Linguistic Style Accommodation Shapes Impression Formation and Rapport in Computer-Mediated-Communication

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Abstract

Communication accommodation theory predicts that social power plays an important role in influencing communicative behaviors. Previous research suggests these effects extend to linguistic style, thought to be a non-conscious aspect of communication. Here, we explore if these effects hold when individuals converse using a medium limited in personal cues, computer-mediated-communication (CMC). We manipulated social power in instant messaging conversations and measured subsequent interpersonal impressions. Low power induced greater likelihood of linguistic style accommodation, across between- (Study 1) and within-subjects (Study 2) experiments. Accommodation by those in a low power role had no impact on impressions formed by their partner. In contrast, linguistic style accommodation by individuals in a high-power role was associated with *negative* interpersonal impressions formed by their lower power partner. The results show robust effects of power in shaping language use across CMC. Further, the interpersonal effects of linguistic accommodation depend upon the conversational norms of the social context.

Keywords

communication accommodation theory, computer-mediated communication, social power, impression formation, linguistic style

Linguistic style accommodation shapes impression formation and rapport in computer-mediated-communication

In modern life, computer-mediated-communication (CMC) is pervasive and abundant, taking a variety of forms including email, social media, blogs, online community forums and more. How CMC shapes the ways in which we communicate, the development and maintenance of relationships, and the interpersonal effects of changing communication technologies, is a continuing focus in interpersonal CMC research (Walther, 2011). In an organizational context, communication technologies such as instant messaging enable teams to communicate over great distances. Many organizations are now using instant messaging as a tool to facilitate collaboration amongst geographically dispersed teams (Handel & Herbsleb, 2002). Instant messaging is quicker and more convenient compared to email or telephone calls, as messages are sent and received instantly. In some organizations instant messaging is used more than twice as often than face to face meetings or telephone calls (Quan-Haase, Cothrel, & Wellman, 2005).

One concern about the increasing use of instant messaging in organizations relates to how virtual team members develop good relationships when they do not physically see or interact with one another. This is especially relevant for relationships between different levels of organizational hierarchy, such as supervisors and subordinates; managers can find maintaining positive working relationships and good levels of rapport with virtual team members particularly challenging when relying on instant messaging to communicate (Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002). Some research claims this is due to increased social distance between supervisors and subordinates, created by the reduced richness of nonverbal and social cues when communicating using instant messaging (Quan-Haase et al., 2005). Thus, the characteristics of CMC may impact on effective

communication, which in turn influence the development of social and task-related relationships, both of which are thought to be critical for the success of virtual teams (Jarvenpaa & Leidner, 1998). For instance, where team members communicated effectively over CMC (in terms of frequent communication, acknowledging other's contributions, and providing explicit feedback on other's suggestions) this was associated with positive perceptions of team members' social and task-related attractiveness, and in turn better work performance (Walther & Bunz, 2005).

An individual's level of power or status within a relationship is already thought to have an influence on how he/she communicates. Individuals in low positions of power often alter their language (use of specific phrases or vocabulary) to be more like those in high power. This has been observed in face-to-face conversations between individuals in high (legal professionals) versus low (witnesses) positions of power in the courtroom (Gnisci, 2005) and computer-mediated communications between individuals of low versus high status in online community forums (Dino, Reysen, & Branscombe, 2009). Communication accommodation theory (Giles, 2016) defines such adaptations to our communicative behaviors as *accommodation,* motivated by a desire on the part of the low powered individual to affiliate with or gain the approval of their higher power partner. Further, accommodation in language use is influential in interpersonal impressions and the formation of rapport between conversationalists in face-to-face interactions (Jacob, Gueguen, Martin, & Boulbry, 2011) and in CMC (Scissors, Gill, & Gergle, 2008). Power, as either a psychological construct or hierarchical structure, is thus implicated in how conversationalists construct messages, and the language used in such messages then influences interpersonal impressions.

In this paper we are particularly interested in how power in instant messaging conversations impacts on the production, perception and evaluation of an aspect of language considered to be non-conscious: linguistic style. Linguistic style is defined by an individual's

use of function words, which are processed and produced non-consciously (Chung & Pennebaker, 2007). Although most of our vocabulary consists of content words, function words (such as pronouns, conjunctions, and articles) represent over half of the words used during an interaction, have little independent semantic meaning, and are used to express grammatical relationships within a sentence (Pennebaker, 2011). Linguistic style refers not to *what* an individual says (message content) but *how* an individual conveys the message. Person A's linguistic style, for example, could be to use many first-person pronouns in his or her speech ("*I* love this movie, *I* can't wait until *I* see it again") whereas Person B's style may be to use fewer pronouns ("*Me* too, going again soon"). Thus, accommodation on the part of Person B might involve increasing the use of personal pronouns to accommodate towards the style of Person A ("*I* love it too, *I*'m going again soon"). Due to their lack of independent meaning, use of function words relies on shared social knowledge; thus, an individual's use of function words is proposed to link to social behaviors (Tausczik & Pennebaker, 2010) and be representative of interpersonal alignment between conversationalists (Ireland et al., 2011). Studying accommodation in linguistic style thus provides an unobtrusive window into the nature of personal relationships, and the factors influencing interpersonal communications that occur outside of an individual's awareness.

Research shows that being in a low position of power does induce individuals to accommodate their linguistic style towards that of their higher power partner in face-to-face communications (Muir, Joinson, Cotterill, & Dewdney, 2016). Where conversationalists accommodate their linguistic style to be similar to one another, this has also been associated with positive interpersonal outcomes such as group cohesiveness (Gonzales, Hancock, & Pennebaker, 2010; Taylor & Thomas, 2008), and increased perceptions of social attractiveness and rapport (Muir et al., 2016). However, it is unclear the extent to which these effects extend to computer-mediated forms of communication. One possibility is that

such effects will directly translate to messages produced and received via CMC. Such a position might assume that text-based communications are a direct replication of spoken language, just with less rich non-verbal cues (e.g., speech minus voice). If individuals produce and perceive language in the same way using CMC as when communicating face to face, we might expect to see similar effects of power upon linguistic style, and similar effects of accommodation in linguistic style upon perceptions of rapport, social and task attractiveness. Alternatively, theories of CMC (such as social information processing theory), suggest people do not simply type out the same words they would have spoken, but rather adapt to the limits of technology by choosing different words and symbols to express what they want to convey (Walther, 1992). Hypothetically, this could be associated with individuals using and/or perceiving function words differently in CMC compared to face-to-face communications. Thus, we explore the impact of power upon accommodation in linguistic style, and the relationship between linguistic style accommodation and perceptions of rapport, social and task attractiveness in instant messaging, a synchronous form of computer-mediated communication.

Communication Accommodation Theory

We draw upon communication accommodation theory (CAT: Giles, 2016) as being a theoretical framework pertinent to understanding factors that influence accommodation in linguistic style and interpersonal impressions in instant messaging. CAT encompasses face-to-face (FtF) communications and has also been applied to a variety of online or otherwise computer-mediated interactions (Gasiorek, Giles, & Soliz, 2015). Further, CAT has been employed in a variety of applied contexts including the workplace, making it particularly relevant for our interests. Accommodative communications are theorized to be key in relationship satisfaction and success in organizations: for instance, non-accommodative communications between managers and subordinates may lead to lower productivity and high

employee turnover (Gnisci, Giles, & Soliz, 2016). In the following section, we briefly introduce CAT and summarize relevant work on the impact of power on linguistic style and the interpersonal outcomes of language use in CMC.

Communication accommodation theory (CAT) describes the ways in which people adjust their communication behaviors during social interactions, their motivations for doing so and the social consequences (Giles, 2016). Early iterations of CAT defined communication behaviors in terms of *convergence* and *divergence*: *convergence* describes when people alter their communication behaviors to be similar to others, whilst *divergence* describes ways in which people accentuate dissimilarities in communicative behaviors (Giles & Smith, 1979).

Recent developments within CAT have refined communicative behaviors as being *accommodative* or *non-accommodative*. How behaviors are defined in these terms depends on the subjective perceptions and evaluations of the recipient (Giles & Gasiorek, 2014). Individuals have notions about what constitutes appropriate communicative behavior in particular contexts, and use these notions to evaluate the communication patterns of others. Accommodative communications are those that are perceived to be appropriate, desirable, or facilitating communication. Converging one's communication behaviors (e.g., accent, pitch or use of specific words or phrases) to be similar to conversational partners is often perceived as accommodative and is positively received. Non-accommodative communications are those perceived not to be adjusted appropriately for one or both individuals (Gasiorek, 2016). Non-accommodation can take the form of over-accommodation, if the extent of accommodation is perceived to be greater than desired (e.g., patronizing talk), whereas too little accommodation is perceived as under-accommodation. Importantly, subjective evaluations are key to whether behavior is perceived as accommodative or non-accommodative; although behaviors may be objectively accommodative (e.g., convergence in

speech rate or word use), they may be subjectively evaluated by the recipient as non-accommodative if inappropriate to the circumstances and social roles of the conversationalists (Gasiorek, 2016; Giles & Gasiorek, 2014). People accommodate when they want to affiliate, decrease social distance, or facilitate comprehension, and non-accommodate when they want to disaffiliate, increase social distance or hinder comprehension (Dragojevic, Gasiorek, & Giles, 2016).

Power and Linguistic Style in CMC

CAT predicts that individuals in low power roles are motivated to seek social approval from their higher power partner, leading to accommodation in their communications (Giles, 2016). There is evidence this does indeed occur when individuals communicate in a variety of contexts, both face-to-face and via CMC. For instance, interviewees accommodate their speech style towards that of their interviewers in employment interviews (Willemyns, Gallois, Callan, & Pittam, 1997) and in a courtroom situation, witnesses accommodate their language use towards that of legal professionals (Gnisci, 2005).

The opposite pattern can sometimes be seen where high powered individuals accommodate towards low power, particularly where the individual in the higher power position assumes a nurturing or mentoring role. Health professionals, arguably in a higher position of power than patients, have been observed to make use of discourse management (e.g., guiding the conversation in specific ways through topic selection or backchanneling) and emotional expression strategies in order to accommodate towards patients (Watson & Gallois, 1998). Further, de Siqueira and Herring (2009) reported an academic advisor accommodated the pace of message production in instant messaging chats towards that of each of her four doctoral students. However, such instances seem to be the exception rather than the rule, and where there is a formal hierarchical power relationship in place (as opposed to a nurturing or mentoring one) the predicted low towards high power accommodation

pattern is more likely to be observed. People in low status positions often accommodate the nature of their messages (e.g., to be more conforming and agreeing) when talking to high status members on online message forums (Dino et al., 2009; Jones, Cotterill, Dewdney, Muir, & Joinson, 2014) and via email (Gilbert, 2012). Relevant to our study, in an organizational context, subordinates accommodate towards supervisors more often than the opposite (Littlejohn, 1992, p. 117).

There is limited evidence that this extends to non-conscious aspects of language use such as linguistic style. Danescu-Niculescu-Mizil et al. (2012) found use of a particular class of function words (e.g., articles) in one utterance by a high-status individual on Wikipedia pages (administrators) increased the probability of their lower status interaction partner (non-administrators) also using that particular class of function words in their next utterance. Along similar lines, Jones et al. (2014) found that individuals with low status in an online community forum were more likely to accommodate their linguistic style when conversing with high status members, compared to the other way around.

A limitation of this previous work is that social status or power was inferred, instead of being directly measured or manipulated. In the present research, we address such issues by experimentally manipulating an individual's level of social power to ensure power differentials between conversationalists are clearly defined. Further, the communications studied were asynchronous, as is the case with communications on online forums or message boards. We therefore examine if changes in linguistic style in relation to social power occur in synchronous CMC (instant messaging). In line with predictions from CAT and previous research we form the following hypotheses:

H_{1a}: There will be a greater frequency of conversations characterized by individuals in a low power role accommodating their linguistic style towards higher power partners, compared to the other way around.

H_{1b}: Individuals in a low power role will exhibit a greater general tendency to accommodate their linguistic style, compared to individuals in a high-power role.

Linguistic Style and Interpersonal Impressions in CMC

A key prediction of CAT is that accommodative communications are related to positive evaluations of the communication, the individual and the relationship, and a variety of research supports this assumption (Soliz & Giles, 2014). Communication style (e.g., word choice and typographic information) is theorized to influence interpersonal impressions in CMC due to the limited number of other available cues on which to base perceptions (Hancock & Dunham, 2001; Walther, 1992). Consistent with this view, and with predictions from CAT, accommodation in word use over CMC has been associated with positive interpersonal impressions. For example, accommodation in word use over email has positively influenced perceptions of rapport (Crook & Booth, 1997), and lexical mimicry (repetition of words or word phrases) was associated with increased perceptions of trust by people conversing via instant messaging (Scissors et al., 2008) and negotiators using online chat-rooms (Swaab, Maddux, & Sinaceur, 2011).

Although linguistic style accommodation between individuals communicating face-to-face predicts positive social outcomes, these outcomes have mostly been operationalized in terms of dyadic measures, such as successful outcomes of negotiations (Taylor & Thomas, 2008), or relationship initiation (Ireland et al., 2011) instead of individual recipient evaluations of the speaker. To our knowledge, only one previous study has examined individual interpersonal impressions associated with linguistic style accommodation, and reports increases in perceived rapport between conversationalists and social attractiveness of the speaker in association with linguistic style accommodation in face-to-face communications (Muir et al., 2016). However, there is little evidence that such effects

translate to CMC. One study found that although dyads accommodated their linguistic style towards each other when communicating over CMC, this was unrelated to ratings of subjective rapport (Niederhoffer & Pennebaker, 2002). Contrarily, other research has shown linguistic style accommodation when communicating over CMC was positively related to group cohesiveness (Gonzales et al., 2010), although this was a measure of group performance as opposed to an assessment of individual interpersonal impressions.

We examine the effects of linguistic style accommodation upon three interpersonal impressions relevant to the success of workplace relationships: rapport, social attractiveness, and task attractiveness. Rapport, particularly in a workplace context, is defined as perceived closeness, harmony and trust, built through verbal communications and self-disclosure (Gremler & Gwinner, 2000). Rapport is an important measure of the quality of workplace relationships. For instance, organizational success and job satisfaction is claimed to be reliant on perceived solidarity (an aspect of rapport, relating to feeling close and having a lot in common) felt between supervisors and subordinates (MacDonald, Kelly, & Christen, 2014). In our study we utilize a measure of rapport employed in previous research into linguistic style, which operationalizes rapport as subjective feelings that the conversation went smoothly, that the individual felt comfortable during the conversation, and that the individual truly got to know their partner (Niederhoffer & Pennebaker, 2002).

We use McCroskey and McCain's (1974) measures of social and task attractiveness which are described as part of interpersonal attractiveness, the tendency to evaluate another person in a positive or negative way. Social attractiveness represents interpersonal liking, and includes items referring to the desire to be friends with the target individual, whereas task attractiveness relates to the target individual's reliability in a task or work situation and how rewarding they would be to work with. Both these aspects of interpersonal attraction have been positively associated with better work performance in an organizational context

(Walther & Bunz, 2005). Hence, we explore how linguistic style accommodation by individuals in high and low power roles over instant messaging influences these three aspects of interpersonal impressions. CAT predicts that accommodative behaviors are associated with positive perceptions formed by their conversational partner. Following this and predictions from prior research (e.g., Muir et al., 2016) we would expect:

> H_2: Greater linguistic style accommodation over CMC is associated with positive perceptions made by the recipient of the speaker's social and task attractiveness, and rapport felt between conversationalists.

Present Research

We present two studies designed to examine the effects of power on linguistic style, and the effects of changes in linguistic style on perceptions of rapport, social and task attractiveness in instant messaging. We utilized a 'speed networking' paradigm (c.f. Muir et al., 2016) in which participants had multiple short conversations with each other 'round-robin' style, whilst playing either a high or low power role. Participants had these conversations using an online chat system which allowed them to send and receive messages instantly. We calculated the extent of linguistic style accommodation for each conversation, and as an overall tendency by each participant within his or her power role. We also collected self-report measures of rapport, social and task attractiveness by each participant of each of their conversational partners. Study 1 used a between-subjects design in which participants played either a high or low power role, or a neutral power role. Study 2 utilized a within-subjects design, in which participants undertook both high and low power roles, to test the reliability and stability of the effects of power upon linguistic style accommodation. Note, due to the similarities between Study 1 and 2, for brevity we present a combined method and results for both studies.

Method

Participants and Design

Study 1. Fifty-four participants took part in Study 1 (25 females, 28 males). Participants ranged from 18 to 25 years old (M = 20.83, $S.D.$ = 1.99), and were undergraduate students. Study 1 utilized a between-subjects design. Thirteen participants were in the low power role (workers), thirteen participants were in the high-power role (judges) and twenty-eight participants were in the neutral power role (collaborators).

Study 2. Thirty participants took part in Study 2 (15 females, 15 males), ranging from 18 to 23 years old (M = 19.24, $S.D.$ = 1.62). In this study we used a within-subjects design. Participants undertook both the worker and judge role, in a counterbalanced order: fourteen participants undertook the worker role before the judge role, and sixteen participants undertook the judge role before the worker role.

In both studies participants were unknown to each other prior to the study, and were paid a small monetary reward at the end of the study.

Procedure and Measures

CMC System. We utilized a free online synchronous chat program designed for business team chat (https://www.hipchat.com). Two participants at a time could enter an individual chat-room and converse privately. Participants typed their message into the chat system and upon pressing 'send', their message was instantly seen by their conversational partner. Participants created their own usernames for use within the CMC system, with most participants using their initials or first names. Although some personal information could be indicated by usernames (e.g., if a first name was clearly male or female) no other information was available about with whom they were chatting. The Hip Chat system automatically kept a secure transcript of all messages sent and received by users in each chat-room. These transcripts were only available for access by the administrative account owner (in this case, the first author) and were retrieved later for analysis.

Power manipulation. We utilized a power manipulation to create a situation in which participants felt they had either high or low levels of power (Muir et al., 2016). Participants were randomly allocated to play either a Worker role (low power) or Judge role (high power). Workers (low power) were given a set of instruction sheets, with each sheet containing a different hypothetical business idea (e.g., a new smartwatch). Workers pitched a different business idea to each Judge (high power). Judges had the ability to award workers extra money depending on their evaluations of the Workers, meaning Judges had power over Workers.

The study took place in a computer laboratory, with each participant seated at an individual workstation with a PC connected to the internet. Upon arrival, participants were randomly allocated to either the Judge or Worker role, logged on to the HipChat program and were instructed in how to use the system. Participants acting as Judges each entered an individual private chat-room, and remained in this chat-room for the duration of the study. Workers were given a set of instruction sheets, upon which was listed the chat-room they should enter (e.g., "please enter *Room 2*") and the business idea they should discuss with the Judge in that chat-room. Workers moved between chat-rooms, and had a five-minute private one-to-one conversation with each Judge, in which they discussed the business idea proposed by the Worker. This procedure was followed until each Worker had conversed with each Judge, pitching a different business idea each time, so each Judge heard a different business idea from each Worker.

In Study 1 (between-subjects) participants were in either the Judge or Worker role. So, each participant in Study 1 had thirteen conversations: each of the thirteen Workers had a conversation with each of the thirteen Judges, meaning a total of 169 five-minute dyadic conversations between individuals of low vs. high power were generated. In Study 2 (within-subjects) participants swapped roles half-way through, and a total of 162 dyadic

conversations between individuals of high vs. low power were generated.[1] Participants in Study 2 were unaware they would be swapping roles half-way through.

Control group. A separate group of participants acted as a control group ('*Collaborators'*) in Study 1. The same procedure was followed as for Workers and Judges, with the exception that there was no power imbalance between participants. Participants were randomly allocated to one of two groups (Group A and Group B). Group B collaborators (N = 14) were given hypothetical business ideas to discuss with Group A collaborators (N = 14), but neither group was responsible for awarding extra money to the other. Thus, collaborators were in a neutral power situation. Group A collaborators remained within an individual private chat-room, whilst participants in Group B moved between chat-rooms. Thus, each of the fourteen participants in Group A had a conversation with each of the fourteen participants in Group B, generating 196 dyadic conversations between individuals of neutral power.

Measures of interpersonal impressions. At the end of each five-minute conversation all participants completed the following measures: (1) a measure of subjective rapport felt during the conversation (Niederhoffer & Pennebaker, 2002; 3 items, Study 1 M = 14.94, $S.D$ = 3.56, α = .76, Study 2 M = 14.97, $S.D.$ = 3.85, α = .82); and (2) measures of their partner's social (4 items, Study 1 M = 14.80, $S.D.$ = 2.52, α = .77, Study 2 M = 14.76, $S.D.$ = 2.68, α = .83) and task attractiveness (4 items, Study 1 M = 14.92, $S.D.$ = 2.52, a = .82, Study 2 M = 15.02, $S.D.$ = 2.57, α = .79; McCroskey & McCain, 1974). Judges had additional measures to complete after each conversation evaluating the worker's idea and how much extra money to award.

At the end of the study participants completed a manipulation check. In Study 1 they rated the extent to which they felt they had power during the conversations, on a scale from 1 (*not at all*) to 5 (*very much*). In Study 2 participants rated the extent to which they felt they had power during the conversations *in each role*, on a scale from 1 (*not at all*) to 5 (*very much*). Participants were then debriefed and paid an equal small monetary reward.

Linguistic Data and Computational Measure of Accommodation

Computational measures of accommodation have been developed to quickly and easily quantify instances of communication accommodation in text. Relevant to our interest in linguistic style, linguistic style matching (LSM) is one measure which quantifies the degree to which linguistic style similarity exists within a dyadic conversation (Niederhoffer & Pennebaker, 2002). LSM measures the degree to which people produce similar rates of function words in conversation, by calculating a score for an individual for each of nine function word categories (see Table 1) then comparing these scores with their conversational partner. To calculate LSM, the absolute value of the difference in use of a function word category between two speakers is divided by the total for each category. All nine categories are then averaged to yield an LSM score for the dyad ranging between 0 and 1, with 1 representing complete matching in function word use between conversationalists. As a dyadic score of linguistic style similarity, LSM has been used to predict dyadic or group outcomes (e.g., Ireland et al., 2011). However, LSM provides a single score per dyad and so does not capture the extent to which each individual accommodates his or her linguistic style. For instance, LSM will not reveal if one individual in a dyad changes their usual linguistic style to a greater, or lesser, extent compared to their conversational partner.

<Table 1 here>

We, therefore, chose to use the Zelig Quotient (ZQ) as a computational method for quantifying linguistic style accommodation for each individual (Jones et al., 2014). The ZQ measure determines the extent to which individuals accommodate their linguistic style towards or away from each of their conversational partners, thus allowing us to examine the effects of high vs. low power upon linguistic style accommodation. This measure has been used in previous research into the effects of power upon linguistic style in face-to-face communications (Muir et al., 2016), and is explained in more detail in Jones et al., (2014).

The HipChat software automatically kept a verbatim transcript of all messages sent and received by individuals within each of the private chat-rooms. These transcripts were firstly segmented into turns for each participant. This was achieved by segmenting the transcript into transmission units (the text transmitted by a participant at one time) and then into turns, which represent consecutive uninterrupted transmission units from the same participant. Turns can consist of a single transmission unit or of several consecutive uninterrupted units together. The transcripts were then processed using the Linguistic Inquiry and Word Count program (Pennebaker, Booth, Boyd, & Francis, 2015) to yield the percentages of function words uttered by each participant in each turn, in each conversation. We used the LIWC percentages to calculate Zelig Quotient (ZQ), as follows. ZQ firstly establishes an individual's baseline (or usual) linguistic style by calculating their average use of nine function word categories (see Table 1) across all the conversations we have for that individual. The extent to which an individual changes their linguistic style from their baseline style to converge towards or diverge away from the linguistic style of each of their conversational partners is then computed (*pairwise speaker to recipient ZQ scores*). Further, by averaging the pairwise ZQ scores across all conversational partners, we can also estimate the individual's *general tendency* to accommodate their linguistic style to that of others, within his or her power role (*overall ZQ scores*). Positive Zelig Quotients (greater than zero) represent convergence towards the linguistic style of their conversational partner. Negative scores (less than zero) represent divergence away from the linguistic style of their partner. Zelig Quotients close to zero represent maintenance of the individual's own baseline linguistic style, with any movement in linguistic style due to noise, rather than convergence or divergence. We calculated pairwise speaker-to-recipient ZQ scores for each conversation and an overall ZQ score for each participant, following the procedure described in Jones et al.

(2014).[2]

Results

Manipulation Checks

Study 1. A one-way ANOVA confirmed a significant difference in perceived personal power between the groups of judges, workers and collaborators (F (3, 53) = 3.54, p = .02, η^2 = .17). Judges perceived they had a greater level of personal power (M = 4.46, *S.D.* = .77) compared to Workers (M = 3.46, *S.D.* = 1.12). There was no such difference in the perception of personal power in the two groups of collaborators, who both rated their level of personal power at a similar level (Group A M = 4.14, *S.D* = .77, Group B M = 4.35, *S.D.* = .74).

Study 2. A within-subjects ANOVA confirmed a significant main effect of power role, in that participants perceived significantly greater levels of personal power when they were in the judge role (M = 4.23, *S.D* = .77) compared to the worker role (M = 3.60, *S.D.* = 1.06; F (1, 28) = 5.99, p = .02, η^2 = .17). The order in which participants undertook roles was not significant in influencing perceived personal power (F (1, 28) = 1.88, p = .18, η^2 = .06) and there was no interaction between role order and power role (F (1, 28) = 1.06, p = .31, η^2 = .03). Thus, the experimental manipulation of power was successful in inducing the perception of a power difference in both studies.

H_1: The Effects of Power upon Linguistic Style Accommodation

We hypothesized that individuals in a low power role would exhibit a greater frequency of conversations characterized by *convergence* in linguistic style towards higher power partners, than individuals in a high-power role would exhibit convergence towards lower power partners (H_{1a}). This hypothesis was partially supported: power role did not significantly predict the frequency to which individuals exhibited divergence or convergence in Study 1 (x^2 (3) = 1.79, p = 0.61) but did in Study 2 (x^2 (1) = 4.81, p = .03). Figures 1 and 2 present

the pairwise speaker-to-recipient ZQs for judges vs. workers (high vs. low power, Figure 1) and the two groups of collaborators (neutral power, Figure 2), as a percentage of the total number of conversations. These scores demonstrate the extent to which each individual accommodated their linguistic style within each conversation. Judges exhibited a slightly higher percentage of negative ZQs (indicating linguistic style divergence) than workers (63% of conversations compared to 57% in Study 1, 62% of conversations compared to 43% in Study 2). The opposite is apparent for convergence, with workers showing a slightly higher percentage of positive ZQs (31% in Study 1, 36% in Study 2) compared to judges (25% in Study 1, 26% in Study 2). Collaborators showed similar levels of divergence (Group A 56%, Group B 54%) and convergence (Group A 27%, Group B 28%).

<Figures 1 and 2 about here>

We further predicted that individuals in a low power role would exhibit a greater general tendency to accommodate their linguistic style, compared to individuals in a high-power role (H_{1b}). Consistent with this hypothesis, power role was a significant influence upon overall ZQ in Study 1 (F (3, 53) = 2.8, p = .05, η^2 = .06) and Study 2 (F (1, 28) = 9.71, p = .004, η^2 = .25).[3] In general, the overall ZQ scores (which represent an individual's tendency to accommodate their linguistic style, within their social role) showed that divergence in typical linguistic style was common; on average, all groups exhibited negative overall ZQ scores. However, overall ZQ of workers (Study 1 M = -.16, $S.D.$ = .07, Study 2 M = -.09, $S.D.$ = .11) were greater than those of judges (Study 1 M = -.23, $S.D.$ = .14, Study 2 M = -.22, $S.D.$ = .17), showing that across both studies workers exhibited significantly less divergence in their typical linguistic style compared to judges. There were no significant differences in overall ZQ between collaborators (Group A M = -.21, $S.D.$ = .08, Group B M = -.24, $S.D.$ = .17; t (26) = 1.2, n.s., d = .22).

Exploratory Analyses: Temporal Dynamics of Accommodation

Prior research suggests that accommodation may not remain at a similar level throughout the course of a conversation. For instance, Riordan, Markman, and Stewart (2013) found convergence in message length and production times in instant messaging conversations increased with each additional turn in the conversation. In contrast, Bonin et al. (2013) examined the time-course of lexical mimicry between individuals (mimicking the words used by a conversational partner) and found it did not increase or decrease linearly, but rather fluctuated over the course of a conversation. Hence, we performed some exploratory analyses to examine the temporal dynamics of linguistic style accommodation in Study 1.

Turn-by-turn linguistic style similarity. We firstly explored similarity in linguistic style on a turn-by-turn basis in the dyads of workers-judges and collaborators, to see if dyads became more or less similar in their linguistic style over the time-course of the conversation. We computed LSM on a turn-by turn basis by applying the LSM calculation to adjacent turns uttered by dyads (e.g., we calculated LSM for turn 1 for both participants in the dyad, then turn 2, and so on). This yields a score showing similarity in linguistic style between individuals at each turn in the conversation. We then used these turn-by-turn LSM scores in a linear mixed model in which we predicted the turn-by-turn LSM scores from power role (workers-judges versus collaborators) and turn number. Use of a linear mixed model allowed us to control for nested observations in the dataset (Heck, Thomas, & Tabata, 2014, pp. 4 - 11). Linguistic style similarity decreased slightly with each additional turn in the conversation (b = -.006, F (1, 1861) = 25.53, p<.001) but the lack of interaction with power role indicates this effect applied across all dyads (F (1, 1861) = .57, p = .45).

Linguistic style accommodation: Development over multiple conversations. We next explored linguistic style accommodation over the multiple conversations undertaken by participants during the study, to see if participants became more or less convergent/divergent in their linguistic style with each additional conversation. Using a linear mixed model, we

predicted pairwise speaker-to-recipient ZQ scores from power role (worker vs. judge vs. collaborator) and conversation number. Levels of linguistic style accommodation did not increase or decrease with each additional conversation (F (1, 120) = .02, p = .89) and there was no interaction of conversation number with power role (F (2, 130) = .13, p = .87).

H_2: Effects of Linguistic Style Accommodation upon Interpersonal Impressions

H_2 predicted that greater linguistic style accommodation would be associated with a positive impression formed of the speaker by the recipient, in line with CAT. In the following analyses, we therefore predicted Person B's ratings of A in terms of rapport, social and task attractiveness, from the extent of Person A's linguistic style accommodation (pairwise ZQ score). In all analyses we utilized a linear mixed model to control for nested observations in the dataset (Heck et al., 2014, pp. 4 - 11). For clarity, in the main we report only significant results here.

In line with H_2, increasing ZQ by collaborators was associated with positive increases in partner's ratings of rapport (GroupA rating GroupB b = .85, t (71) = 2.30, p = .02; GroupB rating GroupA b = .61, t (69) = 2.1, p = .03) and task attractiveness (GroupA rating GroupB b = .60, t (67) = 2.47, p = .02; GroupB rating GroupA b = .52, t (67) = 2.5, p = .02). However, this hypothesis was not supported for Workers and Judges. Across both studies we observed no significant relationship between the extent of linguistic style accommodation by individuals in the low power position (Workers) and Judge's ratings. Further, the extent of linguistic style accommodation by Judges significantly and negatively predicted Workers' ratings of Judges. With increases in Judges' ZQ, there was a corresponding decrease in Worker's ratings of rapport (Study 1 b = -1.99, t (43.62) = -2.92, p = .005, Study 2 b = -2.25, t (4.47) = -2.59, p = .05), social attractiveness (Study 1 b = -.87, t (32.5) = -2.17, p = .04) and task attractiveness (Study 2 b = -1.64, t (35.37) = -2.27, p = .03).

Discussion

The purpose of this paper was to explore how power influences linguistic style, and the effects upon interpersonal impressions in CMC. Using CAT as a guiding theoretical framework, across two studies we show that power influenced the extent to which individuals changed their linguistic style in synchronous CMC (instant messaging). Our hypotheses regarding power were supported: individuals in a low power position were more likely to change their linguistic style to be similar to their higher power partner, rather than the other way around. Our hypothesis regarding interpersonal impressions was partially supported, and demonstrates the importance of social roles in forming perceptions of conversational partners in CMC. Consistent with CAT, where there was no power differential between participants, increasing linguistic accommodation was associated with forming positive interpersonal impressions of partner's rapport and task attractiveness. Contrarily, linguistic style accommodation by participants in a position of high power was associated with poor interpersonal impressions formed by their lower power partner of their rapport, social and task attractiveness. We provide novel evidence as to the importance of power relationships in influencing non-conscious language use and interpersonal impressions in text-based communications, and suggest theoretical contributions for CAT.

Linguistic Divergence as Speech Complementarity

Across both studies, Judges and Workers exhibited linguistic style *divergence* when communicating using instant messaging, in terms of negative overall Zelig Quotients. This is not uncommon in studies investigating linguistic style accommodation in both face-to-face (Muir et al., 2016) and online interactions (Huffaker, Jorgensen, Iacobelli, Tepper, & Cassell, 2006; Jones et al., 2014). The concept within CAT of *speech complementarity* could account for this divergence in linguistic style between high and low power conversationalists (Dragojevic et al, 2016). Speech complementarity describes communicative behaviors that appear divergent in nature, but have the function of conveying and reinforcing social roles.

This concept is related to behavioral complementarity, in which individuals engage in opposing behaviors to develop and reinforce social roles, particularly those associated with hierarchy. People often engage in complementary behaviors as opposed to mimicking one another's behaviors. For instance, Tiedens and Fragale (2003) observed participants engaging in opposing postural behaviors, to preserve hierarchy: faced with a dominant posture from a confederate, participants adopted a submissive posture, and vice versa. Complementary postural behavior was also linked to greater ratings of liking and feelings of comfort in the interaction, compared to postural mimicry (Tiedens & Fragale, 2003). Complementarity is particularly relevant in organizational hierarchies, where there can be strong structured expectations regarding appropriate behavior at levels of the hierarchy. There is evidence that dominant behavior from a supervisor is often met with submissive behavior from supervisees (Moskowitz, Ringo Ho, & Turcotte-Tremblay, 2007), which acts to confirm status in the interaction and reflect appropriate behavioral norms. In the case of our experimental paradigm, objectively measured divergence in linguistic style may be representative of individuals attempting to reflect and preserve their respective power roles communicatively. Thus, the observation of linguistic style divergence by both Workers and Judges is consistent with CAT, and suggests individuals may use speech complementarity in a similar way to behavioral complementarity to preserve and reinforce hierarchical roles in the workplace.

Power influences Linguistic Style Accommodation

Overall, workers diverged their linguistic style to a *lesser* extent than judges, and in individual conversations were more likely to show convergence (i.e., positive Zelig Quotients). Notably, the effects of power were robust and reliable: these effects occurred regardless of whether the power role was stable (between-subjects: Study 1) or shifting (within-subjects: Study 2). Our results are consistent with previous research into the effects

of power on linguistic style in both face-to-face communication (Muir et al., 2016) and in online communities (Jones et al., 2014). Conversing with an individual in a higher power role is proposed to trigger motivations to gain social approval, which then leads to greater accommodation in communication behaviors (Giles, 2016). Our results confirm that power is indeed a strong influence on the way people express themselves. Importantly, its influence extends to non-conscious language use when relying purely on the written (typed) word to communicate.

In respect of the temporal dynamics of linguistic style accommodation, our exploratory analyses revealed a slight decrease in linguistic style similarity between conversationalists with every additional turn in the conversation. Although this was a small effect (b = -.006), potentially this could suggest increasing divergence in linguistic style over the course of the conversation. This contrasts with previous research which showed increasing convergence with every turn in the conversation (Riordan et al., 2013). However, Riordan et al. (2013) studied temporal dynamics of message length and production time, in comparison to our focus on the use of function words. It is possible that our participants did show increasing convergence over time in aspects of communication that we did not measure, as CAT predicts people can converge on some aspects of communication whilst diverging on others (Dragojevic et al., 2016). We further found that participants did not become more or less convergent or divergent with each additional conversation. Although we only examined temporal dynamics within a short time-span and a relatively small number of conversations, this could suggest people have a fairly consistent linguistic style, within a particular social power role. A fruitful avenue for future research would be examining interactions between high vs. low power individuals across a longer time period, to further explore the temporal dynamics of linguistic style accommodation.

Linguistic Style influences Interpersonal Impressions over CMC

We show that social context, in this case power relationships, influences whether changes in linguistic style in text-based communications have a positive or negative impact upon interpersonal impressions. Across both studies, there was no effect of Workers' accommodation upon the perceptions formed by Judges, but the extent of linguistic style accommodation exhibited by Judges negatively predicted interpersonal impressions formed by Workers. Essentially, when individuals communicated in a way that was not consistent with their power role, this was perceived negatively. Our findings suggest that where individuals with roles at different levels of an organizational hierarchy communicate using instant messaging, messages which adhere to the norms associated with an individual's role in the hierarchy are preferred. We propose two different theoretical perspectives which may shed light on these findings: CAT and expectancy violation theory (EVT).

One interpretation of these results from a CAT perspective suggests that in situations where speech complementarity is the preferred or desired communicative behavior, violations of this norm may be perceived negatively. This may be particularly the case in a workplace environment, where there are often clear expectations regarding hierarchy-appropriate communicative behaviors. Divergence in communications where there are clear status differences between speakers is often expected and desired, and perceived as serving an affiliative function, conveying respect, or enhancing message comprehension (Gasiorek, 2016). In our studies, convergence in linguistic style by individuals in the high position of power towards those in the lower position of power was role-inconsistent and disrupted speech complementarity, and thus could have been perceived negatively. This interpretation is in line with research suggesting negative interpersonal impressions can result from departures from expectations of appropriate communications associated with hierarchical roles. For instance, when legal professionals (in a high position of power in a courtroom) accommodate their communications downwards by downgrading their formal communication

style towards the defendant's more informal language, this can be interpreted negatively by defendants as inappropriate to the situation, or patronizing (Linell, 1991). Moreover, in line with our results, mimicry in the context of a negotiation exercise benefits individuals in lower status positions, but not those in higher status (Curhan & Pentland, 2007). Thus, extending this to the workplace, accommodation in linguistic style by individuals in a position of high power (such as a supervisor towards a subordinate) could be perceived as inappropriate to the expectations and conversational norms characteristic of the hierarchical relationship and interpretated negatively (Gasiorek, 2016).

An alternative explanation refers to recent formulations of expectancy violation theory, which invokes increases in uncertainty as an explanation for negative evaluations of unexpected behaviors (Afifi & Burgoon, 2000). According to EVT (Burgoon & Hale, 1988), when expectations about communicative behaviors are violated (e.g., when a conversational partner decreases or increases conversational distance, counter to expectations), this can be evaluated either positively or negatively (Burgoon & Walther, 1990). Our results could suggest that the roles of 'judge' or 'worker' activated cognitive models or schemas associated with high vs. low power roles, including expectations of language use and other communicative behaviors (Fiske & Tablante, 2015). Accommodation by individuals in the high-power role towards those in the low power role was schema-inconsistent (Crockett, 1988) and thus a violation of the social and communicative expectations associated with a high-power role. It was however, a *positive* violation of the expected behaviors and as such, according to EVT should have resulted in increased ratings of rapport, social and task attractiveness. However, uncertainty reduction theory (Berger & Calabrese, 1975) proposes an aspect of communication is providing information about the speaker, which can either increase or decrease uncertainty about future expected behaviors. If people communicate in a way which violates expectations, this can increase uncertainty about future communications,

which then leads to negative interpersonal impressions. In line with this, where individuals in high positions of power in a negotiation situation displayed linguistic signals inconsistent with the role (e.g., linguistic terms displaying submissiveness) this negatively influenced their gains in the negotiation (Belkin, Kurtzberg, & Naquin, 2013). When viewed in this way, our results are consistent with research showing behaviors incongruent with expectations heighten uncertainty, and are associated with negative perceptions of interpersonal attractiveness (Afifi & Burgoon, 2000). Thus, we suggest that interpersonal impressions formed over CMC are based not only on the available cues, including language cues, but on the cognitive models people use in interpreting these cues and predicting future communicative behavior.

Implications

CAT acknowledges the importance of social roles and power in communication behaviors. We have demonstrated accommodative processes, specifically in linguistic style, occurring in relation to power using instant messaging as a communicative medium. We therefore add to the literature base of CAT extending the framework from face-to-face communication to encompass a variety of online or otherwise computer-mediated interactions (Gasiorek et al., 2015). Thus, at a broader level, our results could be taken as evidence that CMC technologies which involve real time synchronous message exchange (e.g., instant messaging, online chat) do a fair job of approximating face-to-face conversations. We report similar effects of power upon linguistic style accommodation in CMC as those observed in face-to-face communication (Muir et al., 2016). Text-only communication methods, whilst altering the *content* of communication, may not fundamentally alter the effects of power upon the *style* in which we communicate.

Our findings also have implications for language use by individuals in high levels of power in an organizational hierarchy. The findings suggest that communicating in a manner

consistent with expectancies of appropriate communicative behaviors may be particularly important for individuals at high level roles within the hierarchy. This may involve intentionally not mimicking subordinates' behavior and instead engaging in behavioral and/or speech complementarity, to preserve status in interactions and maintain positive working relationships with members lower down in the hierarchy.

Limitations and Future Directions

We acknowledge that the artificial nature of the studies presented herein places limits on the conclusions we can draw from the findings; strangers engaging in a one-time conversation in an experimental laboratory situation may not exhibit the same communicative behaviors and reactions compared to individuals involved in on-going relationships within a real-world, professional workplace hierarchy. A further limitation of these studies concerns the short time periods in which participants conversed (five minutes). Researchers often allocate substantially longer times for CMC compared to face-to-face interactions, due to the extra time taken to type a response. Potentially, then, participants in our studies had only a limited opportunity to form full interpersonal impressions of their interaction partners, limiting the validity of our conclusions. However, one study that directly compared personal impressions formed over face-to-face and CMC conversations found that although face-to-face conversationalists exchanged many more utterances compared to CMC, CMC participants were also able to form impressions and actually showed greater confidence in their evaluations. Thus, people are not necessarily limited by the medium when forming impressions over CMC and allocating extra time may not be necessary (Tidwell & Walther, 2002).

An interesting avenue for future research in this area concerns a closer inspection of the interpersonal dynamics associated with accommodation. For instance, we could examine conversation initiation (e.g., who begins speaking first in a conversation) as an indicator of

conversational dominance, and explore relationships with linguistic style accommodation and interpersonal impressions.[4] Further, CAT predicts there are optimal levels of accommodation, and in some situations convergence above that threshold will be viewed negatively but a certain level of divergence viewed positively (Dragojevic et al., 2016). Giles and Smith (1979) reported that where individuals converged on many aspects of their communication (such as speech rate, pronunciation and message content) this was perceived as overaccommodative, and evaluated more negatively compared to convergence on only speech rate and message content. Consequently, in our studies, even if convergence in linguistic style by judges was not consciously detected by workers, it is possible that this accommodation occurred concurrently with other aspects of their communications that we did not measure, such as message content or length. Accommodation in multiple aspects of the message could therefore have been perceived as over-accommodative and perceived negatively. In future research, it would thus be informative to examine further the relationship between style accommodation and other message aspects, and associations with perceptions of accommodation. We also plan to investigate if there is a 'sweet spot' of linguistic style accommodation in association with high versus low power roles; the optimal balance between convergence and divergence which links to the most favorable interpersonal outcomes, without engendering perceptions of over- or under-accommodation (Gasiorek, 2016).

Conclusions

We demonstrate that despite the limitations of computer mediated modes of communication, power transcends these to shape non-conscious language use. Further, we illustrate that the interpersonal effects of accommodative communications can be highly context dependent. The communication medium, in combination with social context in terms of power roles,

appears to be an important factor in whether linguistic style accommodation is interpreted positively or negatively by conversationalists.

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Notes

1. Study 2 was conducted over three separate experimental sessions. In session 1 (N = 14), each of the seven participants in the worker role had a conversation with each of the seven participants in the judge role, generating 49 dyadic conversations. Participants were then given the instructions for the opposite role and the process was repeated, generating a further 49 conversations. Sessions 2 and 3 had uneven numbers of participants (N = 9 and N = 7 respectively). To manage this, the participant currently without a conversational partner sat out that particular round of conversations. Thus, in session 2, four participants in the worker role had a conversation with each of the five participants in the judge role, generating 20 conversations, before swapping roles and generating a further 20 conversations. In session 3, three participants in the worker role had a conversation with each of the

four participants in the judge role, generating twelve conversations, before swapping roles and generating a further twelve conversations.

2. ZQ is calculated as follows. To characterise the extent to which an individual accommodated (or not) their linguistic style, we first estimated their baseline linguistic style by averaging the percentages of function words they uttered across all the conversations they had in the study (e.g., every conversation a worker had with each of the judges). We then calculated the extent to which, for each individual conversation, variation in the individual's linguistic style from their baseline was due to noise, or due to accommodation towards (or away from) their partner's linguistic style. This yields a pairwise speaker-to-recipient ZQ score for each conversation. Each of the pairwise ZQ scores (i.e., a score for each conversation) was then averaged to yield an overall ZQ score for that individual, representing general tendency to accommodate their linguistic style within their role in the study.

3. There were no significant effects of role order (F (1, 28) = 1.25, p = .27, η^2 = .04) and no interaction between power role and role order (F (1, 28) = .96, p = .33, η^2 = .03).

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Table 1. Word Categories used for Calculating Linguistic Style

Category	Examples
Personal pronouns	I, his, their
Impersonal pronouns	It, that, anything
Articles	A, an, the
Conjunctions	And, but, because
Prepositions	In, under, about
Auxiliary verbs	Shall, be, was
High frequency adverbs	Very, rather, just
Negations	No, not, never
Quantifiers	Much, few, lots

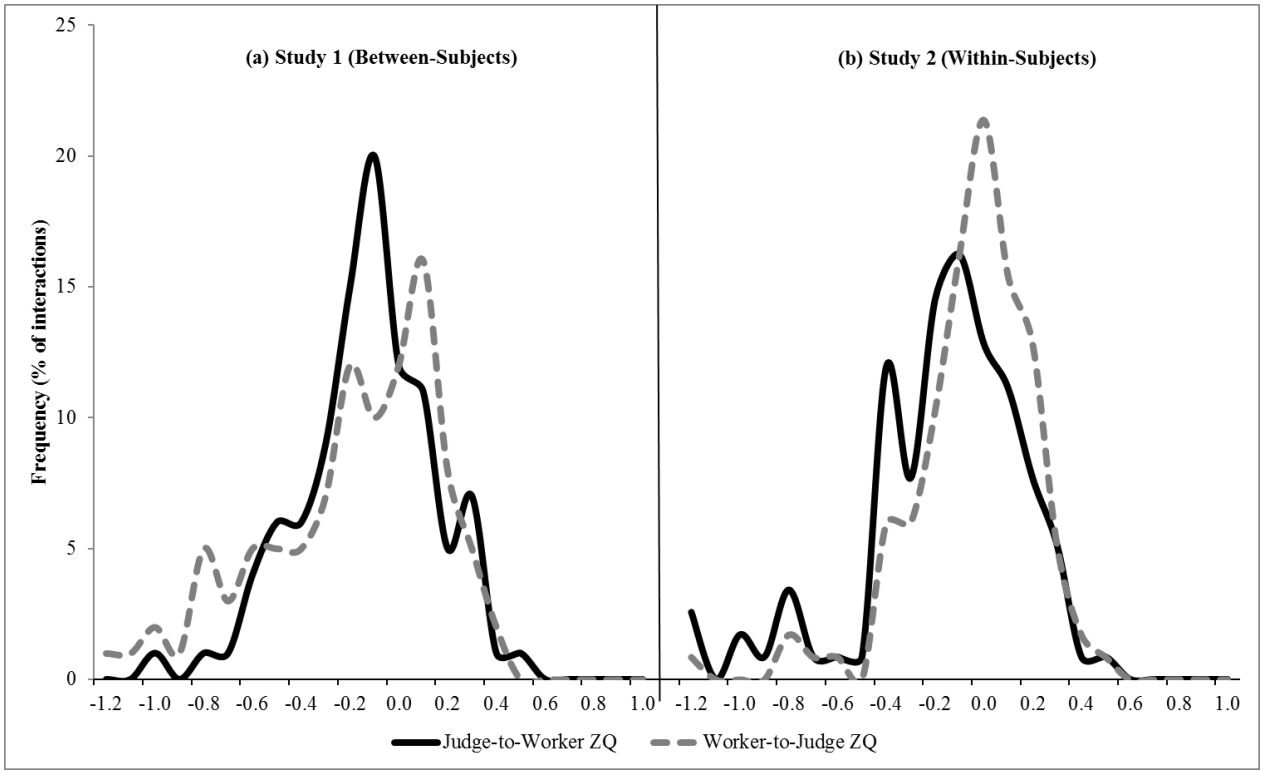

Figure 1. Pairwise speaker-to-recipient Zelig Quotient distributions for conversations between workers (low power) and judges (high power) in Study 1 (a) and Study 2 (b). Positive (+) ZQs represent convergence, negative (-) ZQs represent divergence.

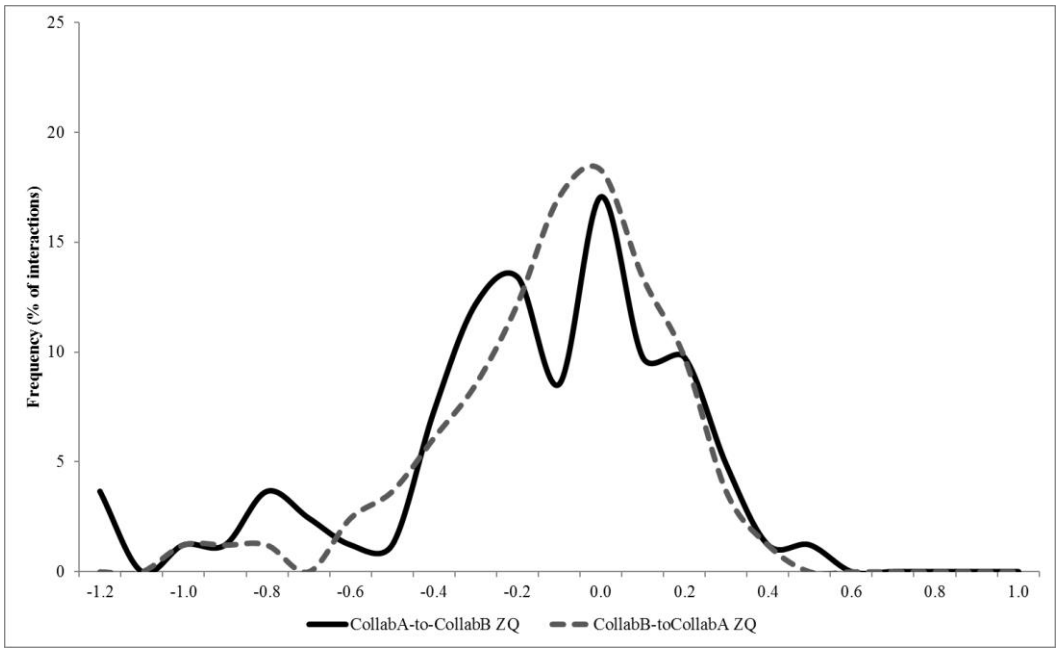

Figure 2. Pairwise speaker-to-recipient Zelig Quotient distributions for conversations between collaborators (neutral power) in Study 1. Positive (+) ZQs represent convergence, negative (-) ZQs represent divergence.

Author Biographies

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