Perceived Proximity in Virtual Work: Explaining the Paradox of Far-but-Close
Jeanne M. Wilson, Michael Boyer O’Leary, Anca Metiu and Quintus R. Jett

Abstract
One’s colleagues can be situated in close physical proximity, yet seem quite distant. Conversely, one’s colleagues can be quite far away in objective terms, yet seem quite close. In this paper, we explore this paradoxical phenomenon of feeling close to geographically distant colleagues and propose a model of perceived proximity (a dyadic and asymmetric construct which reflects one person’s perception of how close or how far another person is). The model shows how communication and social identification processes, as well as certain individual and socio-organizational factors, affect feelings of proximity. The aim is to broaden organizational studies’ theoretical understandings of proximity to include the subjective perception of it. By shifting the focus from objective to perceived proximity, we believe that scholars can resolve many conflicting findings regarding dispersed work. By understanding what leads to perceived proximity, we also believe that managers can achieve many of the benefits of co-location without actually having employees work in one place.

Keywords: distance, virtual, distributed work, teams, perceived proximity

‘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.’ (Wilson 2001)

Conventional wisdom and years of research hold that we feel closest to others who are in close physical proximity to us (Allen 1977; Festinger 1951; Kiesler and Cummings 2002). Yet we increasingly find ourselves in paradoxical situations where we are geographically far from someone with whom we feel quite close (‘far-but-close’). As geographically distributed work arrangements become more common (Richman et al. 2002), some have begun to question the old assumptions about proximity. Developments in telecommunications have led some to conclude that the liabilities of distance have been conquered (Cairncross 1997), as demonstrated by the effective cooperation that global work teams and dispersed free/open-source software developers have been able to achieve (Carmel 1999; Von Krogh and Von Hippel 2003). Meanwhile, others argue that proximity remains essential to the functioning of groups (e.g. Brown 1995). They maintain that it is premature to say ‘distance is dead’ (Olson and Olson 2002) and that new technologies will not eliminate the challenges faced by members of geographically dispersed teams (Handy 1995).
We believe that these conflicting conclusions and the seeming paradox of far-but-close are partly due to scholars’ focus on the effects of objective physical proximity. Although organizational scholars have moved past narrow, objective views of time (Hall 1983), money (Mitchell and Mickel 1999; Zelizer 1994) and price (Beunza et al. 2006), objective proximity continues to dominate studies of geographically dispersed work and to be treated as almost lawfully related to critical work processes and relationships (Lardner 1992), even when authors recognize that perceptions of proximity do not increase linearly with actual proximity (Hansen and Lovas 2004). The assumptions associated with this paradigm, particularly that interpersonal affinities and relationships are weaker when people work in different locations, have led organizational scholars to overlook instances when people feel close to those in distant locations and cases when people situated near each other have demonstrably weak relations. 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 proximity and distance in purely physical terms provides an incomplete view of how people experience it.

In this paper, we explore the paradoxical phenomenon of feeling close to geographically distant colleagues and propose a model of the factors that predict such feelings. In developing this model, we make three contributions. First, we hope to enrich scholars’ views of distance and to broaden our field’s theoretical understandings of proximity to include the subjective experience of it. Our approach is akin to treatments that revitalized views of time in organizational studies (Ancona et al. 2001a; Hall 1983). Second, by exploring perceptions of proximity, we help reconcile the inconsistent and conflicting findings regarding the effects of distance on interpersonal processes and performance (Martins et al. 2004). Third, by modeling the factors that affect perceived proximity, we suggest ways in which organizations can achieve many of the presumed benefits of co-location without the impracticalities of having all employees actually work in one location.

Years of research on the effects of physical proximity on various work and group outcomes have produced conflicting results. While some researchers have found a negative relationship between physical distance and factors such as interpersonal liking, communication frequency and other desired outcomes in work and social settings (e.g. Allen 1977; Festinger 1951; Short et al. 1976), others have found that dispersed teams ultimately achieve equivalent or higher levels of quality and performance (e.g. Cummings 2004; Walther 2002).

Such conflicting results stem, at least in part, from the treatment of distance as a wholly objective phenomenon. Distance in work groups has generally been operationalized as the dichotomous alternative to complete co-location (Griffith et al. 2003; Webster and Staples 2006). When distance has been treated as more than dichotomous, it has been considered in primarily objective and spatial terms, with spatial distances assumed to be experienced equally by all members of a team (O’Leary and Cummings 2007).

However, research in other domains and at other levels of analysis has made important distinctions between objective physical proximity and perceptions of proximity. For example, Torre and Rallet (2005: 49) write that the judgment about a colleague’s proximity is based not only on the number of kilometers
separating them, but also on the individual’s perception of this physical distance. Amin and Cohendet (2004) also 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), who argued that relationships at a distance are not inherently ‘less social, less tacit, less sticky, [or] less negotiated’. In this sense, Amin and Cohendet (2004: 99) recognize that modern corporations can mitigate physical proximity and ‘achieve relational proximity through translation, travel, shared routines, talk, common passions, base standards’, and other means. Similarly, Dow (2000: 61) showed that the impact of geographic distance 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 physical proximity explains no more than half of a person’s feelings of ‘subjective distance’ (Coshall and Potter 1987).

Nonetheless, the differences between geographic proximity and the perceptions of proximity have not been adequately explained (Coshall and Potter 1987). Although researchers have started to refer to the importance of perceptions of proximity (e.g. Mooney et al. 1991), none have defined the construct or developed a model of the factors that affect it. In the next section, we illustrate the differences between geographic proximity and perceptions of proximity with brief examples from several in-depth, longitudinal studies of geographically dispersed teams.

The Paradox of Perceived Proximity

As we have noted, members of teams with low levels of physical proximity do not necessarily feel distant from each other. Conversely, being physically proximate to team members does not always lead to feelings of closeness, as shown by decades of research on co-located teams and their outcomes (Cohen and Bailey 1997). Due to factors such as different thought worlds (Dougherty 1992), faultlines (Lau and Murnighan 1998), functions (Parker 1994) and subgroups (Gibson and Vermeulen 2003; Polzer et al 2006), teams with high levels of physical proximity can still struggle to develop a sense of closeness.

However, there are situations when physical and perceived proximity are aligned. Such situations are represented in quadrants 1 and 3 of Figure 1. Quadrant 1 teams are exemplified by ‘hot groups’ of co-workers who are physically close to one another and perceive each other as close (Leavitt 1996). In quadrant 3 teams, members experience low levels of both actual and perceived proximity; i.e. they are objectively and subjectively distant from each other. If the numerous examples of problems in virtual teams are a meaningful indicator, the dynamics of quadrant 3 are becoming familiar to many. One study, for instance, examined software developers with subgroups on the West Coast of the US and in Bangalore, India (Metiu 2006). In this case, scarce face-to-face communication and low levels of identification between the subgroups led to perceived distances between subgroups that were as considerable as the 14,000 km separating them.
Quadrants 2 and 4 illustrate situations when actual and perceived proximities are not aligned. Teams in quadrant 2 have members who perceive each other as distant despite close physical proximity. Conversely, members of teams in quadrant 4 perceive each other as proximate despite considerable geographic distances separating them. Because such situations are paradoxical in view of the prevailing notions about the link between physical proximity and subjective proximity, we examine them more closely.

The Paradox of ‘Close-but-Far’ (Physically Close, but Perceived as Far)

Wilson’s (2001) study of cross-functional banking teams provides an example of team members who were co-located, but perceived each other as distant (Figure 1, quadrant 2). Each team managed the corporate retirement account of a large US-based corporation, and a number of teams included a treasury analyst as a member. The treasury analysts were located at the bank’s headquarters and, thus, were often physically close to other members of the banking team (sometimes on the same floor as the team’s relationship manager and account manager).

Despite their physical proximity, treasury analysts rarely communicated with their team members and almost never reported experiencing close working relationships with them. Treasury analysts tended to be introverted and work independent of their teammates. They rarely initiated contact with other members or their customers. Consequently, many treasury analysts felt ‘removed’ from their teams, even though they were almost always at or near the teams’ physical centers of activity and authority. As this example demonstrates, physical proximity does not automatically foster subjective proximity.

The Paradox of ‘Far-but-Close’ (Physically Far, but Perceived as Close)

Contrary to the situation in quadrant 2, open-source software development projects regularly include members who are geographically dispersed yet perceive each other as if they are in close proximity (quadrant 4). In spite of the absence of face-to-face interactions, open-source project members experience sufficiently high perceived proximity to achieve complex coordination and collaboration. In
fact, open source projects have been able to bring together the contributions of thousands of developers scattered throughout the world and to create extremely successful products such as the Linux operating system and the Apache web server (Kogut and Metiu 2001). They perceive high levels of proximity because of strong and intense communication, and strong ‘hacker’ (i.e. knowledgeable software developer committed to the free sharing of software) identities (Raymond 1999).

These counter-intuitive close-but-far and far-but-close teams cannot be accounted for with traditional views of the impact of physical proximity on team performance. In fact, the paradox they pose presents an opportunity to examine assumptions, shift perspectives, and consider problems in fundamentally different ways (Poole and Van de Ven 1989). As Cannon (1996: 110) has noted, ‘Many paradoxes are caused by the hangover of one set of assumptions or beliefs into a new age … when beliefs or assumptions fail to keep up with external changes.’ Given that we are in a new age of dispersed collaboration and rapidly evolving communication technologies to support it, we address the paradox by advancing an updated view of proximity which focuses on perceptions of it and models the factors affecting those perceptions.

**Model of Perceived Proximity**

Perceived proximity is a dyadic and asymmetric construct which defines one person’s perception of how close or how far another person is. Our focus is dyadic because people form perceptions of specific others in the course of work. Also, unlike ‘objective distance,’ which can be observed or calculated by others, perceived proximity is known only to the focal person. Perceptions of proximity are naturally asymmetric; for example, a treasury analyst can perceive the account manager as proximal without the account manager having similar perceptions of the analyst.

Like many other perceptions and attitudes (Moorman 1993; Amason and Sapienza 1997), perceptions of proximity have both a cognitive and an affective component. The cognitive dimension refers to a mental assessment of how distant a teammate *seems*. This assessment might be reflected in comments such as ‘When I think of the other person, he or she seems far away.’ The affective dimension recognizes that people’s sense of perceived proximity is not a purely conscious or rational assessment; it is subject to emotions and feelings. These feelings would be reflected in comments such as ‘I feel close to the other person’ or ‘I feel isolated from the other person’.

One could examine perceived proximity in a wide variety of contexts and at various levels of analysis, but our model is intended to apply to dyads and within several specific boundary conditions. First, like all perceptions, the perception of proximity refers to an individual’s thoughts and feelings. Our model focuses on these individual perceptions of a distant teammate, not the aggregated perceptions of all team members or any member’s perceptions of their team as a whole. Second, our model is intended to apply to members of teams completing a complex, interdependent task. Without interdependence or shared goals,
organizational members are unlikely to have sufficient levels of communication or identification to fuel perceived proximity. Third, our model is intended to apply to team members with the prospect of working together in the future. Extremely brief interactions with no prospect of future work together are outside the scope of this model. Longer-term interactions and the prospect of working together again are likely to amplify key factors in our model, including identification, communication and structural assurance (Alge et al. 2003; O’Leary 2002; Wilson et al. 2006).

We now turn to the model itself. As shown in Figure 2, people’s perceived proximity to others is the product of their communication and identification processes, and the individual and socio-organizational factors affecting them.

**Physical Proximity**

Although one can feel distant from colleagues who work in the same office (quadrant 2 of Figure 1), our focus in this paper is on geographically dispersed teams and, thus, physical distance between team members is the basis for our subsequent considerations of perceived proximity. However, people often perceive the same objective geographic distances quite differently (De Blij et al. 2006; Halford and Leonard 2006). What is ‘far’ to one person may be ‘close’ to another (Harrison-Hill 2001). Beyond very low levels of distance (Becker 2004), one’s sense of the distance to a colleague is based on a multitude of factors, of which actual distance exerts a relatively small influence (Mooney et al. 1991; Neyer and Lang 2003). Although physical distance may have some direct effects on perceived proximity, research from other fields (e.g. Coshall and Potter 1987) as well as from organizational studies (e.g. Rice and Aydin 1991) leads us to believe that the connection between physical proximity and...
perceived proximity is primarily a mediated one, with the processes of communication and identification having a more direct effect on perceived proximity.

**Processes of Perceived Proximity**

Communication and identification are the core processes that effect perceived proximity to another person. We discuss each of these processes below, elaborating on the mechanisms through which they affect perceptions of proximity. This is followed by a discussion of some of the individual and socio-organizational factors that affect communication and identification and, through those processes, perceptions of proximity.

**Communication**

The frequency, depth and interactivity of communication increase perceptions of proximity. As communication becomes more frequent, deeper in substance (i.e. more personal and more personally significant), and more interactive (i.e. characterized by more interdependent and reciprocal communicative exchanges) (Burgoon et al. 2002), physically distant colleagues will seem more proximal. These characteristics of communication affect perceptions of proximity through three mechanisms: increasing cognitive salience, reducing uncertainty and envisioning the other’s context. We explain each of these mechanisms in turn.

First, frequency of communication increases the cognitive salience of distant others. Cognitive salience refers to how readily or frequently something comes to mind (Sutrop 2001). Frequent communication causes distant others to be more ‘top-of-mind’ and, consequently, to seem more proximal. Frequent communication can be thought of as one antidote to the out-of-sight-out-of-mind problem described by some scholars of virtual teams (Hinds and Bailey 2003). In the banking example described earlier, less frequent communication with the treasury analysts led them to be inadvertently overlooked in team emails (and in convening a team meeting) because they did not come readily to mind for their teammates. This pattern of infrequent communication led to less active processing of thoughts about the treasury analysts and was one of several factors that made them seem more distant in spite of their geographic proximity.

Frequency and depth of communication also lead to envisioning the other’s context. As people communicate, it becomes easier to envision the other’s attributes and local situation in more detail (Gibson and Gibbs 2006). After communicating by phone and email for several weeks, distant members of a project team might, for example, develop mental images of each other’s work spaces, workloads and work habits. The more detail they can envision about each other and the other’s local context, the closer they seem. It is no accident that telecommunications companies started marketing the phone as ‘the next best thing to being there’, just as people started to move away from their families in large numbers. Envisioning details about the other is a form of cognitive elaboration, which increases the salience of the other (McGill and Anand 1989). The more concrete and detailed an image is, the more proximate it seems in a sensory or temporal way (Nisbett and Ross 1980). Communicating with others is imagery-provoking, and these increasingly concrete images (Walther et al. 2001) serve to make the other seem more proximal.
Frequency, depth and interactivity of communication also act to make distant others more predictable and understandable, and hence seemingly more proximal. This occurs through the mechanism of reducing uncertainty. We know that communication is a primary vehicle for reducing uncertainty about others (Berger and Calabrese 1975) and, since uncertainty about others reduces one’s sense of proximity to them, anything that reduces uncertainty enables perceptions of proximity. When distant team members stop communicating frequently, it creates doubt and uncertainty, which in turn contribute to a greater sense of distance (Cramton 2001). For instance, in the software teams we described earlier, when the frequency of communication changed, the Indian members of the team were often left wondering about developments and decisions at the main site and were surprised by changes in the direction of the project. As one Indian developer put it, ‘We used to have discussions every other day, or we’d talk for hours — so we knew what was happening. But after awhile that stopped, so we in Bangalore felt very much on our own’ (Metiu 2001: 99). The reduced communication led to increased uncertainty and an even wider gulf between the groups. Conversely, as the above quote also illustrates, frequent and interactive communication reduces uncertainty about each other, and feelings of isolation do not arise; on the contrary, the resulting increases in predictability contribute to perceptions of proximity.

Thus, frequent, deep, and interactive communication provides opportunities to learn about others, and to perceive proximity in both of its dimensions, cognitive and affective. At the same time, the process of communication helps individuals discover that they share some valued social categories. In other words, in-depth communication can enhance identification processes.

Identification

Identification is the other core process (and resulting emergent state; Hinds and Mortensen 2005) by which perceived proximity is effected. Identification is a process of self-categorization with respect to others (Dutton et al. 1994) and it is also an outcome of that process. When working — either in a co-located fashion or at a distance — people may discover or create common identities. This is the process of identification. The process and resulting state of identification affects a perception of proximity between two people through three mechanisms: by creating a basis for common ground, by reducing uncertainty (just as communication does), and by engendering positive attributions when real data are absent.

As team members discover that they share a certain social category, they establish a common ground from which they can work (Sarker and Sahay 2002). According to Clark (1992), in order for one person to understand another, there must be ‘common ground’ between them. Common ground is a mutual understanding or common stock of knowledge between two people. Shared background and experiences are an important way in which people infer that common ground exists (Clark 1996). In the example that opens our paper, the perceived proximity between geographically distant analysts was based on their sharing the social identity of ‘mothers of young children’. On this basis, the two
analysts could share their concerns, specific in-depth knowledge and so on. This led them to perceive each other as proximate despite the 1,000 km separating them. Therefore, the more two people identify with some social category, entity or experience (e.g. profession, gender, ethnicity, common political views, shared trauma, etc.), the more common ground they will have between them and, thus, the more proximal they are likely to feel.

In addition to creating common ground, identification also enhances perceived proximity by reducing uncertainty. When people believe they share some common characteristic, entity or experience, they project traits or characteristics on the other based on real or assumed category membership (Cramton 2001). The team of software developers with subgroups on the West Coast of the US and in Bangalore mentioned earlier in the paper provides an illustration of this mechanism. One of the US developers, ‘Maria’, thought of herself as belonging to a particular category of developers who cared about the accomplishment of the entire project and not just with their own narrow assignment. On one occasion, she said, ‘I care about this project, that’s why I give a hand to my colleagues.’ She felt that ‘Nandan,’ one of her Indian colleagues, also belonged to this category, saying:

‘I like him so much … I got to know what kind of person he is. Some people are not concerned at all with anything that’s outside of their assignment. Nandan is open, he can also take criticism, so I know I can speak my mind with him, politely of course.’

Maria clearly expressed her identification with Nandan, their mutual membership in the valued category of people who are interested in the advancement of the entire project. She also noticed Nandan’s way of thinking, his attitudes toward the project, and his way of behaving (e.g. open to criticism). All of these made Nandan both understandable and predictable for Maria. This was the basis on which Maria felt cognitively and affectively proximate to Nandan.

Furthermore, identification leads people to ‘fill in the blanks’ with positive expectations and attributions of the other when behavior and/or motives are not readily visible or apparent. When people identify with one another, they are not only more predictable but they are also more likely receive the benefit of the doubt than the brunt of faulty attribution (Cramton et al. 2007). As Hinds and Mortensen (2005: 293) note, ‘A shared identity can create a psychological tie between distant team members that helps them bridge the physical and contextual distance that otherwise separates them.’ This ‘psychological tie’ is perceived proximity.

Absent a shared identity, people have a strong tendency toward faulty attributions about others’ motives (Cramton 2002). Such faulty attributions degrade any sense of perceived proximity between two people. For example, as the US group grew and wanted to prove its abilities, its members started to point out the differences between them and the Bangalore group and to erect social barriers such as status differentiation. Their emphasis of category differences reduced perceptions of proximity between members of both groups. They commented that ‘Their [the Indian developers’] motivation is to log hours and bill us. We are concentrating on getting the product out’ (Metiu 2006). Identification in this example also interacted with communication to affect perceptions of proximity. As one subgroup sought to differentiate itself from the other, less communication
between the two groups ensued, resulting in even fewer opportunities to discover and develop a shared identity. In this way, they erected what Hinds and Mortensen’s (2005) informants called a ‘ring fence’ around themselves.

Identification has only recently received attention in the literature on work at a distance (Mortensen and Hinds 2001; Wiesenfeld et al. 2001). However, it may have played an important but neglected role in previous findings attributed to physical proximity. For example, Allen (1977) showed that people can maintain interactions and relationships at a greater physical distance when they are all members of the same. 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 ‘roommate’ is a form of shared identity as well as an indicator of physical proximity.

In general, identification and communication have a positive impact on perceived proximity. At the same time, there are instances when too much communication can be detrimental to the development of perceived proximity. For example, communication that is too frequent and/or on topics perceived as irrelevant, inconsequential or surveillance-oriented can lead to feelings of insufferable proximity. For evidence of such excessive perceived proximity, one need look no farther than the oppressively close teammate (Barker 1993) or boss who is always looking over one’s shoulder (virtually or physically).

**Socio-organizational Factors**

Higher-order factors regarding the situation in which group members function also enhance people’s sense of proximity to physically distant others. We focus on two socio-organizational factors which we expect to be particularly important in distributed relationships and which have not received much attention in the literature on such relationships; i.e. the network structure in which the dyad is embedded and the structural assurance provided by the organization.

**Network structure**

There is ample evidence that network structure affects both communication and identification (Pfeffer 1983). Network density, for instance, is the average strength of the relationship between team members and is maximized when all team members are connected by strong relationships. Dense networks foster identification with the group (Portes and Sensenbrenner 1993), stronger norms, and the sense of participation in a close-knit community (Garton et al. 1999). Therefore, an individual in a dense network is likely to identify more strongly with other individuals in the group, and to engage them in the frequent and in-depth communication that fosters perceived proximity. Conversely, individuals in sparsely knit networks have to work harder to maintain each relation, because the group forces that would keep things going are less powerful (Garton et al. 1999). These effects may be even more important in virtual teams where distance reduces the salience of individual characteristics (Ahuja et al. 2003).

**Structural assurance**

Structural assurance refers to conditions that make things seem safe and fair in an organization (Shapiro 1987). Such safeguards include promises, contracts,
regulations, guarantees, legal recourse, standard processes and some features of technology (McKnight et al. 1998). For example, an organization with strong structural assurance might have very rigorous hiring standards. As a result, employees of the organization would feel comfortable communicating with distant co-workers — safe in the knowledge that they were dealing with competent and reliable professionals. Structural assurance can strongly enhance the communication and identification processes between remote individuals. With a high level of structural assurance, individuals will be more likely to communicate openly, to disclose personal information and to discover or create a common identity with other members of the team. Structural assurance develops an expectation that problems will be dealt with fairly and promptly before they get out of hand. In geographically dispersed work, the potential for misinterpretation is greater than in co-located teams (Cramton 2001), but well-specified systems and roles can reduce the chances for misunderstood expectations or intentions. They can also help reduce the uncertainty of remote interaction and the time required to renegotiate rules of interaction each time people start working together at a distance.

Technology is an important component of structural assurance that affects communication and identification in several ways. One obvious way is the role played by technology in enabling the frequency, depth and interactivity of communication processes. At the same time, some forms of communication technology facilitate identification by making both individual members and the team as a whole more salient (Weisband et al. 1995). For example, the technological infrastructure for open-source projects (version control systems, specialized topic-based discussion forums, and so on) provides rich and stable support for complex work and interpersonal interactions between developers who rarely if ever see each other (Raymond 1999). In spite of the apparent anarchy in which anyone can get involved, the projects also rest on a clear role structure whereby users, coders, maintainers and leaders have specific responsibilities (Kogut and Metiu 2001).

The two socio-organizational factors outlined above operate at a higher level of analysis than the dyadic level, and they strongly impact the processes through which perceptions of proximity are formed and maintained. In addition to these socio-organizational factors, individual factors also affect perceived proximity.

**Individual Factors**

Although individual difference variables have received little attention in research regarding geographically dispersed teams (Martins et al. 2004), we believe that some individual characteristics affect perceptions of proximity through their influence on communication and identification. Since working at a distance has been linked to feelings of isolation and uncertainty (Kurland and Bailey 1999), we expect that individuals whose dispositions help them cope with these conditions will be more likely to engage in communication with distant others and to identify with them. At the same time, individuals who are comfortable and accustomed to coping with virtual work will also be more likely to engage in the processes of communication and identification that will lead to increased perceived proximity with distant others.
Openness to experience
Openness to experience has been identified as a critical trait for general coping success (Judge et al. 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 et al. 2000). Openness to experience has been shown to help team members adapt to the requirements of computer-mediated communication (Colquitt et al. 2002), and, thus, encourages the development of communication processes that are well suited to the needs of dispersed groups. We posit that openness to experience fosters communication and identification processes among members of dispersed teams. For instance, when faced with a delayed response from a distant partner, a team member who is high in openness may be more likely to react with inquiry rather than judgment (Schweiger et al. 1986), thereby preserving the relationship and not seeking to label the other in a different social category.

Experience with dispersed work
We expect that people’s experience with dispersed work will also affect their communication and identification processes with distant group members. With experience, members of distributed groups learn to communicate frequently (Jarvenpaa and Leidner 1998), start tasks promptly because of time delays (Iacono and Weisband 1997), disclose personal information (Moore et al. 1999) and explicitly acknowledge receiving messages (Cramton 2001). In essence, experienced tele-workers learn effective norms and routines to be productive in this specific context. Regardless of the specific media used, research also shows that experience and comfort with technology increase communication (Maurer 1994; Stoel and Lee 2003). Identification processes are also likely to be enhanced, given that experienced individuals will tend to rely less on stereotypes when working with distant others, and will be likely to have realistic expectations about similarities and differences between faraway colleagues.

As we have outlined above, both personality and experience can make people more receptive to distant others (Douthitt et al. 1999). Individuals’ openness to experience and experience with geographically dispersed work make them more likely to use technology-mediated communication well, to imbue the resulting communication with richness, to discover or develop shared identities, and, as a result, to perceive greater proximity to distant others.

Consequences of Perceived Proximity
Perceived proximity can have important consequences for individual and group outcomes. Therefore, we briefly discuss this issue even though our model does not focus specifically on the consequences of perceived proximity. With greater perceived proximity, we expect that group members will experience stronger norms, more robust learning from team events, stronger team member and leader-member exchange relationships, and greater willingness to work together in the future. We know, for instance, on the basis of research on leader-member exchange, that workers who feel close to their supervisor or fellow team
members experience greater attention, responsiveness and reciprocal influence (Seers 1989). In effect, feeling close reduces the uncertainty and ambiguity of working at a distance and improves at least two of the three dimensions of group effectiveness: (1) capability to work together in the future; and (2) growth and well-being of team members (Hackman 1990). To illustrate, we describe some effects of perceived proximity from our earlier examples.

For some of the treasury analysts described earlier, perceived proximity did not develop in spite of the small spatial distance separating them from other team members. As a result, they felt they had little influence or support within the team. For other roles at the bank (e.g. account managers), high levels of perceived proximity led to increased commitment to the team and the team’s goals. Account managers would often work late to respond to team members’ requests, whereas treasury analysts seemed to feel less commitment to the team. Similarly, physical proximity did not mitigate the effects of strong social boundaries in the US–Bangalore team, as demonstrated by the fact that bringing the Indian developers to the US site did not lead to increased communication or shared identity. Furthermore, in the absence of perceived proximity, Indian developers were disappointed with the treatment received from the US developers, became disengaged with a project that did not offer growth opportunities, and finally left the project.

**Discussion**

In this paper, we have used the seemingly contradictory notion of being-far-but-feeling-close to move beyond purely objective notions of distance by defining and presenting a model of perceived proximity. We have explored how the state of ‘being far’ physically can co-exist with ‘feeling close,’ and examined the processes and mechanisms that link these ostensibly opposing states to develop a model ‘that gives meaning to the apparent contradictions’ (Vince and Broussine 1996: 4). By embracing a ‘both/and’ view of distance and closeness, we develop a more comprehensive understanding of distance. Our model represents a critical, though missing, link in understanding distance and dispersed teams. Just as organizational scholars recognize that subjective culturally bound perceptions of time may be the most consequential (Ancona et al. 2001b), we have outlined how it is perceptions of proximity that most directly influence team outcomes.

Second, we believe that conflicting claims about the impact and importance of distance (Cairncross 1997; Olson and Olson 2002), as well as contradictory empirical findings (Allen 1977; Ariel 2000; Cummings 2004), may stem from prior authors’ focus on physical proximity. Two empirical examples show how the construct of perceptions of proximity could help reconcile such apparently contradictory findings. First, in one recent study of a globally distributed team, Baba et al. (2004) expected that distance would negatively affect relationships. While the effects of distance were negative for some members of the team, they were positive or irrelevant for others. In one case, the authors note that the American-based leader (Morris) of the team had an arm’s-length relationship
with the Paris-based customer until the arrival of another American (Hyde) at the
customer. Immediately, the communication improved. Even though Hyde was
located in Paris and Morris was located at the US headquarters, they shared a
sense of perceived proximity based on factors highlighted in our model: com-
munication and identification (in terms of national culture and commitment to
particular ways of working). Common ground and predictability ensued, such
that Morris felt closer to Hyde (who worked for the other organization and was
in Paris) than he did to other members of his own team who were located with
him in the US. Perceived proximity offers a way to understand such situations.

In a second example, Jessup and Tansik (1991) relied on traditional social
psychological research to predict that less proximal members would experience
deindividuation (i.e. a loss of salience of remote members). One indicator of
deindividuation was how critical members were of each other’s comments. In
fact, there was no difference between proximal and distant conditions in how
critical members were. Furthermore there was no difference in willingness to
remain in the group. One possible explanation for their results is that all the sub-
jects were drawn from the same course, and hence were knowledgeable about
each other’s context, shared common ground, and tended to make positive attrib-
utions about each other’s behavior. Not surprisingly then, they probably had
some sense of perceived proximity.

Our aim is to highlight that the complexity of these relationships rests on a
variety of individual and contextual factors. As Carlson and Zmud (1999) have
shown, the perceived richness of a communication medium depends on one’s
communication partner, the identity of the two communication partners, how
well they know each other, and the context of the communication. In these cir-
cumstances, it is little wonder that email with a good friend is ‘richer’ than a first
face-to-face meeting with a foreign partner. Therefore, early theories of inter-
personal 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 main-
tained without relying on physical proximity.

Our model specifies the factors and the processes that lead to the development
of perceived proximity. It also specifies some of the mechanisms that explain the
association between factors and processes in our model and perceived proximity.
For example, communication affects perceived proximity because it increases the
cognitive salience of the other, it helps envisioning the other’s context, and it
reduces uncertainty regarding his/her behavior. At the same time, identification
affects perceived proximity because it builds common ground, it enhances the
predictability of the other’s behavior, and it facilitates positive attribution about
the other. We see the specification of these mechanisms as a step toward meeting
Merton’s (1968) desideratum of identifying mechanisms as elementary building
blocks of theories. Recently, Hedstrom and Swedberg (1998) have forcefully and
convincingly argued that the identification and examination of mechanisms is at the core of social science advancement.

The mechanisms in our model are critical to revitalizing scholars’ conceptions of distance and providing a way to reconcile conflicting claims and findings. The model contributes to the literature on work at a distance by explicating the factors that affect perceived proximity. These factors and the relationships among them have important implications for research and practice.

**Implications for Research**

Our model and conceptualization of perceived proximity highlights a number of empirical questions. For example, the correlation between perceived proximity and physical proximity remains to be determined, as do the circumstances (if any) in which physical proximity serves as an independent predictor of group performance. As we argued in this paper, we believe that the perception of proximity is the more proximal predictor of many important outcomes. We also need to understand the interaction effects and feedback loops between the factors in our model, as well as the decreasing effects of objective physical distance over time. Although this idea is intuitively appealing, it has not been effectively tested.

We also expect that patterns of perceived proximity within teams have implications for team-level outcomes. In teams where either all of the members feel distant from each other, or only a subset feel 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 perceived proximity in a team may depend on the type of tasks the team needs to accomplish. In teams whose tasks require close cooperation, perceived proximity might need to be high among a larger subset of members. Conversely, teams with more independent or routine tasks might not need high levels of perceived proximity.

We also need to investigate whether work groups need a certain minimal level of perceived proximity in order to function effectively. It may be that not everyone on the team needs to feel close. At a minimum, perhaps each group member needs to feel close to at least one other group member. In our example of treasury analysts, given the nature of the task, only a few analysts with high levels of perceived proximity might have been sufficient for effective and satisfying work processes. We see the issue of whether a minimum level of perceived proximity is needed for team effectiveness as an important task for future research.

The effects of perceived proximity also warrant investigation. At the individual and dyadic levels, we expect perceived proximity to predict willingness to work together in the future and beliefs about the efficacy of working at a distance. However, we expect that the effect of perceived proximity is curvilinear, with perceived proximity having generally positive consequences up to a point, beyond which very high levels of perceived proximity can have negative effects on the quality of interactions between the two individuals, including a negative feedback effect on communication and identification. For example, high levels of perceived proximity might lead teammates (even highly spatially dispersed ones) to interrupt each other more frequently (Jett and George 2003). Very high levels of perceived proximity might also be associated with excess surveillance.
or control and its negative affective consequences (Barker 1993). Further research is required to understand the nature of this curvilinearity.

**Implications for Practice**

In addition to the theoretical and empirical implications we have outlined above, our model has significant implications for organizational practice. Currently, managers are influenced by the conventional wisdom about distance, especially the assumption that it is difficult to develop effective teamwork at a distance without significant ‘face-time’ (Winger 2005). Our model highlights important variables under organizations’ control that could be used as levers to increase perceptions of proximity regardless of actual physical distance. Because managers do not have a good model of what influences relationships at a distance, they resort to bringing team members together face-to-face (conditions with which they are familiar). It is a crude method that persists because managers do not understand the underlying mechanisms at work. If the variables in our model were thoughtfully managed by organizations, they could reduce the human and financial costs of bringing team members together.

Just as people’s perceptions of time are a variable subject to managers’ strategic influence (Mosakowski 2000), our model suggests that many of the variables that organizations control can be leveraged to increase perceptions of proximity among members of virtual groups. People can be 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 et al. 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 perceptions of proximity. By paying attention to team design and composition, organizations do not necessarily have to resort to physical co-location to achieve the benefits of proximity.

Although we have discussed the importance of perceptions of proximity in the context of widely distributed groups, we believe that it also has relevance for other organizational arrangements and perceptions of proximity between any two entities; e.g. between a supervisor and a subordinate or between a team member and an external team leader. There are strong reasons to expect it to have an impact in any context involving work at a distance (e.g. telecommuting, multinational assignments and distance learning). 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 perceptions of proximity (from each other or from the organization) are becoming more important. While we developed our model to address the experience of distance in dispersed teams, many of the factors in our model are also relevant to team members who work in close physical proximity. As Tsoukas (1996) has argued, all firms are distributed knowledge systems which need to access and integrate diverse knowledge held by individuals. Perceived proximity may help meet this challenge even for co-located colleagues.
Conclusion

In summary, we think our model matters theoretically (by advancing thinking beyond basic objective views of what it means to be geographically distant), empirically (by resolving conflicting findings) and practically (by enabling managers to achieve better results under virtual conditions). 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. Currently, there are competing perspectives and equivocal findings about the significance of proximity in teams. In addition, paradoxical situations where one feels close to faraway colleagues are becoming more common. We address these disputes about the meaning of distance with a richer notion of distance and with a model that explains how members of dispersed teams experience distance. Our model enables organizational scholars to see the dynamics and multidimensional aspects of how people perceive proximity in distributed work contexts.

Notes

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1 Open-source software and its source code is accessible and can be modified and redistributed, under certain conditions, at no charge to the user. The physical distance separating developers is often extreme. For example, Linux was created through the contributions of more than 400 developers from 35 countries (Tuomi 2004).

2 Perceived proximity differs in important ways from several other distance-related concepts, including presence, co-presence and cohesiveness. Presence, a concept used most heavily in computer science, refers to the ‘perceptual illusion of non-mediation’ or ‘a psychological state in which the virtuality of experience is unnoticed’ (Lee 2004: 32). On the surface, it bears a resemblance to perceived proximity, but in practice it is focused on the human–computer interface and the ability of computers to simulate physical presence (usually of non-human agents or objects) (Lee 2004). Unlike presence, perceived proximity is not by definition tied to technology in general or any one technology in particular. Co-presence is a decades-old sociological concept referring to the simultaneous location of two people in the same place, such that they can have unmediated face-to-face interaction (Mead 1934; Goffman 1963). Thus, it is akin to the absence of spatial distance between two people. More recently, computer scientists have adopted ‘co-presence’ to refer to the ‘sense of being together with others in a mediated — either remote or virtual — environment’ (Zhao 2003: 445). In this sense, it refers to the technological simulation of being face-to-face with someone. Lastly, cohesiveness also might be confused with perceived proximity, but cohesiveness is a group-level property with a storied past and a multidimensional basis (Chang and Bordia 2001). Cohesiveness or cohesion describes ‘the overall attraction or bond amongst members of a group’ and has ‘two underlying components: (a) social cohesion, which describes the attraction amongst group members based on social relations within the group; and (b) task cohesion, viewed as attraction that is based on a shared commitment to achieving group goals’ (Wellen and Neale 2006: 168). It has often been assessed by asking group members how much they like each other and/or how long they wanted to stay in the group.
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**Jeanne Wilson**

Jeanne Wilson (PhD, Carnegie Mellon University) is an Associate Professor in the School of Business at the College of William and Mary. Her research focuses on new organizational forms, particularly distributed work groups. She has studied the development of trust over time in distributed groups, knowledge transfer in teams that cross organizational boundaries, and attributions about performance in international project teams. Recent work has been published in *Academy of Management Review* and *Organizational Behavior and Human Decision Processes*.  
*Address*: The College of William and Mary, PO Box 8795, Williamsburg, VA 23187–8795, USA.  
*Email*: jeanne.wilson@mason.wm.edu

**Michael Boyer O’Leary**

Michael Boyer O’Leary (PhD, MIT) is an Assistant Professor of Organization Studies at Boston College’s Carroll School of Management. His research focuses on geographically dispersed and mobile work, especially in a team context, and employs a mixture of quantitative, qualitative and historical methods. More generally, he is interested in the intersection of team performance, working relationships and the social and behavioral aspects of information technology use. His recent work has been published in *MIS Quarterly*.  

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Anca Metiu (PhD, University of Pennsylvania) is an Associate Professor at ESSEC. Her research focuses on collaboration dynamics in virtual teams and examines the interpersonal and inter-group relations among geographically dispersed groups. She also studies virtual communities, open-source software development, and inter-organizational alliances. Current work projects examine conflict resolution in online communities, women’s participation in open-source software communities, and the creation of group engagement in teams. Her work has been published in *Administrative Science Quarterly* and *Oxford Review of Economic Policy*.

**Address:** ESSEC, Avenue B. Hirsch BP 50105, Cergy Pontoise Cedex 95021, France.

**Email:** metiu@essec.fr

Quintus Jett (PhD, Stanford) is a Senior Research Fellow at the Glassmeyer/McNamee Center for Digital Strategies, Tuck School of Business at Dartmouth College. His research focuses on the enabling conditions for open-participation projects, which accept contributors from diverse organizational affiliations and geographic locations. Currently, he employs field methods to examine the boundary conditions of open participation, as it applies to community response to disasters. His recent work has been published in *Academy of Management Review* and by the US Department of Commerce.

**Address:** Tuck School of Business, Dartmouth College, 100 Tuck Hall, Hanover NH, 03755–9000, USA.

**Email:** qjett@dartmouth.edu