoun *we* in academic discourse reports that the pronoun *we* has several discourse functions other than the affiliative function (Fortanet, 2004). For instance, in academic lectures, instructors use the pronoun *we* to guide the students throughout a speech event (i.e., *We've* already talked about this topic), to clarify a point (i.e., when *we* mention this concept, *we* actually mean), or to avoid an authoritarian representation of the instructor (i.e., *We* know from history that) (Fortanet, 2004). As seen in the diversity of these examples, the pronoun *we* serves various functions in communication. As such, one plausible explanation for the use of first-person plural pronoun might lie in the engagement function of this pronoun. A study examining the effects of interactivity in virtual team discussions show that interactive messages are more than twice as likely to contain first-person plural pronouns indicating a sense of involvement (Rafaeli & Sudweeks, 1997). This study argues that engagement is an important outcome of interactivity. That is, group members may use the pronoun *we* as a linguistic tool for engaging passive group members to join the group discussion for an interactive decision making process. For instance, group members may use sentences such as "*We* need to take a closer look at issue 1" or "*We* need to discuss this issue in more detail" not with an affiliation motive but with a desire to call attention to tasks to be completed. Given the interdependent nature of decision making tasks (Straus, 1999),

group members might need to motivate each other to focus on the task, especially if there is a sentiment that some group members are not as engaged in the task.

Also, since decision making tasks are based on group consensus about what is morally right or what is preferred, group members engage in social influence processes to make a decision (McGrath, 1999). Considering that one group member takes on the role of a minority member in the negative condition, he is motivated to complete the decision making task while forcing other group members to think more critically about their decisions. The tasks in which group members have mixed motives (i.e., make a decision and act out the minority member role at the same time) generate more conflict (McGrath, 1999). Increased conflict in group discussions would promote the use of pronoun *we* as group members use it to call one another to reach a consensus. For instance, group members may use sentences such as "*We* need to discuss 4 more issues" or "We need to move on" as a way to call for agreements. Based on the engagement and calling for agreement functions, groups exposed to a minority influence will use the pronoun *we* more frequently compared to groups without the minority influence. Accordingly, the following hypothesis is advanced:

H5: Groups with negatively behaving collaborators will use the pronoun *we* more frequently compared to groups with positively behaving collaborators.

Although several studies examine the use of *we* and its reflections on group dynamics, very few studies have paid attention to the use of first (i.e., I) and second-person singular pronouns (i.e., you) in virtual teams. One of the few studies on the use of

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I pronoun found that increased use of I in personal writing showed an increased self-focus (Stone, & Pennebaker, 2002). In dyadic interactions, the use of *I* and *you* has been associated with relational outcomes. For instance, a research study investigated the frequency of "self" (i.e., I*)* and "other" (i.e., you) pronouns among dyadic interactions of 59 couples (Simmons, Gordon, & Chambless, 2005). Couples were asked to list most important problems in their relationship and choose one to discuss for 10 minutes. Analysis of conversation transcripts showed that couples used more second-person singular pronouns when they were communicating negatively during the problem solution session (Simmons et al., 2005). On the other hand, there was an increased use of first-person singular pronouns when they were communicating positively. Also, use of first person pronouns was positively associated with marital satisfaction (Simmons et al., 2005).

Despite these interesting functions of first and second-person singular pronouns in relationships, no studies to date have evaluated how they operate in the language use of virtual teams. The present dissertation assumes that the minority influence theory can explain first and second-person singular pronoun use in virtual team discussions. As previously discussed the minority member is associated with negative attributions (Nemeth & Wachtler, 1974) due to the dissenting nature of their communication. When the results of relational research on pronouns (Simmons et al., 2005) applied to virtual teams, it is plausible to argue that the conversations between minority and majority members will include more second-person singular pronouns (i.e., *you*) because of the

negativity attributed to minority members. Also, dissenting comments of the minority member will prompt a shift in attentional focus from self to the other, encouraging perspective-taking for a high quality discussion, and finally, leading to an increased use of second-person singular pronoun (Campbell & Pennebaker, 2003). In light of this assumption, the following hypothesis is advanced:

H6: Groups with negatively behaving collaborators will use the pronoun *you* more frequently compared to groups with positively behaving collaborators.

In contrast with the use of pronoun *you*, group members will use more first-person singular pronouns (i.e., I) when there is no minority influence on group discussions. The use of pronoun *I* represents a self-centered perspective, and thus, a lack of interpersonal engagement with others or the task at hand (Campbell & Pennebaker, 2003; Rude, Gortner, & Pennebaker, 2004). In light of these psychological and interpersonal functions of the pronoun *I,* the following hypothesis is proposed:

H7: Groups with positively behaving collaborators will use the pronoun *I* more frequently compared to groups with negatively behaving collaborators.

As seen above, the language patterns of virtual team collaborators are affected by interpersonal behaviors. The following section will look at how social categories affect language use in virtual teams.

Social Categories and Language Use

How do social categories in virtual teams affect linguistic style accommodation? To answer this question, it is important to understand how social identification and

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categorization operates in virtual teams. Social identity theory (SIT) suggests that one's sense of identity comes from their group membership in prominent social categories such as race, gender, nationality, etc. (Tajfel & Turner, 1986). On the basis of shared social identities, individuals describe the attributes of their in-group favorably, which leads to positive in-group bias (Tajfel & Turner, 1986). However, in-group members assign unfavorable attributes to out-group members leading them to develop a negative out-group bias (Tajfel & Turner, 1986). Similarly, social categorization theory (SCT), a variant of SIT, contends that, group members are motivated to display prototypical behaviors in group interactions when the social categories are salient and accessible (Turner et al., 1987). In addition to these frameworks, Social Identity Model of Deindividuation Effects (SIDE; Reicher, Spears, & Postmes, 1995) expands the assumptions of SIT and SCT to the communicative processes of virtual teams. SIDE argues that visual anonymity pronounces the *deindividuation* of group members. That is, when group members are visually anonymous, their individual identities become deindividuated. The deindividuation process strengthens the salience of social categories leading group members to identify with each other on the basis of a salient group identity rather than unique individual identities. Identification with the group identity increases conformity with group prototype, particularly in the presence of an out-group (Reicher et al., 1995).

SIDE model highlights the importance of visual anonymity in intergroup perceptions providing evidence for the effects of social categories on language use in

virtual teams. For instance, SIDE proposes that group norms can shape real time interactions of virtual team members. The length of messages, use of paralanguage, and the personal references vary across groups on the basis of differing group norms (Postmes, Spears, Sakhel, & De Groot, 2001). In a study, when visually anonymous group members were primed with an efficiency norm, collaborators used more task oriented words compared to the group primed with a socioemotional norm (Postmes et al., 2001). Similarly, priming participants with socio-emotional norms generated more socio-emotional words compared to task-oriented words (Postmes et al., 2001). These findings confirm that language is shaped by situational group norms that are linked to emergent social categories.

In summary, in a visually anonymous intergroup context, linguistic style accommodation will differ between in-group and out-group members. Based on the assumptions of the above social identity based approaches, group members will accommodate the language of their in-group members more than out-group members. Thus, the following hypothesis is advanced:

H8: Collaborators will have higher linguistic style accommodation with in-group members compared to out-group members.

Chapter 3 - Method

This chapter explains the proposed research methodology for data collection and analysis to answer the hypotheses proposed in Chapter 2. Also, an overview of the tasks and procedures for the experiment is presented.

Research Design

Studies on interpersonal and social dynamics in virtual teams are rooted in interpersonal (i.e., SIPT) and social identity (i.e., SIDE) approaches (Wang et al., 2008). However, no studies up to date have examined the influence of interpersonal behaviors and social categories on language use and accommodation in virtual team interactions. As noted above, there is a need in virtual contexts with respect to better understanding how language is used in virtual teams (Walther, 2004). This dissertation employed a 2 (negative vs. positive behavior) x 2 (shared vs. unshared social identity) factorial design to examine the effects of interpersonal behaviors and social categories on language use. The data for this dissertation was collected through the participation of 164 students, 41 four-person groups in total, from undergraduate communication courses at a large public university in the US. Participants ranged in age from 18 to 24 ($M = 20.58$, $SD = 1.82$). 58% of participants were female and 42% were male. Transcripts generated during decision making processes of virtual teams were saved for the automated linguistic analysis.

Task

After randomly assigned to anonymous subgroups, participants used Windows Live Messenger to complete Straus & McGrath's (1994) decision making task. This task requires group members to determine disciplinary actions for a fictitious case in which a college teaching assistant accepted a bribe from the basketball team's star player to change the student's grade on an exam. The task is to resolve five issues having to do with the treatment of the athlete and the teaching assistant: (a) the student's grade on the exam or in the course (Issue 1), (b) the student's status on the athletic team (Issue 2), (c) the student's academic status (Issue 3), (d) the teaching assistant's work status as an instructor (Issue 4), and (e) the teaching assistant's academic status (Issue 5). Additionally, the group is asked to satisfy both the academic and athletic department with their decisions. The ethical and complex nature of this decision making task is expected to engage research participants in lively discussions (Straus & McGrath, 1994).

Procedures

Interpersonal behaviors were manipulated by assigning a trained confederate to each group. In the negative condition, the confederate was instructed to imagine that he does not care about what other members think of him and communicate accordingly. In the positive condition, he was instructed to create a positive impression through his communication style without being too obvious. The instructions were similar to those in Wang et al. (2009) study.

The minimal group paradigm was used for social category manipulation. Participants were told that they were assigned to subgroups on the basis of their zodiac signs (i.e., pyramid vs. sphinx), yet in reality the assignments were random. Also, *pyramid* members were told that they processed information emotionally, whereas *sphinx* members were told that they were intellectual thinkers. Depending on their social category, each participant either had a pyramid or a sphinx profile picture and screen name in Windows Live Messenger to reinforce such social categories. Previous studies show that triggering trivial shared qualities such as zodiac signs is sufficient for creating salient social categories that lead to inter-group distinctions and in-group biases (Wang et al., 2009). The manipulation of social categories resulted in four-person teams composed of two-person subgroups (i.e., in each virtual team, two members were sphinxes and two were pyramids).

As participants entered the lab, they were seated separately from each other. Each computer was separated with a divider to ensure visual anonymity and isolate the effect of individuating information on the language use. The confederate was seated in a separate room. Once the decision making task was completed, the participants completed a survey and then were debriefed. Finally, the researcher saved the real time interactions of team members for future linguistic analysis.

Dependent Measures

Linguistic style accommodation. Linguistic style accommodation was measured using language style matching (LSM) metric. LSM measures the degree to which group

members use similar language patterns. It is calculated by averaging the absolute difference scores for nine *function word* categories generated through Linguistic Inquiry and Word Count Program (LIWC; see Tausczik & Pennebaker, 2010 for a detailed review). LIWC counts the percentage of words used in communication on various language categories such as standard language dimensions (i.e., articles, pronouns, prepositions), psychological processes (i.e., affect, cognitive mechanisms such as causations and exclusions), relativity-related words (i.e., time, space, motion), and content dimensions (i.e., sex, home, work) (Pennebaker, Francis, & Booth, 2001). The following nine function word categories under the standard language dimension were used to calculate LSM scores and measure linguistic style accommodation: Verbs (e.g., to be, to have), articles (e.g., an, the), common adverbs (e.g., very, often, nearly), personal pronouns (e.g., I, you, we), indefinite pronouns (e.g., it, this, those), prepositions (e.g., on, after, with), negations (e.g., not, never), conjunctions (e.g., and, but, because), and quantifiers (e.g., many, few, lots). Using function words to measure linguistic style accommodation is a very reliable method since function words occur at a very high frequency generating large sets of data for capturing language patterns (Pennebaker, & King, 1999). Also, LSM metric has been validated in studies measuring linguistic style accommodation in virtual and face-to-face teams (Gonzales et al., 2010; Tausczik, 2009). Therefore, it is plausible to apply this metric to the present dissertation.

Word count. Word count refers to the total number of words used in a communication episode. Word count has been previously linked to higher decision

quality and performance in teams (Leshed et al., 2007). This dissertation analyzed how interpersonal behaviors affected word count as a reflection of interpersonal engagement in group discussions. The word count category in the LIWC output was used for the analysis.

Negations. Negations refer to disagreement words such as *no, not, never*. They have been previously linked to disagreements (Leshed et al., 2007) and negative behaviors (Hancock et al., 2009). For this analysis, negation words were derived through LIWC output. Negation category in LIWC provides the percentage of negation words used in overall language used during a communication episode.

Assents. Assents refer to agreement or positive feedback words such as *yes, agreed, OK*. Assents have been linked to agreements as well as groupthink processes (Leshed et al., 2007). Assents are important linguistic indicators for interpersonal and social dynamics in a group setting. This dissertation used the percentage of assent words used in team discussions derived through LIWC output.

Personal Pronouns. Pronoun use has been previously linked to attentional allocation. For instance, self-focused individuals use more first-person singular pronouns (i.e., *I*) (Rude, Gortner, & Pennebaker, 2004). Also, first-person plural pronouns (i.e., *we*) have been linked with a perception of shared social identity (Stone & Pennebaker, 2002). The documented importance of pronouns in understanding social and interpersonal dynamics provides the rationale for examining the nature of pronoun use in virtual teams. This dissertation analyzed the effects of interpersonal behavior on the use of first-person

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plural (i.e., *we*) and singular pronouns (i.e., *I*) along with second-person singular

pronouns (i.e. *you*) using the personal pronoun categories in LIWC output.

Manipulation Checks

Several questions were employed to assess if independent variables were

effectively manipulated. To check social identity manipulation, an adaptation of Doosje,

Ellemers, and Spears' (1995) identification scale was used. This scale has four items such

as "I identify myself with the sphinx/pyramid members" and "I see myself as a member

of the sphinx/pyramid group". The participants were asked to rate each statement on a 7

point Likert-type scale (1=strongly disagree to 7 = strongly agree). The reliability for this

scale was strong (α = .92).

Interpersonal behavior manipulation was validated using a social attraction scale.

Social attraction refers to perceptions of liking attributed to individuals (McCroskey &

McCain, 1974), and it is closely related to how interpersonal behaviors of communication

partners are perceived (Wang et al., 2009). For this manipulation check, McCroskey and

McCain's (1974) social attraction scale was used. This scale includes items such as "I

think she/he could be a friend of mine" and "I would like to have a friendly chat with

him/her". The items were arrayed in 1 (strongly disagree) to 7 (strongly agree) Likert-

type scale. The social attraction scale's reliability was acceptable (α = .89).

<h1 style="text-align:center">Chapter 4 - Results</h1>

Manipulation Checks

In order to establish whether minimal group inductions (i.e., shared zodiac signs) enhanced group identification, participants categorized as a sphinx were expected to report higher group identification with the other sphinx member of the group than with pyramid members of the group. As expected, identification with in-group members ($M =$ 4.26, $SE = .20$) was significantly higher than identification with out-group members ($M =$ 2.83, $SE = .26$), $F(1, 38) = 42.33$, $p < .001$, $\eta^2 = .42$. This finding confirms that the social categorization manipulation was successful.

To clarify whether the interpersonal behavior manipulation was effective, the analysis compared the ratings of social attraction for positively and negatively behaving confederates. Participants rated confederates communicating negatively ($M = 3.89$, $SE = .15$) as less attractive than confederates communicating positively ($M = 5.39$, $SE = .15$), $F(1, 120) = 14.56$, $p < .001$, $\eta^2 = .48$. Accordingly, the dissertation's interpersonal behavior manipulation was in effect.

Hypotheses Tests

The hypotheses were tested using SPSS independent t-test function. The participants were nested in groups within conditions to test for H1a, H1b and H8. Individual level data was used to test the remaining hypotheses. Language use of the confederate was excluded in the analysis of linguistic markers.

H1a predicted that collaborators would have higher linguistic style accommodation with positively behaving confederates compared to negatively behaving confederates. This hypothesis was based on the theoretical assumptions of CAT. As an alternative and competing prediction, H1b was advanced on the basis of minority influence theory. Accordingly, H1b predicted that collaborators would have higher linguistic style accommodation with confederates communicating negatively compared to confederates communicating positively. The results showed that groups with a minority member (i.e., a dissenting confederate communicating negatively) had higher linguistic style accommodation within the group ($M = .85$, $SE = .009$) compared to groups with a confederate behaving positively ($M = .80$, $SE = .014$), $t(38) = 2.85$, $p < .05$, $d = .92$. These results supported H1b but disconfirmed H1a.

H2 predicted that groups with a minority member behaving negatively would generate more words compared to groups with a confederate communicating positively. The analysis showed that in the presence of a minority member, groups generated more words (M negative$= 476.98$, $SE= 31.12$) compared to when the group has a positively behaving confederate (M positive$= 320.63$, $SE = 29.59$), $t(106) = 3.61$, $p < .001$, $d = .70$. This result confirmed H2.

H3 looked at the effects of interpersonal behaviors on the use of negations. Accordingly, the hypothesis predicted that groups with a minority member behaving negatively would generate more negations compared to groups with a confederate communicating positively. In congruence with this prediction, the analysis showed that

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when there was a minority member in the group, group members used more negations (*M* negative = 2.98, *SE* = .14) compared to when there was a positive confederate (*M* positive = 2.48, *SE* = .13), *t*(106)= 2.42, *p* =.02, *d* = .47.

H4 examined how interpersonal behaviors affected the use of assents. The hypothesis predicted that when there is a confederate acting positively, group members would use more assents compared to when there is a minority member behaving negatively. Providing evidence for this prediction, the results showed that groups with a likable confederate generated more assents (*M* positive = 5.47, *SE* = .63) compared to groups with a dislikable minority member (*M* negative = 3.19, *SE* = .25), *t*(106) = -3.46, *p* = .001, *d* = .67.

H5, H6, and H7 made predictions about the effects of interpersonal behaviors on the use of personal pronouns. H5 predicted that groups with a minority member would use the first-person plural pronoun (i.e., *we*) more frequently compared to groups with a confederate communicating positively. The results confirmed this prediction as the use of pronoun *we* was higher among groups with a minority member (*M* negative = 1.59, *SE* = .11) compared to groups with a positively communicating confederate (*M* positive = 1.21, *SE* = .13), *t*(106) = 2.18, *p* = .03, *d* = .42. H6 predicted that groups with a minority member would use the second-person singular pronoun (i.e., *you*) more frequently compared to groups with a confederate communicating positively. The results provided support for this prediction such that groups with a minority member used the pronoun *you* more frequently (*M* negative = 1.31, *SE* = .14) compared to groups with positively

behaving confederate (*M* positive = .75, *SE* = .10), *t*(106) = 2.96, *p* = .004, *d* = .57.

Lastly, H7 predicted that groups with a confederate communicating positively would use the first-person singular pronoun (i.e., *I*) more frequently compared to groups with a minority member. As expected, the results showed that groups with a likable confederate used the pronoun *I* (*M* positive = 3.09, *SE* = .20) more than the groups with a minority member (*M* negative = 1 .75, *SE*= .10), *t*(106) = -2.21, *p* = .04, *d* = .42.

The last hypothesis looked at the possible effects of social categories on linguistic style accommodation. According to H8, collaborators would have higher linguistic style accommodation with in-group members compared to out-group members. Surprisingly, the results provided no evidence for the effect of social categories on linguistic style accommodation. There was no statistically significant difference between in-group members (*M* in-group = .82, *SE* = .01) and out-group members (*M* out-group = .82, *SE* = .02) with respect to linguistic style accommodation, *t*(38) = .56, *ns*.

Chapter 5 - Discussion

Language and Accommodation in Virtual Teams

The present dissertation examined the effects of interpersonal behaviors and social categories on how virtual team members accommodate their language towards one another and how certain linguistic markers are affected by these two factors. Perhaps unexpectedly, negative interpersonal behaviors had a more robust effect on linguistic style accommodation compared to positive behaviors. In other words, when there was an assertive and critical member in the virtual group (i.e., a negatively communicating, dissenting confederate) compared to when a group had an unassertive and passive member (i.e., a positively communicating, assenting confederate), collaborators displayed higher linguistic style accommodation. This is a remarkable finding given that most of the previous studies reported an opposite pattern. Linguistic style accommodation has traditionally been interpreted as a reflection of mutual liking among dyadic partners (Ireland et al., 2010) or increased group cohesion (Gonzales et al., 2010).

One traditional explanation for the positive relationship between likable interpersonal behaviors and linguistic style accommodation lies in the assumptions of CAT (Giles et al., 1987). According to CAT, people converge their speech patterns and nonverbal behaviors toward people they like but diverge from people they do not like or associate with (Giles et al., 1987). Previous studies looking at the relationship between linguistic style accommodation and positive behaviors (i.e., trust, Scissors et al., 2008), interpersonal attraction (Ireland et al., 2010) and group cohesion (Gonzales et al., 2010)

provided supporting evidence for this prediction. In contrast, the present dissertation

showed that when there was an assertive and critical confederate in a virtual group, group

members displayed higher linguistic style accommodation towards one another compared

to when there was an unassertive and passive confederate. This finding challenges the

assumptions of CAT and suggests that the underlying mechanisms of linguistic style

accommodation possibly stretch beyond interpersonal attraction.

Minority influence theory provides a plausible theoretical explanation for why

negative behaviors are associated with high linguistic style accommodation. According to

minority influence theory, in the presence of a persistent and consistent minority member,

majority members are forced to revisit their arguments and further explain their ideas

(Nemeth & Rogers, 1996). The minority member reinforces the interpersonal engagement

among group members to increase the task focus regardless of the interpersonal attraction

among group members (Nemeth, 1995). A recent study reports a similar rationale when

explaining the link between relational satisfaction and linguistic style accommodation

(Niederhoffer & Pennebaker, 2002). Niederhoffer and Pennabaker (2002) examined

linguistic style accommodation in natural conversations. In a series of experiments, the

researchers looked at the dyadic conversations of college students in a chat room. In

another experiment, official transcripts of Watergate tapes documenting the conversations

between President Richard Nixon and his aides were analyzed. The results showed that

there was high linguistic style accommodation in dyadic interactions at the conversation

and turn-by-turn level. Unexpectedly, linguistic style accommodation was not associated

with relational satisfaction (Niederhoffer & Pennebaker, 2002). The researchers account for the lack of relationship between relational satisfaction and linguistic style accommodation using a coordination-engagement hypothesis. According to this theoretical principle, the more communication partners actively engage with one another, the more verbal and nonverbal coordination they display. It also suggests that communication partners accommodate their language towards their communication partners regardless of the valence of communication (Niederhoffer & Pennebaker, 2002).

However, given that Niederhoffer and Pennebaker's study did not manipulate the valence of communication, it is hard to infer what led to interpersonal engagement in the first place. To better understand the theoretical underpinnings of interpersonal engagement in positive or negative communication contexts, we need to refer to a more robust and unified theory. The present dissertation proposes that one underlying dynamic of interpersonal engagement is the ability of virtual group members to challenge or probe each other's arguments in a group discussion. As such, minority influence theory provides a strong theoretical explanation for why dissent is associated with high linguistic style accommodation in virtual teams. Minority influence theory is a distinct view that accounts for linguistic accommodation processes in virtual teams that CAT and the engagement hypothesis cannot account for.

Consider the case of a virtual work group where members collaborate on a decision making task. Imagine that there is a member who expresses his or her opinions assertively and investigates the validity of others' ideas by asking for a detailed rationale

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or further information. In congruence with minority influence theory, being an assertive and critical group member is disliked because this persistent and rigid communication style leads to further discussions, encouraging others to question the decisions that are generally accepted by the majority (Nemeth & Rogers, 1996). Previous studies showed that when virtual groups are primed with a critical norm, they value unshared information more than shared information and eventually, make better decisions (Postmes, Spears, & Cihangir, 2001). When applied to linguistic style accommodation in virtual teams, it is possible that minority members induce the effect of a critical norm in group discussions. In other words, as minority influence theory suggests, dissenting members can more effectively engage others using their challenging and probing communication styles. However, given that the minority member's communication style (i.e., being critical and assertive) is not the accepted norm in a group, this member is generally disliked. This is an interesting finding given that despite the dislikability of the minority member, group members accommodate their language towards this member.

Future studies should investigate the interrelationships among group norms, linguistic style accommodation and quality of decisions. For instance, researchers can examine how different group norms (i.e., critical vs. consensus) affect linguistic style accommodation in virtual teams (see Postmes et al., 2001). Do group members have higher linguistic style accommodation when they adopt a critical norm or is it the consensus norm that leads to higher linguistic style accommodation? Minority influence theory would suggest that when the group members adopt a critical norm, they will

communicate more critically and engage one another more compared to groups where there is a consensus norm.

Another area of future research can look at how group norms affect linguistic style accommodation over time. Though the current dissertation tested for changes in linguistic style accommodation over time, the preliminary analysis only showed a near-significant difference implying that linguistic style accommodation increased from time 1 to time 2, yet decreased in time 3. Future research should employ a longitudinal design and examine changes in linguistic style accommodation over time, particularly how the effects of interpersonal behaviors on linguistic style accommodation varies. Past research documents that when the group communication was characterized by a typical communicative behavior (i.e., using humor or flaming), group members increasingly displayed this behavior over time (see Postmes et al., 2000). Interestingly, this increase was only observed in message content, not in how messages were constructed. Group members were more concerned about the content of messages compared to their form (Postmes et al., 2000). These findings are based on the notion that communication norms are socially constructed in virtual groups. However, researchers have not examined how interpersonal factors might affect temporal development for language accommodation. It would be interesting to examine how dissenting or assenting group members would affect the social construction of virtual group norms over time. For instance, in a longitudinal study, researchers can observe which virtual group norms generate higher linguistic style accommodation among group members. After group members communicate for an

extended period of time, socially constructed group norms can be identified. Accordingly, researchers can examine which types of communicative behaviors (i.e., humorous, critical, formal etc.) are associated with high or low linguistic style accommodation and how this relationship changes over time.

Linguistic Markers in Virtual Teams

In addition to linguistic style accommodation, this dissertation examined how well established linguistic markers were affected by the experimental manipulations, particularly interpersonal behaviors. The following section will discuss the effects of interpersonal behaviors on the word count, use of negations, assents and personal pronouns.

Word Count

The findings showed that groups with a minority member (i.e., confederate acting negatively) used more words to complete the decision-making task compared to groups with a more passive and unassertive member (i.e., confederate acting positively). That is, as the confederate responded to the majority decisions without considering what they would think about him, he was able to bluntly criticize and probe their decisions. The majority members tried to convince the minority member by providing detailed explanations for their arguments or discussing the pitfalls of the minority member's arguments. This type of critical communication led the group to produce more words in their conversation compared to when there was a more agreeable confederate who took into account his self-impression when he expressed his opinions.

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This finding makes sense in light of minority influence theory. As the minority member challenges the majority ideas, we can expect group members to engage in more in-depth and longer conversations to convince one another. Previous studies documenting that higher word counts are linked to increased task focus in group discussions support this finding (Leshed et al., 2007). For instance, when a minority member challenges majority members to explain their rationale for a complex decision, the challenged team member may provide a longer explanation for his or her decision. However, when there is no minority influence, group members give short answers without providing much of a rationale for their decisions.

Overall, it appears that when there is a pressing and engaging member in a virtual group, group members discuss their decisions more thoroughly. Accordingly, they are more likely to make a superior decision compared to groups who do not have a minority member to engage all group members. Research on the differential effects of majority and minority influences shows that when group members are exposed to minority views, they are stimulated to think more divergently, and therefore identify more innovative and creative solutions for problems (Nemeth, 1986). On the other hand, when the majority view is salient in group discussions, group members think and discuss in more convergent ways neglecting novel solutions or decisions (Nemeth, 1986). In other words, minority members stimulate more discussion to seek further information for superior decision making, whereas majority members show less desire to further discuss the issue (Nemeth & Rogers, 1996).

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Past research along with the present findings confirm that the word count use is a simple reflection of the collective effort group members put into their decision making task. Therefore, future studies should examine in what ways word counts reflect creativity in virtual teams. For example, studies on creativity shows that there is a positive relationship between the number of ideas discussed in a brainstorming session and the creativity of ideas the group generated (Osborn, 1957). As such, future research should examine the relationship between the quantity of words virtual teams use and the creativity of decisions they make.

Negations

The results showed that, similar to word counts, negations (i.e., no, not, but) were used more frequently in groups with minority members compared to groups with positively behaving confederates. As illustrated in the example below (Pyramid 2 is the minority member behaving negatively), groups with a minority member used more negations to express their disagreements and provide negative feedback to one another.

Pyramid2 says: I'm **not** moving my opinion on a D

Sphinx2 says: I'm **not** moving mine on a B

Pyramid2 says: But you did agree with suspension right?

Sphinx2 says: yeah

Pyramid1 says: suspension makes sense if his grade is a D **doesn't** it?

Sphinx1 says: ok so it's a D with suspension

Sphinx2 says: yeah **but** with a d he is out the whole season. I said suspend him

part of the season theres a big diff

It is possible that the use of negations signals interpersonal engagement among

group members as well as a strong task focus. This finding is congruent with previous

studies documenting the engagement function of negations. For instance, negations signal

objective discussion of ideas and unique information sharing which leads to more

effective decisions (Swaab, Phillips, Diermeier, & Medvec, 2008). Using negations to

provide feedback or express disagreements shows that group members are interested in

hearing each other's arguments, receive feedback and revisit their ideas in light of the

feedback received (Tausczik, 2009)

The findings of the present dissertation imply that, negative linguistic styles

characterized by the increased use of negations may have a positive influence on group

processes and outcomes. As such, future studies should more closely examine functions

of negations in group discussions.

Assents and Language Use

While negations (i.e., no, not, never) and the use of second person singular

pronouns (i.e., you) represent interpersonal engagement among group members and an

increased task focus, increased use of assents indicate the opposite. The present

dissertation found that the number of assents (i.e., yes, yeah, agree) was higher in the

groups with a positively communicating confederate compared to groups with a

negatively communicating confederate. This finding is congruent with previous research

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suggesting that assents represent low task engagement in virtual team interactions (Leshed et al., 2009). In the following example, the group members reached a suboptimal decision because they did not address how their verdict would meet the expectations of different parties. They decided to take away TA responsibilities of the graduate student, while keeping him as a graduate student. In order to make a quick decision, group members did not discuss how keeping the TA as a graduate student would affect the impression of the department across the university.

Pyramid1 says: **Ok**.. what about reaming in grad school. Are y'all cool with that

Pyramid 2 says: **ya** he remains in grad school

Sphinx2 says: **yeah** he stays in grad school

Sphinx1 says: yes **agree**…he should stay

The use of assents in this interaction showcases the deleterious effects of groupthink in virtual teams as represented by using more assents (Leshed et al., 2009). However, when we look at an episode involving the minority member (i.e., negatively communicating confederate) where group members are discussing what grade the star basketball player should get, we observe a completely different pattern in which assent words did not appear frequently.

Pyramid2 says: Seriously, as least me and sphinx2 are providing some explanation

       behind what we're saying. Why do yall wanna give him an F or D?

Sphinx1 says: I still think that he should get a D, it isn't fair to those that rightly

       deserve the grade. If teachers just give students the grade they want

then anybody could be anything today and it isn't fair to those that

worked hard to get a B, that their fellow classmate can get a B

because he bribed the TA.

As illustrated in the preceding example, when there is a minority member in the group (i.e., Pyramid2), the discussion is not characterized by the exchange of agreement words. Instead, group members are forced to provide in-depth explanations for why they argue for or against a certain decision. A main implication of this finding is that the minority member overrides the effects of groupthink on the decision making process by holding group members accountable for explaining the rationale behind their arguments (Nemeth & Rogers, 1996).

Current studies on virtual teams neglect the study of groupthink despite its well-known deleterious influence on group processes. The present dissertation showed that certain linguistic markers in the language use of group members illustrate groupthink dynamics in virtual teams. Future studies should examine how we can use certain linguistic markers to detect and avoid groupthink. Previous studies proposed visual feedback systems that positively influenced team members' language use (Leshed et al., 2009). Similarly, future studies should focus on finding ways to identify groupthink at the linguistic level (e.g., assents), and shape the language of virtual team members to improve the decision making process.

Personal Pronouns

First-person plural pronouns. Not only the use of negations, but also the use of personal pronouns was affected by the interpersonal behavior manipulation. First-person plural pronouns (i.e., *we*) were used more frequently in negatively communicating groups compared to positively communicating groups. This is an interesting finding given that the majority of previous studies found that the use of pronoun *we* was associated with increased group cohesion (Cialdini et al., 1976; Gonzales et al., 2010; Stone & Pennebaker, 2002). Conversely, this dissertation suggests that group members in fact use the pronoun *we* as a tool to engage one another in the decision making process.

Following minority influence theory, when a dissenting member challenges majority members to think more creatively and critically about their decisions, the group will experience more conflict compared to groups where minority influence does not exist. In this case, group members are expected to use the pronoun *we*, not necessarily to show group cohesion but to make sure everyone is focused on the task and the group is making progress in the decision making process. This finding is in line with the research on interactivity. In a past study, messages referring to a single message in group discussions that preceded them were defined as *interactive*. The analysis showed that 10% of these interactive messages included the pronoun *we* suggesting a positive relationship between first-person plural pronouns and engagement of group members with one another (Rafaeli & Sudweeks, 1997).

As previous studies rationalized their findings on the basis of CAT (Gonzales et al., 2010; Stone & Pennebaker, 2002), it is not surprising that the use of pronoun *we* has been traditionally interpreted as a function of mutual attraction or group cohesion. Applying the assumptions of minority influence theory to the study of pronoun use provides an alternative explanation for the function of the pronoun *we* in virtual teams. Previous studies generated a taxonomy of functions that pronoun *we* serves in academic discourse (Fortanet, 2004). For instance, professors use the pronoun *we* to guide students through a speech event, to clarify a previous point or to avoid an authoritarian view of the professor (Fortanet, 2004).

Future studies in virtual teams should investigate what specific functions the pronoun *we* serves in virtual decision making. It is possible that group members would use the pronoun *we* to speed up the decision making process or call attention to an unexplored aspect of the situation the way professors might do (Fortanet, 2004). Identifying how virtual team members use the pronoun *we* at different stages of the decision making process, researchers can examine a wide range of group processes. For instance, increased use of *we* for calling everyone to action might show an attempt to increase productivity, whereas it might also indicate an increased conflict as group members use it to remind one another different viewpoints.

First-person and second-person singular pronouns. In addition to the use of pronoun *we*, the use of *I* and *you* also informs us about interpersonal dynamics in group interaction. Virtual groups with negatively behaving confederates used the pronoun *you*

more frequently compared to groups with positively behaving confederates. Additionally, the analysis uncovered a higher frequency of pronoun *I* in positively behaving groups compared to negatively behaving groups. Previous research suggests that the pronoun *I* indicates a self-focus, whereas the use of *you* indicates an other-oriented focus (Campbell & Pennebaker, 2003; Stone & Pennebaker, 2002). Based on this, it appears that when groups had a dissenting minority member communicating critically and assertively, other group members increasingly used second-person singular pronouns (i.e., you). Similarly, previous studies reported that when people communicated about a negative issue, they unconsciously used more second-person singular pronouns (i.e., you) (Simmons et al., 2005). However, when the communication climate was positive, they used more first-person singular pronouns (i.e., I) (Simmons et al., 2005). Given the attentional focus represented by the use of *I* and *you* (Stone & Pennebaker, 2002), it is possible that in the presence of a dissenter, group members are forced to employ an other-oriented focus manifested in the use of pronoun *you*. Consider, for example, the following example in the condition with a negatively communicating confederate:

Pyramid1 says: He should of studied if he didn't want to let his team down

Pyramid2 says: by that principle, every athlete should be allowed to get free

                   passes. What do you think?

Sphinx2 says: Maybe he did. Not all people have a high intelligence level like

                   you. **You** might be able to pass the test but **you** don't know a thing

                   about basketball ☺

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Pyramid2 says: all activities require time and balance between academics.

Pyramid1 says: i agree, being a STUDENT athlete **you** take on an obligation to not

only **your** team..but also to the reputation of **your** school.

In the above example, Pyramid2 is the confederate (i.e., dissenting member).
Proposing that athletes should get special privileges, Pyramid 2 opens up a new
discussion among other group members. Starting with the confederate's question, other
group members start using the pronoun *you* to reflect on one another's opinions. On the
other hand, in the following example, Pyramid2 is the likable confederate supporting
other members' decisions.

Pyramid1 says: **I** believe that Tom should be fired as a TA

Sphinx1 says: yea and **I** think it also makes are university is serious about

academic honesty

Pyramid2 says: **I** agree

Sphinx2 says: So do **I**. He would be a terrible model as a TA.

Pyramid2 says: because if he's a ta and he's helping people cheat, then that's going

to lead into bad work ethics later on

Sphinx2 says: exactly

Sphinx1 says: yea **I** agree as well

Pyramid2 says: this is going smoothly

This example illustrates that in the absence of a minority member, group members
reach a consensus in a self-focused manner that does not take into consideration how

their decision would satisfy the academic department of the TA. Because there is not a minority member to remind them to consider the expectations of all parties involved in their decision, group members express their opinions, agree with one another and disregard an important part of their task (i.e., satisfying the needs of all departments). As illustrated in this example, there is an increased use of pronoun *I* compared to the previous example where the minority member reinforces an other-oriented approach by using the pronoun *you* in the discussion.

The findings of this dissertation show that interpersonal dynamics (positive vs. negative) surface in the use of first and second-person singular pronouns in virtual teams. As such, researchers should devote more attention to the use of pronoun *I* and the pronoun *you* in virtual team interactions. For instance, research can attempt to connect the use of pronoun *I* and *you* with key group processes. More specifically, researchers can examine whether increased use of pronoun *you* predicts higher quality decisions compared to when there is an increased use of pronoun *I*. Examining the relationship between pronoun use and group performance can help virtual team leaders monitor the language use in virtual team interactions and, if necessary, make meaningful interventions.

Language and Social Categories

The present dissertation also looked at linguistic style accommodation through the lens of social identification and categorization processes in virtual teams. There was no difference between in-group and out-group members in terms of linguistic style

accommodation. Put differently, group members did not accommodate the language of in-group members more than out-group members. Thus, there was no support for the predictions of social identity based theories. According to SIT and SCT, group members are expected to accommodate their language more towards in-group compared to out-group members as a result of positive in-group biases (Tajfel & Turner, 1986). Also, as predicted by SIDE, in visually anonymous virtual teams, deindividuation of group members will strengthen the salience of group identities. This will in turn reflect on the way group members use language. However, the present dissertation did not provide evidence for the predictions of SIT, SCT, and SIDE. In contrast, the findings suggest that interpersonal behaviors may have a stronger effect on how group members use language in group discussions compared to social categories. This is congruent with recent studies documenting a stronger effect of interpersonal behaviors on group processes compared to social categories (Wang et al., 2010).

One of the factors strengthening the influence of interpersonal behaviors on language use might lie in the nature of the task used in this dissertation. The complex and interdependent decision making task required group members to reach a consensus on five different ethical issues (i.e., status of a star basketball player and TA) (McGrath, 1984). One of the requirements of the task was to satisfy the needs and expectations of all parties involved in the case (i.e., athletics department vs. academic department). It is possible that the complexity of the ethical decisions along with the interdependent nature of the task intensified the effects of interpersonal behaviors on language use (Straus,

1999). While previous studies required group members to collaborate on an inherently intellective task (e.g., information finding in different almanacs) that was low in interdependence (Gonzales et al., 2010), this dissertation used a judgment task that required teammates to discuss and agree on different ethical issues. Intellective tasks require reaching a consensus on a decision that has a correct answer. That is, this type of task does not require group members to talk about their individual values and beliefs regarding the alternative decisions. Once the group members find the correct solution, they do not discuss the issue any further (Straus, 1999). However, judgment tasks require group members to seek consensus on a decision that requires not just the communication of facts but also values, beliefs and attitudes about the alternative solutions. In contrast with intellective tasks, judgment tasks are more prone to conflicting viewpoints (Straus, 1999). As such, the nature of task type might have exacerbated the effects of negative behaviors given that group members may feel strongly about their personal values and beliefs. For example, it is likely that the participants were biased about school athletics considering the sample. It is possible that the intensity of personal beliefs and values manifested in the language use, overriding the effects of shared social categories. Previous studies show that the amount of disagreement words increases as groups work on more interdependent tasks (i.e., judgment tasks) (Straus, 1999). Future studies should examine how different task types affect language use in virtual teams. Researchers should study how judgment tasks generate a different linguistic pattern among group members compared to intellective tasks (e.g., Straus, 1999). Future research should also consider

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the moderating effects of task types on the relationship between social categories and language use.

Limitations

The present dissertation has several limitations. One important limitation is manipulating minority influence without making majority opinions salient. Instead, minority influence was manipulated through the communication style of the confederate. Although this poses an important limitation, in real virtual teams there might not be a way to tell the difference between minority influence and interpersonal demeanor. As the confederate was asked to communicate in a way that he does not care what others thinks of him, he constantly clashed with the rest of the group members (i.e., the majority) bluntly criticizing their viewpoints. Though this resembles how previous studies described minority members (Nemeth, 1986), future studies should tease apart the effect of interpersonal demeanor from minority influence effects when examining their differential effects on language use in virtual teams.

Another limitation of this dissertation is the use of zero history virtual groups without any anticipation for future interaction. Previous research shows that anticipated interaction affects relational communication in virtual groups (Walther, 1994). For example, examination of dyads communicating via email showed that when e-mail partners anticipated a longer relationship, they exchanged more frequent and personal messages and asked more questions compared to dyads communicating face-to-face (Tidwell & Walther, 2002). As such, future studies should examine language use in

longitudinal groups to examine how temporal factors influence current findings. For example, future studies should look at how dissenting group members affect linguistic style in groups with and without anticipation for future interactions.

Conclusion

Study of language use is an underexplored research territory despite its value as a true reflection of interpersonal and group dynamics (Pennebaker et al., 2003). In an effort to shed light on language use in virtual teams, the present dissertation examined how interpersonal behaviors (i.e., a teammate behaving positively vs. negatively) and social categories (i.e., in-group vs. out-group status) influenced language use in short-term virtual teams. The findings showed that interpersonal behaviors, particularly negative behaviors (i.e., assertive and critical communication) generated higher linguistic style accommodation among group members compared to more positive, yet at the same time, more passive behaviors. Stepping out of the theoretical assumptions of CAT, this dissertation concludes that it is not the nice and likable member who generates higher linguistic accommodation, but the demanding and dislikable member. In summary, as the popular American saying goes, in virtual teams the squeaky wheel gets more oil.

Virtual teams are indispensable work forms in contemporary organizations. Their increasing importance for organizations will make virtual team research even more central for communication scholars. Laying the groundwork for research in the examination of language use in virtual work teams, this dissertation makes valuable contributions to organizational communication literature. Using automated linguistic

analysis, organizational communication scholars can start exploring how numerous group phenomena emerge in virtual work interactions. For instance, studying linguistic manifestations of groupthink or linguistic precursors of creativity and performance will be new venues for exploration in organizational communication. Overall, the findings of this dissertation confirm that a closer examination of language use is essential for a profound understanding of interpersonal and group dynamics in virtual teams.

Appendix A: Task Instructions for Participants

In the following exercise, your group will be asked to settle a situation in which a college student bribed an instructor to change his grade in a course. The following information describe the circumstances of the case. Your task is to work as a group and determine which courses of disciplinary action to choose for the student and the teaching assistant (T.A.). Your group should consider the consequences of the different actions when making its decision.

There are several departments on campus that have preferences for how this matter should be settled. *The solution that your group comes up with will be scored in terms of how satisfying it is to the different departments*.

Please take a few minutes to read the case.

Disciplinary Action Case

This case involves determining the disciplinary actions for a situation in which a college student athlete has been found guilty of bribing an instructor to change his grade in a course. This event took place at a prestigious college in the southern U.S. .The student, Jack, is a star athlete on the college basketball team. He leads the team in points, assists, blocked shots, and rebounds. He is very popular and has drawn larger crowds at the game than in previous seasons, substantially increasing the college's revenues due to athletics. In fact, Jack is such a good player and is so popular that the school has received a great deal of positive attention from the press, enhancing the college's reputation and attracting student enrollment.

Jack had been concerned about a grade in one of his courses. He needed a B or better on the midterm exam to get a B in the course and remain eligible to play basketball. He received a D on the midterm. To maintain his eligibility, he offered $200 to the course's graduate student teaching assistant to change his exam grade to a B. The teaching assistant, Tom, accepted the offer. Another teaching assistant learned of the incident and reported both Jack and Tom to the administration. When confronted, Jack and Tom admitted to what they had done.

As the disciplinary action committee, your group's task is to choose the best courses of disciplinary action. There are five issues to settle in the case:

Issue 1: Jack's grade in the course
Issue 2: Jack's status on the basketball team
Issue 3: Jack's status as a college student
Issue 4: Tom's status as an instructor (note: If Tom is restricted from teaching, he loses a source of income that helps pay his way through graduate school.)
Issue 5: Tom's status as a graduate student

When considering the alternatives for each issue, you should consider the consequences of the various options. In addition, be sure that you do not choose an illogical

combination of alternatives (e.g. if you decide to suspend him from the academic program for one semester, then he cannot be suspended from playing basketball for only one game; if you decide to expel Tom from school, then he cannot work for the college as a teacher). The following information describes the different departments' preferences and the possible courses of disciplinary action for each of the five matters.

The athletic department does not condone cheating, however, it does not want to lose Jack from the team due to a suspension or expulsion. With Jack on the team, the school has a good chance at winning the conference championship. Without Jack, the college is unlikely to win the championship. In addition, the money brought in from attendance at the games due to Jack's popularity has increased this department's resources, which it does not want to lose. On the grounds that extreme punishment for either Jack or Tom would only hurt the school and serve no useful purpose, the athletic department supports a lenient course of disciplinary action.

The college faculty wishes to uphold the highest academic and ethical principles. After all, the main purpose of the college is as an academic institution. The faculty believes that cheating is reprehensible; it is the academic equivalent of theft and fraud, and the harshest punishment should be given to both Jack and Tom. In addition, a harsh and publicized disciplinary action will send a message to others that cheating is not tolerated at this college. This message will have a positive effect on the college's reputation for high academic standards. If the punishment is too light, then a precedent of lenience will be set for cases in the future, conveying the message that cheating is condoned, or it will convey a message that different standards apply to different students.

The college's administration wants a solution that takes into account the preferences of both the athletic department and faculty positions and protects the college's public image. The administration wants to ensure the continued success of the athletic program. It also wants to uphold the college's academic standards and principles. Both the athletic and academic programs have contributed to the college's positive reputation. The administration is concerned that this matter be handled very carefully or the college may jeopardize its reputation, future enrollment, and financial support from other institutions and alumni.

As a committee, your task is to agree on how to settle this matter. You all must agree on one decision to resolve each of the five issues. When the experimenter tells you to begin, please discuss this case as a group and try to resolve as many issues as possible. You have 45-60 minutes to complete this task.

Appendix B: Instructions for the Confederates

For "pyramid" team members
This is a note regarding your computer-mediated communication. These are your instructions.
Based on the birthday information you provided when you signed up for this study, you were born under the sign of pyramid. As we know, these people tend to process information emotionally. Thus you belong to the PYRAMID team. You have been assigned to a four-person group for your discussion. Your group consists of two teams: the pyramid team (your team) and the sphinx team who tend to process information intellectually. Please note that you will be working with this SAME group for the entire discussion.
Please sign in MSN with the below information:
Username: pyramid1@live.com   password: xxxxx
Once all four members of your group sign in, please start the discussion.
Once the discussion started, please follow the below instruction:

Being Mean

Imagine that shortly into your discussion, you realize that you are disgusted with this group and no longer care what the group thinks of you. In fact, you would not like talk to this group again. Make your interaction style to one that would lead the group members to form a negative impression of you. Make yourself as unfriendly to the group members as you can without making it obvious that this is what you are doing.

For "pyramid" team members

This is a note regarding your computer-mediated communication. These are your instructions.

Based on the birthday information you provided when you signed up for this study, you were born under the sign of pyramid. As we know, these people tend to process information emotionally. Thus you belong to the PYRAMID team. You have been assigned to a four-person group for your discussion. Your group consists of two teams: the pyramid team (your team) and the sphinx team who tend to process information intellectually. Please note that you will be working with this SAME group for the entire discussion.

Please sign in MSN with the below information:

Username: pyramid2@live.com   password: xxxxxx

Once all four members of your group sign in, please start the discussion.

Once the discussion started, please follow the below instruction:

Being Nice
> **Imagine that shortly into your discussion, you realize that you really like this group, and care very much that the group likes you too. In fact, you find that you would like to get to know this group better. Make your interaction style to one that would lead the group members to form a positive impression of you. Make yourself as friendly to the group members as you can without making it obvious that this is what you are doing.**

Appendix C: Scales for Manipulation Checks

Social Attraction Scale

1. I think **Sphinx2** could be a friend of mine

Strongly disagree   1   2   3   4   5   6   7   Strongly agree

2. It would be difficult to meet and talk with **Sphinx2**

   Strongly disagree 1   2   3   4   5   6   7   Strongly agree

3. **Sphinx2** just wouldn't fit into my circle of friends.

   Strongly disagree 1   2   3   4   5   6   7   Strongly agree

4. **Sphinx2** and I could never establish a personal friendship with each other.

   Strongly disagree 1   2   3   4   5   6   7   Strongly agree

5. I would like to have a friendly chat with **Sphinx2.**

   Strongly disagree 1   2   3   4   5   6   7   Strongly agree

Identification Scale

   1. I identify myself with the Sphinx members of the group.

Strongly disagree   1   2   3   4   5   6   7   Strongly agree

   2. I identify myself with the Pyramid members of the group.

Strongly disagree   1   2   3   4   5   6   7   Strongly agree

   3. I see myself as a member of the Sphinx group.

Strongly disagree   1   2   3   4   5   6   7   Strongly agree

   4. I see myself as a member of the Pyramid group.

Strongly disagree   1   2   3   4   5   6   7   Strongly agree

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Appendix D: Mean Scores for LSM Scores between Confederates and Non-Confederates and Within Non-Confederates in the Negative and Positive Condition

	Negative Condition								Positive Condition							
Between Conf and Non-Conf					Within Non-Conf				Between Conf and Non-Conf				Within Non-Conf			
n	*M*	*SD*	*SE*		*n*	*M*	*SD*	*SE*	*n*	*M*	*SD*	*SE*		*n*	*M*	*SD*	*SE*
20	.85	.040	.008		20	.85	.040	.009	20	.77	.098	.022		20	.80	.066	.014

Appendix E: Mean Differences for LSM Scores between Confederates and Non-Confederates and Within Non-Confederates in the Negative and Positive Condition

	Negative Condition				Positive Condition						
	n	*M*	*SD*	*SE*	*n*	*M*	*SD*	*SE*	*t*	*p*	*df*
Between Conf and Non-Conf	20	.85	.040	.008	20	.77	.098	.022	3.10	.004	38
Within Non-Conf	20	.85	.040	.009	20	.80	.066	.014	2.85	.007	38

Appendix F: Mean Differences for LSM Scores between In-Group and Out-Group Members

	In-Group LSM				Out-Group LSM						
LSM	*n*	*M*	*SD*	*SE*	*n*	*M*	*SD*	*SE*	*t*	*p*	*df*
	20	.82	.08	.01	20	.82	.09	.02	.56	.575	38

Appendix G: Mean Scores of LIWC Categories for Pyramid and Sphinx Members in the Negative and Positive Condition

| | Negative Condition | | | | | | Positive Condition | | | | | |
| | Pyramid | | | Sphinx | | | Pyramid | | | Sphinx | | |
LIWC	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
WC	38	472.42	255.94	36	499.32	229.15	40	293.35	206.52	37	315.68	227.13
WPS	38	51.75	65.18	36	77.11	110.96	40	47.43	29.72	37	43.94	29.37
Sixltr	38	13.69	2.76	36	14.05	2.47	40	13.35	3.27	37	13.54	3.66
Dic	38	89.56	2.20	36	89.72	1.76	40	89.83	3.21	37	90.24	2.62
funct	38	58.18	3.12	36	58.82	2.55	40	56.54	4.97	37	57.63	4.87
pronoun	38	17.64	3.25	36	17.27	2.80	40	17.16	2.85	37	16.49	3.08
ppron	38	11.65	2.77	36	11.04	2.05	40	11.99	2.89	37	11.19	2.79
i	38	3.25	1.81	36	3.01	1.10	40	3.72	1.46	37	3.62	1.91
we	38	1.80	0.84	36	1.51	0.92	40	1.29	0.98	37	1.42	1.10
you	38	1.22	1.19	36	1.43	1.37	40	1.04	1.50	37	0.76	0.75
shehe	38	4.61	1.24	36	4.57	1.54	40	5.53	2.59	37	4.94	2.28
they	38	0.77	0.94	36	0.52	0.58	40	0.42	0.63	37	0.45	0.53
ipron	38	5.99	1.76	36	6.23	1.70	40	5.17	1.88	37	5.30	1.92
article	38	6.71	1.60	36	7.29	1.42	40	6.60	2.13	37	6.40	2.40
verb	38	19.17	2.46	36	18.41	2.24	40	17.64	2.35	37	17.24	3.51
auxverb	38	11.57	1.72	36	11.57	1.77	40	11.01	2.59	37	11.20	3.02
past	38	1.87	1.12	36	1.84	0.76	40	1.71	1.15	37	1.26	0.90
present	38	11.75	2.53	36	11.84	2.14	40	10.68	2.11	37	10.17	2.31
future	38	2.59	1.42	36	2.19	0.83	40	2.29	1.24	37	2.75	1.31

adverb	38	5.26	1.30	36	5.07	1.23	40	5.36	2.31	37	6.15	1.83
preps	38	9.97	2.27	36	10.84	2.21	40	9.93	2.67	37	10.65	2.47
conj	38	6.30	1.50	36	6.42	1.39	40	7.31	1.90	37	7.77	1.95
negate	38	2.80	1.01	36	3.10	1.12	40	2.35	1.01	37	2.41	1.23
quant	38	2.70	0.91	36	2.54	1.08	40	1.91	0.94	37	1.89	1.10
number	38	0.54	0.47	36	0.60	0.35	40	0.46	0.46	37	0.69	0.74
swear	38	0.13	0.30	36	0.10	0.16	40	0.05	0.12	37	0.07	0.14
social	38	11.84	2.21	36	11.90	2.41	40	11.10	2.76	37	9.75	2.04
family	38	0.01	0.04	36	0.00	0.00	40	0.02	0.08	37	0.00	0.00
friend	38	0.01	0.05	36	0.01	0.06	40	0.01	0.05	37	0.00	0.00
humans	38	0.30	0.34	36	0.36	0.44	40	0.13	0.25	37	0.19	0.30
affect	38	8.00	2.67	36	7.24	1.84	40	8.55	2.94	37	9.00	2.94
posemo	38	5.57	2.66	36	5.02	1.66	40	6.41	2.98	37	6.90	3.26
negemo	38	2.40	1.04	36	2.23	0.85	40	2.14	1.13	37	2.08	1.50
anx	38	0.11	0.18	36	0.10	0.14	40	0.09	0.18	37	0.05	0.16
anger	38	1.08	0.76	36	1.01	0.53	40	0.86	0.78	37	0.74	0.86
sad	38	0.51	0.49	36	0.44	0.36	40	0.58	0.66	37	0.61	0.79
cogmech	38	20.64	2.63	36	19.74	2.22	40	18.77	3.78	37	18.99	3.51
insight	38	2.89	1.13	36	2.59	1.03	40	2.75	1.35	37	2.84	1.35
cause	38	1.58	0.84	36	1.75	0.78	40	1.45	0.79	37	1.36	0.80
discrep	38	3.61	1.36	36	3.37	1.06	40	3.19	1.34	37	3.55	1.54
tentat	38	3.21	1.23	36	2.96	0.86	40	3.32	1.89	37	3.54	1.50
certain	38	1.53	0.85	36	1.58	0.76	40	1.41	0.95	37	1.14	0.78
inhib	38	0.53	0.50	36	0.60	0.51	40	0.46	0.55	37	0.42	0.44
incl	38	4.58	1.34	36	4.50	1.26	40	3.68	1.47	37	3.93	1.61
excl	38	3.96	1.16	36	4.17	1.24	40	3.96	1.53	37	3.99	1.94
percept	38	1.43	0.83	36	1.44	0.83	40	2.02	1.57	37	1.52	1.22
see	38	0.24	0.29	36	0.26	0.26	40	0.37	0.44	37	0.32	0.45

hear	38	0.74	0.56	36	0.86	0.69	40	0.95	0.84	37.00	0.53	0.46
feel	38	0.41	0.46	36	0.28	0.26	40	0.61	0.97	37.00	0.60	0.77
bio	38	0.27	0.28	36	0.28	0.37	40	0.15	0.27	37.00	0.21	0.29
body	38	0.09	0.15	36	0.07	0.15	40	0.05	0.11	37.00	0.13	0.21
health	38	0.10	0.17	36	0.12	0.19	40	0.05	0.13	37.00	0.06	0.21
sexual	38	0.06	0.13	36	0.08	0.15	40	0.04	0.13	37.00	0.03	0.09
ingest	38	0.04	0.11	36	0.01	0.06	40	0.01	0.06	37.00	0.00	0.01
relativ	38	9.41	2.07	36	10.23	1.81	40	9.65	2.43	37.00	10.56	2.33
motion	38	1.35	0.70	36	1.57	0.58	40	1.16	0.65	37.00	1.18	0.75
space	38	4.38	1.46	36	4.65	1.31	40	4.42	1.49	37.00	4.77	1.52
time	38	3.59	1.53	36	3.94	1.36	40	3.87	1.71	37.00	4.25	1.72
work	38	6.24	1.84	36	6.65	2.06	40	7.19	2.06	37.00	7.65	2.90
achieve	38	1.84	0.84	36	1.98	0.85	40	1.77	1.16	37.00	1.99	1.25
leisure	38	1.64	0.82	36	2.08	0.72	40	1.76	1.21	37.00	1.27	0.93
home	38	0.03	0.14	36	0.03	0.10	40	0.05	0.18	37.00	0.03	0.14
money	38	0.44	0.45	36	0.48	0.41	40	0.31	0.53	37.00	0.41	0.52
relig	38	0.05	0.26	36	0.06	0.15	40	0.02	0.07	37.00	0.01	0.05
death	38	0.02	0.06	36	0.02	0.06	40	0.01	0.05	37.00	0.00	0.00
assent	38	3.40	2.19	36	2.76	1.45	40	5.57	3.71	37.00	5.35	4.58
nonfl	38	0.47	0.40	36	0.39	0.30	40	0.40	0.49	37.00	0.53	0.59
filler	38	0.35	0.39	36	0.31	0.31	40	0.25	0.39	37.00	0.25	0.44
Period	38	4.53	4.01	36	4.77	3.60	40	3.83	3.72	37.00	2.81	3.05
Comma	38	1.99	1.67	36	1.34	1.39	40	1.60	1.22	37.00	1.86	1.89
Colon	38	0.26	0.53	36	0.13	0.29	40	0.20	0.41	37.00	0.16	0.43
SemiC	38	0.07	0.26	36	0.00	0.00	40	0.00	0.03	37.00	0.04	0.16
QMark	38	1.81	1.19	36	1.81	1.41	40	1.88	1.45	37.00	2.80	2.69
Exclam	38	0.35	0.97	36	0.19	0.40	40	0.16	0.31	37.00	0.16	0.36
Dash	38	0.17	0.32	36	0.17	0.47	40	0.17	0.46	37.00	0.05	0.17

Quote	38	0.13	0.23	36	0.11	0.24	40	0.16	0.33	37.00	0.10	0.33
Apostro	38	3.35	1.29	36	4.02	1.51	40	3.25	1.55	37.00	2.81	1.44
Parenth	38	0.16	0.33	36	0.07	0.16	40	0.03	0.11	37.00	0.06	0.17
OtherP	38	0.34	0.40	36	0.37	0.53	40	0.42	0.94	37.00	0.33	0.43
AllPct	38	13.39	5.57	36	13.06	3.91	40	11.79	5.27	37.00	11.21	4.06

Appendix H: Mean Scores for Negations for Confederate and Non-Confederate Members in the Negative and Positive Condition

| | | Negative Condition | | | | | | Positive Condition | | | |
| | | Confederate | | Non-Confederate | | | Confederate | | Non-Confederate | | |
	n	*M*	*SD*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
Negations											
	38	2.45	1.24	3	1.12	20	2.09	1.44	58	2.47	0.98

Appendix I: Mean Differences for Negations between Non-Confederate Members in the Negative and Positive Condition

Negations	Negative Condition			Positive Condition					
	n	*M*	*SD*	*n*	*M*	*SD*	*t*	*p*	*df*
	55	2.98	1.12	58.00	2.48	0.98	2.42	0.02	106

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