Review

From a distance: Impression formation and impression accuracy among geographically distributed coworkers

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ABSTRACT

One critical and to date understudied social psychological construct with significant implications for technology-mediated distributed work is *impression formation*. Forming useful impressions of each other is crucial for coworkers to avoid mistrust, misattribution, and conflict, and thereby, work effectively and productively. In this theoretical review paper I systematically outline how elements of distributed and virtual work – geographic dispersion, electronic dependence, heterogeneity, and dynamic structures – shape coworkers' impression of each other by influencing information and motivation, the main moderators of impression formation. I develop a model of how the impression formation process acts in technology-mediated distributed work settings, draw propositions, and identify ways to mitigate the breakdown in impression formation among distributed coworkers. Finally, I conceptualize impression accuracy in terms of descriptive, predictive, and explanatory knowledge about others and discuss how it can be increased with positive outcomes for trust, attribution, knowledge sharing, and conflict resolution.

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Contents

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1. Introduction

Geographically distributed work is on the increase across the globe and work arrangements involving workers distributed across geographically distant locations are now more common than ever (Brockhoff, 1998; Carmel, 1999). In spite of centuries of global work (O'Leary, Orlikowski & Yates, 2002) scholars argue that recent advances in technology, changes in the global economy, and changes in the nature of work have given rise to unique challenges faced by distributed workers (Armstrong & Cole, 1995; Gibson & Cohen, 2003; Gibson & Gibbs, 2006; Hinds & Bailey, 2003). Whether conducted under the umbrella of 'distributed work' (Hinds & Kiesler, 2002), 'dispersed work' (Cramton, 2001), 'virtuality' (Chudoba, Wynn, Lu, & Watson-Manheim, 2005; Schweitzer & Duxbury, 2010) or 'virtual work' (Bjørn & Ngwenyama, 2009; Desouza, Nissen, & Sørensen, 2008; Dubé & Robey, 2009; Gibson & Cohen, 2003; Watson-Manheim, Chudoba, & Crowston, 2011), empirical studies have outlined a range of issues that plague distributed work[1] arrangements such as conflict (Hinds & Mortensen, 2005), misattribution (Cramton, 2002), lack of mutual knowledge (Cramton, 2001), mistrust (Jarvenpaa & Leidner, 1999), limited access to expertise (Grinter, Herbsleb, and Perry, 1999), and problems with knowledge sharing and transfer (Griffith, Sawyer & Neale, 2003; Desouza et al., 2008; Oshri, Fenema, & Kotlarsky, 2008). The problematic issues identified in distributed work arise primarily from the inability of workers to develop effective *working relationships* that require the acquisition of interpersonal knowledge about others (Gabarro, 1979). In other words, the genesis of communication and coordination breakdown is at the individual level and occurs due to a lack of impressions to facilitate interpersonal understanding in technology-mediated distributed contexts (Cramton, 2001). In spite of the importance of impression formation in distributed settings, an investigation of the role of impressions and process of impression formation in distributed work has been absent: How do coworkers form impressions of distributed coworkers? Specifically, what role do elements identified in prior work – distance, technology, heterogeneity, and dynamicity – as critical factors in the context of distributed and virtual work play in this process? In this paper, I advance a theoretical model and present propositions that systematically identify (1) the antecedents of impression formation among distributed workers, (2) factors that inhibit the process, and (3) the mitigating factors that might lead to more accurate impressions. Finally, I discuss the implications for future research on globally distributed work.

The literature reviewed in this paper comes from a broad range of disciplines including, but not limited to, organization science, information systems, computer-mediated communication, computers-supported cooperative work, human–computer interaction, and social psychology. The author conducted a systematic and thorough literature search through electronic databases and by following references cited in high-impact articles (as determined by numbers of papers citing the article) and review articles related to the topic (Hertel, Geister, & Konradt, 2005; Martins, Gilson, & Maynard, 2004; Powell, Piccoli, & Ives, 2004; Wainfan & Davis, 2004). Given the extensive work in this area within the past decade, it was deemed necessary to be selective in the review of prior work and once the initial framing of the paper was determined, further review centered on majors elements identified as being critical for developing a model of impression formation in geographically distributed settings.

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[1] I primarily use the term 'distributed work' here because it is one of the widely accepted terms and also because it more precisely captures the context to which I am referring – coworkers in different locations that have access to technology but who can also travel to meet. When discussing other researchers' studies, however, I use the terminology employed by the authors.

2. Impression formation

Mead (1934) conceptualized humans as symbol processing life forms and identified a fundamental need in humans to be able to make sense of their world in relations to others. To act towards, and with someone, we need to know that person, making impression formation one of the fundamental social processes. People form impressions of each other all the time, whether consciously or implicitly, and use the interpersonal knowledge acquired for a variety of purposes in their daily life (Uleman, 1999). In an organizational setting, such as a workplace, impressions take on an increasingly crucial role as organizations by definition require interpersonal socialization. Whether it is assigning work, asking others for assistance or expertise, or deciding whether to interact with them personally or not, workers need to make judgments that rely on impressions of others. The first studies of impression formation among social psychologists started over half a century ago when Asch (1946) proposed the Gestalt approach to impression formation. According to this approach, people form holistic impressions of others and assign them particular *categories*. The piecemeal view of impression formation (Anderson, 1981), on the other hand, proposed that people form impressions by averaging various isolated features and take different *traits* into account. Bridging this gap between the Gestalt and piecemeal views, Fiske and Neuberg (1990) proposed a continuum model of impression formation. According to the continuum model (Fiske & Neuberg, 1990), people do both – they form holistic as well as individuated impressions depending on the extent to which they use a target's particular attributes. Towards one end of the continuum are *category-based processes* that use a target's category membership (e.g. race and gender) and exclude individual attributes, and towards the other end are *individuating processes* (e.g. jovial or sarcastic) that include a target's particular attribute and exclude category membership of the target. Critically, the continuum model of impression formation (Fiske, Lin, & Neuberg, 1999; Fiske & Neuberg, 1990) proposes that impression formation depends on the nature of information a perceiver has about a target and the motivation she has for forming an impression. The combination of information and motivation determines the amount of <u>attention</u> a perceiver pays to different cues about a target and how she <u>interprets</u> the cues thereby establishing the nature of impression formed – individuated or categorical, simple or complex (Fiske & Neuberg, 1990). Although different impressions suffice under different conditions, individuated and complex impressions are more valuable than categorical and simple impressions as they allow perceivers to use the impressions more judiciously based on the situation. For purposes of distributed collaborative work, complex and individuated impressions can help avoid breakdowns common in these settings such as misattribution, mistrust, and consequently, conflict.

3. Factors inhibiting impression formation among distributed coworkers

Forming impressions of distributed coworkers can be more challenging than forming impressions of collocated coworkers as dispersion can reduce information about coworkers and decrease motivation to form impressions. Four characteristics of distributed work settings that can affect impression formation among distributed coworkers are: the *distance* that separates coworkers (Gibson & Gibbs, 2006; Hinds & Bailey, 2003); their reliance on *technology* for communication and interaction (Gibson & Gibbs, 2006; Hinds & Bailey, 2003); *heterogeneity* of team members with respect to their culture and nationality (Cramton & Hinds, 2005; Gibson & Gibbs, 2006); and the *dynamic structures* of virtual teams (Gibson & Gibbs, 2006). I now turn to a detailed discussion of how each of these factors can impact impression formation.

3.1. Distance

Physical distance between coworkers is one of the defining characteristics of distributed work settings (Hinds & Bailey, 2003) with many nuanced variations (Birnholtz, Dixon, & Hancock, 2012). And even though in reality few teams are completely dispersed and most teams are a hybrid of collocated as well as distributed members (Gibson & Cohen, 2003; O'Leary and Cummings, 2007), physical distance does preclude much face-to-face interaction, especially the opportunity to interact informally in the workplace. Moreover, distance leads to time zone differences and maintaining inclusive contact becomes a challenge. An unbalance is created where collocated members typically interact more frequently with one another than with their distant colleagues (e.g. Hinds & Mortensen, 2005; Walther, 2002). As a result, the amount and types of information distributed coworkers have about each other and their motivation to interact, given extra effort required, is impacted.

3.1.1. Effect of distance on information

I argue that distance inhibits how distributed coworkers get information about each other in three specific ways:

1. It limits the types of situation in which distributed coworkers can interact with one another.
2. It limits distributed coworkers from observing other coworkers interacting with one another.
3. It limits incidental or spontaneous interaction among distributed coworkers.

3.1.1.1. Interaction across situations. Collocation exposes coworkers to each other in a variety of situations such as meetings, coffee breaks, and over lunch. On the other hand, distributed coworkers are limited in their interactions within the context of a single situation – official meetings. For instance, even though distributed coworkers may significantly use communication technologies such as email, video conferencing, or phone for unlimited time, their interactions are still contextually limited because most of their interactions are official or work related. This reduces cross-situational information among distributed coworkers and has the potential to impact impression formation negatively (Welbourne, 2001). Specifically, Welbourne (2001) found that as cross-situational familiarity with a person increased, impressions evolved to become more complex – they were more descriptive and explanatory. Furthermore, increased cross-situational acquaintance resulted in causal theories to explain the target's behavior. This effect was important regardless of the length of interaction as interactions across situations allowed perceivers to account for additional information about a target. Therefore, to the extent that distributed work reduces exposure to coworkers' behaviors – a kind of information – in a diverse set of contexts, distance will lead to less developed and less elaborated impressions.

3.1.1.2. Observing others interacting. Berger and Bradac (1982) propose another dimension of interaction – observing others – that can influence information availability and thus affect impression formation differently in collocated as compared with distributed settings. They suggest that while forming impressions, perceivers tend to prefer situations in which the target person is actively taking part in an activity, as opposed to being in a passive state. Furthermore, perceivers prefer situations where the target is interacting with someone rather than being engaged in a solitary activity and this is the case even when we are unable to overhear conversations. This is a result of our ability to learn more about another person by observing them react to others rather than observing them react to objects since the behavior of other persons is a lot more variable than that of an object

(Berger & Perkins, 1978). In distributed work settings, coworkers have limited opportunities to observe their coworkers interacting with others. Therefore, as suggested by previous studies, if the preference of people for active observation is accurate, distributed coworkers will have less information about their coworkers on which to base an impression, and will feel less confident in their judgments.

3.1.1.3. Incidental interaction. Another kind of interaction often absent in distributed settings is incidental interaction (Hinds & Mortensen, 2005). In a collocated setting people often run into each other or are part of a group conversation where they might not know everyone, but still get to know something about others. Distributed coworkers, however, rarely get an opportunity to interact in unplanned situations (Armstrong & Cole, 1995; Hinds & Mortensen, 2005). Carlston and Mae (2003) define incidental impression formation as, "knowledge about an individual that is acquired inadvertently, during the course of activities that are not directed at forming an impression (p. 99)." Incidental interactions are more likely to lead to acquisition of information that is personal and gossip-like in nature (Carlston & Mae, 2003; Uleman, 1999). Given the decreased likelihood of unplanned encounters when people are distributed as compared with collocated, it can be assumed that incidental impressions are less likely to form thereby reducing the complexity of impressions and even their quantity if workers are not on the therefore the only interaction likely to occur is incidental.

Drawing on the three mechanisms discussed above though which distance impacts interaction and hence information among distributed coworkers, I suggest the following proposition:

Proposition 1. Due to physical distance, distributed coworkers as compared with collocated coworkers will have less interpersonal information about each other and therefore develop more category-based than individuated impressions.

3.1.2. Effect of distance on motivation

I argue that distance will indirectly influence motivation and hence impressions by affecting power relations and in-group/out-group formation across locations (Armstrong & Cole, 1995).

3.1.2.1. Unequal power distribution. A common indirect outcome of geographical dispersion of coworkers is the uneven distribution of power among coworkers at the different locations. For instance, a team might have a manager, who has more power than team members, might be at a different location than most team members. This impacts motivation, according to Neuberg and Fiske (1987), because power differential among people leads to uneven interdependence such that the person in power is less dependent on the person who is not in power. This has direct implications for impression formation since the person who is not in power, and therefore more dependent, is generally more motivated to form an impression of the power holder, a conclusion supported by several studies (De Bruin & Van Lange, 2000; Goodwin, Gubin, Fiske, & Yzerbyt, 2000; Stevens & Fiske, 2000). Based on these findings the following proposition can be advanced:

Proposition 2. Coworkers in remote locations, as compared with coworkers collocated with project leader, will be more motivated to form individuated impressions of the project leader given stronger perceived power differential.

3.1.2.2. In-group/out-group categorization. Dispersion of team members among different locations is detrimental as it also prompts workers to align with a particular location, intensifying in-group/out-group comparisons among coworkers who are at different locations (Armstrong & Cole, 1995). These comparisons lead people

to create in-group/out-group distinctions and workers categorized as sharing membership in a given individual's group are perceived differently, and more negatively, than those not categorized in that group. Through a series of studies, Reynolds and Oakes (2000) show that when in-group/out-group dimensions provide the salient frame of reference it influences impression formation and leads to increases in stereotyping. In distributed work settings in-group/out-group formation along the lines of location is intensified since several dimensions including nationality, language and culture often align with the location and strengthen in-group/out-group dynamics across sites (Cramton & Hinds, 2005), leading to this proposition:

Proposition 3. In-group/out-group categorization along the lines of location will be pronounced among distributed coworkers and will reduce motivation to form individuated impressions of distributed colleagues.

3.2. Technology-mediation

Distributed work arrangements have been present in some form over centuries (O'Leary, Orlikowski & Yates, 2002) and it is widely agreed that the factor that distinguishes present day distributed work from previous distributed work arrangements is the increased use of technology-mediated communication (Hinds & Kiesler, 2002). Distributed workers accomplish work using a variety of technologies including communication applications such as email, teleconferencing, and videoconferencing, and increasingly through social software and other Web 2.0 applications and studies show that when people use technology-mediated communication to interact it has an effect on processing of interpersonal information (Hinds, 1999; Straus, Miles, & Levesque, 2001; Weisband & Atwater, 1999) and consequently on work processes such as coordination (Wiredu, 2011). But as yet, the research on the role of these applications in forming interpersonal relationship is inconclusive. For instance, it is still debated whether technology-mediation can lead to strong new relationships or are they only able to help maintain relationships that already exist. Nonetheless, given the centrality of technology-mediation to distributed work, it is essential to discuss if it might affect impression formation.

3.2.1. Effect of technology-mediation on information
One way in which technology affects impression formation is by changing the quantity and quality of information to which coworkers have access. Face-to-face interaction because of its embodied nature allows information about voice, gestures, mannerisms, and other facets to be conveyed. In technology-mediated communication the variety of information is reduced and information about the context in which the person is embedded is also reduced (Sproull & Kiesler, 1991). As a consequence, technology leads to impressions that are potentially different from those formed in face-to-face interaction and this is well documented (Hancock & Dunham, 2001; Spears, Lea, & Postmes, 2001; Walther, 1993). Specifically, the conclusive evidence about the nature of impressions in technology-mediated interactions is that impressions do form but the rate of impression formation is lower as compared to face-to-face interaction (Tidwell, & Walther, 2002; Walther, 1993). Impressions are also less detailed or complex but they are more *intense* than those formed in face-to-face interactions (Hancock & Dunham, 2001). The intensity of the impressions is a result of limited breadth of information about others resulting in disproportionate focus on the information that is available about others. One implication of this is that if stereotypical impressions are formed, they will increase in intensity with subsequent interaction since the quantity of information will increase but not its diversity. Overall, the following proposition can be advanced:

Proposition 4. Impressions formed by distributed coworkers through technology-mediated communication will have more intensity but less complexity as compared to impressions formed via face-to-face interaction.

3.3. Heterogeneity

Distributed firms often span national boundaries and team members constitute a diverse, heterogeneous membership with different linguistic, social, and economic backgrounds (Armstrong & Cole, 1995). This heterogeneity is advantageous as it results in more creative and detailed solutions (Cummings, 2004; Eisenhardt, 1989; Williams & O'Reilly, 1998) as teams that contribute different perspectives on a problem counter some of the possible negative consequences of extremely homogeneous groups (Janis, 1983). At the same time, this diversity has the potential for negative consequences largely because of disruption in group cohesion due to increased stereotyping (Eisenhardt, 1989). In addition, negativity is likely to be intensified as in-group/out-group biases develop among coworkers at different locations since location tends to be aligned with the nationality and culture of a coworker (Cramton & Hinds, 2005). In relation to the large body of work addressing the effects of a heterogeneous and diverse workforce on socialization within organizations, there is limited work examining its effects within distributed teams (for exceptions see Cramton & Hinds, 2005; Cummings, 2004). But irrespective of direct prior empirical evidence, it is not hard to see the potential of heterogeneity or diversity to shape and be shaped by interpersonal impression.

3.3.1. Effects of heterogeneity on motivation
3.3.1.1. Implicit biases and stereotypes. Proponents of social identity and self-categorization theories suggest that impressions that are more individuated or stereotypic will be determined, respectively, by whether the salient self-other categorization is defined in interpersonal terms or group terms. According to this viewpoint, stereotypic impressions are formed of out-groups in intergroup contexts when individual's identities as part of an in-group are stronger. Individuated impressions are formed when there is no meaningful contrasting out-group (Reynolds & Oakes, 2000, p. 357). Reynolds and Oakes's (2000) suggest that less stereotypic impressions are formed in interpersonal conditions, as opposed to group conditions, and that stereotyping increases when in-group/out-group dimensions provide the salient frame of reference. People have implicit ideas of what people from other cultures and nationalities are like (Fiske, 2002). These ideas are often stereotypical in nature. Stereotypes confirm what individuals think so they are less motivated to pay additional attention to cues. And regardless of the argument whether stereotypical impressions are necessarily inaccurate in and of themselves, once a distributed coworker forms a categorical impression of another coworker based on national or cultural stereotype she will require that much more motivation to re-categorize that impression, making it difficult to update and thus to increase the accuracy of her impression.

Proposition 5. Pronounced in-group/out-group categorization based on nationality or other salient social category among distributed coworkers will result in less individuated and more categorical impressions that are likely to be stereotypic.

3.4. Dynamic structure

Gibson & Gibbs, 2006 argue that global work teams are increasingly dynamic in nature and "change occurs frequently among participants, their roles, and their relationships to each other (p. 458)." This dynamic structure of a team, according to Gibson & Gibbs,

2006, is detrimental to effective team work as it increases uncertainty and perceived risk and this "uncertainty often spills over into attributions and interpretations about the motives of the parties involved (p. 459)." Since impression formation is moderated by information and motivation and exchanges between the target and the perceiver change impressions, the dynamicity of changes in team would require coworkers to constantly acquire new information about others and also shifts their motivation as dependencies among coworkers change with time. Therefore, a dynamic structure will equally affect information and motivation and it can be proposed that:

Proposition 6. Dynamic structure of teams will increase the need to revisit impressions requiring more effort to form impressions increasing the probability that coworkers will fall back to easily accessible categorical impressions thereby reducing individuated impressions.

4. Facilitators of impression formation among distributed coworkers

So far, we have seen how distance, technology-mediation, heterogeneity, and dynamic structure can work to inhibit individuated and complex impressions that are regarded as more accurate and useful impressions. I now discuss five factors that can facilitate more accurate impression formation by increasing the complexity of impressions and individuated impressions among distributed coworkers. The five facilitators are: (1) travel, which involves face-to-face interaction; (2) shared identity; (3) use of electronic interpersonal information; (4) expectation of future interaction; and (5) sharing of contextual information. Although I delineate these factors for analytical purposes, in real work settings they often work in tandem. Travel is likely to increase anticipation for future face-to-face interaction and shared identity is likely to increase use of electronic interpersonal information.

4.1. Travel

Travel between locations will likely facilitate impression formation by providing workers the opportunity to interact face-to-face with their otherwise distant coworkers. Furthermore, travel will allow the opportunity to interact in different situations and contexts, both formal and informal, thereby increasing information complexity. Travel can also make it possible for them observe their coworkers in the presence of other people and increase contextual information about coworkers' work practices and environments (Armstrong & Cole, 1995). Travel may also indirectly influence the motivation distributed coworkers have for forming impressions of each other since travel entails face-to-face meetings and therefore coworkers will be motivated to know more about each other as they anticipate future face-to-face interaction. But, as Hinds and Bailey (2003) caution, travel will never fully mitigate the negative effects of distance as, "when team members return to their respective sites distance will once again exist among them (p. 626)."

Proposition 7. Travel between locations will increase impression complexity and individuated impressions among distributed coworkers as it will give coworkers a chance to interact in different situations and increase contextual knowledge.

4.2. Shared identity

Shared identity has been found to be critical at the team level (Hinds & Mortensen, 2005), especially as a moderator of

interpersonal conflict. This relationship can be extrapolated to argue that shared identity will also affect how individual workers perceive each other by motivating coworkers to learn more about each other since they share a common concerns and outcomes. When workers are motivated to know more about their distributed coworkers, they are more likely to form individuated and complex impressions about them. Shared identity, therefore, can be a useful resource in overcoming lack of attention paid by those in power to learn about their coworkers. Distributed coworkers, as discussed earlier, are also prone to in-group/out-group based conflict due to location based faultlines that naturally form due to different locations. A shared identity can also mitigate differences that arise due to a perception of being in the "other" group. In collocated settings, coworkers get a chance to build rapport through informal interactions and have higher chances of doing things together, such as going for lunch or coffee, which can contribute towards building a shared identity (Armstrong & Cole, 1995). Distributed coworkers lack these opportunities to do things together, other than in technology mediated group meetings, and therefore shared identity is harder to develop. Therefore, among geographically distributed workers there is an *explicit* need to build a stronger collective identity among subgroups in different locations. Shared identity can be developed through the use of technology such as Intranets and team homepages, through travel, and by creating opportunities for collective activities.

Proposition 8. Impression formation can be facilitated by building a shared identity to negate the effects of unequal power distribution and in-group/out-group biases based on locations.

4.3. Use of electronic interpersonal information

In addition to providing a medium for communication among distributed group members, technology can play other roles in influencing how people perceive others. For instance, in a study of the role of personal homepages in the workplace, researchers found that even though workers used the pages primarily for project information, authors took advantage of the opportunity to personalize them (Bly, Cook, Bickmore, Churchill, & Sullivan, 1998). Furthermore, Bly and her colleagues argue that regardless of organizational culture, project tasks or difficulties of implementation, people personalized their work and their presentation of self in ways that were meaningful both to themselves and their readers. The emergence of personal web pages at work suggests that web technologies can play a crucial role in the way employees further their self-presentation in the organization. As Fiske and Neuberg (1990) suggest, more information can lead to individuated impression formation. Therefore, if used properly, Intranets can play a powerful role in helping coworkers find out about distributed coworkers leading to more individuated impressions.

Proposition 9. Greater use of personal information sharing technology such as company Intranets among distributed coworkers will facilitate more individuated impression formation.

4.4. Expectation of future interaction

The expectation of future interaction changes the way in which we form impressions (Berger & Bradac, 1982), "When persons expect to interact with each other in the future, they will monitor their present interaction more carefully and try to reduce their uncertainties about each other more (p. 15)." Anticipated interaction increases exchange of biographic and demographic information and heightens recall of conversational content and details about the person with whom one is interacting (Berger & Bradac,

1982). This finding has been confirmed in relation to computer-mediated communication and Walther (2002) has concluded that, "anticipated future interaction increases a number of interpersonal behaviors and feelings, including the amount of personal information exchanged, self-disclosure, feelings of similarity, positive and friendly self-presentations, and cooperation in negotiations (p. 248)." Although expectation of future interaction is common for all workers, in the absence of frequent interactions it holds special significance for distributed workers and will likely lead to an increase in motivation to form individuated impressions. Therefore, anticipated future interaction will increase distant coworkers' motivation to form more individuated impressions. Moreover, anticipated future face-to-face interaction may be a particularly strong motivator for distributed coworkers. Therefore, travel and other novel forms of interaction can indirectly act as a significant motivating factor for impression formation.

Proposition 10. Expectation of future interaction will motivate coworkers, particularly distributed coworkers, to form more individuated impressions of each other.

4.5. Sharing of contextual information

Finally, one critical facilitator for impression formation is sharing of contextual information. Lack of shared context among team members has been recognized as a common problem in distributed teams and can lead to misattribution (Cramton, 2001) and conflict (Hinds & Bailey, 2003). Cramton (2001) suggests that people make more personal rather than situational attribution concerning their remote partners because of a "failure to share and remember information about remote situations and contexts, and uneven distribution of information (p. 365)". She also suggests that when people work under heavy cognitive load they become more likely to make personal rather situational attributions since information

processing limitations amount to blaming individuals for problems that may have broader causes. Moreover, in the absence of situational information, they are likely to make negative attributions concerning the dispositions of the remote partners. Gibson and Cohen (2003) also argue that when distributed team members find it difficult to form impressions of their teammates, "virtual team members often err on the side of dispositional attributions, assuming behavior was caused by personality, because they lack situational information and are overloaded, and this may make them less likely to try and modify problematic situations (p. 411)." In a study of distributed groups, Walther, Boos, and Jonas (2002), arrive at a similar conclusion. According to them, when distributed group members are unable to adapt to each other, group members are more prone to make attributional judgments about distant partners rather than consider their adjustment difficulties. They also suggest that by redirecting participant's attention to situational issues in local rather than distributed interaction scenarios, participants become more effective when they later encounter distributed environments. These studies suggest that distributed coworkers will wrongfully attribute to people problems that might be situational in nature and personal misattributions of coworkers will likely lead to inaccurate impressions. Therefore, an explicit effort has to be made to increase sharing of contextual information.

Proposition 11. Sharing of contextual information will allow distributed coworkers to make proper attributions for events, thereby avoiding personal misattributions when an outcome is the result of a situation as opposed to the action of a distributed coworker and result in individuated impressions of coworkers.

5. Feedback and repair

So far, I have discussed factors that might inhibit impression formation among distributed coworkers and factors that might
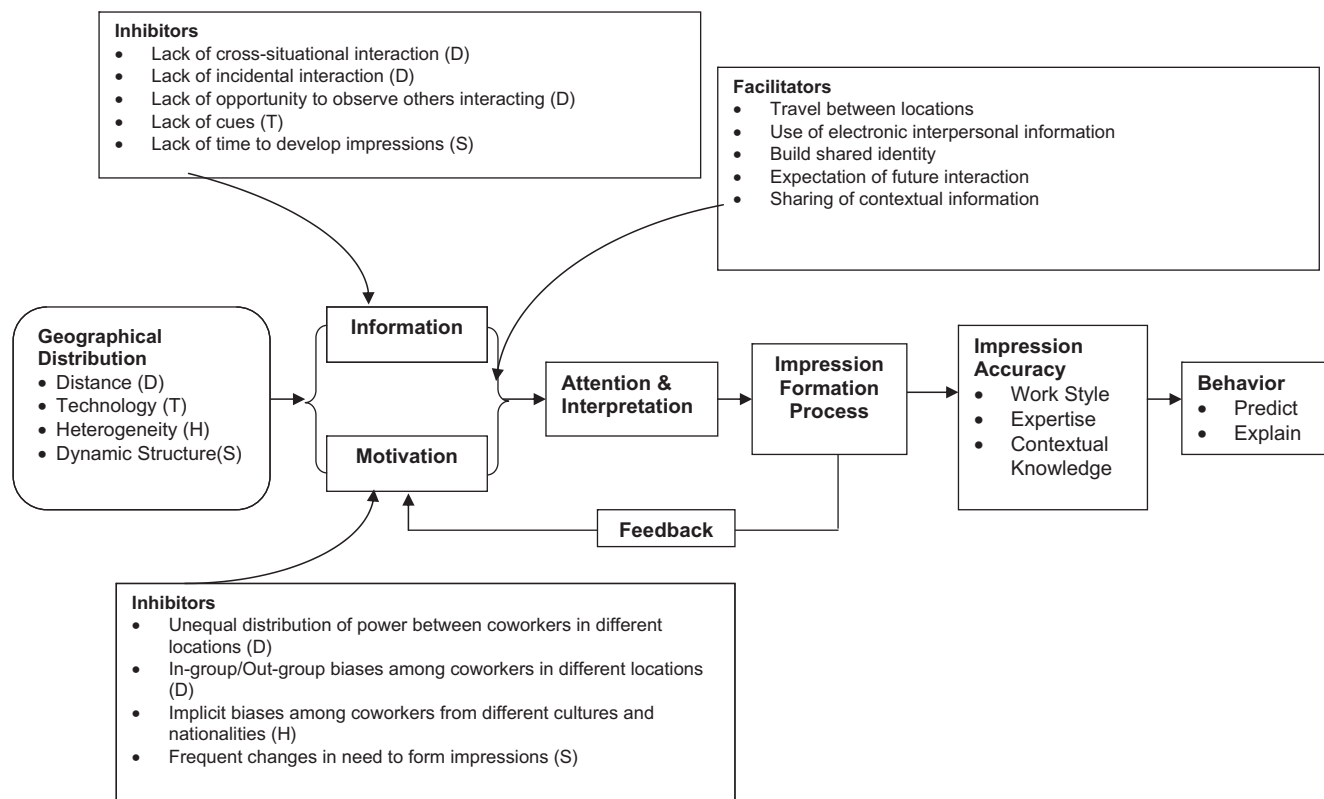
Fig. 1. A model of impression formation and impression accuracy among geographically distributed coworkers.

facilitate more individuated and complex impressions. In this Section 1 take a temporal perspective and focus on the role of feedback in impression change over time. Impression formation is a continuous process in which people build upon and update impressions of others with time and additional information. Research on the impression formation process suggests that impressions can change from category-based to attribute-based if new information or additional motivation is acquired (Fiske & Neuberg, 1990); attribute-based impressions are derived from the specific characteristics of the target person and thus tend to be more accurate. However, moving to attribute-based processing can be challenging for distributed workers largely because of the lack of sources of information readily available to them. For instance, in a study of student project teams Cramton (2001) found that project partners were considered lazy or rude if they did not reply to a message whereas in reality the project partners had not received the message at all. Moreover, the negative attributions that resulted from this misunderstanding endured even when the cause of the problem had been identified. Therefore, distributed teams are likely to find it harder to correct inaccurate impressions and repair of impressions is problematic as subsequent information is neither more complex nor is there increased motivation. Furthermore, as discussed earlier, stereotypical impressions once formed are hard to change as specific trait inferences become obstructed by inhibitory processes when behavior is consistent with already activated stereotypes (Wigboldus, Dijksterhuis, & van Knippenberg, 2003).

Proposition 12. Feedback is important in changing impressions but it will be harder for distributed coworkers to repair impressions since access to new information in a timely manner is limited and given frequent changes in work structure it will be difficult to build on prior knowledge about a coworker.

6. Impression accuracy in distributed work settings

Relatively speaking, all impressions can be useful; but principally, accurate impressions enable more optimal choices among messages exchanged in an interaction, lowering our chances of offending or embarrassing someone (Jussim, 1993; Berger & Bradac, 1982). One way to consider accuracy is to judge the usefulness of impressions within the context of work – accurate impressions reduce breakdowns and facilitate smooth collaboration among distributed team members. In terms of the nature of these impressions we have seen that complex and individuated impressions are preferred for interpersonal work as they reduce stereotyping, and consequently, bias and discrimination, and allow workers to understand others' perspectives, a crucial element of work collaboration (Krauss & Fussell, 1991). In a distributed workplace, accuracy of impressions can be judged along several dimensions depending on the interaction among coworkers, their interdependence, and the objective of their interaction. Here I consider three kinds of impressions in terms of content: work style, expertise, and contextual knowledge.

In a work context, impressions such as knowledge of a coworker's communication habits, their language preferences, and other specific habits such whether she returns calls, how fast she responds, how she feels about interruptions, and so forth, affect coordination among coworkers (see Cramton, 2001, for examples). I use the term *work style* to capture these aspects of a worker's impression. One of the unique advantages of distributed work is the increase in the availability of *expertise* (Hinds & Kiesler, 2002); however, as Cummings (2004) cautions, that advantage only has value if workers have access to information about expertise. Faraj and Sproull (2000) also note that although expertise is a necessary

input, it is important for team members to be familiar with each other's experience, skills, and specialized knowledge to facilitate expertise coordination, in essence creating a transactive memory system they can draw on (Oshri et al., 2008). A final factor of importance for collaboration in distributed work setting is the *contextual knowledge* that distributed team members have about each other. Contextual knowledge refers to information about the context of working, practices within different locations, and culture. Contextual knowledge prevents misattribution among distributed coworkers, especially the tendency of coworkers to attribute behaviors to personality (Cramton, 2001), and brings awareness of coworkers' activities which provides a context for own activities (Johri, 2007; Weisband, 2002). Therefore, I propose that:

Proposition 13. Impressions formed among workers about distributed coworkers' work style, expertise, and contextual knowledge will be less developed and/or inaccurate because lack of information and motivation will lead to less individuated impressions and more category-based impressions that are more prone to bias and less likely to be updated.

7. Behavior

The impressions people form of each other determine how they behave with one another. Following Berger and Bradac (1982), I propose to focus on two behavioral elements of knowledge that coworkers might need in order to work effectively with each other: *predictive* and *explanatory*. Berger and Bradac (1982) differentiate between three kinds of knowledge that a person can have about another person: *descriptive*, *predictive*, and *explanatory*. The *descriptive* level of knowing refers to our ability to 'know' a person based on the reliability with which we can identify him or her. This set of knowledge is based mostly on the physical characteristics of a target person and usually determines our ability to identify a particular person in a crowd. *Predictive* knowledge refers to our ability to predict *what* a given person will say or do, or how a person will react in a given situation. In this case we are not only sure of who a person is, but we can reliably predict his or her reaction and maybe also their beliefs and attitudes. Moreover, descriptive and predictive levels are related in the sense that descriptive knowledge may give rise to predictive activity. Predictive knowledge may give rise to successful interactions since to interact effectively we often need to accurately predict people's reaction. *Explanatory* knowledge is yet a higher level of knowledge that involves our ability to explain *why* a person did or did not do, or say or did not say something. We might be able to predict how a person or a group might respond to something, but even then our ability to explain their actions might be fairly limited. Knowing why a person believes in something or behaves in the way s/he does, gives us more possible ways to influence that person than if we can only predict their actions. Therefore, for behavioral accuracy predictive and explanatory knowledge are critical. Behavioral accuracy of an impression for a distributed work setting can be defined as the *ability of a coworker to predict a distributed coworker's behavior and explain the reasons for her actions.*

The two elements of behavioral accuracy – prediction and explanation – will be salient at different times and situations. The predictive level of knowledge is critical for interaction among coworkers in any work setting. Whether coworkers need to share knowledge and learn from each other or collaborate on a task they need to be able to predict what that person knows and whether or not s/he will be willing to work with them. In such cases, although descriptive knowledge about a person might be useful – for instance age can be an indicator of tenure at a given job – it doesn't necessarily help coworkers in their interaction since it does not tell

us about the behavior of a person. Explanatory knowledge is also valuable for the kinds of interactions that occur among coworkers in distributed work settings. Knowing why a person does what s/he does can direct the way in which we approach a person. For instance, knowing why a person might not be replying to your email can diffuse the natural tendency to assign negative attributions to that person (Cramton, 2001). Based on the discussion of impression accuracy and behavior, the following proposition is advanced:

Proposition 14. Inaccurate impressions will reduce the ability of distributed coworkers to predict and explain distributed coworkers' actions.

Fig. 1 depicts the propositions that have been put forward in this paper and shows how distance (*D*), technology-mediation (*T*), heterogeneity (*H*), and dynamic structure (*S*) impact information and motivation leading to factors that can inhibit impression formation, and lists factors that can facilitate impression formation. The model also depicts the outcomes of the impression formation process – impression accuracy and the consequent behavior. Accuracy in this model includes judgments of work style, expertise, and contextual knowledge about a target and behavior refers to whether perceivers are able to predict and explain the behavior of targets based on their impressions (Berger & Bradac, 1982; Gabarro, 1990).

8. Discussion and conclusion

Impression formation among distributed coworkers is crucial for coworkers to work effectively with each other and to develop trust, avoid misattribution, and to share knowledge and expertise. Although impression formation has been studied in face-to-face settings and also in settings where the target and perceiver are completely distributed and interact only via technology, these situations do not truly represent a distributed work arrangement, which is often a hybrid of face-to-face and technology-mediated interactions. I present propositions, represented visually through a model, of how the impression formation process works in distributed work settings by taking into account both face-to-face interactions as well as technology-mediated interactions. Even though the advantages of face-to-face interaction have often been stated through case studies (Nardi & Whittaker, 2002), this is the first attempt to systematically account for characteristics of face-to-face interaction that are beneficial to distributed work and link them with technology-mediation. And although several inhibitors that result from technology-mediation might be common to both distributed and collocated settings that rely heavily on technology-mediation, inhibitors identified for distance are unique to distributed work settings. I also suggest several facilitators for processes identified as inhibiting impression formation in distributed work settings. Of course, there is an assumption on my part that the literature on impression formation, which is based largely on face-to-face settings, will also hold for distributed work settings. This might turn out not be the case and our conceptions of impression formation in distributed settings might be different but since it is an empirical question I think it is a productive assumption for the purposes of this review.

The propositions suggest other directions for future work, including increasing our limited theoretical understanding of the impression formation process and employing different methods, for instance, using diaries and logs (Duck, 1991; Park, 1986) to understand how information is acquired and how impressions systematically form and change over time. Prior work on impression formation suffers from a lack of ecological validity, it is based entirely on laboratory studies (Fiske & Neuberg, 1990), and in effect focuses on first impressions rather than the field where subjects

often have prior history, expectation of long term interaction, and occasions for multiple encounters (Ybarra, 2001). Furthermore, subjects also have access to more cues and inhabit a more complex environment where the target and perceiver both are a part the setting and form impressions of each other. There is some evidence that being embedded in a complex organization may cause social structures such as status hierarchies to override the cues often used as prompts in studies of impression formation in the laboratory (e.g. Weisband, Schneider, & Connolly, 1995). In essence, a distributed work setting provides a context to compare and contrast impression formation and allow a more socially situated examination of the process (Smith & Semin, 2004). A contextual investigation of impression formation is essential to understand how institutional and situational factors intertwine within distributed settings to shape impressions of others (Johri, 2007). There is a chance that in certain cases, categorical impressions serve us well enough and individuated impressions bring an undesirable level of complexity to a relationship; issues such as this need to be examined empirically.

This paper advocates a focus on individual workers within their distributed context. It is through the effort of individual workers who spend significant effort in creating work practices which allows for productive distributed work. In a recent study Johri (2011) shows how individual workers are able to draw on resources available at hand – both social and material – to create effective distributed work practices. He characterizes this process as "sociomaterial bricolage" (Johri, 2011). The usefulness of this approach is provided credence by the emerging literature on the role of "brokers" within distributed settings (Di Marco & Taylor, 2011; Johri, 2008; Levina & Kane, 2009). Brokers acts as conduits for the flow of information and knowledge across locations and are critical in helping teams create common work norms. This critical role of distributed workers needs further investigation to tease different mechanisms that distributed coworkers employ to create novel work practices and how relational knowledge about others supports this activity.

On the pragmatic side, this work contributes towards guidelines for the design and use of technologies. The current model suggests that a combination of different strategies will work best for facilitating impression formation and increasing impression accuracy. For instance, use of technology should be supplemented by travel and when coworkers travel to a different location they should spend their time in different situations with a coworker. The use of several new technologies such as awareness tools, Blogs, and Wikis have a social component and are based on interaction among workers. For instance, several expert systems that help identify expertise are becoming common across organizations (Ackerman, Pipek, & Wulf, 2003; Pipek, Wulf, & Johri, 2012). Yet, no study delineates the role impression formation and consequent relationship development might play in developing an expert system. As the literature review in this paper shows, interpersonal impression formation might play a crucial role in not only recognizing expertise, but also in interaction among coworkers.

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A. Johri / Computers in Human Behavior xxx (2012) xxx–xxx

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