

Subjective Distance in Teams

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Abstract

This paper develops the concept of *subjective distance* as a critical, but under-specified, factor in the effectiveness of virtual work arrangements. Past research has focused on objective, geographic distance and produced conflicting and inconsistent findings regarding the relationship between distance and a variety of important processes and outcomes (e.g., team communication and performance). We define subjective distance as individuals' cognitive and affective representation of the distance between them and their team members, and argue that it is likely to predict important team outcomes better than objective distance. Then, we offer a model of subjective distance and the individual, social, task, and organizational factors that shape it.

“Working for the first time on a geographically distributed service delivery team, Jan expected to feel closest to the other members of the team who were located in her office. She was surprised to discover, after two months of work, that she actually felt closest to the account analyst 650 miles away.¹”

Conventional wisdom (and years of research) hold that we feel closest to others who are in close physical proximity to us. There is a long tradition of research that supports this point of view (Festinger, 1951; Newcomb, 1956; Allen, 1977). However, as geographically distributed work arrangements become more common (Richman, Noble & Johnson, 2002; Gartner Group, 2001) some have begun to question this assumption. Developments in telecommunications have led some to conclude that the liabilities of distance have been destroyed or conquered (Cairncross, 1997), as demonstrated by the strong norms of solidarity and cooperation that global work teams and dispersed “open-source” software developers have been able to achieve (Carmel, 1999; Von Krogh & Von Hippel, 2003). Meanwhile, others argue that proximity remains essential to the functioning of groups. They maintain that it is premature to say “distance is dead” (Olson & Olson, 2002) and that new technologies will not eliminate the challenges faced by members of geographically dispersed teams (Hallowell, 1999; Handy, 1995). There are as many authors offering skeptical forecasts about the future of dispersed work teams (Shapiro, Furst, Spreitzer, & von Glinow, 2002) as there are authors taking optimistic points of view (Townsend, DeMarie, & Hendrickson, 1998).

Researchers’ approach to studying distance in organizations has changed relatively little over the years, despite the technological and social changes in the way dispersed work is performed (O’Mahony & Barley, 1999). Distance has generally been viewed as an objective concept in the management and organization studies

literatures, measured in feet, meters, or other concrete spatial units. An exclusive emphasis on objective distance has its limitations. Contrary to the straightforward assumption that interpersonal affinities and relationships are weaker when persons work in different locations, there are instances when interpersonal relations are strong despite individuals being in distant locations. In contrast, persons situated near each other can have demonstrably weak relations. Nevertheless, this experience of distance as a subjective concept is relatively unexplored. As Scott (1999: 463) noted, there is “a need for more sophisticated research to explore this phenomenon. Clearly, not enough emphasis has been placed on *what it means to be dispersed*” from others (emphasis added). Treating distance in purely objective terms provides an incomplete view of how people experience it.

In this paper, we augment previously objective conceptions of distance by introducing the concept of *subjective distance* and developing a model of the factors that shape it. We define subjective distance as individuals’ cognitive and affective representations of the distance between them and their team members.² We suggest that personal, social, task, and organizational factors affect how people experience distance. This experience-based conceptualization of subjective distance helps reconcile the inconsistent and conflicting findings regarding the processes and performance of geographically dispersed teams (Martins, Gilson, & Maynard, 2004), which have been based on objective conceptions of distance.³

We develop the concept of subjective distance in several stages. First, we review previous research on distance and related concepts. Second, we show how the experiences of objective and subjective distance can diverge in organizations. Then, we introduce subjective distance as a construct that helps explain the relations among team members, whether they are local or dispersed. Fourth, we explain how

individual, social, task, and organizational factors affect subjective distance. We conclude by addressing how to measure subjective distance and discussing the implications of a subjective, experience-based conception of distance.

Literature Review

Our understanding of distance draws on a long line of proximity (or “propinquity”) studies. More than a half century ago, researchers began demonstrating the importance of physical distance in interpersonal relationships (e.g., Caplow & Forman, 1950; Festinger, 1951; Festinger, Schachter, & Back, 1950; Gullahorn, 1952; Maisonneuve, Palmade, & Fourment, 1952; Newcomb, 1954). These and subsequent studies established a negative relationship between physical distance and factors such as interpersonal liking and enjoyment, communication frequency, and other desired outcomes in work and social settings (Allen, 1977; Athanasiou & Yoshioka, 1973; Conrath, 1973; Friedman, 1966; Short, Williams, & Christie, 1976). More recent studies have elaborated upon these theories, demonstrating that the physical dispersion of organization members has a negative effect on communication and can obstruct the development of team member relations (Valacich, George, Nunamaker, & Vogel, 1994; Warkentin, Sayeed, & Hightower, 1997). At a more macro level, researchers have also shown the value of proximity in economic relationships (Baum & Sorenson, 2003; Gertler, 1995; Saxenian, 1994).

More recently, developments in telecommunications have led some to proclaim that “distance is dead” (Cairncross, 1997). The solidarity and cooperation that global work teams and dispersed open source software developers have been able to achieve show that physical distance may not always impede success (Carmel, 1999; Von Krogh et al., 2003). Researchers also have found that dispersed teams ultimately achieve equivalent or higher levels of quality even if they get off to a slower start

(Gallupe & McKeen, 1990; Jessup & Tansik, 1991). Furthermore, dispersion can positively affect team performance because dispersed members contribute useful, non-redundant information (Ariel, 2000). When they share that information across boundaries, distance does not appear to be related to performance (Cummings, 2004). Thus, a steady stream of research from the 1950s to the present attests to the importance of distance in collaborative relations, but a growing body of conflicting findings is spurring a lively debate about the effects of distance on geographically dispersed work.

We believe that the mixed and conflicting findings that fuel this debate are partly due to a focus on objective physical distance. As shown in a series of recent reviews (Arrow, McGrath, & Berdahl, 2001; Scott, 1999; Sessa, Hansen, Prestridge, & Kossler, 1999), distance in teams has generally been operationalized as the dichotomous alternative to complete co-location. When distance has been measured, it has been in primarily objective and spatial terms, with spatial distances assumed to be experienced equally by all members of a team. However, we know that traditionally objective concepts such as money (Mitchell & Mickel, 1999; Zelizer, 1994), time (George & Jones, 2000; Mainemelis, 2001; Orlikowski & Yates, 2002), and identity (Thatcher, Doucet, & Tuncel, 2002) all have important subjective dimensions. For example, Zelizer (1994) and Mitchell and Mickel (1999) have shown that differences in biographical, demographic, personality, social, and attitudinal variables affect individuals' perceptions of money.

Research in other domains and at other levels of analysis also has shown important distinctions between objective and subjective distance. For example, Amin and Cohendet (2004: 87) emphasize what they call "relational or social proximity," and argue that it "involves much more than 'being there' in terms of physical

proximity.” Their approach borrows from Nonaka and Konno (1998), arguing that relationships at a distance are not inherently “less social, less tacit, less sticky, less negotiated.” In this sense, Amin and Cohendet (2004: 99) recognize that modern corporations can mitigate objective distances and “achieve relational proximity through translation, travel, shared routines, talk, common passions, base standards,” and other means. Similarly, Dow (2000: 61) showed that “though geographic distance is a highly significant predictor, its impact is largely distinct from that of psychological distance” and, thus, using geographic distance “as the sole indicator of psychological distance would be severely flawed.” In fact, researchers have found that objective distance explains no more than half of a person’s feelings of subjective distance (Coshall & Potter, 1987). However, a neglect of social psychological variables has left the deviations between subjective and objective distances “inadequately explained” (Coshall et al., 1987: 612). In the next section, we illustrate these deviations with actual examples from geographically dispersed teams.

ILLUSTRATIONS OF OBJECTIVE AND SUBJECTIVE DISTANCE IN PRACTICE

As we have noted, teams with high levels of objective distance (e.g., the globally dispersed teams that have been used in a follow-the-sun approach to software development, Carmel, 1999) do not necessarily have high levels of subjective distance. Conversely, teams with low levels of objective distance don’t always have low levels of subjective distance. Being physically proximate to team members doesn’t always lead to feelings of closeness or collegiality, as shown by decades of research on co-located teams and their performance (Cohen & Bailey, 1997). Due to different thought worlds (Dougherty, 1992), faultlines (Lau & Murnighan, 1998),

functions (Parker, 1994), sub-groups (Polzer, 2004), and other factors (Jackson & Ruderman, 1995), teams separated by little to no objective distance can still struggle to develop a sense of closeness. These counterintuitive observations are represented in the off-diagonals of Figure 1, with teams whose members feel close to each other despite considerable geographic dispersion in Quadrant 4, and the “close-but-far” teams in Quadrant 2. Teams separated by many miles and/or time zones, as well as by considerable subjective distances among members are in Quadrant 3 (e.g., the team that decided to launch the Challenger space shuttle flight in a fateful tele-conference, Vaughan, 1996). Such teams exemplify the pessimistic predictions about geographically dispersed work. Teams in Quadrant 1 are exemplified by high-performing teams and “hot groups” of co-workers who are both objectively and subjectively close to one another (Leavitt, 1996). In the remainder of this section we describe teams in each of these Quadrants to illustrate important factors that influence feelings of subjective distance.

Insert Figure 1 about here

The early research regarding distance and proximity did not specifically address teams (Caplow et al., 1950; Festinger et al., 1950) and dealt with very low levels of objective distance (as in Quadrant 1). As research regarding distance expanded beyond social relations to address distances between co-workers in organizations, the distances in question remained objective and relatively small (Conrath, 1973; Monge & Kirste, 1980; Monge, Rothman, Eisenberg, Miller, & Kirste, 1985). The most prominent early example of research with larger distances was Allen’s (1977) study of research & development communications. Although this

work allowed for larger distances than had previously been studied, it found that changes in communication frequency occurred at relatively low levels of distance (e.g., 30 meters). While Allen's work did not address subjective distance explicitly, it does point to the potential for high levels of subjective distance even when co-workers are physically close.

The seemingly anomalous situation in which team members are co-located but are not subjectively close was observed in a study of cross-functional banking teams which ranged from completely co-located to completely dispersed (Quadrant 2) (Wilson, 2001). The teams managed the corporate retirement accounts for their assigned customers (large U.S.-based corporations). Depending on the nature of the customer's account, some of the teams included a Treasury Analyst as a member. Since all of the Treasury Analysts were located at the corporate headquarters, they were often physically close to other members of the team (sometimes on the same floor as the team's Relationship Manager and Account Manager). Yet the Treasury Analysts almost never *felt* close to the other members of the team. This occurred for a variety of reasons. First, the Treasury Analysts' work was relatively self-contained and did not affect the work of other members of the team. Their low task interdependence meant that these analysts communicated infrequently with other members of the team. Attraction-selection-attrition forces (Schneider, Goldstein & Smith, 1995) also seemed to result in a concentration of introverted personalities in the Treasury area. Their jobs required virtually no contact with the customer or other members of the team, and employees who enjoyed "running numbers" all day tended to be attracted to (and stay in) these positions. In effect, the task characteristics interacted with personality characteristics and resulted in no internal or external motivation to communicate with others. This lack of communication caused the

Treasury Analysts to feel “removed” from their teams, even though they were almost always at or near the teams’ physical centers of gravity.

The treasury analysts stand in contrast to a more familiar situation, in which a dispersed team experiences a high level of subjective distance (Quadrant 3). Such is the case with a team of software developers with subgroups on the west coast of the United States and in Bangalore, India. The two sub-groups were separated by spatial (13,000 miles) and temporal (13 ½ hours) distances that made face-to-face interactions rare, teleconferences frequent, and e-mail the main communication tool. At the same time, there were group-level differences in status that encompassed real and perceived differences in the groups’ financial resources and access to the end market; group imbalances in decision-making power; and knowledge gaps (mostly market-related, but also technology-related). The considerable subjective distance created by these status differences made the U.S. developers consider that it was below their status to accept suggestions from the lower-status Indian site: “Why should they give us their suggestions? They’re not paid to make suggestions; we are telling them what to execute, and that’s what they should do.” In this context of scarce face-to-face communication and strong social barriers to intra-group closeness, the members of the two groups felt distant from each other and did not develop a common identity. Even the use of a “one site, one conduit” coordination mechanism, whereby one engineer assumed the role of conduit of communication with the other site, did not make the two subgroups feel subjectively closer to each other. Only the engineers who traveled often across the two sites were seen as being closer. As one U.S. developer said about an Indian engineer who came several times to the United States: “I trust him; I got to know what kind of person he is” (Metiu, 2001).

Of course physical distance does not always co-vary with subjective distance. Open source software development projects offer a prime example of geographically dispersed yet subjectively close teams (Quadrant 4). The physical distance separating developers is extreme. For example, the Linux credit files (these files list every contributor of code) list over 400 developers from 35 countries (Tuomi, 2004). In spite of extreme physical dispersion, open source projects have been able to develop complex and high quality software such as the Linux operating system or the Apache web server. In spite of the absence of face-to-face interactions, open source contributors experience sufficient closeness to achieve complex coordination and collaboration. One factor contributing to experienced closeness is the similar ideological orientation that values the sharing of code (Raymond, 1999). Another critical factor in fostering subjective proximity among open source developer groups is the shared culture of open source development, rooted in the common grammar provided by UNIX, expressed in the licenses that protect open source software from being privatized by individuals or companies, and manifested in the norms of cooperation and reciprocity that govern participation (Kogut & Metiu, 2001). Yet another important factor in fostering subjective proximity in these communities is the level playing field, manifested by a relative lack of awareness of member attributes that might indicate status and privilege inequalities (Rosette, 2004); instead, open source developers build status through peer recognition for their project contributions (Stewart, 2003). While software's modularity allows many individuals to contribute to these projects, the end result is only as good as its weakest component; in this sense, task interdependence compensates effectively for the challenges of working virtually (Hertel, Konradt, & Orlikowski, 2004). In spite of the physical distance between developers, strong and intense communication processes – enabled by access to

common newsgroups and technologies – help make these communities a central presence in developers’ lives. Developers identify strongly with their open source communities, as illustrated by the importance developers attribute to the ideological differences between the two main open source philosophies (Ghosh, Glott, Klieger, & Robles, 2002). Programmers’ identities form through a complex socialization process aimed at becoming a “hacker,” i.e., a knowledgeable software developer. Because other pre-existing subgroup identities that might cause stratification or conflict are less salient, the superordinate identity – in this case, identities as hackers and valued open source project contributors – can become the most salient (Hornsey & Hogg, 2000).

In summary, the banking and open source teams exemplify the off-diagonal Quadrants 2 and 4 in Figure 1. These non-intuitive close-but-far and far-but-close teams cannot be accounted for with traditional views of the impact of objective distance on team performance. To account for these observations we need subjective distance.

A MODEL OF SUBJECTIVE DISTANCE

We define subjective distance as an individual’s cognitive and affective representations of the distances between them and their teammates. Just as objective distances can change with people’s travels or re-locations, subjective distance is unlikely to be static. It grows or decreases based on a range of individual, social, task, and organizational factors. Subjective distance is grounded in people’s daily experiences and work practices, and can differ radically from objective measures of distance (Bradner & Mark, 2002). Definitionally, subjective and objective distance

also differ in two other ways. First, unlike “objective distance,” which can be observed or calculated by others, subjective distance is known only to the focal person. Second, like trust (McAllister, 1995) and conflict (Amason & Sapienza, 1997), subjective distance has cognitive and affective dimensions, while objective distance does not. The cognitive dimension refers to a mental assessment of how distant a teammate *seems*. This assessment might be reflected in a person’s responses to items such as “When I think of the other person, he or she seems far away” or “When I think of the other person, I don’t think about the physical distance between us.” The affective dimension recognizes that people’s sense of subjective distance is not a purely conscious or rational assessment; it is subject to emotions and feelings. These feelings would be reflected in responses to items like “I feel close to the other person” or “I feel isolated from the other person.”

Before detailing the factors that affect subjective distance, it is important to distinguish subjective distance from several related concepts (i.e., cohesiveness, presence, and co-presence) and other types of distance (i.e., institutional, emotional, psychic, technological, and social). While subjective distance is similar in some ways to the constructs of cohesiveness, presence, and co-presence, it differs from them in important ways. Cohesiveness is usually operationalized as the level of attraction or liking within a group. Subjective distance is not directly tied to the degree that group members like one another. It is possible to actively dislike others, yet feel too close or insufferably proximal to them, even though they are not in the same room or office. Subjective distance is also distinct from the construct of presence, which is defined as the subjective experience of being in one place or environment, even when one is physically situated in another (Witmer & Singer, 1998). Presence has been studied primarily in the context of virtual reality and involves a technology-enhanced sense or

awareness of being in the same place. In contrast, subjective distance does not depend on a feeling of actually “being there” (Heeter, 1992). Finally, subjective distance is distinct from the concept of co-presence which refers to people being able to attend to the same stimulus object (Clark & Marshall, 1981). We also note that presence and co-presence are both highly variable states. Two team members could feel strongly co-present today, but not at all co-present tomorrow if their physical locations changed.

Our conceptualization of subjective distance also differs from other distance-based constructs, which often are rooted in the *similarity* or *difference* between two entities on some dimension. Technological distance, for instance, is a measure of the divergent technological interests of two firms (Rosenkopf & Almeida, 2003). Institutional distance is a concrete comparison of the regulatory institutions of two countries (Kostova & Roth, 2002). Unlike these first two forms of distance, subjective distance, as we have defined it, does not depend on actual similarities or differences. We can often feel subjectively close to others who are very different from ourselves. A third type of distance, emotional distance, is used by people to minimize emotional pain (often through the use of humor); to trivialize or minimize the psychological and emotional strain of some stressor (Bakker, Schaufeli, Sixma, Bosveld, & van Dierendonck, 2000). In contrast to the action of emotional distancing, subjective distance is not a motivated reaction.

Psychic distance relates to a firm’s degree of uncertainty about a foreign market, resulting from cultural differences and other business difficulties which present barriers to learning about and operating within the broader market (Evans & Mavondo, 2002). Psychic distance is determined by uncertainty and defined by differences in national culture. In contrast, subjective distance can actually grow as

one becomes more certain or familiar with one's team. Finally, social distance, while measured at the individual level, is most often used in the sociological literature as a reflection of the differences between groups or classes of people (Smith, 1983). Subjective distance, on the other hand, reflects an individual's closeness to a specified other, rather than to an entire demographic group or class of people.

Having distinguished between subjective distance and several related concepts, we now describe our model of how team members experience distance. Figure 2 depicts our model, showing that individuals' experience of distance is the product of objective distance; communication and identification processes; and the individual, social, task, and organizational factors affecting them.

Insert Figure 2 about here

Objective Distance

Although one can feel distant from colleagues who work in the same office, our focus is on geographically dispersed teams and, thus, objective distance among team members is the basis for our subsequent considerations of subjective distance. Objective geographic distance in teams has spatial, temporal, and configurational elements (O'Leary & Cummings, 2002). The spatial element is the most commonly used in research on teams and dyadic interactions, and also the one that comes most immediately to people's minds. It is measured in feet and miles (or meters and kilometers). The second element of objective distance is temporal. Temporal distance captures the extent to which people's normal work hours overlap. Non-overlapping work hours can be the result of people being separated by many time zones, or by working opposite shifts in the same location. The third element of objective distance

captures the pattern or arrangement of members across sites, independent of the spatial-temporal distances among them. This element incorporates the isolation or clustering of members at certain sites. It also recognizes that the configuration of roles, resources, power, and status within a team are not well captured using traditional spatial measures of meters or miles.

As important as these three dimensions of objective distance are, people estimate and experience distances differently. What is “far” to one person may be “close” to another. Although we know of no explicit tests of this in a team context, research in other fields supports the idea that subjective distance is both distinct from objective distance and a more powerful predictor of team processes and outcomes. For example Mooney, Sherman and LoPriesto (1991) have found that people’s perceptions of distance from home are much better predictors of how they adjust to new situations than actual distance from home. Indeed, as we argued in the beginning of the paper, the conflicting findings on the impact of team dispersion on team outcomes are partly due to a narrow focus on objective distance as the explanatory factor. In our view, objective distance doesn’t affect subjective distance directly, but it does affect the processes of communication and identification through which subjective distance forms and evolves.

Processes by which Subjective Distance is Formed

Communication and identification are key mediating processes by which subjective distance emerges and, thus, are at the core of our model. We discuss these processes below, and then address the individual, social, organizational, and task factors that affect them.

Communication. Communication – especially its frequency and depth – is one of the most important determinants of subjective distance, and has been noted as

critical factor in the long line of research on distance in social interactions. The original theory of propinquity, as articulated by Newcomb (1956: 575), stated that “other things equal, people are most likely to be attracted toward those in closest contact with them.” Homans (1950) put it another way: If the frequency of interaction between two or more persons increases, the degree of their liking for one another increases. These claims have been supported using a range of relational variables in a wide variety of settings. Frequency of interaction has been shown to affect cooperation (Axelrod, 1984), affective commitment (Tschan, Semmer, & Inversin, 2004), and other aspects of close relationships in a variety of settings: between leaders and followers (Antonakis & Atwater, 2002; Kacmar, Witt, Zivnuska, & Gully, 2003), buyers and sellers (Heide & Miner, 1992), and even grandparents and grandchildren (Harwood, 2000). Frequent communication also has been shown to be instrumental in on-line social support. Wright and Bell (2003) found that the amount of time spent in on-line health support groups was directly related to the level of perceived support, with on-line and face-to-face participants perceiving equivalent levels of support.

Depth of communication also helps foster subjective closeness among team members. Exchanging expert information or working closely on difficult problems, gives people a sense of proximity as they become intimately familiar with one another’s knowledge, expertise, and interests (Kidder, 1981; Ullman, 1997). Similarly, subjective distance can decrease as group members learn about individuals’ non-work likes and dislikes, values, hobbies, passions and preoccupations (Tidwell & Walther, 2002).

Identification Processes. We expect that members of dispersed teams will feel closer to one another the more they identify with the team. In addition to subjective distance, shared identity has a powerful influence on many other attitudes

and behaviors, especially attraction and interpersonal relations. Even in minimal group settings (groups without face-to-face contact, without established norms and without any internal group structure) group members demonstrate a preference for other members of their own “group” (Tajfel, Billig, Bundy & Flament, 1971). People within group boundaries express more positive affect and trust for one another (Brewer & Kramer, 1985) and tend to exhibit cooperative rather than competitive behavior (Schopler & Insko, 1992). Identification with a group can elicit cooperative behavior even in the absence of interpersonal communication among the members (Brewer & Brown, 1998). For these reasons, we expect identification to be an important mechanism in our model of subjective distance.

Previous findings attributed to objective distance can be re-evaluated in terms of the effects of group identity. For instance, Allen’s (1977) study with research and development labs showed that people can maintain interactions and relationships at a greater physical distance when they are all members of the same group. Group identity may even be a plausible alternative explanation for Newcomb’s (1956) original results, which showed higher levels of attraction within roommate pairs than across roommate pairs, since “roommates” is a form of group identity as well as an indicator of physical proximity.

Communication and identification are the core processes by which individuals experience subjective distance, but those processes themselves are affected in important ways by several types of factors. These include: individual (openness to experience, need for affiliation, and experience with dispersed work, technology, and travel), social (perceived similarity, status differences, and role centrality), task (interdependence), and organizational (structural assurance and culture) factors. We describe each of these below.

Individual Factors

Although individual difference variables have received little attention in research on the study of the effects of distance on work teams (Martins et al., 2004), we believe that some stable individual differences affect subjective distance – both directly and indirectly through their influence on communication and identification. In general, since working at a distance has been linked to feelings of isolation and uncertainty (Kurland & Bailey, 1999), we expect that individuals whose dispositions help them cope with these conditions will feel less subjective distance. In particular, we expect that openness to experience and need for affiliation will lessen subjective distance directly and indirectly, by enhancing the communication and identification processes. We also expect that individuals' experience with dispersed work, technology, and travel will directly reduce subjective distance between them and their teammates, and will also indirectly reduce subjective distance through the effect of experience on mediated communications.

Openness to experience. Openness to experience has been identified as a critical trait for general coping success (Judge, Thoresen, Pucik, & Welbourne, 1999). Individuals who score high on openness to experience are flexible, tolerant, and inquisitive when confronted with new situations (McCrae, 1996). They also remain confident in the face of adversity and adapt readily to changes in context (LePine, Colquitt, & Erez, 2000). The traits of adaptability and openness to change are required in order to be rewarded by challenge (a curiosity stimulated and intrigued by uncertainty) and to endure inevitable hardships, delays and frustrations (Jordan & Cartwright, 1998). Openness to experience has been shown to help team members adapt to the requirements of computer-mediated communication (Colquitt, Hollenbeck, Ilgen, LePine, & Sheppard, 2002), and it therefore encourages the

development of communication processes that suit the needs of dispersed groups. Openness to experience has also been identified as useful in the context of expatriate assignments. In order to appreciate cultural differences, the trait of broadmindedness (a sensitivity to and accepting of differences between people) is required. Therefore, openness to experience is likely to foster identification processes among dispersed team members who can appreciate each other's differences. We posit that openness to experience has complex effects, directly minimizing the experience of physical distance as well as fostering communication and identification processes among members of dispersed teams.

Need for affiliation. Need for affiliation is another predictor of people's suitability for and success working in dispersed interactions (Wiesenfeld, Raghuram, & Garud, 2001). Need for affiliation represents individuals' desire for social contact or belongingness (Veroff & Veroff, 1980) and is associated with receiving social gratification from a sense of communion with others (Murray, 1938). Although conventional wisdom suggests that individuals with a high need for affiliation would be frustrated working with others at a distance (Dobrian, 1999), research has shown that need for affiliation is significantly and positively related to virtual workers' identification with a collective (Wiesenfeld et al., 2001). Individuals with high need for affiliation reported that they maintained contact by increasing emails, phone calls, and even creating a support group to maintain the feeling that they were part of the unit or organization (Wiesenfeld et al., 2001).

Experience with dispersed work. In a similar fashion, we expect that people's past experience with dispersed work will affect the subjective distances between them and their team members. For people with extensive experience with geographically dispersed teams or other forms of dispersed/remote work, distances

among team members are likely to be perceived as smaller and less consequential because the novelty and uncertainty of dispersion will have worn off and they will have developed skills to work more effectively at a distance (Staples, Hulland & Higgins, 1998). For example, experienced people expect to have to adapt their work rhythms and modes of communication to mesh with distant colleagues.

Experience with technology. Many studies have demonstrated that as people's experience with technology increases, they perceive it to be easier to use, more useful and ultimately actually use it more (Maurer, 1994; Stoel & Lee, 2003). Although a large number of empirical studies have found that interaction in technology-mediated groups is more task-oriented and less personal than interaction in face-to-face groups (Connolly, Jessup, & Valacich, 1990; Hiltz, Johnson, & Turoff, 1986; Rice, 1984), other studies have found that technology-mediated groups can achieve high levels of cohesion or intimacy (Abel, 1990; Chidambaram, Bostrom, & Wynne, 1991; Fussell, 2000; Parks & Roberts, 1998; Robey, Khoo & Powers, 2000), especially with interaction over time (Alge, Wiethoff, & Klein, 2003; Walther & Burgoon, 1992; Wilson, Straus, & McEvily, 2000). Furthermore, research has shown that bandwidth and the "richness" of various media are actually highly context- and user-dependent (Carlson & Zmud, 1999; Markus, 1994; Ngwenyama & Lee, 1997; Rasters, Vissers, & Dankbaar, 2002). For example, Rasters et al (2002) found that people can communicate effectively about complex and equivocal issues even when relying exclusively on a lean communication medium. In this sense, media richness has gone from a concept conceived in only objective terms to one that is now viewed in subjective, experiential terms – just as we suggest distance should be. Regardless of the specific media used, experience and comfort with technology should increase

communication and, thus, decrease subjective distance (Jarvenpaa & Leidner, 1999; Kayworth & Leidner, 2000).

Experience with travel. In research on consumer behavior, objective distance has dominated despite the recognition that subjective estimates of distance and travel time are more accurate predictors of behavior. Nonetheless, some research has directly assessed people's sense of distance and found that it is moderated by their experience with travel (e.g., Harrison-Hill, 2000). For example, people from the geographically isolated country of Australia and frequent business travelers tend to experience distances as shorter than people who live in less isolated environments and/or travel less in general. Experienced travelers are also likely to acquire an appreciation of different cultures, communication modes and needs; as a result, they are less affected by the stresses of working with distant others (Beehr, Jex, Stacy, & Murray, 2000; Ciganek & Ramamurthy, 2003; DeFrank, Konopaske, & Ivancevich, 2000; Ivancevich, Konopaske, & DeFrank, 2003; Westman & Etzion, 2002). Thus, experience with travel is likely to enhance mediated communications and reduce subjective distance.

Social Factors

Social factors within a dispersed team affect members' subjective experience of distance directly and indirectly by influencing the communication and identification within the team. We propose three social factors that are especially influential: perceived similarity with a teammate, status difference between the focal member and a teammate, and the centrality of a member's role within or between subgroups of the team. In addition to their direct effects, we expect status differences to increase subjective distance by reducing communication and identification. In contrast, we expect that members with higher role centrality and dyads who perceive

each other as similar will communicate and identify with the team more, and thus have lower levels of subjective distance from their teammates.

Perceived similarity between team members. While diversity within a team can produce the requisite variety of ideas and skills needed to complete a creative or non-routine task, it can also lead to conflict (Jehn, 1995). Demographic attributes can initially be the most salient dimensions of diversity in teams. Individuals often use physical and social cues such as race, gender, and age to categorize people, organize information about them, and develop expectations about their behavior (Berger, Cohen, & Zelditch, 1972; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). Once people categorize others as members of particular groups about which they may have very generalized or stereotypic knowledge, they typically base their impressions of those people on categorization alone (Fiske & Neuberg, 1990). Often, however, members of distributed teams collaborate in the absence of detailed knowledge about each other's demographic characteristics. In this sense, the lack of physical co-location may alleviate biases that would otherwise obstruct activities like brainstorming (Connolly et al., 1990). At the same time, even in the absence of physical and social cues about other members in dispersed teams, *perceived* similarity can be powerful, and impressions can be even more strongly based on stereotypical knowledge (Cramton, 2002). In addition to common demographic factors, perceptions of a teammate's experiences, attitudes, styles, identities, thought processes, and mental models can affect subsequent relationships in powerful ways. For example, research has shown that overlaps in team members' views or mental models of the task and of the team were positively related to subsequent team performance and process (Mathieu, Goodwin, Heffner, Salas, & Cannon-Bowers, 2000), and vice versa. Furthermore, the effects of such psychological differences may become

stronger over time, while the effects of demographic differences become weaker (Chatman & Flynn, 2001; Harrison, Price, & Bell, 1998). We contend, therefore, that a team member will perceive lower subjective distance as the perceived similarity with other team members increases (and as communication and identification with teammates increases).

Status differences among team members. Status is one aspect of diversity that has received particular attention in the literature on dispersed or technology-mediated groups. Social identity theory maintains that “society is comprised of social categories which stand in power and status relation to one another” and that “some categories have greater power, prestige, status, and so on, than others” (Hogg & Abrams, 1988: 14). While computer-mediated interactions can level the effects of status (Postmes, Spears, & Lea, 1998; Tan, Wei, & Watson, 1999), authors have also shown that status differences persist in electronic groups (Weisband, Schneider, & Connolly, 1995; Cramton & Hinds, 2005), and that differences in the allocation of resources due to status differences reduce the effectiveness of member contact in distributed groups (Brewer et al., 1998; Spears & Lea, 1994). Furthermore, Spears & Lea (1994) found that technology may be used by high-status individuals to exert greater power and influence over low-status individuals. In-depth studies of distributed collaborations also have shown that status differences affect the level and quality of interaction between members (Brown, 1995; Metiu, 2001). Thus, status differences tend to exacerbate objective distances, both directly and by reducing team communications and identification.

Role centrality within team or between subgroups. People who play a central role in a dispersed team may feel “closer” to other team members than people who have more peripheral team roles. Similar statements can be made about persons

who serve the role of boundary spanners by addressing the biases and distortions likely to occur across organizational boundaries (Tushman, 1977) and by acting as information conduits among remote groups and individuals. By virtue of their role, boundary spanners will be at the center of communication networks and foster communication processes that keep dispersed teams together. The nature of a boundary spanner's activities can make other team members feel closer to them than to other team members. We expect that close interactions with central actors who span locations also will foster the development of identification processes in dispersed teams. Central actors and boundary spanners will be perceived by other dispersed team members as less distant than most team members, although these perceptions might not be reciprocated by the central actors and boundary spanners.

Task Factors

In addition to the social factors within a dispersed team, we also propose that a dispersed team's task affects subjective distance between members. Task characteristics are critical to group functioning (McGrath, 1984). We propose that member commitment to task goals and task interdependence are important factors that shape subjective distance through their effects on identification and communication processes.

Goal commitment. Shared commitment to task goals can reduce the subjective distance between team members. The goal-setting literature finds that specific, challenging goals can enhance the performance of teams (Locke & Latham, 1990; Locke, Shaw, Saari, & Latham, 1981; O'Leary-Kelly, Martocchio, & Frink, 1994). An important moderator in achieving this effect is commitment to achieving those goals (Hollenbeck, O'Leary, Klein, & Wright, 1989; Klein, Wesson, Hollenbeck, & Alge, 1999). Zander (1980) has identified many kinds of goals in a

group context, including each member's goals for themselves, each member's goals for other members, and each member's goals for the group as a whole, as well as the group's goal for itself. While each of these types of goals could potentially affect the subjective distance between team members, we propose that each member's shared commitment to the group's goal is the most critical. Sharing a commitment to the group's collective goal increases both communication and identification, reducing the subjective distance between team members.

For instance, a team member might have a strong commitment to work goals, but be similarly committed to family goals (Klein et al., 1999). The member's strong commitment to other outside goals could interfere with his or her commitment to the group's goals, thus maintaining a higher level of subjective distance with teammates. Member commitment to group goals also may intensify with shared attention and work. For example, regular meetings can reinforce project goals among group members and enhance commitment, but this reinforcement may be lacking in virtual teams that cannot meet as frequently as teams situated at the same work site (Chinowsky & Rojas, 2003). Furthermore, different team behaviors have been observed across groups that are assigned goals and those groups that participate in developing their own goals (Guthrie & Hollensbe, 2004; Locke et al., 1990; O'Leary-Kelly et al., 1994). Democratic participation in the development of group goals can build members' shared goal commitment and subsequently reduce their subject distance towards each other. In total, team members' commitment to the group's goals affects subjective distance, and a number of conditions can mute or accentuate this effect.

Task interdependence. Task interdependence, like member commitment to task goals, is an important factor that affects subjective distance between team

members. Task studies have long identified the impact of task interdependence on team processes and on the way team members relate to one another (Thompson, 1967). More recent studies have shown that high levels of interdependence enhance performance (Fan & Gruenfeld, 1998). These findings also extend to virtual groups, where high levels of task interdependence have a positive effect on ratings of team performance, particularly early in the life of the group (Hertel, Konradt, & Orlikowski, 2004). Increased task interdependence increases the need for deeper and more frequent communications within a team and leads people to identify more strongly with the team (DeSanctis & Poole, 1997), which in turn reduces subjective distance among team members.

Moderators of Task and Social Factors

The task and social factors described above are moderated by team tenure and team members' expectations of future work together. We expect that longer tenure and expectation of future interaction will reduce the effects of perceived diversity, status differences, role centrality, and task interdependence on the subjective distance among dispersed team members. Note that these moderators are temporal, capturing changes in the subjective experience of distance over time. While other parts of our model are more static (with the exception of the individual experience factors), these moderators underscore our view that subjective distance is sensitive to time and history.

Team tenure. Studies of work teams show that people who go through an intense work episode together tend to feel closer (Kidder, 1981; Ullman, 1997). Research also finds that physical distance, and the technologies to overcome it, have a decreasing effect on team functioning and perceptions the longer a team works together (Alge et al., 2003; Walther, 1995; Wilson et al., 2000). Still other studies

show that member tenure influences communication patterns (Ahuja & Galvin, 2003). As their tenure together increases, most dispersed teams will likely develop communication routines that reduce the subjective distance among members. We expect this to occur even when teams have had no face-to-face contact. Team tenure also is likely to moderate the effect of perceived diversity on work processes, communication, and identification, due to the build-up of shared experiences.

Team expectations of future work together. Team members who expect to work together on subsequent projects are more likely to invest their time in the development of positive work routines and personal relationships in the current task. A number of studies have shown that expectations of future interaction help minimize the potentially adverse effects of physical distance and non-habitual telecommunications technology use in a dispersed group (Alge et al., 2003; Walther, 1994; Walther, 2002). Furthermore, research finds that dispersed teams begin to adapt to the challenges of physical separation when they have expectations of long-term team interactions (O'Leary, 2002). Based on simulation studies, we also know that social capital can flourish in geographically dispersed social networks, as long as those networks are stable over time (Axelrod, Riolo, & Cohen, 2002). Thus, we expect lower subjective distance when team members expect to work together again in the future.

Organizational Factors

In addition to the individual, social, and task factors described above, subjective distance also is a function of the larger context in which a team works. Two key elements of that context include structural assurance for the team and the organizational culture in which it operates. These factors vary both within inter-

organizational teams and in single-organization teams with strong local sub-cultures and variations in organizational support.

Structural assurance. For our purposes, structural assurance is the assumption that other members of the organization team can be trusted because their employer/s have hired good employees and provided them with adequate training (Galvin, McKnight, & Ahuja, 2000; McKnight, Kacmar, & Choudhury, 2004; Wiesenfeld et al., 2001; Wiesenfeld, Raghuram, & Garud, 1999). An organization can enhance structural assurance by providing appropriate communication technology and travel budgets, and by assigning experienced members to boundary-spanning roles to reduce the subjective distance among dispersed team members (Wiesenfeld et al., 2001). Sophisticated communication tools, such as videoconferencing and other collaborative tools can substitute for understandings that are more commonly achieved face-to-face.

At the same time, a high degree of formalization that creates explicit rules, policies, procedures, plans, goals, and areas of responsibility provides a clear roadmap for coordination. In distributed settings, the opportunities scope for misinterpretation are greater than in co-located teams (Cramton, 2001). Well-specified roles and task objectives can help reduce the chances for misunderstood expectations or intentions. All of the steps an organization takes to ensure that dispersed teams function well should have a positive effect on the communication and identification processes within these teams.

Organizational culture. A strong organizational culture may go a long way toward fostering organizational identity, enhancing communication, facilitating conflict management, and ultimately reducing subjective distance among team members. Groups with strong norms can better cope with challenging situations

(Ginnett, 1993; Meyerson, Weick, & Kramer, 1996; Weick, 1993). Collaboration across distance is one such challenge, and a strong organizational culture can increase people's feelings of closeness despite their lack of physical proximity (O'Leary, Orlikowski, & Yates, 2001). Kotlarsky and van Fenema (2004) report evidence from a distributed software project in which remote developers in Geneva still felt close to the other members of the team in New York because they perceived a shared organizational culture.

Measuring Subjective Distance

Fully testing our model requires a measure of subjective distance. There already is a foundation in social psychology and geography for measuring perceived distance from objects or events in one's life (Ross & Wilson, 2002). In geography, researchers have devoted considerable attention to individuals' ability to assess distances, asking subjects to estimate the actual feet, miles, or travel time (i.e., the objective distance) between themselves and others. Using a more open-ended approach, Bradner and Mark (2002) asked subjects in an experimental study of distant collaboration to draw on paper where they perceived the other participant to be relative to themselves. Subjects produced a wide range of drawings, from country maps with X's to drawings of people divided only by a wall. Subjects' drawings generally fell into three categories: depicting the other right next to the subject, depicting the other in the same city or on the same road, and depicting the other very far away. As with other studies, there were interesting differences between the subjects' drawings and the actual distance between the partners. Even when subjects knew that their partner was on the other side of the country, for example, one third of the subjects' drawings showed the partners adjacent to one another. While such measures are instructive and show that people are generally poor judges of objective

distance, these measures also are strongly influenced by spatial estimation ability, drawing ability, cultural differences, and other factors. One of these factors is subjective distance.

An alternative approach, more consistent with social psychological measures, is to ask subjects to think about a specific team member and place an X on a diagram at the point that best indicates how far away this person seems to the subject. This form of graphic rating scale is a more direct reflection of the concept of distance than might be captured in a typical Likert response format (see Figure 3).

Insert Figure 3 about here

Graphic rating scales used in a larger survey also have the advantage of serving as a cognitive speed bump (Harrison & McLaughlin, 1993), interrupting the monotony and response sets that result from a long series of Likert-type items. Others have used graphic scales in a way that could be applied to subjective distance (Ross & Wilson, 2002). For example, Shamir and Kark (2004) have tested a single-item graphic scale (based on two circles with varying degrees of overlap) for measuring organizational identification. Further work needs to be done to establish the validity of such a scale.⁴

DISCUSSION

This paper develops subjective distance as a main factor in team functioning, and advances a model to explain and predict the effects of physical distance and numerous individual, organizational, task and social factors on the development and maintenance of interpersonal relationships in organizational groups. We have argued that objective distance has only an indirect effect on team functioning, and that this

effect is shaped by subjective distance. Subjective distance represents a critical, though missing, link in understanding distance and dispersed teams to date. We believe that conflicting claims about the impact and importance of distance (Cairncross, 1997; Olson et al., 2002) may stem from prior authors' focus on objective distance. Our model offers a way to reconcile these competing claims and to predict the circumstances under which objective distance is likely to have the greatest effects.

Our model suggests that it is important to reconsider existing notions about the effects of distance. Original theories of interpersonal relationships at a distance may no longer account for current patterns of behavior and may be of little help in predicting relational development in organizations (Wilson, 2001). Both the original law of propinquity (Newcomb, 1956) and the related contact hypothesis (Allport, 1954) are based on the premise that proximity is a necessary condition for interaction, and therefore for the development and maintenance of positive interpersonal relationships. Proximity is, of course, no longer a prerequisite for interaction. As we argue in this paper, interpersonal relationships and a feeling of closeness can be maintained in organizations without relying on physical proximity.

The concept of subjective distance explains why we can feel close to people we rarely if ever see, and to this end we can point to arguments advanced by historians and anthropologists focused on quite dissimilar contexts. Anderson (1991) has developed the notion of imagined communities to describe the development of modern nations. These communities are *imagined* because their members will never know most of their fellow members, meet them, or even hear of them, yet in the minds of each lives the image of their communion; moreover, they are ready to kill and to die for these imagined communities. Similar, though probably not as strong,

are feelings towards entities such as teams that can occur among dispersed individuals, particularly when communication and identification processes are in effect.

In exploring the question of whether physical proximity is ever a necessary condition for group effectiveness, we go even further, arguing that being farther away from one another may be more efficient in some cases, such as when the task is independent or when the individual tasks need high levels of concentration and demand few interruptions. As some researchers have shown, there are real problems associated with working in face-to-face settings, such as interruptions or unequal participation because of status-related issues (Jett & George, 2003; Perlow, 1999). Some subjective distance may also be useful in decision-making situations. Researchers have shown, for instance, that predictions made on the basis of telephone interviews are more accurate than those made from face-to-face interviews because the interviewers aren't distracted by irrelevant physical cues (Straus, Miles & Levesque, 2001). However we do not deny that there are situations when physical proximity is needed in work groups. For example, co-location may be necessary for a group working on the same physical artifact; similarly, high task interdependence combined with strong time pressures may call for physical co-location.

Recently, a consensus has emerged in the managerial literature that an initial face-to-face meeting is conducive to group cooperation (Barczak & McDonough, 2003). On the basis of our arguments, we dispute such blanket recommendations. As suggested in our model, teams that have worked together before, or those that share a common culture, may achieve the same result. At the same time, however, we view the specification of the situations when physical proximity is necessary as an important task for future research.

Implications for research

Our model of subjective distance highlights a number of other unanswered empirical questions. It remains to be determined the extent to which the subjective experience of distance is correlated with objective distance, and under what circumstances (if any) objective distance serves as an independent predictor of group performance effects. We have made the case that subjective distance mitigates physical distance or dispersion, with subjective distance being driven by a wide variety of factors (e.g., tenure together as team, organizational identification, perceived diversity). We also need to understand the interaction effects between the various categories of factors in the model. It seems likely that many of the factors have cumulative effects that may not be independent. For example, a common organizational culture may mitigate some of the effects of status differences on subjective distance. It is also likely that low levels of subjective distance will lead to higher levels of communication and identification. Our model, in other words, is marked by strong interaction effects and feedback loops, which future research will clarify. We also have suggested that the effects of objective physical distance decrease over time in relationships. Although this idea is intuitively appealing, it has not been effectively empirically tested.

We also expect that *patterns* of individual subjective distance within teams have implications for team-level outcomes. Subjective distance could be conceptualized in social network terms: as a web of dyadic ties in which the denser the relations (the more subjectively close all the members of the team feel to each other) the more likely members would be to work together in the future, the higher the level of team learning, and the stronger the group efficacy. Conversely, in teams where either all of the members feel subjectively distant from each other, or only a

subset feel subjectively close, we expect the group to learn less, be less likely to work together in the future and feel less positive about the group's potential and outcomes. However, the "optimal" level of subjective distance in a team may depend on the type of tasks the team needs to accomplish. In teams whose tasks require close cooperation, we might want a larger subset of team members to feel subjectively close. Conversely, teams with more independent or routine tasks might not need high levels of subjective proximity.

At the same time, high levels of dyadic subjective proximity among group members may be detrimental to group outcomes as they can foster groupthink (Janis, 1982). Effective groups are those whose members can feel sufficiently distant to question each other's assumptions, play devil's advocate, and push each other to move toward better solutions. Some level of conflict may be beneficial for teams (DeDreu & Weingart, 2003). Therefore, we infer that a low to moderate level of subjective distance may allow people the kind of questioning that is akin to "constructive" conflict (Carnevale & Probst, 1998) and leads to positive group outcomes.

We also need to investigate whether work groups need a certain minimal level of subjective proximity in order to function effectively. It may be that not everyone on the team needs to be subjectively close, just enough members so that the groups holds together. Perhaps at a minimum, each group member needs to feel subjectively close to at least one other group member. We see the issue of whether a minimum level of subjective proximity is needed for team effectiveness as an important task for future research. Are there configurations that enable moderate levels of team subjective proximity, while fostering high dyadic proximity among interdependent members?

While in the current paper we have focused on dyadic subjective distance, we recognize that some additive models of subjective distance may be consequential for *team* outcomes. Aggregating dyadic measures of subjective distance to the team-level is not a simple task (Chan, 1998). We do recognize, however, that if we are to arrive at concrete prescriptions regarding dispersed teams' effectiveness, we may have to assess both a dispersion model of distance (based on the variance within the team in dyadic measures of subjective distance), as well as an additive model of subjective distance (based on a summation of the dyadic distances within the team).

The *effects* of subjective distance also warrant investigation. At the individual and dyadic levels, we expect that the level of subjective distance will predict willingness to work together in the future and beliefs about the efficacy of working at a distance. Ultimately, we expect that one's cumulative subjective distance from others will exhibit the sort of spiral effects discussed by others (Lindsley, Brass & Thomas, 1995). For instance, after multiple experiences of feeling subjectively close to other physically remote team members, it seems likely that one would go into the next experience of working at a distance *expecting* to feel close to the other team members. People act in ways that preserve their established knowledge structures and perceptions in order to maintain cognitive consistency (Greenwald, 1980). In turn, they maintain cognitive consistency by seeking out, attending to, and interpreting information in ways that reinforce their prior beliefs and expectations (Fiske & Taylor, 1984). In the case of work at a distance, this means that positive expectations about feeling close to others should lead group members to look for examples of closeness, ignore examples of overly formal or distant behavior, and interpret ambiguous behavior in a positive light. Group members might be more likely to notice prompt responses to inquiries, ignore cases where there was no response, or

interpret non-response in a favorable light (i.e., “they must be working on higher priority items”).

We expect subjective distance to have explanatory power beyond its obvious importance for behavior in dispersed contexts. There are strong reasons to expect it to have an impact in any context involving work at a distance: telecommuting, multinational assignments, virtual teams, and distance learning. In addition, we expect it to have relevance for research on such traditional OB topics as leader-member relations, employee monitoring and control, socialization and information sharing. Here we expand on its possible application to research on transactive memory and social support.

In the case of research on transactive memory systems in teams (Wegner, 1987; Liang, Argote and Moreland 1995), it may be that individuals who feel subjectively close to their team members may also come to rely more on them for the purpose of information gathering and communication. We can also envision that a team which developed subjective proximity among a sufficient number of dyads or members will also be likely to have a well-developed transactive memory system. After all, the initial research on transactive memory has been done in the context of partners in intimate relationships (Wegner, 1987). Presumably, the affect between the members of the couple has fueled their reliance on each other for information purposes. In any case, we believe that studies that would examine concomitantly the development of transactive memory and subjective proximity are important for understanding team performance.

Our work on subjective distance also has implications for researchers who have recognized the importance of socially supportive relationships in teams. Recent research has shown that people expect to be working in teams where the other

members provide social support (Parris, 2003). House (1981) suggested that there are several types of behaviors constituting social support, affective (emotional support) and non-affective (instrumental, appraisal, and information support). This line of research emphasizes the link between the quality of team interactions and the attending communication processes, with enhanced performance at the individual level (Shirom, 1976). Our work on subjective distance acknowledges this relationship and takes it further in several ways. As we have argued when discussing the feedback loops in our model of subjective distance, individuals who feel subjectively close to other team members are likely to identify more, and to engage in rich communication processes. In this sense, we see subjective distance as an important mechanism in the formation of and sustenance of social support in teams.

From a management standpoint, our model suggests that many of the variables that organizations control can be leveraged to reduce subjective distance among members of virtual groups. People can be specifically selected for characteristics that increase their tolerance for working at a distance. Organizations also can provide substitutes for proximity in the form of structural assurance, strong work cultures, norms for interaction and the technology to support the teams' interactions (Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002). Since the effects these variables have on team members' experiences of distance are likely to change over time, our model suggests that organizations should gauge team members' ongoing experience of distance. With attention to team design, team composition, and the social history of team members, organizations do not necessarily have to resort to physical co-location to achieve the benefits of proximity.

Although we have discussed the importance of the subjective experience of distance in the context of widely distributed groups, we believe that it also has

relevance for other organizational arrangements. As increasingly flexible work arrangements proliferate, more employees are working at home, meeting at client sites and interacting through technology. The actual physical distance between the offices of two people is becoming less relevant. However, their experience of distance (from each other or from the organization) is becoming more important. Also, while we developed our model to address the experience of distance in dispersed teams, many of the factors that we raise are also relevant to team members who work in close physical proximity. Thus, our model of experienced distance might be applied readily to co-located teams in addition to virtual teams.

Conclusion

The increasing prevalence of dispersed work teams raises many questions about the meaning and experience of distance in organizations, particularly for individuals who are members of dispersed teams. There are currently competing perspectives and equivocal findings on the significance of spatial proximity and geographic distance for teams. We address these disputes about the meaning of distance with a model that explains how members of dispersed teams experience distance. The conceptualization of subjective distance as a cognitive and affective representation of working with others, rather than a purely objective notion, enables organizational scholars to see the dynamics and multi-dimensional aspects of how people experience distance in dispersed teams.

Footnotes

¹ Observation from Wilson (2001).

² Although we focus on subjective distance in teams, the concept could just as easily be applied to the subjective distance between any two entities – e.g., between a supervisor and a subordinate or between a team member and an external team leader.

³ We use Hackman's (1990) definition of "team," which in turn draws on Alderfer (1972), and has following defining characteristics: boundedness, stability of membership, commonality and interdependence of task, and authority to manage its own internal processes. Some of these characteristics are being called into question as geographically dispersed teams push elements of the traditional definition of a team. This is especially true with boundedness and stability, because many geographically dispersed teams tend to have more permeable boundaries and changing membership. Although some have drawn distinctions between "team" and "group" (Hare, 1992:15-21; Johnson & Johnson, 1994:503-4), we use them interchangeably (Hackman, 1990:14, footnote 1).

⁴ We propose using a multi-trait, multi-method approach to measuring subjective distance. Following Campbell and Fiske's (1959) original suggestion, we would evaluate subjective distance and two other related constructs – an antecedent of subjective distance (perceived diversity) and an outcome of subjective distance (willingness to work together again) – using three different methods: 1) a multi-item Likert scale, 2) a social network measure, and 3) the graphic distance scale described in the body of the paper. For the multi-item Likert measure of subjective distance, items could be constructed that reflect perceptions of proximity. Confirmatory factor analysis could be used to identify items that represent a coherent and unidimensional construct. For the social network analysis of subjective distance, participants could be

asked to evaluate how close they feel to each other member of the team or unit, with the final geodesic distance between nodes representing subjective distance. We would expect to observe both convergent and discriminant validity, with different measures of subjective distance being more highly correlated than monomethod assessments of the different constructs.

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FIGURE 1

The Relationship between Objective and Subjective Distance

Subjective Distance	High (feels distant)	2 (ex: Treasury team members)	3 (ex: US – Bangalore software teams)
	Low (feels close)	1 (ex: Hot groups)	4 (ex: Open source groups)
		Low (co-location)	High (global dispersion)

Objective Distance

FIGURE 2

Model of Subjective Distance

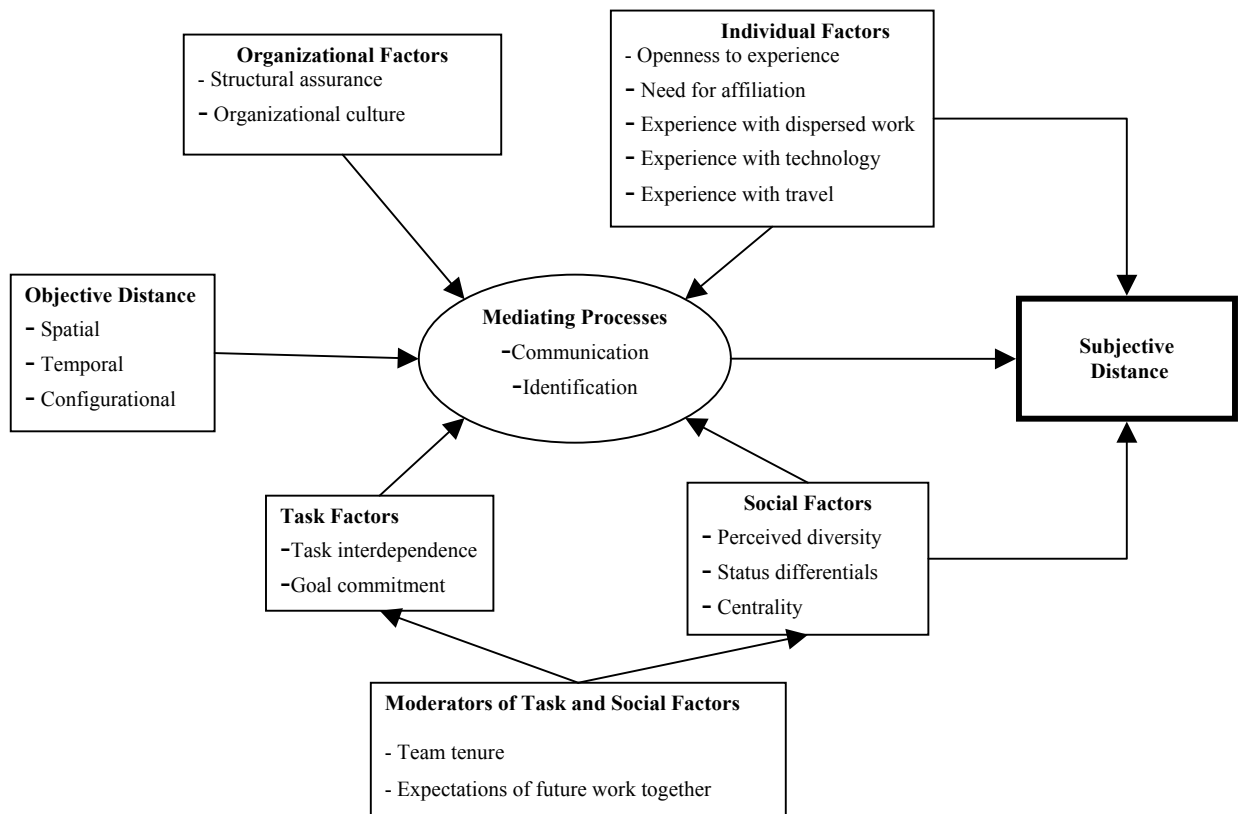


FIGURE 3

One Potential Measure of Subjective Distance (based on Shamir & Kark, 2004)

Instructions: Other people may feel quite close or far away, regardless of how far away they actually are. Think about person identified above. Place a mark in the circles at the point that best indicates how far away this person seems to you.

