Article

Small Group Research
2019, Vol. 50(1) 3–38

DOI: 10.1177/1046496418785019
journals.sagepub.com/home/sgr
SAGE

Language and Group Processes: An Integrative, Interdisciplinary Review

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Abstract

This article reviews research that examines the use of language in small interacting groups and teams. We propose a model of group inputs (e.g., status), processes and emergent states (e.g., cohesion, influence, and innovation), and outputs (e.g., group effectiveness and member well-being) to help structure our review. The model is integrated with how language is used by groups to both reflect group inputs but also to examine how language interacts with inputs to affect group processes and create emergent states in groups, and then ultimately helps add value to the group with outputs (e.g., performance). Using cross-disciplinary research, our review finds that language is integral to how groups coordinate, interrelate, and adapt. For example, language convergence is related to increased group cohesion and group performance. Our model provides the theoretical scaffolding to consider language use in interacting small groups and suggests areas for future research.

Keywords

language, group process, cohesion, LIWC, status

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Small groups and teams are complex, adaptive systems that engage in multiple processes associated with adding value to the system in which they are embedded, to the group itself, and to members of the group (McGrath, Arrow, & Berdahl, 2000). Across the panoply of informative models of these processes from the disciplines of psychology (e.g., McGrath, 1991; McGrath et al., 2000), management (e.g., Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Marks, Mathieu, & Zaccaro, 2001), and communication (e.g., Orlitzky & Hirokawa, 2001), it is apparent that group members need to communicate extensively to coordinate, adapt, and interrelate with one another. Because groups and teams are inherently social, the language that arises as members interact with one another is central to their existence and functioning (Bonito & Sanders, 2011).

"Language use frequently involves the recoding of implicit, nonlinguistic representations into explicit, linguistic ones" (Holtgraves & Kashima, 2008, p. 74). Several group inputs, processes, emergent states, and outputs, such as cohesiveness (Keyton & Springston, 1990), conflict, power, and status (Sell, Lovaglia, Mannix, Samuelson, & Wilson, 2004) can be analyzed through an explicit linguistic representation. Traditionally, research has examined language as a reflection of individual states and emotions (Semin, 2000), but within the context of groups, language is not only reflective but also is used by members to influence and create integration and cohesiveness.

Model of Group Interaction

Models of groups and teams often take an input–process–output approach to understand group communication and performance (Ilgen et al., 2005). Using this overarching model, we identified inputs, processes and emergent states, and outputs in groups that had been studied in conjunction with language use, and we explicate these here within the context of previous theories and models of groups (Figure 1).

Groups and their members begin with different inputs that affect their interaction (Hollenbeck, Beersma, & Schouten, 2012). Although members can certainly claim status during a group interaction, members often have a priori differences in authority, status, or hierarchy. Groups also begin with member differences in information, preferences, and opinions. These a priori differences affect group behavior and may be manifested in language use.

During interaction, groups are working through interpersonal and teamwork processes during which time group states, such as cohesion, emerge (Marks et al., 2001). Group members are also working on task-related processes and adapting (Argote, Gruenfeld, & Naquin, 2001; Ilgen et al., 2005). In our model (Figure 1), we identify the intersection of language use

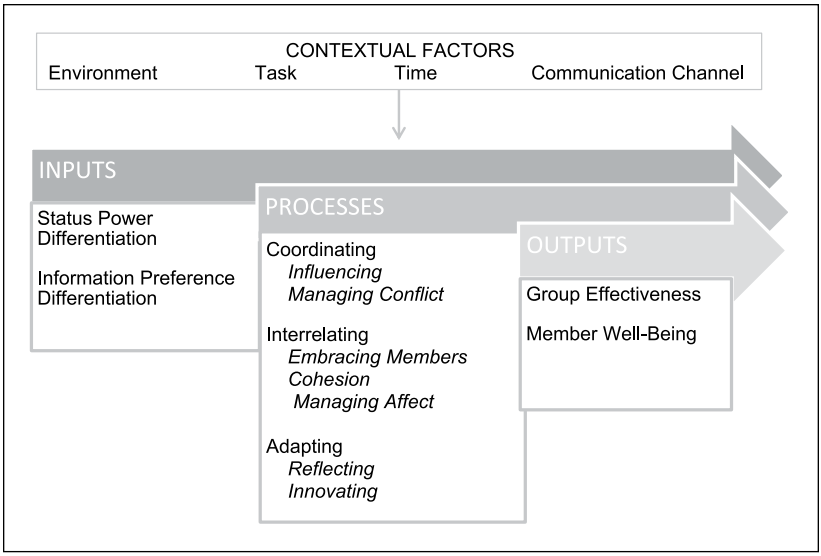

Figure 1. Group interaction model.
Note. Contextual factors form the background for an emergent process through which inputs beget processes and emergent states, which, in turn, give rise to outputs.

and group processes and emergent states related to coordinating, interrelating, and adapting. In addition, language use can strengthen group inputs, such as status, or interact with inputs to affect group processes. To maximize coverage of the literature, we take an interdisciplinary view of each process and emergent state. For example, cohesion (Salas, Grossman, Hughes, & Coultas, 2015) and language have been examined in many different disciplines and have been conceived of in terms of attraction in teamwork settings (Castro-Hernandez, Swigger, & Ponce-Flores, 2014) as well as in terms of attraction among group members (Manson, Bryant, Gervais, & Kline, 2013).

Ultimately, groups engage in functions associated with adding value to the group and its members (McGrath, 1991). So we examine how language use and the processes examined relate to group effectiveness and member well-being. Our review was driven by the availability of research on language and groups. For example, there is an abundance of research on status and language use, but we were unable to find as much research examining the effects of informational differences on language use or examining how processes such as innovation are reflected in language use in groups. Thus, we revisit these in future directions.

By examining empirical research on language and groups, we aim to integrate the literature that often only examines one element (e.g., cohesion) and that is often scattered across different disciplines working within their own theories and methodologies. With its focus on small group interaction, our review can be readily distinguished from existing language reviews, such as a recent review of intergroup communication (Keblusek, Giles, & Maass, 2017) and an earlier review of social processes in relationships (Pennebaker & Chung, 2013).

Literature Search Methodology

This review considers research published over the past quarter century (1985 through 2017) in the fields of communication, computer science, education, human factors, management, marketing, and psychology that examines language use in small groups and teams. We began by searching for titles, abstracts, or keywords that referenced groups and language use or text-analysis tools for analyzing language use. Search terms included "groups or teams or group dynamics," "language use," "text analysis," "computer-aided text analysis," and the 18 computer-aided text analysis programs outlined by Neuendorf (2017), including Linguistic Inquiry Word Count (LIWC; Pennebaker, Francis, & Booth, 2001) and Diction (Hart, 2000). In addition, we picked seminal, highly cited articles from our search and checked where they had been cited. This produced a set of more than 1,000 articles. Reviewing titles and abstracts, we excluded master's theses or dissertations and publications unrelated to groups and teams, such as publications examining cognitive basis of language use and the use of national languages (e.g., German) among bilinguals, heritage speakers, and immigrants. From these articles, we identified 115 articles that we reviewed in detail, and in doing so added additional papers that were referenced in these articles that met our criteria but had not been found in our initial search. We excluded theoretical and review articles (e.g., Guerin, 2003; Yilmaz & Youngreen, 2016), focusing on publications reporting original findings. We excluded studies that did not involve group members using language when interacting. Although most sociocognitive experiments examining linguistic intergroup bias (LIB) were excluded, we included studies that involved communication among group members (e.g., Gustafsson Sendén, Lindholm, & Sikström, 2014). We excluded studies of friendship dyads and romantic couples but did include research on dyads working on negotiation tasks (e.g., Ireland & Henderson, 2014).

Altogether, we found 80 publications that fulfilled our criteria. As the members of the groups documented in these publications interacted with one

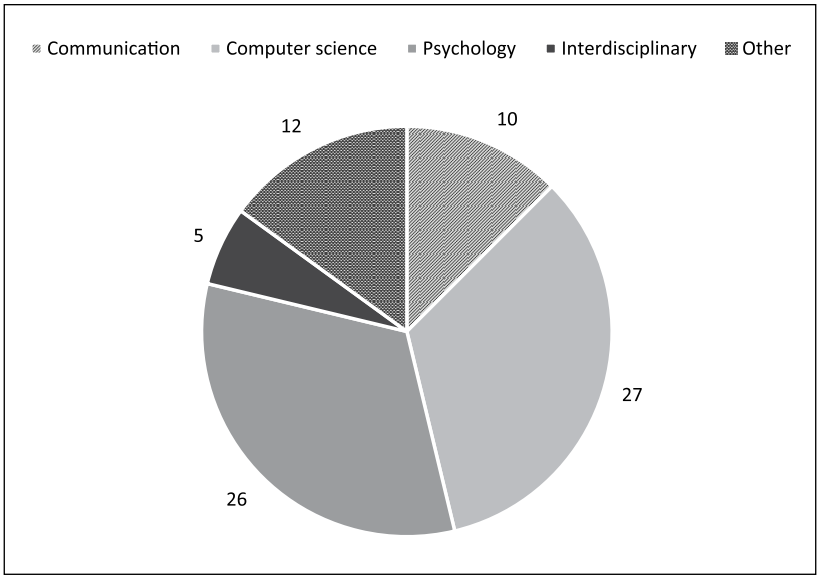

Figure 2. Interacting groups' language use publications by discipline.
Note. Shown clockwise, communication contributed 10 publications, computer science 27, and psychology 26. Five appear in interdisciplinary outlets. Other includes five in management, four in human factors, two in education, and one in marketing.

another they used face-to-face (Kane & Rink, 2016; Van Swol & Carlson, 2017) as well as computer-mediated communication channels (Stevenson, Lytle, Baumholser, & McCracken, 2017; Yilmaz & Peña, 2015). Experimental groups engaged in a variety of involving tasks that required members, for instance, to weigh evidence to make complex decisions (Van Swol & Carlson, 2017; Yilmaz, 2016), produce origami sailboats (Kane & Rink, 2015), or monitor airspace (Hansen & Levine, 2009). Naturalistic groups also collaborated intensely to support members (Han et al., 2008), share best practices (Matthews et al., 2015), fly airplanes (Goguen, Linde, & Murphy, 1986), and apply science to manage space exploration rovers (Paletz & Schunn, 2011).

The publications included in our selection appeared in key outlets for communication (e.g., *Communication Research, Communication Monographs*), computer science (e.g., *Computers in Human Behavior, Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*), psychology (e.g., *Group Processes and Intergroup Relations, Journal of Language and Social Psychology*), and for interdisciplinary audiences (e.g., *PloS One, Small Group Research*). As shown in Figure 2, computer science and psychology

each contributed approximately one third of the publications, communication outlets contributed 13%, interdisciplinary outlets contributed 6%, and the remaining 15% come from other disciplines (i.e., management, 6%; human factors, 5%; education, 3%; and marketing, 1%).

Academic interest in groups whose members use language when interacting with one another dates back to the 1980s when researchers conducted seminal work demonstrating that airplane crew communication influences performance and safety (e.g., Goguen et al., 1986). Aside from black box recordings and flight simulators, it was relatively rare for group interactions to be recorded in ways that lent themselves to granular empirical study of language given the expense and difficulty of recording in the lab. In addition, theory in both communication (Hewes, 1986) and psychology (Davis, 1973; Laughlin & Ellis, 1986) often downplayed communication in small groups. This changed substantially with the rise of computer-mediated communication, the increasing availability of data, including natural language data, and the advent of computer-aided text analysis tools, which rose in use toward the end of the first decade of the 21st century. One popular tool, LIWC, focuses on function words such as pronouns, negations, or conjunctions that do not reflect specific semantic information but are used at a high frequency (Boyd & Pennebaker, 2016; Pennebaker, Chung, Ireland, Gonzales, & Booth, 2007). A group's internal dynamics may be revealed by its members' use of these function words (Pennebaker & Chung, 2013). For example, language convergence has commonly been examined as language style matching (LSM), which uses nine LIWC function word categories to measure similarity and mimicry of language use among speakers (Gonzales, Hancock, & Pennebaker, 2010), but has also been operationalized in other ways, including mimicry on the next turn of talk (Danescu-Niculescu-Mizil, Lee, Pang, & Kleinberg, 2012) or as correlations among a broader array of LIWC categories (Budak & Agrawal, 2013).

Accordingly, in Figure 3, we see a rise in publications beginning in 2005, which has been maintained for over a decade. It is noteworthy that between 2005 and 2017, the discipline of psychology consistently contributed publications. Commencing in 2010, computer science gained prominence and the discipline of communication also displays renewed interest in the topic of language use in interacting groups.

Literature Review

Group Inputs Reflected in Language Use

Status and power differentiation. If group members' status is known a priori, status is an input that affects interaction. However, status can also be an emergent process, and language rather than reflecting status can build to

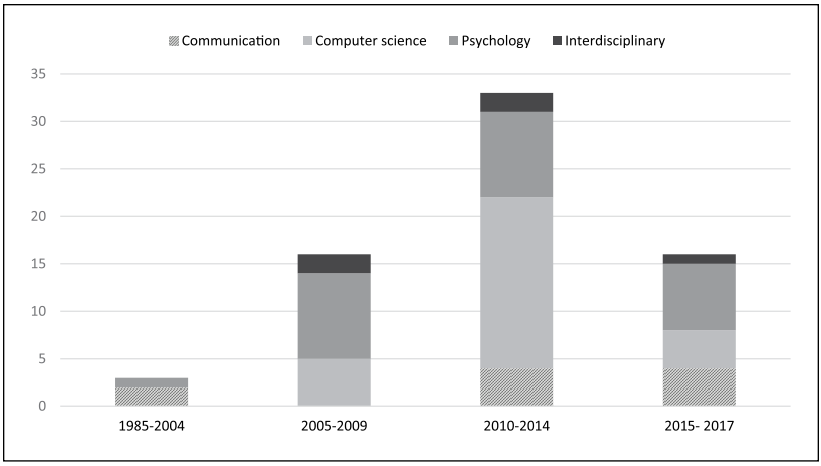

Figure 3. Group language use publications as a function of time and discipline.
Note. There is a steady flow of work in psychology, new interest from computer science and in interdisciplinary outlets, and renewed interest in communication.

create it. First, we review research examining how status is reflected in the language that high and low status group members use. Much research has found that status is reflected in pronoun use, which can reveal focus of attention on oneself or on others (Pennebaker, 2011). Marginal, low status members tend to use singular pronouns, such as "I," rather than collective pronouns, such as "we," because they lack standing in the group, gain esteem from their personal identity, and tend to have a self-focus (Brewer & Gardner, 1996; Jetten, Branscombe, Spears, & McKimmie, 2003; Kacewicz, Pennebaker, Davis, Jeon, & Graesser, 2014; Rink & Ellemers, 2011). This result has been found in emails and letters between high and low status group members (Chung & Pennebaker, 2007; Kacewicz et al., 2014), in online forum discussion groups (Dino, Reysen, & Branscombe, 2009; Reysen, Lloyd, Katzarska-Miller, Lemker, & Foss, 2010), in airplane crews (Krifka, Martens, & Schwarz, 2003; Sexton & Helmreich, 2000), in discussions among doctors, patients, and companions (Sakai & Carpenter, 2011), in long-term online collaboration (Scholand, Tausczik, & Pennebaker, 2010b), and in the conversations of ad hoc laboratory groups (Kacewicz et al., 2014). Low status group members may be more self-focused or may be trying to call attention to themselves to gain visibility from higher status members.

Dino et al. (2009) also found that lower status members in online discussion groups used more emotional language (see also, Reysen et al., 2010) and exclamation marks, which may be done to gain attention. High status

members may have a more outward focus, be more socially attuned, focus more attention to their groups, and they may have gained status by being more focused on their groups and engaging with others (Flynn, Reagans, Amanatullah, & Ames, 2006; Kacewicz et al., 2014). Indeed, Dino et al. (2009) found high status members used more social language. Higher status members are also likely to dominate a group discussion (Itakura, 2001; Palmer, 1989; Sakai & Carpenter, 2011; Sapru & Bourlard, 2013). For example, airplane captains use more words per turn than other crew members (Krifka et al., 2003), and teams with fewer status differences have more equality of participation than teams with a steep status hierarchy (Paletz & Schunn, 2011).

Communication accommodation theory (Giles & Coupland, 1991) proposed that individuals change their communication style and language to reflect relative status. Low status members are more likely to converge and change their communication style and language to be more similar to high status members (S. Jones, Cotterill, Dewdney, Muir, & Joinson, 2014; Muir, Joinson, Cotterill, & Dewdney, 2016; Muir, Joinson, Cotterill, & Dewdney, 2017). Lower status Wikipedia editors were more likely to match their language to higher status editors, and when editors gained status, they decreased the amount of language coordination. Similar results were found for interactions in the U. S. Supreme Court; lawyers (low status) coordinated their language more to Supreme Court Justices (high status), especially the chief justice (Danescu-Niculescu-Mizil et al., 2012). Liao, Bazarova, and Yuan (2016) found that in face-to-face groups, members with lower confidence matched the linguistic style of group members with higher confidence more than higher confidence members matched others, and this accommodation led to perceptions of lower expertise. In MOOC (massive online open course) discussion groups, students were found to be more likely to match the language of student leaders than to match the language of other students (Moon, Potdar, & Martin, 2014).

Polite language can also be used to examine status differences (Miller, Rye, Wu, Schmer-Galunder, & Ott, 2014). Polite language involves the expression of positive emotions and frequent use of hedges, indirect language, and counterfactual language (Danescu-Niculescu-Mizil, Sudhof, Jurafsky, Leskovec, & Potts, 2013), which is coupled with infrequent use of negative language and little expression of negative emotions (Fiske et al., 2015). Generally, lower status group members use polite language more frequently than do higher status group members (E. Jones, Gallois, Callan, & Barker, 1999; O'Barr, 1982). Wikipedia editors elected to high status positions used less polite language after attaining status, but more polite language before their election, and editors who lost elections used more polite

language after losing (Danescu-Niculescu-Mizil et al., 2013). Goguen et al. (1986) found that low status airplane crew members used more mitigated, indirect speech ("the window needs to be closed") than did high status crew members who used more direct speech ("close the window"). Lower status members in online discussion forums tended to use more positive emotional language (Reysen et al., 2010), which may, in turn, increase likeability. Indeed, members of a class discussion forum who used more positive emotion words (e.g., glad, support, trust) ended up being more central in the emergent communication network (Vercellone-Smith, Jablokow, & Friedel, 2012). Lower status group members were less likely to use negative emotion language when conversing with high status members (Scholand, Tausczik, & Pennebaker, 2010a). Thus, politeness may indicate status and dependency in group interactions (Danescu-Niculescu-Mizil et al., 2013).

Language use and participation in group discussions is a means by which status may emerge in groups (Huffaker, 2010). Group members who dominate discussion, which is generally an indicator of emerging status, tend to use more negative emotion language (Paletz & Schunn, 2011). Although most research on pronoun use and status has examined a priori status, research in online discussion groups has found that emergent status was related to greater use of "we" pronouns, possibly reflecting a group focus (Cassell, Huffaker, Tversky, & Ferriman, 2006), and in computer-mediated groups, those who accommodated the language of other members were perceived as less influential and competent (Liao et al., 2018). Finally, members may be perceived as low status by using more language related to ingratiation (Reysen et al., 2010).

Information and preference differentiation. Members may enter a discussion with extreme or moderate views on a group task. In an interactive, face-to-face laboratory study examining how groups discuss controversial issues and chart a collective path forward, group members with extreme opinions entered the discussion with more confidence and a higher perception of their own knowledge, but when these extreme members use more cognitively complex language, their own confidence and influence in the group waned (Van et al 2016). Van Swol, Prahl, Kolb, Acosta-Lewis, and Carlson (2016) explained these results in terms of illusion of understanding. Extreme members may have overestimated their knowledge about the issue and failed to realize the issue's nuances, and when they engaged in more complex discourse with the group, the limits of their knowledge, and their overconfidence may have become more salient.

Group members may also enter a discussion with others who they expect to have different preferences and information based on social category

differences. In one such study of a mock jury, members of racially mixed groups used fewer social words (e.g., admit, advice, sharing) and expressed greater self-focus (e.g., first-person singular pronouns) than did their counterparts in homogeneous groups (Stevenson et al., 2017). The researchers suggested that anxieties about social category differences can lead to self-monitoring and a task focus, whereas social category similarities can lead to comfort manifested in a more social focus. Along related lines, group members holding a majority opinion used pronouns associated with outward focus (e.g., "we," "they") more often than did group members holding a minority opinion (Van Swol & Carlson, 2017). Theory suggests strategic use of such pronouns may help members with minority opinions yield influence (Yilmaz & Youngreen, 2016).

Emergent Group Processes and Language Use

Coordinating

Influencing. Language accommodation and convergence can be used to understand influence in groups (Gonzales et al., 2010). Often when someone converge their language to their partner, it is because they seek social approval or affiliation (Giles & Coupland, 1991). Danescu-Niculescu-Mizil et al. (2012) found that both lawyers and Wikipedia editors were more likely to match the language of someone whose views differed from their own. This language convergence may be a reflection that one is to some extent dependent on a target of influence, and hence, language convergence may reflect the lower status of a persuader. Yilmaz and Peña (2015) found that group members responded to a member who disagreed with the majority with higher word count and more LSM. They suggested that higher LSM and word count reflected engagement with and attempts to influence the disagreeing member. Research has found that workers in a simulated lab task were more likely to accommodate the language of high-status decision makers, and that this effect was strongest for participants higher in leadership, self-monitoring, and Machiavellianism because such individuals are likely to proactively use language to influence others (Muir et al., 2016). Another moderator of the relationship between language convergence and influence in a group discussion is found in the information and preference differentiation of group members. In particular, Van Swol et al. (2016) found a positive association between language convergence and influence for group members with moderate views about a controversial issue, but a negative association for members with extreme views, possibly because the discussion contributions of extreme members were more negative.

Huffaker (2010) examined how members become influential in online discussion groups. Consistent with research on emergent status, those who contributed more to the discussion were more influential, but also those who used more emotional language had more influence. In online discussions, people may be attracted to debates and heated discussion. Accordingly, emotional language could make people more interested in someone's contribution to the group and indicate that the member is especially passionate. Along related lines, assertive language (i.e., always, never) has also been associated with influence in online settings (Huffaker, 2010).

Linguistic complexity could also yield influence in groups. In online discussion, for instance, those expressing ideas with greater linguistic diversity had more influence in the group, possibly because it signals competence (Huffaker, 2010). Van Swol and Carlson (2017) found that people holding minority opinions were more influential in groups when they used more causation language, which could be indicative of argument development. Because numerical minority members cannot persuade through normative influence, it is important that they have well-reasoned arguments. Similarly, complexity of language could be used to identify members with influential roles in a group discussion. Sapru and Bourlard (2013) analyzed the discussions of design teams and found that group members who were very active in the discussion and drove the agenda used more language indicative of complex thinking such as causation or inhibitive language. However, members who tended to be more neutral and passive used language indicative of low cognitive complexity.

Majority members were less influential when they used more "you" pronouns. Given that previous research has found that "you" pronouns are often used with accusation, blaming, and distancing, majority members who try to persuade a minority with "you" pronouns may have been perceived badly or engendered defensiveness (Van Swol & Carlson, 2017). Similarly, group members with extreme opinions, who tended to have higher belief superiority and held their opinions with more confidence, used more "you" pronouns in a group discussion than other group members, and the more that extreme members used "you" pronouns, the less influence they had in the group (Van Swol et al., 2016). On balance, when there is disagreement in the group and the influence attempt is from members who may be more confident in their opinion, use of "you" pronouns may be counterproductive in a group discussion.

Managing conflict. Use of "you" pronouns can reflect a focus on others in relation to oneself and has been linked with negativity, confrontation, blaming, criticism, arguing, extremity, and accusation (Biesen, Schooler, &

Smith, 2016; Simmons, Chambless, & Gordon, 2008; Van Swol et al., 2016). Pennebaker (2011, p. 175) states that "you" pronouns are "the equivalent of pointing your finger at the other person while talking." For example, in a decision-making group with a confederate playing devil's advocate, use of "you" pronouns was higher than in a group where the confederate agreed with group members (Yilmaz, 2014). Swaab, Phillips, Diermeier, and Medvec (2008) found that when groups could split into subfactions, use of "other" focused pronouns increased, and this reduced the ability to reach an agreement. Thus, pronouns indicating a focus on others may indicate conflict.

Swaab et al. (2008) were also able to operationalize conflict in groups by examining language related to disagreement, such as negations, and dissent ("cannot, doesn't, isn't, no, not, wasn't, and without," p. 383). Other research has linked negations with more conflict in the group (Yilmaz & Peña, 2015). Negations can reflect engagement, as members try to hear each other's different viewpoints, and this could indicate the presence of more task conflict.

Negative emotion words, which could be indicative of more relationship conflict, have been linked to more conflict and inability to come to an agreement (Brett et al., 2007; Huffaker, Swaab, & Diermeier, 2011). On the contrary, group members use more assents and acknowledging language when they are acting in ways supportive of others, engaging in few conflicts, and reaching agreements (Huffaker et al., 2011; Sapru & Bourlard, 2013; Yilmaz & Peña, 2015). Group members who respond to dissent with more positive emotion language and assenting language generally have more positive interpersonal behavior in team discussions (Fischer, McDonnell, & Orasanu, 2007).

Interrelating

Embracing members. The process through which groups embrace some members and distance away from others depends on both the characteristics and actions of individual members and the group (Moreland & Levine, 1982). Central to this reciprocal influence process is how language use can signal commitment to the group, which in turn, tends to be reciprocated with social acceptance. Although some forms of this "group talk" are highly context-dependent with unique vocabulary (Eastman, 1985; Kadar & Bax, 2013), other forms are relatively context-independent, as outlined below.

Personal pronoun use may signal that people are connecting to others (Pennebaker & Chung, 2013). In a breast cancer support group, over the group's 11-week life span, members' use of "I" pronouns decreased, while their use of "you" pronouns increased (Alpers et al., 2005). Virtual team members faced with a difficult coworker (a confederate instructed to create a negative impression) frequently used "we" and "you" pronouns (Yilmaz,

2014). Pragmatic theory (Helmbrecht, 2002) and qualitative research in organizational settings (Kane & Levina, 2017) points out that the pronoun "we" tends to be used in an inclusive way, but it can also be used to exclude others, as in this case with virtual team members embracing each other and distancing from the difficult member. Demmans Epp, Phirangee, and Hewitt (2017) found that greater use of pronouns in a classroom online discussion was related to more posting and replies and suggested that use of pronouns created more social presence and reduced psychological distance. Other research has found that people respond more to posts in online discussion groups that contain more personal pronouns (Arguello et al., 2006), especially when they also signal a member's interest in the group (Burke, Kraut, & Joyce, 2010).

First-person plural pronouns (e.g., "we") may reflect collective identity (Ashmore, Deaux, & McLaughlin-Volpe, 2004; Brewer & Gardner, 1996) and can be used to evoke as well as foster group attachments (Goffman, 1981; Guerin, 2003). An experiment where participants were tasked with composing sentences from a list of words revealed that people used many more collective "we" pronouns when working with a group member than when working alone (Gustafsson Sendén et al., 2014). An archival analysis of Australian election speeches revealed that constituents embraced leaders who used fewer personal pronouns and more collective pronouns (Steffens & Haslam, 2013). Unlike leaders who have high status, newcomers rarely use collective pronouns; however, such pronouns could be used strategically to signal group commitment and help the newcomers integrate into the group (Rink, Kane, Ellemers, & Van der Vegt, 2013). Testing this notion, a scenario and an interactive group experiment revealed that group members displayed greater social acceptance of a newcomer who used integrating pronouns (i.e., "we," "our") than of a newcomer who used differentiating pronouns (i.e., "I," "you," Kane & Rink, 2015). Along related lines, the emergence of "we" language in a team composed of educators, researchers, and consultants signaled that the members were embracing one another as a multiprofessional team (Gillispie & Chrispeels, 2008).

The level of abstraction that members use when speaking about their own group is another way of signaling group commitment. Sociocognitive work demonstrates a LIB construal pattern (i.e., abstract descriptions of in-group attributes and out-group deficiencies; concrete descriptions of in-group deficiencies and out-group attributes) that positively differentiates one's in-group (Keblusek et al., 2017). An intragroup experimental study reveals that individuals instructed to be a "loyal and supportive group member" used language consistent with LIB more often than did individuals instructed to be "a disloyal and unsupportive member of the group" (Assilaméhou & Testé, 2013, Study 1, p. 114). Additional studies focused on responses to language

use revealed that group members embraced a member who used LIB-consistent language and distanced from a member who used LIB- inconsistent language (Assilaméhou & Testé, 2013, Studies 2 and 3). On balance, the use of collective pronouns and group-enhancing construal appears to signal a speaker's commitment to the group, which in turn, tends to be reciprocated with social acceptance from other group members.

Moderators. Assilaméhou and Testé (2013) found that social acceptance from the group depended much more on group-enhancing construals made in reference to an in-group than in reference to an out-group, which may be due to the inherently intragroup nature of managing group membership. In another experiment, strongly identified members of a group appreciated a leaders' use of collective pronouns, whereas weakly identified members did not (Hornsey, Blackwood, & O'Brien, 2005). Among health care teams managing a simulated medical emergency, the more a team leader, who was a doctor, used collective pronouns the more other doctor team members, but not nurse team members, felt comfortable expressing themselves (Weiss, Kolbe, Grote, Spahn, & Grande, 2017). A final moderator is a member's future prospects in the group (Rink & Ellemers, 2009). Experiments reveal greater embracing of a permanent newcomer who used integrating pronouns (e.g., "we") compared with a permanent newcomer who used differentiating pronouns (e.g., "I," "you"), but more distancing of a temporary newcomer who used integrating pronouns compared with a temporary newcomer who used differentiating pronouns (Kane & Rink, 2016). Taken together, these studies suggest that embracing may result more often when members, who have future prospects in the group, use collective pronouns and group-enhancing construals to reference a group when communicating with other members who themselves identify with the group.

Cohesion. This emergent state may arise as members become engaged with and attracted to a group from the point of view of social rapport as well as shared task perspectives (Castro-Hernandez et al., 2014; Manson et al., 2013). Language convergence, especially as measured with LSM, has been used as a key linguistic indicator of cohesiveness (Pennebaker & Chung, 2012; Salas et al., 2015). Whereas a few studies have found no association (Carmody, Mateo, Bowers, & McCloskey, 2017; Munson, Kervin, & Robert, 2014), most studies have found a positive association between language convergence and indicators of cohesion (Budak & Agrawal, 2013; Castro-Hernandez et al., 2014; Gonzales et al., 2010; Manson et al., 2013; Muir et al., 2017; Scissors, Gill, & Gergle, 2008; Tausczik & Pennebaker, 2013). For example, Gonzales et al. (2010) found that LSM was associated with group members' self-reported cohesiveness.

Research examining linguistic and paralinguistic mimicry and convergence found that mimicry and convergence in group discussion had a stronger relationship to social cohesion than to task cohesion (Nanninga, Zhang, Lehmann-Willenbrock, Szlálvik, & Hung, 2017). Furthermore, when Tausczik and Pennebaker (2013) gave groups feedback to increase their level of engagement in discussion (e.g., "Be sure to pay attention to what others are saying" p. 462), LSM increased in the group. People tend to converge in their language with people they like and who are similar to themselves (Moore & McFerran, 2017), but language convergence, synchrony, and mimicry can also lead to greater liking, rapport, trust, and perception of similarity (Chartrand & Bargh, 1999; Giles, 2008; Xuan & Filkov, 2013). Therefore, there may be a reciprocal influence between language convergence and cohesion as these dynamic processes unfold in interacting groups. Thus, language convergence may increase cohesion, but cohesive groups are also likely to have more language convergence.

Group engagement and shared perspectives aspects of cohesion may arise from group composition (e.g., homogeneous experiences) and manifest themselves linguistically in collective first-person pronouns and in positive group references. Consistent with this argument, compared to online health support groups composed of members with heterogeneous disease experiences, homogeneous support groups used more collective pronouns ("we," "our") and expressed positive feelings about the group, and these differences manifested in the first 5 weeks of a 20-week support group intervention (Lieberman, Wizlenberg, Golant, & Di Minno, 2005). A study of interactions across a 5-year period in 142 workplace community-of-practice groups revealed the use of fewer first-person singular pronouns ("I," "me") and more first-person plural pronouns ("we," "us") in groups whose members were collectively more satisfied with the community (Matthews et al., 2015). Research with airplane crews also found that use of "we" pronouns was positively related to performance (Sexton & Helmreich, 2000). Contrary to their hypothesis and the aforementioned findings, Gonzales et al. (2010) found a negative relationship between use of "we" pronouns and a measure of cohesion collected from student groups in the laboratory completing an information search task. Caution may be warranted in interpreting the last result, as cohesion is a group state that can take days, weeks, or months to emerge (Waller, Okhuysen, & Saghafian, 2016).

Moderators. Engagement aspects of cohesion tend to be salutary and have even been associated with members' well-being in a support group context (Lieberman et al., 2005). However, in negotiations where members may be in opposition and have conflicting motives, engagement can focus on hostility

and reduce the ability to cooperate and reach a solution (Ireland & Henderson, 2014; Manson et al., 2013 although see Taylor & Thomas, 2008). In a group with more dissent and use of negative language, such as negations, the mutual engagement through language convergence may not be productive. Increases in language convergence were related to worse performance for groups with an uncooperative member who spurred negative communication and dissent, but increased performance in groups with positive communication (Yilmaz, 2016). This suggests that the engagement that language convergence reflects may only be beneficial in groups with cooperative members and shared goals.

Muir et al. (2017) found that high power members who accommodated the language of low power group members were perceived negatively in terms of rapport and social attractiveness, possibly because they violated expectations that high power members should engage in language divergence (see also Curhan & Pentland, 2007). Muir et al. (2016) found that low power members perceived the interaction as lower quality when they accommodated the language of the high power member, although the high power member perceived the low power member more positively as a result of the accommodation. Thus, when there are power dynamics the effects of language convergence on cohesion are nuanced as high status group members may not be expected to engage in linguistic convergence.

Managing affect. On balance, LIWC's emotion word categories appear to capture group sentiments with validity confirmed in studies of online breast cancer support groups (Alpers et al., 2005) and yahoo chat groups (Chee, Berlin, & Schatz, 2009), though one study of cancer support groups suggests that LIWC indicators may be more valid for negative affect and anger expression than for positive affect expression (Liess et al., 2008).

Research with online groups (Holyst, Chmiel, & Sienkiewicz, 2017) has examined how emotion expression works as a form of influence. Responses to a group member often echo the same emotion possibly through mimicry, and so language of members reinforces and amplifies the initial emotion in the discussion, forming an emergent cluster in the group discussion where one emotion dominates. People respond more to online discussion posts that contain more emotional language (Arguello et al., 2006), and this can help amplify emotions within a group.

Positive emotion language, assents, and agreement may also be linguistic indicators of a positive group climate (Fischer et al., 2007; Krifka et al., 2003). For example, small groups of students who worked remotely with peers of another faith under effective teamwork conditions (e.g., common goal, engaging joint tasks, equal status, dual identity) were significantly more

likely to express positive emotions than were their counterparts in a control condition (White, Abu-Rayya, Bliuc, & Faulkner, 2015). This can help outcomes, which we discuss in the "Group Outputs and Language Use" section. Group members used more positive emotion language when they knew each other less well (Scholand et al., 2010a). Geographically distributed software developers communicating via online collaboration tools to complete projects more frequently expressed positive emotions than negative emotions (Licorish & MacDonell, 2012). This likely reflects greater use of politeness among members who do not know each other well or are distributed remotely.

A study comparing emotional expression in online versus face-to-face support groups for adolescents and young adults with cancer found that both types of groups expressed more positive than negative emotions, but that groups communicating face-to-face expressed nearly twice as much positive emotion than did those using the computer-mediated channel (Thompson, Crook, Love, Macpherson, & Johnson, 2016). Furthermore, the online groups expressed significantly more anger and sadness than did face-to-face groups, suggesting that "individuals feel more comfortable expressing negative emotion online rather than face to face" (Thompson et al., 2016, p. 2642). Another study of online breast cancer support groups again found that negative emotion expression was less prevalent than positive emotion expression and importantly that decreases in negative emotion expression were associated with improvements in well-being for individual members (Han et al., 2008). This work highlights the value of groups managing negative affect.

Adapting

Reflecting. Whereas an individual may engage in solitary reflection, group members need to be communicating with one another to be reflecting as a group on their process, tasks, or the group itself. Accordingly, indicators of group reflection span the gamut from communication frequency and amount to complexity of vocabulary used (cf. Rink et al., 2013). Gonzales et al. (2010) found a positive association between cohesion and reflecting as measured by word count. Other research has found a positive association between word count, which could indicate more reflecting, and group performance (Castro-Hernandez et al., 2014; Sexton & Helmreich, 2000). But, not all types of group reflecting have similar effects on subsequent group interrelating, particularly managing affect. In an educational setting, virtual project teams engaged in more task-related than social reflection, as evidenced by the number of posts in forums, and this was positively related to task performance (Castro-Hernandez et al., 2014). In an experimental study of virtual teams, more communication and better task performance occurred in teams with a difficult coworker compared with teams with a coworker trying to

make a good impression (Yilmaz & Peña, 2015), which is consistent with work on minority influence in groups (Nemeth, 1992). But, in a mock-jury experiment, compared to participants working in a racially homogeneous group, participants in a racially heterogeneous group took longer formulating their communication and expressed themselves with fewer words (Stevenson et al., 2017).

Language categories such as cognitive mechanism words (e.g., "cause," "because"), conjunctions, prepositions, and words per sentence can reflect language complexity (Tausczik & Pennebaker, 2010; Van Swol et al., 2016) and indicate more use of rational argumentation. For example, negotiators who used more facts and rational persuasion than emotion-based appeals used more cognitive mechanism words (Gelfand et al., 2015). In an analysis of work-related instant message conversations between 18 team members collected over a year (Scholand, Tausczik, & Pennebaker, 2009), more complex language was used by team members when they were discussing work related, as opposed to more social, topics. In addition, team members used more complex language when communicating with group members who were more difficult to approach, suggesting group members were not having social conversations with these members and only communicated with them on task topics. Research with online discussion groups found that use of complex language decreased replies from receivers (Arguello et al., 2006). Poor performing airplane crews used more large words; use of large words (possibly indicating more technical terms) was related to more errors (Krifka et al., 2003; Sexton & Helmreich, 2000). Use of larger words could come at the expense of more concise communication or use of larger words may take more cognitive resources, making it more difficult to then reflect on the contribution (Sexton & Helmreich, 2000). This work suggests that language complexity has important implications for group reflection and its effects on members' influence and participation.

Moderators. The presence of a group member with an extreme opinion could act as a moderator on language complexity. The presence of a group member with an extreme opinion lowered the cognitive complexity of discourse in the group, possibly because meaningful deliberation with extreme members is difficult (Van Swol et al., 2016).

Task load can moderate the language used as groups reflect on their task. As groups start to work on tasks, they may cycle through phases that require higher cognitive load and may use language as a means to cope with cognitive load. Research on discussion groups in an online course found that increased cognitive presence in a group discussion was correlated to greater use of words indicative of cognitive load (Joksimovic, Gasevic, Kovanovic,

Riecke, & Hatala, 2014). They defined cognitive presence as "operationalized through practical inquiry (i.e., critical thinking) to support the development of the model for critical discourse" (p. 640). Hence, when groups were engaging in critical thinking, they were using more language indicative of cognitive load such as articles, prepositions, conjunctions, auxiliary verbs, certainty words, exclusive, tentative, and cognitive processes words.

Research with bushfire management teams (Khawaja & Marcus, 2012) analyzed language as teams worked through a 5-hr task. With tasks with higher cognitive load, groups had more words per sentence, more language indicative of disagreement, more plural pronouns, and fewer singular pronouns. Results with pronouns suggest that collaboration increases during times of high cognitive load. Similarly, research with airplane cockpit crews has found that words per sentence increase with higher cognitive load, but that acknowledgments decreased possibly due to more conflict (Krifka et al., 2003; Sexton & Helmreich, 2000). Research with NASA problem-solving teams found that use of plural pronouns, complex language, and exclusionary language indicative of contrasting ideas increased for more nonroutine tasks outside the members' level of comfort (Miller et al., 2014). Hesitation and nonfluencies were also more common for more stressful, high cognitive load tasks (Krifka et al., 2003; Miller et al., 2014). This suggests that unobtrusive linguistic measures could help identify groups taxed by high cognitive load.

Innovating. Innovating involves a group discovering, implementing, or producing something that is new and useful (West, 2002). For example, groups that alter their work routines can be considered to be innovating when the changes bring about greater efficiencies or effectiveness (Kane, Argote, & Levine, 2005). We found a few studies of language use and innovating processes, which all examined whether this process was affected by subtle differences in the type of language a change-agent newcomer used when suggesting an innovative work method (Hansen & Levine, 2009; Kane & Rink, 2015, 2016). In an interactive group experiment, Hansen and Levine (2009) reasoned and found that groups would be more likely to adopt an innovative work routine when it was proposed in a more assertive than unassertive way, given that such a style communicates expertise and certainty. As outlined in the section on embracing members, groups may also have affiliative concerns, which a change-agent may address by using integrating pronouns ("we," "our") rather than the more common differentiating pronouns ("I," "you"), which in turn, renders groups likely to adopt a new work routine (Kane & Rink, 2015), especially when the change agent joins the group on a permanent basis (Kane & Rink, 2016). In all these studies, groups may have been especially receptive to innovation because of the changes

and disruptions that come with newcomer entry (Kane & Rink, 2017; Rink, Kane, Ellemers, & Van der Vegt, 2017).

Group Outputs and Language Use

Group effectiveness. Language convergence has been used to reflect emergent states in groups such as rapport and cohesion that develop from interpersonal dynamics in the group. How these states relate to group performance has been of interest to group researchers. Research is mixed about the relationship between language convergence and team performance. Some research has found no relationship between language convergence and group performance (Munson et al., 2014). Carmody et al. (2017) found that language convergence was related to lower accuracy in an online problem-solving task. They reasoned that language convergence could be an indicator that the group is stuck or "spinning their wheels" (p. 144). Although their results may only generalize to tasks with a correct answer, they reasoned that when group members have high trust and rapport, additional communication, as operationalized through LSM, may be unnecessary and a hindrance. Hence, language convergence may be essential for groups with low trust to help build rapport, but if a group already has high trust, language convergence may not be needed. Tausczik and Pennebaker (2013) found a similar trend when they provided feedback to groups to encourage engagement in the discussion, which tended to increase language convergence. For groups doing well and exchanging a high amount of information, engagement feedback reduced performance. However, groups that initially were not exchanging much information benefited from engagement feedback. Research in negotiation dyads has found that language convergence earlier in the interaction was related to positivity and social engagement, but language convergence later in the negotiation was related to the inability to negotiate effectively (Ireland & Henderson, 2014) or that language convergence earlier in the negotiation when it is important to develop trust has a stronger effect on reaching agreements and developing trust than later language convergence (Swaab, Maddux, & Sinaceur, 2011). This suggests that engagement and language convergence may be especially beneficial for the performance of groups who are not working well and have lower trust or lower amounts of information sharing or for groups that are in the early stages of working together.

Pennebaker and Chung (2012) reported that Wikipedia entries with higher LSM among editors' discussion were rated higher in quality than entries with lower language convergence in the discussion. Gonzales et al. (2010) found a relationship between language convergence and performance on an almanac task, but only for participants interacting face to face. For participants

interacting online in their study, there was no relationship between language convergence and performance. Tausczik and Pennebaker (2013) found some support that language convergence was related to group performance, but found that language indicative of information exchange was a more consistent predictor of group performance in their series of studies. Other research has found that groups with higher language convergence were more likely to reach consensus and correctly solve a problem (Schwanda et al., 2011), reach an agreement in a multiparty negotiation (Huffaker et al., 2011), or attain a higher grade in a semester long student project (Castro-Hernandez et al., 2014). Overall, this research indicates that convergence is positively related to group performance. Whether successful groups engage in more language convergence or language convergence contributes to group success often cannot be determined in this research.

Fischer et al. (2007) found that positive emotion language and assenting and acknowledging language were positively related to group performance on a problem-solving task. Other research (Yoo & Kim, 2014) finding a relationship between positive emotion language and performance on student group projects suggests that this is due to more praise in successful groups. However, it is possible that successful teams used more positive emotion language and acknowledging language due to their success and not that language is contributing to their high performance. Research with airplane crews similarly found that higher performing crews used more acknowledging language (Krifka et al., 2003). However, Leshed, Hancock, Cosley, McLeod, and Gay (2007) found that when groups worked on an online team decision-making task, the use of positive emotion language and assenting language was negatively related to perceptions of participation and task focus; positive emotion language was perceived as being off-task, and assenting language was perceived as passive and reflective of low involvement in the discussion. Other research has found that groups with more positive and assenting language performed worse on a decision-making task than groups with more negative language (e.g., negations, never, no). Assenting language could be indicative of groupthink processes and less critical thinking in a group discussion (Yilmaz, 2016). Polite language could have negative effects on team performance, especially on tasks with high cognitive load. In airplane crews, mitigated, indirect speech reduced the chance that a situation would be identified as an emergency or that the contribution would be picked up by other group members and become the focus of conversation (Goguen et al., 1986). Krifka et al. (2003) found that while higher performing airplane crews used more polite language overall, they reduced their use of polite language when cognitive load increased, whereas poorly performing crews did the opposite.

Member well-being. Groups engage in processes associated with not only adding value to the group and the system in which it is embedded, but also and importantly to the members themselves (McGrath, 1991). Member well-being can manifest itself in a myriad of ways, including physiological health, psychological health, happiness, growth, and learning. Although research on language use in groups has yet to explicitly identify linguistic markers of member well-being, there is some emerging evidence suggestive of language use and group processes associated with member well-being. For example, structuring health support groups to promote the emergence of cohesion, as reflected in inclusive pronouns and positive group references, was positively associated with improvements in member's physiological health (Parkinson's disease symptoms) and psychological health (less depression; Lieberman et al., 2005). In another study of health support groups, members experienced more breast-cancer related concerns in groups with more negative affect expression (Han et al., 2008). In educational settings, learning (as measured by course performance) was higher for members of project teams that engaged in more linguistic reflection (Castro-Hernandez et al., 2014), and religious prejudice (measured 6 and 12 months after the culmination of an interfaith work group intervention) was lower for members of groups that expressed fewer negative emotions, such as anger (White et al., 2015). Finally, workplace community-of-practice groups that better supported individual members' needs were those groups with fewer expressions of anger, fewer first-person singular pronouns ("I"), and more first-person inclusive pronouns ("we"). Taken together, this work suggests an association between member well-being and linguistic indicators of communal interrelating.

Discussion

In Figure 4, we return to the model introduced in Figure 1 and add the types of language that are used to reflect and influence each of the group inputs and emergent processes. Our review underscores Holtgraves and Kashima's (2008) statement that "speakers' language use can inadvertently affect the thoughts and actions of the speakers themselves, the recipients, and the collective that include both" (p. 73). First, language is used to reinforce and alter input conditions during group interaction. Language helps to reify status through pronoun use, polite language, and language convergence, and also creates status differences through inequality of participation. Language can also reflect initial differences in opinion with linguistic factors such as complexity of discourse or pronoun use.

However, language can influence and reflect group processes such as coordinating, interrelating, and adapting. Language is a tool of influence, as

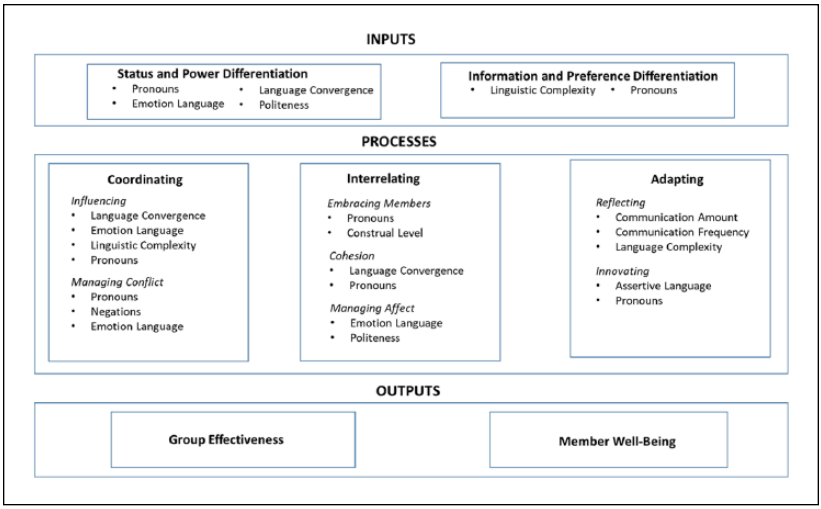

Figure 4. Group interaction inputs, processes, and outputs reflected in and influenced by language use.
Note. Members' use of pronouns, for example, reflect inputs, such as status and power differentiation, and influence processes, such as embracing members.

members who are trying to influence others may engage in more language convergence or use more complex language. Language can both reflect and exacerbate or assuage conflict in a group. Pronouns can reflect an other-directed focus that may be more pronounced with conflict, and positive emotion language in response to conflict can improve group dynamics. Language is used to embrace or distance members through pronoun use and construal level and can build cohesion through language convergence and collective pronoun use. Language can both express and help spread emotions in a group. Language also is integral to how group members reflect on the task. Often groups increase their use of language with higher reflection and use more complex language, especially under conditions of high cognitive load where group coordination and reflection are especially important. Finally, newcomers can help groups innovate by using language that helps groups embrace the newcomers.

Ultimately, groups work to add value, and language is related to outputs in the group indirectly through its effects on group processes or directly. For example, language convergence can improve group performance through its effect on increased cohesion, whereas polite language could directly affect group performance by limiting members' ability to be understood. Finally,

language contributes to member well-being through promoting cohesion and positive emotions in the group. Ultimately, language can then alter subsequent inputs into later group interactions by affecting initial factors such as group climate and status.

Future Directions

The group interaction model that underlies our review identifies a set of contextual factors that form the background for an emergent process through which group inputs, such as information and preference differentiation, beget processes and emergent states, such as influencing and cohesion, which, in turn, give rise to group effectiveness and member well-being. As the group processes unfold, emergent states and outputs obtained at one point in time become the inputs and contextual conditions at subsequent points in time (Ilgen et al., 2005). A noteworthy study that we reviewed illuminates such dynamics with a 20-week intervention that composed groups to have high or low information and preference differentiation, measured member well-being pre- and postintervention, and assessed group emotional language expression and cohesion at various intervals (e.g., Lieberman et al., 2005). In addition to adopting these sorts of innovative longitudinal study designs, to make conceptual progress it will be important for scholars to clearly delineate their assumptions and theories about how these constructs evolve over time (Cronin, 2015; Luciano, Mathieu, Park, & Tannenbaum, 2017; Waller et al., 2016).

In looking forward, we highlight methodological recommendations for researchers. Stevenson et al. (2017) obtained a measure of linguistic style by having group members first write their thoughts individually before discussing the task as a group. The researchers then used LIWC to obtain individual measures of linguistic style markers examined in their study, which they then used as covariates and controls in subsequent analysis of the group communication. This is a best practice to be emulated. Researchers would also be advised to keep abreast of the developments in automated text analysis tools. Crossley, Kyle, and McNamara (2017) developed Sentiment Analysis and Social Cognition Engine (SEANCE) using eight established word databases and report that it outperformed LIWC in determining the valence of online reviews (e.g., Amazon product review corpus). SEANCE may be worth exploring, especially for researchers of group affect and emotion given the many sentiment-related databases included (e.g., EmoLex, Geneva Affect Coder, VADER). However, one concern noted by Crossley et al. (2017) is the sheer number of indices that modern text analysis tools report. This is not only an issue of

sense-making, but it raises the possibility of spurious findings given so many measures and the increasing size of language data sets. Accordingly, it is critical that researchers of language in groups follow transparent reporting guidelines; for example, by a priori specifying the directionality of the relationships between variables (Aguinis, Ramani, & Alabduljader, 2017), by separately reporting primary, secondary, and exploratory hypothesis testing (Appelbaum et al., 2018), and by accounting for multiple comparisons across measures of similar constructs (e.g., Lieberman et al., 2005; but also see Perneger, 1998).

More research is needed on some areas in our model (e.g., innovating, managing affect). For example, we did not encounter any studies of linguistic indicators of innovating in groups, which may be an area for future research given how many other group processes are manifested in language use. Whereas reflecting involves group members posting, replying, discussing, and potentially generating new ideas, innovating involves a group discovering, implementing, or producing something new and useful (West, 2002). Groups may engage in incremental innovation involving changes in task routines and products produced, and linguistic style could influence groups adopting innovative work methods.

Conclusion

We provide a review of language use in groups, and while some areas, such as cohesion and status, offer considerable research on language in groups, other areas, such as innovation and language use, could benefit from more research. Our hope is that this review with its theoretical scaffolding, integrative review, and methodological recommendations helps spur additional research across the disciplines on language use and group processes.

Acknowledgments

The authors gratefully acknowledge the research assistance provided by Emily Shemanski and Esther Paik in preparing this review.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

References marked with an asterisk indicate studies included in the review.

Aguinis, H., Ramani, R., & Alabduljader, N. (2017). What you see is what you get? Enhancing methodological transparency in management research. *Academy of Management Annals*, *12*, 1-28. doi:10.5465/annals.2016.0011

*Alpers, G. W., Winzelberg, A. J., Classen, C., Roberts, H., Dev, P., Koopman, C., & Taylor, C. B. (2005). Evaluation of computerized text analysis in an Internet breast cancer support group. *Computers in Human Behavior*, *21*, 361-367. doi:10.1016/j.chb.2004.02.008

Appelbaum, M., Cooper, H., Kline, R. B., Mayo-Wilson, E., Nezu, A. M., & Rao, S. M. (2018). Journal article reporting standards for quantitative research in psychology: The APA publications and communications board task force report. *American Psychologist*, *73*(1), 3-25. doi:10.1037/amp0000191

Argote, L., Gruenfeld, D., & Naquin, C. (2001). Group learning in organizations. In M. E. Turner (Ed.), *Groups at work: Theory and research* (pp. 369-411). Mahwah, NJ: Lawrence Erlbaum.

*Arguello, J., Butler, B., Joyce, E., Kraut, R., Ling, K. S., & Wang, X. (2006). Talk to me: Foundations for successful individual-group interactions in online communities. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, *24*, 959-968. doi:10.1145/1124772.1124916

Ashmore, R. D., Deaux, K., & McLaughlin-Volpe, T. (2004). An organizing framework for collective identity: Articulation and significance of multidimensionality. *Psychological Bulletin*, *130*, 80-114. doi:10.1037/0033-2909.130.1.80

*Assilaméhou, Y., & Testé, B. (2013). The effects of linguistic abstraction on evaluations of the speaker in an intergroup context: Using the linguistic intergroup bias makes you a good group member. *Journal of Experimental Social Psychology*, *4*, 113-119. doi:10.1016/j.jesp.2012.08.001

Biesen, J. N., Schooler, D. E., & Smith, D. A. (2016). What a difference a pronoun makes: I/We versus you/me and worried couples' perceptions of their interaction quality. *Journal of Language and Social Psychology*, *35*, 180-205. doi:10.1177/0261927X15583114

Bonito, J. A., & Sanders, R. E. (2011). The existential center of small groups: Member's conduct and interaction. *Small Group Research*, *42*, 343-358. doi:10.1177/1046496410385472

Boyd, R. L., & Pennebaker, J. W. (2016). A way with words: Using language for psychological science in the modern era. In C. W. Dimofte, C. P. Haugtvedt, & R. F. Yalch (Eds.), *Consumer psychology in a social media world* (pp. 222-236). New York, NY: Routledge.

*Brett, J. M., Olekalns, M., Friedman, R., Goates, N., Anderson, C., & Lisco, C. C. (2007). Sticks and stones: Language, face, and online dispute resolution. *Academy of Management Journal*, *50*, 85-99. doi:10.5465/AMJ.2007.24161853

Brewer, M. B., & Gardner, W. (1996). Who is this "we"? Levels of collective identity and self-representations. *Journal of Personality and Social Psychology*, *71*, 83-93. doi:10.1037/0022-3514.71.1.83

*Budak, C., & Agrawal, R. (2013). On participation in group chats on Twitter. *Proceedings of the International Conference on World Wide Web*, *22*, 165-175. doi:10.1145/2488388.2488404

*Burke, M., Kraut, R., & Joyce, E. (2010). Membership claims and requests: Conversation-level newcomer socialization strategies in online groups. *Small Group Research*, *41*, 4-40. doi:10.1177/1046496409351936

*Carmody, P., Mateo, J. C., Bowers, D., & McCloskey, M. J. (2017). Linguistic coordination as an unobtrusive, dynamic indicator of rapport, prosocial team processes, and performance in team communication. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, *61*, 140-144. doi:10.1177/1541931213601518

*Cassell, J., Huffaker, D., Tversky, D., & Ferriman, K. (2006). The language of online leadership: Gender and youth engagement on the Internet. *Developmental Psychology*, *42*, 436-449. doi:10.1037/0012-1649.42.3.436

*Castro-Hernandez, A., Swigger, K., & Ponce-Flores, M. P. (2014). Effects of cohesion-based feedback on the collaborations in global software development teams. *Proceedings of the International Conference on Collaborative Computing: Networking Applications and Worksharing*, *10*, 74-83.

Chartrand, T. L., & Bargh, J. A. (1999). The chameleon effect: The perception–behavior link and social interaction. *Journal of Personality and Social Psychology*, *76*, 893-910. doi:10.1037/0022-3514.76.6.893

*Chee, B., Berlin, R., & Schatz, B. (2009). Measuring population health using personal health messages. *AMIA Annual Symposium Proceedings*, *2009*, 92-96. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2815419/

Chung, C., & Pennebaker, J. (2007). The psychological functions of function words. In K. Fiedler (Ed.), *Social communication* (pp. 343-388). New York, NY: Psychology Press.

Cronin, M. A. (2015). Advancing the science of dynamics in groups and teams. *Organizational Psychology Review*, *5*, 267-269. doi:10.1177/2041386615606826

Crossley, S. A., Kyle, K., & McNamara, D. S. (2017). Sentiment Analysis and Social Cognition Engine (SEANCE): An automatic tool for sentiment, social cognition, and social-order analysis. *Behavior Research Methods*, *49*, 803-821. doi:10.3758/s13428-016-0743-z

*Curhan, J. R., & Pentland, A. (2007). Thin slices of negotiation: Predicting outcomes from conversational dynamics within the first 5 minutes. *Journal of Applied Psychology*, *92*, 802-811. doi:10.1037/0021-9010.92.3.802

*Danescu-Niculescu-Mizil, C., Lee, L., Pang, B., & Kleinberg, J. (2012). Echoes of power: Language effects and power differences in social interaction. *Proceedings of the International Conference on World Wide Web Conference*, *21*, 699-708. doi:10.1145/2187836.2187931

*Danescu-Niculescu-Mizil, C., Sudhof, M., Jurafsky, D., Leskovec, J., & Potts, C. (2013). A computational approach to politeness with application to social factors. *Proceedings of the Annual Meeting of the Association of Computational Linguistics*, *51*, 250-259. Retrieved from http://aclweb.org/anthology/P/P13/P13-1025.pdf

Davis, J. H. (1973). Group decision and social interaction: A theory of social decision schemes. *Psychological Review*, *80*, 97-125. doi:10.1037/h0033951

*Demmans Epp, C., Phirangee, K., & Hewitt, J. (2017, April). *The interplay between students' usage of pronouns and community levels in online courses*. Presented at the American Educational Research Association Annual Meeting, San Antonio, TX. Retrieved from http://www.pepperproject.ca/uploads/1/8/9/8/18984529/aera2017paper2-jhjhcdkp_pronperthouswords.pdf

*Dino, A., Reysen, S., & Branscombe, N. R. (2009). Online interactions between group members who differ in status. *Journal of Language and Social Psychology*, *28*, 85-93. doi:10.1177/0261927X08325916

*Eastman, C. M. (1985). Establishing social identity through language use. *Journal of Language and Social Psychology*, *4*, 1-20. doi:10.1177/0261927X8500400101

*Fischer, U., McDonnell, L., & Orasanu, J. (2007). Linguistic correlates of team performance: Toward a tool for monitoring team functioning during space missions. *Aviation Space and Environmental Medicine*, *78*(Suppl. 1). B86-B95.

*Fiske, S. T., Bergsieker, H., Constantine, V., Dupree, C., Holoien, D. S., Kervyn, N., . . .Swencionis, J. (2015). Talking up and talking down: The power of positive speaking. *Journal of Social Issues*, *71*, 834-846. doi:10.1111/josi.12152

Flynn, F. J., Reagans, R. E., Amanatullah, E. T., & Ames, D. R. (2006). Helping one's way to the top: Self-monitors achieve status by helping others and knowing who helps whom. *Journal of Personality and Social Psychology*, *91*, 1123-1137. doi:10.1037/0022-3514.91.6.1123

*Gelfand, M. J., Severance, L., Lee, T., Bruss, C. B., Lun, J., Abdel-Latif, A.-H., . . . Moustafa Ahmed, S. (2015). Culture and getting to yes: The linguistic signature of creative agreements in the United States and Egypt. *Journal of Organizational Behavior*, *36*, 967-989. doi:10.1002/job.2026

Giles, H. (2008). Communication accommodation theory. In L. A. Baxter & D. O. Braithewaite (Eds.), *Engaging theories in interpersonal communication: Multiple perspectives* (pp. 161-173). Thousand Oaks, CA: SAGE.

Giles, H., & Coupland, N. (1991). *Language: Contexts and consequences*. Pacific Grove, CA: Brooks/Cole.

*Gillispie, J., & Chrispeels, J. H. (2008). Us and them: Conflict, collaboration, and discursive negotiation of multishareholder roles in school district reform. *Small Group Research*, *39*, 397-437. doi:10.1177/1046496408319877

Goffman, E. (1981). *Forms of talk*. Philadelphia: University of Pennsylvania Press.

*Goguen, J., Linde, C., & Murphy, M. (1986). *Crew communications as a factor in aviation accidents* (NASA Technical Memorandum Report No. 88254). Retrieved from https://ntrs.nasa.gov/search.jsp?R=19870003708

*Gonzales, A. L., Hancock, J. T., & Pennebaker, J. W. (2010). Language indicators of social dynamics in small groups. *Communications Research*, *37*, 3-19. doi:10.1177/0093650209351468

Guerin, B. (2003). Language use as social strategy: A review and an analytical framework for the social sciences. *Review of General Psychology*, *7*, 251-298.

*Gustafsson Sendén, M., Lindholm, T., & Sikström, S. (2014). Selection bias in choice of words: Evaluations of "I" and "we" differ between contexts, but "they"

are always worse. *Journal of Language and Social Psychology*, *33*, 49-67. doi:10.1177/0261927X13495856

*Han, J. Y., Shaw, B. R., Hawkins, R. P., Pingree, S., McTavish, F., & Gustafson, D. H. (2008). Expressing positive emotions within online support groups by women with breast cancer. *Journal of Health Psychology*, *13*, 1002-1007. doi:10.1177/1359105308097963

*Hansen, T., & Levine, J. M. (2009). Newcomers as change agents: Effects of newcomers' behavioral style and teams' performance optimism. *Social Influence*, *4*, 46-61. doi:10.1080/15534510802280827

Hart, R. P. (2000). *Diction 5.0: The text-analysis program*. Austin, TX: Digitext, INC.

Helmbrecht, J. (2002). Grammar and function of we. In A. Duszak (Ed.), *Us and others: Social identities across languages, discourses and cultures* (pp. 31-50). Philadelphia, PA: John Benjamins.

Hewes, D. E. (1986). A socio-egocentric theory of group decision-making. In R. Y. Hirokawa & M. S. Poole (Eds.), *Group decision-making and communication processes* (pp. 265-291). Beverly Hills, CA: SAGE.

Hollenbeck, J. R., Beersma, B., & Schouten, M. E. (2012). Beyond team types and taxonomies: A dimensional scaling conceptualization for team description. *Academy of Management Review*, *37*, 82-106. doi:10.5465/amr.2010.0181

Holtgraves, T. M., & Kashima, Y. (2008). Language, meaning, and social cognition. *Personality and Social Psychology Review*, *12*, 73-94. doi:10.1177/1088868307309605

*Holyst, J. A., Chmiel, A., & Sienkiewicz, J. (2017). Detection and modeling of collective emotions in online data. In J. A. Holyst (Ed.), *Cyberemotions: Collective emotions in cyberspace* (pp. 137-158). Cham, Switzerland: Springer.

*Hornsey, M. J., Blackwood, L., & O'Brien, A. (2005). Speaking for others: The pros and cons of group advocates using collective language. *Group Processes & Intergroup Relations*, *8*, 245-257. doi:10.1177/1368430205053941

*Huffaker, D. (2010). Dimensions of leadership and social influence in online communities. *Human Communication Research*, *36*, 593-617. doi:10.1111/j.1468-2958.2010.01390.x

*Huffaker, D., Swaab, R., & Diermeier, D. (2011). The language of coalition formation in online multiparty negotiations. *Journal of Language and Social Psychology*, *30*, 66-81. doi:10.1177/0261927X10387102

Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in organizations: From input-process-output models to IMOI models. *Annual Review of Psychology*, *56*, 517-543. doi:10.1146/annurev.psych.56.091103.070250

*Ireland, M. E., & Henderson, M. D. (2014). Language style matching, engagement, and impasse in negotiations. *Negotiation and Conflict Management Research*, *7*, 1-16. doi:10.1111/ncmr.12025

Itakura, H. (2001). Describing conversational dominance. *Journal of Pragmatics*, *33*, 1859-1880. doi:10.1016/S0378-2166(00)00082-5

Jetten, J., Branscombe, N. R., Spears, R., & McKimmie, B. M. (2003). Predicting the paths of peripherals: The interaction of identification and future possibilities. *Personality and Social Psychology Bulletin*, *29*, 130-140. doi:10.1177/0146167202238378

*Joksimovic, S., Gasevic, D., Kovanovic, V., Riecke, B. E., & Hatala, M. (2014). Social presence in online discussions as a process predictor of academic performance. *Journal of Computer Assisted Learning*, *31*, 638-654. doi:10.1111/jcal.12107

Jones, E., Gallois, C., Callan, V., & Barker, M. (1999). Strategies of accommodation: Development of a coding system for conversational interaction. *Journal of Language and Social Psychology*, *18*, 123-152. doi:10.1177/0261927X99018002001

*Jones, S., Cotterill, R., Dewdney, N., Muir, K., & Joinson, A. (2014). Finding Zelig in text: A measure for normalising linguistic accommodation. *Proceedings of the International Conference on Computational Linguistics*, *25*, 455-465. Retrieved from http://www.aclweb.org/anthology/C14-1044

*Kacewicz, E., Pennebaker, J. W., Davis, M., Jeon, M., & Graesser, A. C. (2014). Pronoun use reflects standings in social hierarchies. *Journal of Language and Social Psychology*, *33*, 125-143. doi:10.1177/0261927X13502654

*Kadar, D. Z., & Bax, M. M. H. (2013). In-group ritual and relational work. *Journal of Pragmatics*, *58*, 73-86. doi:10.1016/j.pragma.2013.03.011

Kane, A. A., Argote, L., & Levine, J. M. (2005). Knowledge transfer between groups via personnel rotation: Effects of social identity and knowledge quality. *Organizational Behavior and Human Decision Processes*, *96*, 56-71. doi:10.1016/j.obhdp.2004.09.002

Kane, A. A., & Levina, N. (2017). "Am I still one of them?" Bicultural immigrant managers navigating social identity threats when spanning global boundaries. *Journal of Management Studies*, *54*, 540-577. doi:10.1111/joms.12259

*Kane, A. A., & Rink, F. (2015). How newcomers influence group utilization of their knowledge: Integrating versus differentiating strategies. *Group Dynamics: Theory, Research, and Practice*, *19*, 91-105. doi:10.1037/gdn0000024

*Kane, A. A., & Rink, F. (2016). When and how groups utilize dissenting newcomer knowledge: Newcomers' future prospects condition the effect of language-based identity strategies. *Group Processes & Intergroup Relations*, *19*, 591-607. doi:10.1177/1368430216638534

Kane, A. A., & Rink, F. (2017). Personnel movement as a mechanism for learning in organizations and teams. *The Oxford Handbook of Group and Organizational Learning*. Advance online publication. doi:10.1093/oxfordhb/9780190263362.013.20

Keblusek, L., Giles, H., & Maass, A. (2017). Communication and group life: How language and symbols shape intergroup relations. *Group Processes & Intergroup Relations*, *20*, 632-643. doi:10.1177/1368430217708864

Keyton, J., & Springston, J. (1990). Redefining cohesiveness in groups. *Small Group Research*, *21*, 234-254. doi:10.1177/1046496490212006

*Khawaja, M. A., & Marcus, N. (2012). Analysis of collaborative communication for linguistic cues of cognitive load. *Human Factors*, *54*, 518-529. doi:10.1177/0018720811431258

*Krifka, M., Martens, S., & Schwarz, F. (2003). Group interaction in the cockpit: Some linguistic factors. *Linguistische Berichte*, *12*, 75-101. Retrieved from https://amor.cms.hu-berlin.de/~h2816i3x/Publications/GihreLB-Krifka.pdf

Laughlin, P. R., & Ellis, A. L. (1986). Demonstrability and social combination processes on mathematical intellective tasks. *Journal of Experimental Social Psychology*, *22*, 177-189. doi:10.1016/0022-1031(86)90022-3

*Leshed, G., Hancock, J. T., Cosley, D., McLeod, P. L., & Gay, G. (2007). Feedback for guiding reflection on teamwork practices. *Proceedings of the International ACM Conference on Supporting Groupwork*, *17*, 217-220. doi:10.1145/1316624.1316655

*Liao, W., Bazarova, N. N., & Yuan, Y. C. (2018). Expertise judgment and communication accommodation in linguistic styles in computer-mediated and face-to-face groups. *Communication Research*, *45*, 1122-1145. doi:10.1177/0093650215626974

*Licorish, S. A., & MacDonell, S. G. (2012). What affects team behavior? Preliminary linguistic analysis of communications in the jazz repository. *Proceedings of the International Workshop on Cooperative and Human Aspects of Software Engineering*, *5*, 83-89. doi:10.1109/CHASE.2012.6223029

*Lieberman, M. A., Wizlenberg, A., Golant, M., & Di Minno, M. (2005). The impact of group composition on Internet support groups: Homogeneous versus heterogeneous Parkinson's groups. *Group Dynamics: Theory, Research, and Practice*, *9*, 239-250. doi:10.1037/1089-2699.9.4.239

*Liess, A., Simon, W., Yutsis, M., Owen, J. E., Piemme, K. A., Golant, M., & Giese-Davis, J. (2008). Detecting emotional expression in face-to-face and online breast cancer support groups. *Journal of Consulting and Clinical Psychology*, *76*, 517-523. doi:10.1037/0022-006X.76.3.517

Luciano, M. M., Mathieu, J. E., Park, S., & Tannenbaum, S. I. (2017). A fitting approach to construct and measurement alignment: The role of big data in advancing dynamic theories. *Organizational Research Methods*, *21*, 1-41. doi:10.1177/1094428117728372

*Manson, J. H., Bryant, G. A., Gervais, M. M., & Kline, M. A. (2013). Convergence of speech rate in conversation predicts cooperation. *Evolution & Human Behavior*, *34*, 419-426. doi:10.1016/j.evolhumbehav.2013.08.001

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, *26*, 356-376. doi:10.5465/amr.2001.4845785

*Matthews, T., Mahmud, J. U., Chen, J., Muller, M., Haber, E., & Badenes, H. (2015). They said what? Exploring the relationship between language use and member satisfaction in communities. *Proceedings of the ACM Conference on Computer Supported Cooperative Work & Social Computing*, *18*, 819-825. doi:10.1145/2675133.2675150

McGrath, J. E. (1991). Time, interaction, and performance (TIP): A theory of groups. *Small Group Research*, *22*, 147-174. doi:10.1177/1046496491222001

McGrath, J. E., Arrow, H., & Berdahl, J. L. (2000). The study of groups: Past, present, and future. *Personality and Social Psychology Review*, *4*, 95-105. doi:10.1207/S15327957PSPR0401_8

*Miller, C., Rye, J., Wu, P., Schmer-Galunder, S., & Ott, T. (2014). Team psychosocial assessment via discourse analysis: Power and comfort/routine. In W. G. Kennedy, N. Agarwal, & S. J. Yang (Eds.), *Social computing, behavioral-cultural modeling and prediction: SBP 2014* (pp. 309-317). Cham, Switzerland: Springer.

*Moon, S., Potdar, S., & Martin, L. (2014). Identifying student leaders from MOOC discussion forums through language influence. *Proceedings of Conference on Empirical Methods in Natural Language Processing, 2014*, 15-20. Retrieved from http://www.aclweb.org/anthology/W14-4103

*Moore, S. G., & McFerran, B. (2017). She said, she said: Differential interpersonal similarities predict unique linguistic mimicry in online word of mouth. *Journal of the Association for Consumer Research*, *2*, 229-245. doi:10.1086/690942

Moreland, R. L., & Levine, J. M. (1982). Socialization in small groups: Temporal changes in individual-group relations. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 15, pp. 137-192). New York, NY: Academic Press.

*Muir, K., Joinson, A., Cotterill, R., & Dewdney, N. (2016). Characterizing the linguistic chameleon: Personal and social correlates of linguistic style accommodation. *Human Communication Research*, *42*, 462-484. doi:10.1111/hcre.12083

*Muir, K., Joinson, A., Cotterill, R., & Dewdney, N. (2017). Linguistic style accommodation shapes impression formation and rapport in computer-mediated communication. *Journal of Language and Social Psychology*, *36*, 525-548. doi:10.1177/0261927X17701327

*Munson, S. A., Kervin, K., & Robert, L. P. (2014). Monitoring email to indicate project team performance and mutual attraction. *Proceedings of the ACM Conference on Computer Supported Cooperative Work*, *17*, 542-549. doi:10.1145/2531602.2531628

*Nanninga, M. C., Zhang, Y., Lehmann-Willenbrock, N., Szlávik, Z., & Hung, H. (2017). Estimating verbal expressions of task and social cohesion in meetings by quantifying paralinguistic mimicry. *Proceedings of the ACM International Conference on Multimodal Interaction*, *19*, 206-215. doi:10.1145/3136755.3136811

Nemeth, C. J. (1992). Minority dissent as a stimulant to group performance. In S. Worchel, W. Wood & J. A. Sampson (Eds.), *Group process and productivity* (pp. 95-111). Newbury Park, CA: SAGE.

Neuendorf, K. A. (2017). *The content analysis guidebook* (2nd ed.). Los Angeles, CA: SAGE.

O'Barr, W. M. (1982). *Linguistic evidence: Language, power, and strategy in the courtroom*. New York, NY: Academic Press.

Orlitzky, M., & Hirokawa, R. Y. (2001). To err is human, to correct for it divine: A meta-analysis of research testing the functional theory of group decision-making effectiveness. *Small Group Research*, *32*, 313-341. doi:10.1177/104649640103200303

*Paletz, S. B. F., & Schunn, C. D. (2011). Assessing group-level participation in fluid teams: Testing a new metric. *Behavioral Research Methods*, *43*, 533-536. doi:10.3758/s13428-011-0070-3

Palmer, M. (1989). Controlling conversations: Turns, topics and interpersonal control. *Communication Monographs*, *56*, 1-18. doi:10.1080/03637758909390246

Pennebaker, J. W. (2011). *The secret life of pronouns: What our words say about us*. New York, NY: Bloomsbury Press.

*Pennebaker, J. W., & Chung, C. K. (2012). *Language and social dynamics* (Technical Report 1318). U.S. Army Research Institute for the Behavioral and Social Sciences. Retrieved from http://www.au.af.mil/au/awc/awcgate/army/tr1318.pdf

Pennebaker, J. W., & Chung, C. K. (2013). Counting little words in big data: The psychology of individuals, communities, culture, and history. In J. P. Forgas, O. Vincze, & J. László (Eds.), *Social cognition and communication* (pp. 25-42). New York, NY: Psychology Press.

Pennebaker, J. W., Chung, C. K., Ireland, M., Gonzales, A., & Booth, R. J. (2007). *The development and psychometric properties of LIWC2007*. Austin, TX: LIWC.net. Retrieved from http://www.liwc.net/LIWC2007LanguageManual.pdf

Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). *Linguistic inquiry and word count (LIWC): LIWC2001*. Mahwah, NJ: Lawrence Erlbaum.

Perneger, T. V. (1998). What's wrong with Bonferroni adjustments. *BMJ : British Medical Journal*, *316*, 1236-1238. doi:10.1136/bmj.316.7139.1236

*Reysen, S., Lloyd, J. D., Katzarska-Miller, I., Lemker, B. M., & Foss, R. L. (2010). Intragroup status and social presence in online fan groups. *Computers in Human Behavior*, *26*, 1314-1317. doi:10.1016/j.chb.2010.04.003

Rink, F., & Ellemers, N. (2011). From current state to desired future: How compositional changes affect dissent and innovation in work groups. In J. Jetten, & M. J. Hornsey (Eds.), *Rebels in groups: Dissent, deviance, difference and defiance* (pp. 54-72). Oxford, UK: Blackwell. doi:10.1002/9781444390841.ch4

Rink, F., Kane, A. A., Ellemers, N., & Van der Vegt, G. S. (2013). Team receptivity to newcomers: Five decades of evidence and future research themes. *Academy of Management Annals*, *7*, 245-291.

Rink, F., Kane, A. A., Ellemers, N., & Van der Vegt, G. S. (2017). Change in organizational work teams. In E. Salas, R. Rico, & J. Passmore (Eds.), *The Wiley-Blackwell handbook of the psychology of teamworking and collaborative processes* (pp. 177-194). Somerset, NY: Wiley-Blackwell.

Rink, F. A., & Ellemers, N. (2009). Temporary versus permanent group membership: How the future prospects of newcomers affect newcomer acceptance and newcomer influence. *Personality and Social Psychology Bulletin*, *35*, 764-775. doi:10.1177/0146167209333177

*Sakai, E. Y., & Carpenter, B. D. (2011). Linguistic features of power dynamics in triadic dementia diagnostic conversations. *Patient Education & Counseling*, *85*, 295-298. doi:10.1016/j.pec.2010.09.020

Salas, E., Grossman, R., Hughes, A. M., & Coultas, C. W. (2015). Measuring team cohesion: Observations from the science. *Human Factors*, *57*, 365-374. doi:10.1177/0018720815578267

*Sapru, A., & Bourlard, H. (2013). Investigating the impact of language style and vocal expression on social roles of participants in professional meetings. In

Proceedings of the humaine association conference on affective computing and intelligent interaction (pp. 324-329). doi:10.1109/ACII.2013.60

*Scholand, A. J., Tausczik, Y. R., & Pennebaker, J. W. (2009). *Quantifiable and objective approach to organizational performance enhancement: Examining social structure and linguistic content during collaborative group work from a network perspective* (SAND2009-5975). Livermore, CA: Sandia National Laboratories. Retrieved https://www.researchgate.net/profile/Andrew_Scholand/publication/2552067 63_Quantifiable_and_objective_approach_to_organizational_performance_enhancement/links/0a85e53ab1d3b737f8000000.pdf

*Scholand, A. J., Tausczik, Y. R., & Pennebaker, J. W. (2010a). Assessing group interaction with social language network analysis. In S. -K. Chai, J. Salerno, & P. L Mabry (Eds.), *Advances in social computing: SBP 2010* (pp. 248-255). Berlin, Germany: Springer.

*Scholand, A. J., Tausczik, Y. R., & Pennebaker, J. W. (2010b). Social language network analysis. *Proceedings of the ACM Conference on Computer Supported Cooperative Work*, *13*, 23-26. doi:10.1145/1718918.1718925

*Schwanda, V. L., Barron, K., Lien, J., Schroeder, G., Vernon, A., & Hancock, J. T. (2011). Temporal patterns of cohesiveness in virtual groups. *Proceedings of the ACM Conference on Computer Supported Cooperative Work*, *14*, 710-712. doi:10.1145/1958824.1958951

*Scissors, L. E., Gill, A. J., & Gergle, D. (2008). Linguistic mimicry and trust in text-based CMC. *Proceedings of the ACM Conference on Computer Supported Cooperative Work*, *11*, 277-280. doi:10.1145/1460563.1460608

Sell, J., Lovaglia, M. J., Mannix, E. A., Samuelson, C. D., & Wilson, R. K. (2004). Investigating conflict, power, and status within and among groups. *Small Group Research*, *35*, 44-72. doi:10.1177/1046496403259813

Semin, G. R. (2000). Agenda 2000—Communication: Language as an implemental device for cognition. *European Journal of Social Psychology*, *30*, 595-612. doi:10.1002/1099-0992(200009/10)30:5

*Sexton, B. J., & Helmreich, R. L. (2000). Analyzing cockpit communications: The links between language, performance, and workload. *Human Performance in Extreme Environments*, *5*, 63-68.

Simmons, R., Chambless, D., & Gordon, P. C. (2008). How do hostile and emotionally over-involved relatives view their relationships? What relatives' pronoun use tells us? *Family Processes*, *47*, 405-419. doi:10.1111/j.1545-5300.2008.00261.x

*Steffens, N. K., & Haslam, S. A. (2013). Power through "us": Leaders' use of we-referencing language predicts election victory. *PLoS ONE*, *8*(10), e77952. doi:10.1371/journal.pone.0077952

*Stevenson, M. C., Lytle, B. L., Baumholser, B. J., & McCracken, E. W. (2017). Racially diverse juries promote self-monitoring efforts during jury deliberation. *Translational Issues in Psychological Science*, *3*, 187-201. doi:10.1037/tps0000113

*Swaab, R. I., Maddux, W. W., & Sinaceur, M. (2011). Early words that work: When and how virtual linguistic mimicry facilitates negotiation outcomes. *Journal of Experimental Social Psychology*, *47*, 616-621. doi:10.1016/j.jesp.2011.01.005

*Swaab, R. I., Phillips, K. W., Diermeier, D., & Medvec, V. H. (2008). The pros and cons of dyadic side conversations in small groups: The impact of group norms and task type. *Small Group Research*, *39*, 372-390. doi:10.1177/1046496408317044

Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *Journal of Language and Social Psychology*, *29*, 24-54. doi:10.1177/0261927X09351676

*Tausczik, Y. R., & Pennebaker, J. W. (2013). Improving teamwork using real-time language feedback. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, *16*, 459-468. doi:10.1145/2470654.2470720

*Taylor, P. J., & Thomas, S. (2008). Linguistic style matching and negotiation outcome. *Negotiation and Conflict Management Research*, *1*, 263-281. doi:10.1111/j.1750-4716.2008.00016.x

*Thompson, C. M., Crook, B., Love, B., Macpherson, C. F., & Johnson, R. (2016). Understanding how adolescents and young adults with cancer talk about needs in online and face-to-face support groups. *Journal of Health Psychology*, *21*, 2636-2646. doi:10.1177/1359105315581515

*Van Swol, L. M., & Carlson, C. (2017). Language use and influence among minority, majority, and homogeneous group members. *Communication Research*, *44*, 512-529.

*Van Swol, L. M., Prahl, A., Kolb, M., Acosta-Lewis, E. E., & Carlson, C. (2016). The language of extremity: The language of extreme members and how the presence of extremity affects group discussion. *Journal of Language and Social Psychology*, *35*, 603-627. doi:10.1177/0261927X16629788

*Vercellone-Smith, P., Jablokow, K., & Friedel, C. (2012). Characterizing communication networks in a web-based classroom: Cognitive styles and linguistic behavior of self-organizing groups in online discussions. *Computers & Education*, *59*, 222-235. doi:10.1016/j.compedu.2012.01.006

Waller, M. J., Okhuysen, G. A., & Saghafian, M. (2016). Conceptualizing emergent states: A strategy to advance the study of group dynamics. *Academy of Management Annals*, *10*, 561-598. doi:10.1080/19416520.2016.1120958

*Weiss, M., Kolbe, M., Grote, G., Spahn, D. R., & Grande, B. (2017). We can do it! Inclusive leader language promotes voice behavior in multi-professional teams. *The Leadership Quarterly*, *29*, 389-402. doi:10.1016/j.leaqua.2017.09.002

West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology*, *51*, 355-387. doi:10.1111/1464-0597.00951

*White, F. A., Abu-Rayya, H. M., Bliuc, A.-M., & Faulkner, N. (2015). Emotion expression and intergroup bias reduction between Muslims and Christians: Long-term Internet contact. *Computers in Human Behavior*, *53*, 435-442. doi:10.1016/j.chb.2015.04.074

*Xuan, Q., & Filkov, V. (2013). Synchrony in social groups and its benefits. In P. Michelucci (Ed.), *Handbook of human computation* (pp. 791-802). New York, NY: Springer.

*Yilmaz, G. (2014). The tale of we, you, and I: Interpersonal effects on pronoun use in virtual teams. *The Florida Communication Journal*, *42*, 27-39.

*Yilmaz, G. (2016). What you do and how you speak matter: Behavioral and linguistic determinants of performance in virtual teams. *Journal of Language and Social Psychology*, *35*, 76-97. doi:10.1177/0261927X15575772

*Yilmaz, G., & Peña, J. (2015). How do interpersonal behaviors and social categories affect language use? The case of virtual teams. *Communication Quarterly*, *63*, 427-443. doi:10.1080/01463373.2015.1058285

Yilmaz, G., & Youngreen, R. (2016). The application of minority influence theory in computer-mediated communication groups. *Small Group Research*, *47*, 692-719. doi:10.1177/1046496416661033

*Yoo, J., & Kim, J. (2014). Can online discussion participation predict group project performance? Investigating the roles of linguistic features and participation patterns. *International Journal Artificial Intelligence in Education*, *24*, 8-32. doi:10.1007/s40593-013-0010-8

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