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Subgroups, Imbalance, and Isolates in Geographically Dispersed Teams

Abstract

Research regarding geographically dispersed teams (GDTs) is increasingly common and has yielded many insights into how spatio-temporal and socio-demographic factors affect GDT functioning and performance. Largely missing, however, is research on the effects of the basic geographic configuration of GDTs. In this study, we explore the impact of GDT configuration (i.e., the relative number of team members at different sites, independent of the characteristics of those members or the spatial and temporal distances among them) on GDT dynamics. In a quasi-experimental setting, we examine the effects of configuration using a sample of 62 six-person teams in four different one- and two-site configurations. As predicted, we find that configuration significantly affects team dynamics – independent of spatio-temporal distance and socio-demographic factors. More specifically, we find that teams with geographically-based subgroups (defined as two or more members per site) have significantly less shared team identity, less effective transactive memory, more conflict, and more coordination issues. Furthermore, in teams with subgroups, imbalance (i.e., the uneven distribution of members across sites) exacerbates these effects; subgroups with a numerical minority of team members report significantly poorer scores on the same four outcomes. In contrast, teams with geographically isolated members (i.e., members who have no teammates at their site) outperform both balanced and imbalanced configurations.

Introduction

Work in geographically dispersed teams (GDTs) is not "new" (King and Frost 2002; O'Leary, Orlikowski and Yates 2002), but it is increasingly common as firms try to tap into distributed expertise, expand their market reach, provide employees with flexibility, and reduce real estate costs (Richman, Noble and Johnson 2002). A substantial amount of research on GDTs' processes and performance has explored the effects of different dimensions of dispersion (Griffith, Sawyer and Neale 2003; Kirkman and Mathieu 2005; O'Leary and Cummings 2007). Research on spatial distance has found that as the physical distance (measured in feet, meters, miles, or kilometers) between individuals increases, they communicate both less frequently and less effectively (e.g., Allen 1977; Van den Bulte and Moenaert 1998). Within the context of GDTs, members may be separated by thousands of miles – resulting in an increase in communication failures between sites. Research has also found that temporal distance (measured in time zones between members) has distinct effects above and beyond those caused by spatial distance. For example, teams spanning multiple time zones experience significant coordination challenges due to poorly synchronized schedules and deliverables (e.g. Espinosa and Carmel 2003; Espinosa and Pickering 2006; Massey, Montoya-Weiss and Hung 2003; Rutkowski, Saunders, Vogel and van Genuchten 2007; Saunders, van Slyke and Vogel 2004). Among other things, this work has shown that both spatial and temporal distances among team members continue to pose real challenges despite new information and communication technologies (Kiesler and Cummings 2002; Olson and Olson 2000).

Scholars of GDTs and traditional teams have also explored the role of other types of boundaries and intra-team differences, including organizational, cultural, national, and other socio-demographic differences (Bhappu, Zellmer-Bruhn and Anand 2001; Espinosa, Cummings, Wilson and Pearce 2003; Gibson and Gibbs 2006; Hardin, Fuller and Davison 2007; Harrison and Klein 2007; Krebs, Hobman and Bordia 2006). These socio-demographic differences (especially cultural and national ones) often co-vary with the aforementioned spatio-temporal dispersion in GDTs and, while providing the potential for greater creativity and decision-quality, often lead to tension and conflict (Jehn 1994).

1

In addition to these spatio-temporal and socio-demographic dynamics, work in GDTs is also affected by teams' *geographic configuration*, which O'Leary and Cummings (2007) define as the number of geographically dispersed sites and the relative number of team members at those sites, independent of the spatial, temporal, and socio-demographic distances between them. Several previous studies allude to the effects of configuration. For example, Armstrong and Cole (2002) observed conflicts caused by interactions between large and small sites; Baba, Gluesing, Ratner and Wagner (2004) recognized the coordination challenges of teams spanning many sites; and Grinter, Herbsleb and Perry (1999) noted the effects of members' geographic isolation on teammates' awareness of them. Nevertheless, despite the rapidly growing number of studies of GDTs in the last decade (e.g., see recent reviews by Axtell, Fleck and Turner 2004; Hertel, Geister and Konradt 2005; Hinds and Kiesler 2002; Martins, Gilson and Maynard 2004; Powell, Piccoli and Ives 2004; Webster and Staples 2006), few scholars have directly examined configuration. Thus, our understanding of the impact of GDT configuration is limited, thereby providing an opportunity for new research to complement and extend existing work on spatio-temporal, and socio-demographic dispersion. This paper does that by studying teams in which we controlled for spatio-temporal and socio-demographic distances between members, allowing us to focus on the independent effects of geographic configurations including subgroups, numerical minorities, and isolates.

The few studies of GDTs that have directly addressed geographic configuration have focused on balanced subgroups. Studying student project teams split between Texas and Virginia, Cramton (2001) did not set out to examine configuration, but her case analyses noted important effects of geographic subgroups. She found that geographic subgroups could quickly trigger in-group/out-group dynamics, which led to restricted information flow between them and, in turn, faulty attributions, reduced cohesion, and increased intra-group conflict. She concluded with a call for more research on subgroup dynamics due to the reality that most dispersed teams include collocated subgroups. Cramton and Hinds (2005) took up this challenge and extended the research regarding faultlines (Lau and Murnighan 1998) into the context of internationally dispersed teams. They drew on theories of social identity, intergroup relations, and coalition formation to develop a theoretical model for how geographic dispersion might align with

demographic diversity to heighten subgroup salience and, thus, exacerbate ethnocentrism. At the same time, they proposed several moderators, which can shift teams' subgroup dynamics from ethnocentricism to cross-national learning. In fact, they proposed that subgroup salience is *necessary* for cross-national learning because it makes people more aware of each other's unique strengths. Though making a significant theoretical contribution, Cramton and Hinds' work was not empirical and they did "not address the differential consequences of how team members are distributed, e.g., numbers of locations and number of people at each location" (pp.256-7).

Polzer, Crisp, Jarvenpaa, and Kim (2006) examined this empirically, arguing that subgroups with more members fostered stronger faultlines, with detrimental effects on trust and conflict. With 45 teams of six graduate students at 10 different universities, they found the highest levels of conflict and lowest levels of trust in teams split between two sites, with three members per site. Teams with two members at each of three sites had moderate levels of conflict and trust, while teams with one member at each of six sites had the lowest levels of conflict and highest levels of trust. They also found that these effects were exacerbated when people at a site were also of the same nationality. This is consistent with faultline theory (Lau and Murnighan 1998), which argues that the alignment of multiple salient attributes (e.g., geography and demography) triggers heightened subgroup categorization and polarization.

As Cramton and Hinds (2005) theorized and as Polzer et al. (2006) found, geographically-based subgroups can powerfully affect team processes. However, neither of these studies (nor any other studies of geographically dispersed teams) explored the effects of *uneven or imbalanced* distribution of members, or of the combination of subgroups and isolates within one team. In practice, however, team members are often located at sites of differing sizes – for example, a large cluster of members at a headquarters or production facility and individual members at satellite or regional offices. The prevalence of such configurations "in the wild" is borne out in Cummings' (2004) sample of teams in a *Fortune* 500 telecommunications company. Of the 115 teams that were geographically dispersed, 68 teams (59%) were very unevenly distributed, with one large site and one-or-more small sites (where "large" is greater than or equal to 50% of the team or two times larger than the next largest site). In a second sample of 214

GDTs from another *Fortune 500* firm (Cummings 2005), 193 teams (90%) had an uneven distribution of members across sites, including many geographic isolates.

Thus, studies with only balanced distributions of members across sites are at odds with the reality of GDTs. Furthermore, Polzer and colleagues' (2006) theorizing that teams with larger subgroups activate stronger faultlines cannot explain the dynamics of teams with subgroups of varying sizes and isolated members. Given the prevalence of imbalanced subgroups and isolates, and the general dearth of research on configurations in GDTs, we set out to study the relative effects of numerical isolates, minorities, majorities, and equally-sized subgroups on team dynamics, while holding constant spatial, temporal, and socio-demographic differences. In so doing, we extend previous work on dispersion and address Hinds and Mortensen's (2005: 304) observation that the field lacks an understanding of the "different dimensions of distributed work and how these dimensions shape team dynamics."

Our findings contribute to the literature in empirical, theoretical, methodological, and managerial terms. Empirically and theoretically speaking, we advance the field's understanding of GDTs and show how and why the largely unaddressed dimension of geographic configuration affects teams' dynamics. Methodologically, we respond to calls for more multi-level and meso-level research (House, Rousseau and Thomas-Hunt 1995; Klein and Kozlowski 2000). Whereas previous teams research has focused almost exclusively on individual- or team-level outcomes, our study examines the intermediate level of subgroups, as well as individuals and teams. From a managerial standpoint, our findings provide both a cautionary tale about geographic subgroup effects and a potentially promising one about the role that geographic isolates may play.

Theory and Hypotheses

In line with Cramton and Hinds (2005) and Polzer et al. (2006), we propose that geographic subgroups and imbalance among them are related to many of the negative outcomes found in previous studies of GDTs [e.g., impeded communication (DeSanctis and Monge 1999) and (Cramton 2001), reduced trust (Jarvenpaa and Leidner 1999), and increased conflict (Mortensen and Hinds 2001)] and that

these effects arise through the process of social categorization. Research on social identity and self-categorization posits that individuals examine their environment, distilling their co-workers into prototypes whom they categorize as members of their "ingroup" (similar) or "outgroup" (dissimilar) (for a review, see Hogg and Terry 2000). Social categorization into distinct ingroups and outgroups has been shown to be a powerful determinant of behavior, with those in the ingroup valued more highly and treated better than those in the outgroup (Tajfel and Turner 1986). Categorization also changes perceptions of individual members of both ingroups and outgroups, as people maximize similarities within and differences between ingroups and outgroups (Brewer and Harasty 1996; Campbell 1958; Hamilton 1998; Sherman, Hamilton and Lewis 1999). This results in individuals holding attitudes and opinions more similar to their ingroup (Phillips and Loyd 2006) and renders individuals less easily identifiable (Taylor, Fiske, Etcoff and Ruderman 1978), with outgroups perceived as more homogenous than ingroups (Judd and Park 1988; Mullen and Hu 1989; Quattrone and Jones 1980).

The role of subgroup boundaries as a basis for categorization was similarly suggested by Polzer et al. (2006) in their study of teams with balanced subgroup configurations. Furthermore, Cramton and Hinds (2005), in their model of faultlines, explicitly compared categorization based on subgroups with categorization based on other, typically demographic dimensions. In so doing, they theorized that geographic subgroups are a major basis for categorization.

Building on but going beyond these findings on the effects of subgroups, we believe that configurational imbalance plays a critical, distinct, and as yet unexamined role. We further extend previous research by proposing that geographic isolates are distinct from numerical minorities, and avoid negative outcomes in GDTs because they do not trigger negative categorization processes. For reasons we address in the following section, we believe their isolate status reduces the likelihood that they will be categorized (both by themselves and their teammates) with respect to their location. To examine these phenomena, we focus on four team dynamics, known to be critical to team functioning (Arrow, McGrath and Berdahl 2001) and GDT success (Hinds and Mortensen 2005) – i.e., shared team identity, transactive

memory, conflict, and coordination issues. In the next sections, we address the properties of subgroups, imbalance, and isolates, and hypothesize about their relationship to these dynamics.

Geographic Subgroups, Imbalance, and Isolates

The existence of geographic *subgroups* provides a basis for the social categorization processes outlined above. Research finds that individuals categorize themselves and others on the basis of the characteristics that are most distinctive at a given moment (Cota and Dion 1986; Hogg and Turner 1987) and that most differentiate them (Cohen and Swim 1995; Nelson and Miller 1995). Geographic subgroups are highly salient and clear differentiators in GDTs, triggering intra-group social categorization on the basis of team members' physical location. As noted, this argument is consistent with that made in both Cramton and Hinds (2005) and Polzer et al. (2006), both of which suggests that subgroup boundaries are likely to serve as a basis for categorization. Thus, individuals are likely to attribute ingroup status to those members at the same location and outgroup status to those at distant locations, thereby affecting shared team identity, transactive memory, conflict, and coordination issues.

Beyond the general effects of subgroups, *imbalance* in the relative size of subgroups will have additional negative effects on GDT dynamics. With respect to categorization itself, research suggests that social minorities categorize more strongly due to their greater strategic need for solidarity (Hogg 2001; Simon 1992), thus strengthening the categorization effects for minorities. In addition, unevenness in the size of subgroups heightens perceptions of inequity and increases tension and politicization between those subgroups (Mannix 1993).

Though geographic *isolates* might be perceived as the extreme case of imbalance, we do not consider them as such. We believe there is a qualitative difference between the experience of a geographic subgroup – even one with only two members – and the experience of a geographically isolated individual. Subgroups provide a collective context within which interpersonal dynamics can occur; isolated members, however, lack that context. Although interaction among ingroup members is not a necessity for ingroup formation, such interaction is likely to increase individuals' identification with that group (Ashforth and Mael 1989) and may provide a basis for categorization (Hogg and Turner 1985;

Turner 1984). Isolates, however, lack such interactions with local teammates, which would otherwise reinforce their own local distinctiveness and, thus, differentiate them from distant others. Furthermore, isolates provide a weak basis for ingroup/outgroup differentiation for the rest of their team and, therefore, fail to trigger strong ingroup categorizations among their teammates. Thus, in contrast to teams with both balanced and imbalanced subgroups, we believe that isolates will not trigger negative categorization-driven effects and may, in fact, trigger distinctly positive effects on the basis of their isolated status. We elaborate on our hypotheses in the following four sections. We hypothesize about the effects of three configurations (a. subgroups, b. imbalance, and c. isolates) on each dynamic (1. shared team identity, 2. transactive memory, 3. conflict, and 4. coordination).

Shared Team Identity

Researchers studying identity in teams have repeatedly found that a shared team identity is a key antecedent of effective functioning and success (Fiol and O'Connor 2005). For example, Brown and Wade (1987) found that groups lacking a distinct identity performed more poorly than those with more established identities. Moore, Kurtzberg, Thompson, and Morris (1999) also identified the lack of a shared team identity as a major impediment to rapport building and a team's ability to reach consensus. Research regarding GDTs has found similar effects. For example, Hinds and Bailey (2003) argue that the members of teams lacking shared identity are less likely to discuss issues when they occur, thereby impeding their ability to effectively work through and resolve those issues.

At the same time, many researchers have found that individuals hold multiple, overlapping, and often nested identities (Ashforth and Mael 1989; Brewer 1995). Although research has shown that individuals identify strongly with their work teams (Barker and Tompkins 1994), we believe that geographic subgroups will provide a highly visible basis for intra-team social categorization into local ingroups and distant outgroups. The existence of multiple identities necessitates a ranking process through which some identities are considered more salient and, thus, more likely to be invoked than others. Within organizational settings, this process is based on both the subjective importance attributed to an identity and its relevance to the current situation (Ashforth and Johnson 2001). Generally speaking,

7

research has shown that lower order identities are more subjectively important and relevant to the situation than higher-order identities (Brewer 1995; Lawler 1992). Ashforth and Johnson (2001) build on van Knippenberg and van Schie (2000), giving four reasons that all apply to geographic subgroups. First, a geographic subgroup is more likely to form an individual's primary group than is the overall team due to greater intra-subgroup versus team-level interaction. Second, shared experience and context leads to greater perceived similarity and consequently greater entitativity (Brewer and Harasty 1996) with members of the same geographic subgroup, and through that to a shared subgroup-level identity. Third, as individuals balance the need for assimilation and distinctiveness (Brewer 1991), subgroups provide more intimate settings with greater distinctiveness and exclusivity than a team-level identity. Finally, as organizations continue moving toward flatter, more laterally-linked work environments, individuals rely increasingly on more fluid and lower bases of identity (Stroh, Brett and Reilly 1994). Taken together, this suggests that individuals are more likely to identify with their geographic subgroups at the cost of a single, overarching shared team identity. Thus, we hypothesize:

> **Hypothesis 1A**: Teams with geographically-defined subgroups will report lower levels of shared team identity than teams without such subgroups.

Research suggests that social minorities exhibit stronger categorization effects as a result of their greater need for solidarity and affiliation (Hogg 2001; Simon 1992), resulting in an even greater tendency by minority members to favor subgroup over team-level identification. Compounding this effect are findings that the existence of minorities may also prompt majority members to exaggerate within-group commonalities and between-group differences (Tajfel and Wilkes 1963). We expect, however, that the effects will be stronger for minority members as majority members may seek to exert their numerical dominance by co-opting the team-level identity and claiming it as their own. This suggests that minority status will strengthen subgroup members' focus on subgroup rather than team-level identity, thus we expect lower team-level identity will be borne particularly heavily by members of minority subgroups:

> **Hypothesis 1B**: Among teams with geographically-defined subgroups, members of minority subgroups will experience lower levels of shared identity than members of majority or balanced subgroups.

In contrast, we do not believe the same categorization effects will be triggered in teams with geographic isolates. Though some research building on Kanter's (1977b) work suggests that the negative effects found for minorities are likely to be even stronger for solos (Heilman 1980; Taylor 1981), this work typically confounds category bases with status. Studies of equal or high-status solos find no negative effects and, in fact, some positive effects of solo status. For the isolates themselves, research has found that lower-order identities can be too exclusive, thus threatening the desire for inclusiveness which partially motivates the identification process (Brewer 1991). Self-identifying as isolates would leave individuals with no ingroups, so isolates are more likely to invoke higher-order identities (Ashforth and Johnson 2001). Furthermore, even if they choose to identify with their isolate status, they lack the reinforcement that would otherwise be provided by one or more collocated teammates. As research has shown, individuals look to their immediate social interactions to form and maintain social prototypes (Fiske and Taylor 1991), which form the basis of their ingroup and differentiate it from their outgroup. Without collocated colleagues to form their ingroup, isolates are likely to identify with the next-most-relevant group – i.e., the team as a whole. In support of this, in recent work on demographically-based tokenism, Loyd, White, and Kern (in press) argued that groups with duo token members are likely to experience greater self-categorization and less cohesion than similar groups with solo token members.

For the non-isolated team members, we would expect high identification with the team, because they constitute the vast majority of it and because a lone isolate at the other site is likely to trigger a weak outgroup response, if any at all. Furthermore, an isolate's identification with the entire team is likely to prompt him or her to engage in positive, ingroup-driven, pro-social team behaviors (for a discussion, see Hogg and Terry 2000). To the extent these are perceived by the rest of the team, they are likely to engender a reciprocal response with greater identification and inclusiveness. Thus, we expect that:

Hypothesis 1C: Teams with geographic isolates will experience higher levels of shared identity than teams with balanced or imbalanced subgroups.

Transactive Memory

Transactive memory systems are multi-member cognitive systems which groups of individuals efficiently organize, store, and retrieve information (Lewis 2003). In effective transactive memory systems, members use their awareness of other members' domains of expertise to maximize the breadth and depth of the team's collective knowledge, while minimizing redundancy and effort (Brandon and Hollingshead 2004; Hollingshead 2001; Moreland, Argote and Krishnan 1996; Wegner 1987). This is accomplished by differentiating, identifying, and integrating members' domains of expertise (Nonaka and Takeuchi 1995). Successful transactive memory systems reflect three basic characteristics. First, knowledge is specialized – differentiated across members. Second, knowledge is credible – members trust in the knowledge held by others. Third, knowledge is coordinated – members know who has what expertise and how to access it (Liang, Moreland and Argote 1995; Moreland and Myaskovsky 2000).

Intra-group categorization is likely to have a negative impact on both knowledge coordination and source credibility. Because categorization exaggerates perceived similarities within groups, it renders members less uniquely identifiable (Taylor et al. 1978) and makes the recognition of specialized knowledge more difficult. Also, bias toward ingroup interaction will result in individuals having less exposure to, and thus information about, outgroup members' knowledge – knowledge that again is perceived as less differentiated. When specialized knowledge is identified, given that outgroups arouse more negative affect and less trust (Kramer and Brewer 1984), outgroup members' knowledge is likely to be viewed as less valuable and credible by ingroup members. Finally, even if identified and viewed as credible, the inclination to assume that outgroup members' will be competitive rather than cooperative (Schopler and Insko 1992) reduces the likelihood that individuals will coordinate knowledge with outgroup members. Thus, transactive memory is likely to suffer in subgroup configurations as a result of intra-team social categorization and its resultant reductions in source credibility and coordination, yielding our next hypothesis:

Hypothesis 2A: Teams with geographically-defined subgroup configurations will report less effective transactive memory than teams without such subgroups.

Research in collocated groups indicates that people tend to seek consensus and respond negatively to potentially deviant minorities (Hogg 2001). These negative responses will lead minority subgroups to distance themselves from, and be distanced by, majority subgroup teammates – beyond that resulting from simple out-group categorization. This distancing will result in less communication about what each team member knows, which will cause individuals in numerical minorities to know less about their majority counterparts and, thus, perceive their majority teammates as less credible. Similarly, majority subgroup members will learn less about their minority teammates, but sheer numbers will give them knowledge about a greater percentage of the team's members. As a result, we hypothesize that:

Hypothesis 2B: Among teams with geographically-defined subgroups, members of minority subgroups will experience less effective transactive memory than members of majority or balanced subgroups.

As with shared identity, in contrast to teams with geographic subgroups (balanced and imbalanced), teams with geographic isolates trigger weak, if any, categorization, and as such, avoid its negative impacts on team member coordination and credibility. Furthermore, the inherent novelty and uniqueness of a geographic isolate increases his or her salience to the other members of the team (see Fiske and Taylor 1991 for a discussion), making that individual and his or her knowledge more readily accessible and distinctive to teammates seeking information. This increases the likelihood that an isolated individual's knowledge will be located and utilized effectively. Conversely, an isolate's physical separation from the rest of the team forces that individual to engage more actively in information seeking behaviors in order to keep abreast of team activities. This increases the likelihood that an isolate will be able to effectively locate and utilize knowledge held by distant teammates. Thus, we hypothesize that:

Hypothesis 2C: Teams with geographic isolates will experience more effective transactive memory than teams with balanced or imbalanced subgroups.

Conflict

Researchers have differentiated among three types of conflict: affective (interpersonal), task, and process conflict (see Jehn 1997 for a discussion). The categorization of individuals as outgroup members

11

brings with it derogation (Tajfel 1982), which is likely to result in affective conflict. In addition, Hewstone (1990) found that outgroup members were attributed more personal responsibility for negative outcomes, thus increasing the likelihood of affective conflict. We expect similar increases in both task and process conflict as a result of reduced interaction and information sharing across subgroups. Cramton (2001) found evidence of this in a study of distributed student teams in which conflict frequently arose due to incomplete or uneven information exchange. Thus, we hypothesize:

>*Hypothesis 3A*: Teams with geographically-defined subgroup configurations will report
>more conflict than teams without such subgroups.

Power imbalances in general have been found to produce strong negative emotions and conflict (Sell, Lovaglia, Mannix, Samuelson and Wilson 2004). Based on these findings and three other streams of research, we expect that conflict will be perceived more strongly (negatively) by members of minority subgroups. First, Social Impact Theory (Latane, Williams and Harkins 1979) states that larger groups engender more social loafing by making individual contributions less easily distinguishable. This suggests that those in majority subgroups will loaf more, likely causing resentment among the minority subgroup members. This, in turn, will engender conflict over motivation and effort levels that will be especially pronounced for minority subgroup members. Second, conflicts are manifested most prominently in terms of competition for recognition, status, and power (Brewer 2001). In imbalanced teams, the minority subgroup will tend to seek recognition, status, and power, while the majority subgroup will struggle to protect it. Minority status also increases competition between members of the minority subgroup (Ellemers, van den Heuvel, de Gilder, Maass and Bonvini 2004). This intra-subgroup competition occurs due to those minority members perceiving an advantage in being solo (Kanter 1977a) and trying to distance themselves from other minority members to avoid being categorized by the majority (Loyd 2005). Third, given their size, majority subgroups tend to perceive themselves as more influential. Absent any special expertise, however, they lack the authority to justify that perceived influence (Hogg 2001). Members of minority subgroups are likely to perceive this gap, prompting resentment and thereby

reducing their sense of shared identity. Taken together, social impact theory, resource competition, and perceived inequality lead us to hypothesize that:

> **Hypothesis 3B**: Among teams with geographically-defined subgroups, members of minority subgroups will experience higher levels of conflict than members of majority or balanced subgroups.

The lack of categorization in teams with isolates reduces the likelihood of the inter-site tensions that prompt conflict between sites. In addition, isolates' identification with the entire team is likely to prompt increased interaction with distant teammates. This interaction helps compensate for meaning lost due to the use of mediating technologies (Zack 1993) and helps teams catch and resolve concerns before they escalate (Kiesler and Cummings 2002). As noted by Cramton (2001) and Hinds and Mortensen (2005), such communication across sites can considerably reduce inter-site conflict. Thus, the lack of inter-site categorization-driven tensions, coupled with increased interaction leads us to hypothesize that:

> **Hypothesis 3C**: Teams with geographic isolates will experience less conflict than teams with balanced or imbalanced subgroups.

Coordination Issues

For teams to accomplish their tasks successfully, they must coordinate their work by managing the dependencies among task components, resources, and personnel (Malone and Crowston 1994). Research has shown that ingroup/outgroup distinctions are likely to lead members to exhibit competitive rather than cooperative behavior (Brewer and Kramer 1986; Schopler and Insko 1992), thereby reducing the likelihood that they will coordinate their efforts effectively. Furthermore, the lack of contextual information resulting from ingroup homophily and corresponding outgroup avoidance (Coser 1956; Sherif, Harvey, White, Hood and Sherif 1961) is likely to leave team members confused about or unaware of distant teammates' activities and work processes (Cramton 2002; Grinter et al. 1999; Hoegl and Proserpio 2004). Lacking this contextual information, teams find it more difficult to coordinate their work, accomplish their tasks (Clark and Brennan 1991; Fussell and Krauss 1992), and resolve coordination issues when they arise (Cramton 2002; Kraut, Fussell, Brennan and Siegel 2002). Thus, we next hypothesize:

Hypothesis 4A: Teams with geographically-defined subgroup configurations will report more coordination issues than teams without such subgroups.

Effective coordination depends heavily on good communication. Given the threats to shared identity, the lower transactive memory, and higher conflict described above, and given the ability of majority members to out-vote majority members on coordination-related decisions about schedules, deadlines, task assignments, etc., members of minority subgroups are likely to experience more significant coordination issues than members of majority or balanced subgroups. In her examination of the effects of power imbalance on resource allocation, Mannix (1993) argues that members of imbalanced groups are likely to take on a competitive rather than cooperative stance, which leads to a spiraling effect in which all members behave competitively in an effort to protect their own interests. As a result, the group is unable to increase its overall resources by coordinated action. Thus, we hypothesize that:

Hypothesis 4B: Among teams with geographically-defined subgroups, members of minority subgroups will experience higher levels of coordination issues than members of majority or balanced subgroups.

Finally, teams with isolates will share additional coordination-relevant contextual information because they lack the inter-site categorization effects and have increased interaction arising from the isolates' identification with the entire team. Furthermore, it is possible that isolates may serve valuable informational roles in teams by acting as devil's advocates and thereby prompting teammates to assess their task strategy more effectively (Valacich and Schwenk 1995). Absent the intergroup tensions arising from subgroup configurations, the increased salience of an isolate's solo status will make all members more likely to recognize the need for, and enact, explicit coordination mechanisms. Thus, given the lack of inter-subgroup categorization and the potential coordination-benefits of devil's advocacy and increased salience, we hypothesize that:

Hypothesis 4C: Teams with geographic isolates will experience fewer coordination issues than members of teams with balanced or imbalanced subgroups.

Methods

Sample

To test our hypotheses, we conducted a quasi-experimental study in which we assigned subjects to 62 teams with six members each (two additional teams with only five members were dropped from our analyses). Our subjects were undergraduates enrolled in two semester-long organizational behavior courses taught by the authors at two medium-sized universities – one in the United States and one in Canada. We obtained demographic and background information about the students from the universities' registrars and a survey we administered at the beginning of the semester. The subjects' average age was 20.5; 93.1 percent of them were majoring in business or management-related fields; 62.1 percent grew up in the U.S., 19.9 in Canada, and 17.9 percent in 14 other countries; 48.7 percent were women; all spoke fluent English and 77.7 spoke it at home.

We divided the 62 teams among four distinct geographic configurations: collocated teams consisted of six members all at the same geographic location (6-0); distributed-with-isolate teams consisted of five members at one site, working with one team member at the distant site (5-1); distributed-imbalanced teams consisted of four members at one site and two at the other (4-2); and distributed-balanced teams were evenly split, with three members at each of the two sites (3-3). Within the constraint of the number of subjects available at each location, we strove for roughly equal numbers of teams in each configuration, resulting in 19 collocated teams, 15 distributed-with-isolate teams, 11 distributed-imbalanced teams, and 17 distributed-balanced teams. We treated teams with reciprocal configurations (e.g., 4 members in Canada and 2 in the U.S. vs. 2 in Canada and 4 in the U.S.) as functionally equivalent.

As we noted earlier, prior work has highlighted the importance of both spatio-temporal and socio-demographic differences among sites. Because all subjects in the study were located in one of two locations, both within the same time-zone, our experimental setting controlled for spatial and temporal distance among team members. With respect to socio-demographic dimensions, we assigned students to

teams to minimize potential faultlines wherein the geographic subgroups coincided with socio-demographic subgroups based on gender, ethnicity, age, nationality, education (major), or primary language. In general, we were successful in avoiding the creation of faultlines. Of the 62 teams, there was only one in which education aligned with geographic subgroup (the geographically isolated member was also the only non-management major); two in which language aligned with geographic subgroup (the only geographically isolated member was also the only 1st-language French speaker); and four in which the nationality aligned with subgroup (the Canadian members were all females and the U.S. members were all males). Besides these seven teams, there were no others where geographic subgroups overlapped with demographic subgroups on the basis of gender, ethnicity, age, nationality, education, or primary language. We re-ran our analyses with these seven teams removed and found no change to the pattern of our results. Therefore, we present data for all 62 teams.

To explore the effects of subgroups on GDT dynamics, we considered the four configurations in two basic categories depending on whether they had geographically-defined subgroups (Figure 1). The first category included the two conditions with geographically-defined subgroups – i.e., the distributed-balanced (3-3) and distributed-imbalanced (4-2) configurations. The second category included the two conditions without such subgroups – i.e., the collocated (6-0) and distributed-with-an-isolate (5-1) configurations. We used these categories for our tests of Hypotheses 1A, 2A, 3A, and 4A. To compare the experience of team members in the numerical minority with non-minority members, we examined the data at the subgroup level in our tests of Hypotheses 1B, 2B, 3B, and 4B. Finally, we compared the experiences of GDTs with isolates to GDTs with balanced and imbalanced subgroup configurations in our tests of Hypotheses 1C, 2C, 3C, and 4C.

Procedures, Task, and Data Collection

Subjects worked in their teams to complete a final written deliverable. They had slightly more than three weeks from the time they received their team rosters until the time their reports were due. Each team selected a topic from the course (drawing from a list we provided or proposing a related topic of their own) and expand on it in an 8-10 page written report. Sample topics included conflict management, innovation, diversity, leadership development, and knowledge management. We asked teams to summarize the current state of knowledge about their topic based on business press and academic sources. With that background research as a guide, teams had to describe how the topic is currently handled or manifested in at least two real organizations. These descriptions could be based on public sources, but we required teams to interview at least two employees in their focal organizations. Students were encouraged to use organizations to which they had direct access to facilitate these interviews, which could be conducted face-to-face, by phone, or via email. Though some teams used small, local organizations or franchises, most focused on large, national or international corporations (e.g., Home Depot, Fidelity, Bank of Montreal, Amazon) about which business or general press coverage was readily available.

Apart from the list of potential topics and a required one paragraph description of their chosen topic and target organizations one week into the project, we provided no structure for the teams, forcing them to take responsibility for their own schedule, roles, responsibilities, task strategies, and work processes. In this sense, they met key criteria for "real teams" not simply "co-acting groups" (Hackman 1990). We designed the task to be multiplex (Arrow et al. 2001) requiring creativity, decision-making, coordination and cooperation among team members. Given the amount of work required and the need to interview people in two off-campus organizations, it would have been difficult for any one member to do the whole project, but neither we nor the task dictated how interdependently subjects had to work, leaving it up to them to determine their own division of labor (Wageman and Gordon 2005).

Because employees working in real organizations generally choose from a wide range of communication technologies (Watson-Manheim and Bélanger 2007), we provided teams in our study with a realistic "communication portfolio" (Lee, Watson-Manheim and Ramaprasad 2007). Thus, we provided all subjects – in both distributed and collocated teams – with the email addresses of all teammates and gave them access to free audio and video conferencing. We also allowed subjects to use any media to which they had access, including: audio and video conferences, 1-to-1 telephone calls, instant messaging, email, and face-to-face meetings among some or all collocated teammates. Though it was possible for teams to create their own listservs using free, publicly available tools (e.g., Yahoo Groups), we did not provide teams with listservs in order to avoid biasing groups toward all-team communication. This feature of our design contrasts with many previous experimental and quasi-experimental studies (including Polzer et al. 2006) in which teams were provided with listservs, discussion boards, or chat rooms and their communications were constrained to one of those media. Though this made it impossible for us to archive the teams' communications, we opted to favor realism by maximizing the choices available to them and minimizing the constraints on their communication – whether team-wide or in subgroups. We also asked subjects to report on the frequency with which they used different media.

Even among collocated teams, email was by far the most frequently used medium (used an average of 5.62 time per week per student). Face-to-face communication was the next most frequently used medium at an average of 1.98 times per week, followed by instant messaging at 1.41 times per week. Telephone (1-to-1 or conference) and video conferencing were rarely used (.54 and .01 times per week on average, respectively). Communication among collocated teammates was more frequent in general, but the relative frequencies by media were the same as overall team-wide communication (i.e., email was most frequent followed by FTF, IM, and telephone). Even among collocated teammates, email was used more than twice as often as face-to-face interaction (18.43 vs. 8.9 times per week).

Students were required to complete these team projects as a class assignment . Their experiences doing the projects provided a basis for subsequent class discussions and at the end of the term they were

required to write reflection papers on their experiences working in the teams. Students could also use their work on the projects as input for a final class assignment (which was not part of the study). When we started this study, previous research led us to believe that certain configurations would do worse than others. Thus, ethical concerns kept us from evaluating students on their performance in the teams. However, the close integration with class discussions and the reflection paper assignment helped motivate students to engage actively in the team projects.

In addition to the background survey administered at the beginning of the term, we conducted a web-based survey immediately after students submitted their projects, asking about their perceptions of and interaction with each of their teammates and their teams in general. We assured them that: 1) their responses were confidential, 2) they would not be seen by their teammates, 3) they would not be seen by us until after their grades had been determined, and 4) they would not influence those grades. In this way, we sought to obtain candid responses, which we analyzed at the individual, subgroup, and team level.

Dependent Variables and Measures

We examined four dependent variables (shared identity, transactive memory, conflict, and coordination), all of which have been found to have strong ties to team performance (Arrow et al. 2001).

*Shared team identity***.** We assessed shared team identity with a pictorial measure of interpersonal closeness shown to correlate with feelings and behaviors reflecting interconnectedness (Aron, Aron and Smollan 1992; Hinds and Mortensen 2005; Tropp and Wright 2001). We adapted this measure to the team-level by providing team members with a set of six graphical representations of relationships between "self" and "other" and asking them to select the number corresponding to the picture that most closely matched their relationship with their team (1 = very distant, 6 = very close). The mean of all team members' individual ratings was used as a team-level measure of identification with the team.

Transactive memory. We used Lewis' (2003) measure of transactive memory, asking respondents to rate the accuracy of 15 statements about their team (e.g., "I have knowledge about an aspect of the project that no other team member has" and "I trust that other members knowledge about the project is credible") using a five point Likert scale anchored by 1 = "Not at all accurate" and 5 = "Very accurate."

We used the individual-level mean across all 15 statements as a measure of transactive memory, with high reliability ($\alpha = .93$). The mean of all team members' individual ratings was our team-level measure of transactive memory and the mean of the individual ratings of all team members at the same location was our measure of subgroup-level perceptions of team transactive memory.

Conflict. We measured conflict using relationship conflict scales developed by Jehn (1995) and further refined by Jehn and Mannix (2001). Respondents answered nine questions about conflict frequency (e.g., "How much conflict is there in the team about task responsibilities?" and "How much relationship tension is there in the team?") using a five-point Likert scale anchored by 1 = "Not at all" and 5 = "Very much." We averaged these scores according to Jehn's model to form indices of the three types of conflict as well as a measure of overall conflict, all with high reliability ($\alpha = .94$, $\alpha = .85$, $\alpha = .89$, and $\alpha = .86$, respectively). The measures of affective, task, and process conflict were highly correlated with each other (average correlation = .81, $p<.01$) and with the measure of overall conflict (average correlation = .93, $p<.01$). When run in the analyses, each type of conflict produced similar patterns of results, so we report results based on the measure of overall conflict. We used the mean of all team members' individual ratings as team-level measures of conflict. To create ratings of subgroup-level perceptions of overall team conflict, we used the mean of the individual ratings of all team members at the same location.

Coordination issues. Lastly, we measured coordination issues using respondents' ratings of the extent to which they faced a set of five coordination challenges (e.g., "incompatibility between different team members' tools and/or work processes") on their team (as in Hinds and Mortensen 2005). They responded using a 5-point Likert scale (1 = not at all, 5 = very much). We calculated a mean of the five items to create an individual-level measure of coordination issues with high reliability ($\alpha = .86$). We used the mean across all members in the team as a measure of team-level coordination issues and the mean across all members at a given location as a measure of subgroup-level coordination issues.

Results

We present descriptive statistics for each of our measures in Table 1.

To test our hypotheses, we conducted a series of ANOVAs. To test H1A, H2A, H3A, and H4A, we compared *team-level* ratings for configurations with and without subgroups (i.e., 3-3 and 4-2 vs. 6-0 and 5-1, respectively). To test H1B, H2B, H3B, and H4B, we divided the sample into teams with and without subgroups and then compared *site-level* ratings of each of the constructs for minority vs. non-minority subgroups. This yielded ANOVAs of 2s vs. 3s and 4s for the subgroup condition and 1s vs. 5s and 6s for the non-subgroup configurations. Finally, to test H1C, H2C, H3C, and H4C, we compared *team-level* ratings of distributed teams with and without isolates (5-1 vs. 3-3 and 4-2, respectively)

In framing this study, we build on prior work which leads us to assume that teams with different configurations would differ significantly with respect to shared identity, transactive memory, conflict, and coordination issues. To verify this assumption, we ran a one-way ANOVA and found significant differences on all four constructs across the four conditions. As shown in Table 1, shared identity ranged from a low of $M = 2.96$ for distributed-imbalanced teams to a high of $M = 3.78$ for collocated teams ($F = 37.83$, $df = 58$, $p < .001$). Transactive memory ranged from a low of $M = 3.34$ for distributed-imbalanced teams to a high of $M = 3.79$ for collocated teams ($F = 3.15$, $df = 58$, $p < .05$). Conflict ranged from a low of $M = 1.69$ for distributed-with-an-isolate teams to a high of $M = 2.23$ for distributed-imbalanced teams ($F = 3.38$, $df = 58$, $p < .05$). Following a similar pattern, coordination issues ranged from a low of $M = 2.51$ for distributed-with-an-isolate teams to a high of $M = 2.97$ for distributed-imbalanced teams ($F = 3.10$, $df = 58$, $p < .05$). Taken together, this validates our assumption that teams with different configurations (but similar spatio-temporal and socio-demographic distances between members) are statistically different on key team dynamics.

In our first set of hypotheses (H1A, H2A, H3A, and H4A), we argued that teams with subgroups will perform more poorly than those without them on four dimensions: shared identity, transactive memory, conflict, and coordination issues. ANOVAs comparing subgroup vs. non-subgroup teams

supported these hypotheses. First, teams with subgroups had lower shared identity than non-subgroup teams (M = 3.03 vs. M = 3.75 respectively) and that difference was significant (F = 23.83, df = 60, p < .001). Second, teams with subgroups had significantly lower transactive memory than non-subgroup teams (M = 3.42 vs. M = 3.79 respectively and F = 9.24, df = 60, p < .01). Third, teams with subgroups had higher conflict than non-subgroup teams (M = 2.21 vs. M = 1.76 respectively), which was also statistically significant (F = 9.90, df = 60, p < .01). Fourth and finally, teams with subgroups had significantly more coordination issues than teams without subgroups (M = 2.94 vs. M = 2.51 respectively and F = 9.51, df = 60, p < .01). Thus, we find support for H1A, H2A, H3A, and H4A.

In our second set of hypotheses (H1B, H2B, H3B, and H4B), we suggested that members of minority subgroups would have more negative experiences than those in majority subgroups. These minority subgroup dynamics often began with majority subgroups' claims to sheer numerical power. As one subject reported after the completion of her project, "When we started [to] work with them, we were optimistic … but then [our four teammates at the other site] threatened to 'out-vote' us on several key decisions. The two of us here had little we could do in response and things devolved from there." ANOVAs comparing numerical minority subgroups (two people per site) with numerical non-minority subgroups (three and four people per site) partially supported this hypothesis. As shown in Table 1, among teams with subgroup configurations, teams with geographic minorities reported significantly lower shared identity than non-minorities (M = 2.32 vs. M = 3.15, respectively; F = 11.41, df = 54, p < .01). Furthermore, geographic minorities reported lower transactive memory than non-minorities (M = 2.99 vs. M = 3.48, respectively; F = 4.66, df = 54, p < .05). Geographic minorities also reported more coordination issues than non-minorities (M = 3.39 vs. M = 2.87 respectively), but the significance of that difference was only suggestive (F = 3.82, df = 54, p < .06). Finally, although minority configurations did report higher conflict than non-minority teams (M = 2.53 vs. M = 2.16 respectively), that difference was not significant (F = 1.93, df = 54, n.s.). Thus, we find strong support for hypotheses 1B and 2B, suggestive support for 3B, but no support for hypothesis 4B.

In our third set of hypotheses (H1C, H2C, H3C, and H4C), we suggested that members of teams with geographic isolates would have less negative experiences than those in teams with subgroup configurations – either balanced or unbalanced. ANOVAs comparing distributed-with-isolates vs. distributed-without-isolates teams supported these hypotheses. Teams with an isolate reported significantly higher shared identity than did teams with subgroups (M = 3.71 vs. M = 3.03; F = 15.49, df = 41, p < .01, respectively). Furthermore, teams with isolates had more effective transactive memory systems than those with balanced or imbalanced subgroups (M = 3.79 vs. M = 3.55, respectively; F = 4.81 df = 41, p < .01). Teams with isolates also reported lower conflict than teams with balanced or imbalanced subgroups (M = 1.69 vs. M = 2.21, respectively; F = 7.35, df = 41, p < .01). Lastly, teams with isolates reported significantly fewer coordination issues than their counterparts with balanced or imbalanced subgroups (M = 2.51 vs. M = 2.94 respectively) and that difference was also significant (F = 4.84, df = 41, p < .10). Thus, we find strong support for hypotheses 1C, 2C, 3C, and 4C.

Discussion

We began this work noting that research and theory on GDTs has focused on issues of spatio-temporal dispersion and socio-demographic differences, with almost no examination of the configurational characteristics of those teams. To gain further insights into such characteristics, we designed this study to explicitly answer the question: "How do different configurations affect the dynamics of GDTs?" and implicitly verify our assumption that, controlling for spatio-temporal dispersion and socio-demographic differences, differences in geographic configuration affect the dynamics of GDTs. We find that not only does configuration significantly affect GDT dynamics, but also that a key determinant of those dynamics is the existence of geographically-defined subgroups. We find that such subgroups lead to significant negative outcomes with respect to shared identity, transactive memory, conflict, and coordination issues. We also found that members of minority subgroups were at a significant disadvantage with respect to shared identity and transactive memory (and, marginally, coordination issues) when compared to their non-minority counterparts. This supports our underlying theoretical

23

framework, which holds that minority subgroup members bear the brunt of the tensions in their teams. Furthermore, this highlights the extent to which team members' experiences may vary across sites within the same team, based solely on differences in configuration. Finally, we find that teams with geographic isolates avoid the negative dynamics experienced by teams with subgroups and may, in fact, experience some surprisingly positive outcomes for both the isolates and their distant, collocated teammates.

Addressing Alternative Explanations

Two potential alternative interpretations and explanations for our data involve the role of isolates and minority status. First, it is plausible that the positive results for teams with isolates were due to the collocated five team members ignoring or excluding their distant, isolated teammate; 5-1 teams might devolve into de facto 5-0 teams, leaving isolates with little room to contribute to or influence their teams. However, further examination of the data indicates that this was not the case. We asked all subjects to rate the contribution and influence of, and their communication with, each teammate. Isolates' collocated teammates did not rate the isolates significantly lower in terms of contribution to the team ($M = 3.85$ vs. $M = 3.81$, respectively, $F = .06$, $df = 83$, n.s.), influence on the team ($M = 3.49$ vs. $M = 3.46$, respectively, $F = .01$, $df = 44$, n.s.), or communication with the team ($M = 1.67$ vs. $M = 1.88$, respectively, $F = .14$, $df = 83$, n.s.). Isolated members were not simply excluded from communication, and they were able to contribute to and influence the team. As one subject who was part of a five-person collocated subgroup reported after completion of the project, "We could have just ignored [John, our geographically isolated teammate], but we didn't want to leave John out completely and he turned out to be an influential member of the team even though he was far away from the rest of us. If anything, he forced us to be more explicit about how we were going to work together to ensure that he wasn't left out."

Second, we suggested that subgroups have an initial effect and minority status plays an additional role. This raises the question of whether the relative ordering of these two phenomena is correct or if minority status plays a key role regardless of the presence of subgroups as defined earlier. If this were the case, we would expect the experience of isolates to parallel the negative experience of minority members

in subgroup conditions, reporting less shared identity and less effective transactive memory, more conflict and coordination issues. Our data, however, clearly show that this is not the case.

Implications

Our findings have several theoretical, empirical, and practical implications. First, our research holds implications for theories of social categorization. We provide evidence for the effect of social categorization based on seemingly minimal differences in geographic subgroup configuration. Furthermore, we believe that although the subgroups in this study were based on geographic location, these results may be more broadly generalizable to subgroups based on other dimensions (e.g., demography). Loyd, White, and Kern's (in press) recent findings regarding demographically-based tokens – i.e., that duo token members experience greater self-categorization and less cohesion than singleton token members – provide support for our findings regarding imbalance. This suggests an extension of the substantial body of research on the effects of demography on social categorization beyond mean levels to more systematically address the effects of different configurations.

Second, our work highlights the importance of geographic configuration as a key construct to be measured and accounted for in studies of GDTs. Prior research has attributed many of the negative effects of GDTs (e.g., lower shared identity, communication, trust, transactive memory, and common knowledge; and more conflict) to intra-team spatio-temporal and socio-demographic differences. While we do not discount the importance of such differences, our data show that "mere" configuration is enough to trigger problems associated with dispersion in teams. In addition, by leveraging existing research on social categorization, we provide a theoretical framework with which to examine and understand the effects of GDT configuration. Furthermore, the findings regarding imbalance and geographic isolates may provide insights regarding existing theories of minority influence and tokenism outside the domain of GDTs.

Third, relating this research to the small body of prior work on GDT configuration, our findings extend the work of Polzer et al. (2006) and provide a boundary condition to their argument that larger subgroups foster stronger faultlines. In our study, five-person sites did not evidence stronger faultline effects than their four-person counterparts. We attribute this result to the five-person sites failing to

trigger subgroup-level categorization or imbalance-related tension. We do not counter Polzer's claim that larger subgroups foster stronger faultlines, but do note that a site must constitute a subgroup to trigger these effects. We also believe that our work, coupled with that of Polzer et al., suggests an additional dimension along which faultlines may emerge – i.e., that of geographically-defined subgroups. Though such subgroups may align with subgroups based on other dimensions (e.g., culture, language, nationality), as is especially the case in many global organizations, they need not do so to affect team dynamics. This suggests that geographically-based subgroups may play an important role by either aligning with (and thus reinforcing) or spanning (and thus weakening) faultlines formed by these other dimensions.

Our findings also provide insights into the role and impact of isolates in GDTs. A large body of research on tokenism and solo status suggests that isolates face special pressures, stronger majority/minority boundaries, entrapment in stereotypical roles, and general social isolation (Kanter 1977a; Kanter 1977b), and geographic isolation also has been suggested to exacerbate feelings of social or professional isolation (Cooper and Kurland 2002; Vega and Brennan 2000). In contrast, isolates in our study experienced fewer negative dynamics than their non-isolated counterparts, and contribution, influence, and communication data suggest they were not socially isolated. Therefore, our findings support and extend recent research on GDT configuration in which Cramton and Hinds (2005) speculate, and Polzer et al. (2006) find, that teams comprised solely of isolates do better than those with balanced subgroups. This consistent contrast to the established tokenism and social isolation literatures suggests that geographic isolates in GDTs may be uniquely different from the socio-demographic isolates which have been studied in traditional teams.

Beyond illustrating how geographic isolates may not trigger critical categorization processes and may thus avoid the negative dynamics experienced by the subgroup conditions, we find teams with isolates have dynamics on par with or better than their collocated counterparts. This suggests that such isolates may serve unique, beneficial roles for their team, potentially acting as devil's advocates or , as evidenced in subject comments, prompting small (but valuable) increases in mindful coordinating activities among all team members (including larger subgroups of collocated members). The roles of

26

isolated team members remain an important issue for further study, especially in field settings where the effective integration of geographic isolates is often vital, but perhaps more difficult than in our quasi-experimental context. The impact of other configurations that include isolates (e.g., 4-1-1 and 3-1-1-1 just within six-person teams) is also worthy of further study. Teams with multiple isolates may find the isolated members bonding to form cross-site subgroups, thereby offsetting some of the effects of being the only team member at a given site.

Turning next to empirical implications, our findings highlight two key issues. Traditional, dichotomous approaches to studying teams as either dispersed or collocated mask the configuration-based effects highlighted in this study, resulting in an obvious loss of accuracy (O'Leary and Cummings 2007). Inattention to issues of configuration in prior GDT research introduces a confound which we believe may account for many of the field's equivocal findings. To understand and develop robust theories about GDTs, we need to treat configuration as a separate and distinct dimension of dispersion. By taking configuration into account, we believe that scholars can gain increased clarity regarding the relationships between dispersion and the concepts under examination.

Second, our research highlights the value of the subgroup-level analyses in teams research. We found that geographic minority subgroups differed significantly from their non-minority counterparts, while team-level minority configurations showed no such significant difference. This illustrates the significant within-team differences that may exist on the basis of subgroups – be they defined configurationally, demographically, or otherwise. Thus, our study further highlights the importance of examining team phenomena at the level of the team, subgroup, and individual.

Finally, turning to practitioners, this research illustrates the importance of sensitivity to geographically-defined subgroups in GDTs, particularly if such subgroups are not balanced. As we noted earlier, GDTs are often formed to bring together distributed experts whose location may be outside the control of team managers. Our research suggests that teams with isolates may avoid the negative dynamics found in GDTs with subgroups. While complementing the work of Polzer et al. (2006), this finding runs counter to conventional wisdom that isolation is inherently negative. In fact, this research

suggests that creating collocated subgroups with "strength-in-numbers" may do more harm than good by promoting ingroup/outgroup categorization within teams and thereby reducing team effectiveness.

Relatedly, this research highlights the need for managers to think more carefully about how to reduce the likelihood that social categorization leads to subgroup identification rather than identification with the team as a whole (Brewer and Brown 1998). Social categorization research suggests that increasing the salience of the superordinate group is an effective means of reducing categorization-based tensions (Hornsey and Hogg 2000). Work on the contact hypothesis (Pettigrew 1998) emphasizes the benefits of increased interactions as a means of overcoming these effects.

Limitations, Boundary Conditions, and Domains for Future Research

Through this quasi-experimental study, we were able to control for a number of potential confounds like demographic characteristics. In so doing, however, we made it impossible to assess the impact of broader contextual factors on the constructs in question. We might expect organizational culture, rules, norms, and roles to provide individual team members guidance with respect to their behavior in GDTs. Furthermore, we created a task that required involvement by all members, but did not draw heavily on variation across members with respect to their expertise or roles. In addition, we limited our analysis to six-member teams dispersed between a maximum of two locations in the same time zones. Naturally-occurring GDTs in organizational contexts frequently have more than six members and may vary in their dispersion between a single location and as many sites as there are members. Finally, though long in comparison to many laboratory experiments, the projects used in this study were completed in a relatively short period compared to many real organizational projects. Team dynamics evolve over time and we might expect longer-lived GDTs to adopt processes to overcome or at least ameliorate some of the negative dynamics we identified. Given these limitations, we believe further research exploring GDT configuration and its effects on existing organizational teams is warranted.

We also believe these limitations highlight important boundary conditions for the applicability of our findings and, thus, we urge caution generalizing beyond them. Specifically, this study examined six-person teams in one- and two-site configurations in which there were no ex ante differences in expertise

or roles by site. Though individual members may have differed in their personal motivation, the sites had an essentially common goal and incentives. Finally, the teams in this study were designed to control spatio-temporal and socio-demographic differences. The scalability of our findings remains to be tested with: larger teams; teams with more sites; teams with more varied (and potentially conflicting) expertise, roles, goals, and incentives; and teams with more variance on spatio-temporal or socio-demographic dimensions. Research on these topics would help extend beyond the boundary conditions of the work presented here, wherein we focus on the effects of configuration alone.

Conclusion

By stepping away from traditional GDT issues like spatio-temporal, and socio-demographic distances, our study stresses the importance of considering geographic configuration as a distinct and potentially influential dimension of dispersion. We find that GDT dynamics are strongly affected by configuration-driven categorization effects, independent of the spatial, temporal, and socio-demographic dimensions of dispersion, which have been studied more often. Configurationally-based subgroups, imbalance among them, and the existence of geographic isolates have significant effects on team dynamics and should be accounted for both in practice and in future research on GDTs.

Table 1: Means, Standard Deviations, and Correlations

Condition		Variable	M	S.D.	1.	2.	3.
All Teams (n = 62)	1	Shared Identity	3.42	0.68			
	2	Transactive Memory	3.62	0.51	0.58** **		
	3	Conflict	1.96	0.60	-0.44** **	-0.75 **	
	4	Coordination Issues	2.70	0.58	-0.51** **	0.76 **	-0.79 **
Distributed Balanced Teams (3-3; n = 17)	1	Shared Identity	3.07	0.44			
	2	Transactive Memory	3.47	0.51	0.37		
	3	Conflict	2.19	0.64	-0.41	-0.86 **	
	4	Coordination Issues	2.91	0.60	-0.42	0.78 **	-0.70 **
Distributed Imbalanced (4-2; n = 11)	1	Shared Identity	2.96	0.55			
	2	Transactive Memory	3.34	0.58	0.67 *		
	3	Conflict	2.23	0.72	-0.81 **	-0.71 *	
	4	Coordination Issues	2.97	0.70	-0.66 *	0.77 **	-0.90 **
Distributed with Isolate (5-1; n = 15)	1	Shared Identity	3.71	0.65			
	2	Transactive Memory	3.79	0.51	0.48		
	3	Conflict	1.69	0.46	0.01	-0.62 *	
	4	Coordination Issues	2.51	0.58	-0.32	0.67 **	-0.74 **
Collocated (6-0; n = 19))	1	Shared Identity	3.78	0.66			
	2	Transactive Memory	3.79	0.37	0.54 *		
	3	Conflict	1.82	0.46	-0.15	-0.58 **	
	4	Coordination Issues	2.51	0.36	-0.32	0.66 **	-0.69 **

*p < 0.05, **p < 0.01

30

Figure 1: Team Configurations with and without Subgroups and Imbalance

		Subgroup	
		No	Yes
Imbalanced	No	Collocated (6-0)	Distributed-balanced (3-3)
	Yes	Distributed-with-isolate (5-1)	Distributed-imbalanced (4-2)

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