Rethinking Team Boundaries

Mark Mortensen
INSEAD, mark.mortensen@insead.edu

Martine R. Haas
The Wharton School, University of Pennsylvania, mrhaas@wharton.upenn.edu

Working paper
Please do not cite or circulate without permission

Boundedness – the distinction between members and non-members – has long been a central defining feature of a team. In this perspective paper, we start by discussing classic conceptualizations of team boundaries, which emphasize the importance of boundary clarity. Yet many teams are more fluid, more overlapping and more dispersed − and consequently their boundaries are less clear − than ever before. We review recent literature that begins to illuminate the changing nature of team boundaries, and argue that fluidity, overlap, and dispersion have important implications for teams through their effects on members' shared identity and mutual understanding. We propose that today's teams can be usefully characterized as tightly versus loosely bounded, rather than as clearly bounded by definition, and conclude by examining the implications of the changing nature of team boundaries for future theoretical and empirical research on teams.

Keywords: Teams; Boundaries; Boundedness; Global; Virtual; Fluid; Overlapping [Teams/Groups]

Electronic copy available at: http://ssrn.com/abstract=2841150

Introduction

For more than 40 years, research on teams has relied on a traditional definition of a team as a bounded set of individuals who work interdependently to achieve a common goal (e.g. Alderfer 1977b; Cohen and Bailey 1997; Guzzo and Dickson 1996; Hackman 1987; Sundstrom et al. 1990). The concept of "boundedness" is central to this definition. At its heart is the premise that there is a clear delineation between members and non-members. Yet in recent years, this premise has become increasingly questionable. As teamwork becomes more dynamic, distributed, and project-driven, team boundaries have become less clear. This has substantial implications for how scholars theorize about and empirically study work teams, as well as for managerial understanding of how such teams should be designed and supported. It is time to update our understanding of team boundaries to take into account their changing characteristics.

While scholars have begun to make some initial inroads in this direction, their efforts are still just scratching the surface of the rapidly changing nature of team membership. Their emerging insights also have yet to be integrated into a common framework for reconceptualizing team boundaries and catalyzing new research directions. In this paper, we provide such a framework, and explore its implications for future research on work teams. We start by discussing the early foundational conceptualizations of work teams to illuminate how boundaries have traditionally been understood. We then explain how the changing nature of work is leading to team configurations that do not reflect the premise of clear boundaries. In particular, we propose that teams increasingly exhibit three features, and review the emerging research in each of these three areas. First, team membership is often fluid, as individuals move on and off teams during the course of their work. Second, team memberships often overlap, because individuals commonly work on multiple teams simultaneously. Third, team members are often dispersed, since individuals work in different geographic locations and/or organizational units.

The increasing fluidity, overlap, and dispersion of teams can help organizations to be more innovative, flexible, efficient, and responsive than ever before (for discussions see: Brown and Duguid

2001; Gibson and Gibbs 2006; O'Leary et al. 2011a; Schiller and Mandviwalla 2007; Thiry and Deguire 2007). However, increasing team fluidity, overlap, and dispersion also decrease boundary clarity, since each can lead to both individual uncertainty and collective disagreement about who is actually on the team. The implication is that the premise of clear membership that underpins classic definitions of teams can no longer be taken for granted, highlighting the need to revisit many of the arguments and assumptions that underlie our current scholarly theories about what teams are and how they work. We illustrate this by exploring how increasing team fluidity, overlap, and dispersion can affect two emergent states that research has shown matter for team effectiveness: shared identity and mutual understanding. We suggest that teams that are more fluid, overlapping, and dispersed will find it harder to build and sustain a shared identity and mutual understanding because of their lack of boundary clarity, as well as for other reasons. Finally, we propose that future research can benefit from viewing teams not as by definition clearly bounded, but instead as operating along a spectrum from loosely to tightly bounded, where the looseness-tightness characterization reflects their fluidity, overlap, and dispersion. By characterizing teams using these three dimensions, a more accurate and generative understanding of team boundaries and their implications for theory, research, and practice will be possible.

Team Boundaries and Boundedness

Historical Background

In a series of seminal works on groups and boundaries, Alderfer (1976b) drew on systems theory to propose that boundaries "hold the system together as an organized entity and thus help to distinguish what a system is from what it is not" (1976b, p. 1593). He defined a group as: "… a collection of individuals (1) who have significantly interdependent relations with each other, (2) who perceive themselves as a group by reliably distinguishing members from nonmembers, (3) whose group identity is recognized by nonmembers, (4) who, as group members acting alone or in concert, have significantly interdependent relations with other groups, and (5) whose roles in the group are therefore a function of expectations from themselves, from other group members, and from nongroup members" (1977b, p. 320). Each of these

2

elements contributes to a view of teams as clearly bounded systems, the membership of which is agreed upon by both insiders and outsiders.

Hackman (1987) built on Alderfer's work in stressing that "real teams" take the form of "intact social systems complete with boundaries and differentiated roles among members" (1987, p. 322). Hackman also explicitly emphasized that boundary clarity is critical for team effectiveness: "To work well together, team members need to know who they are. Members are sure to run into difficulties if there is so much ambiguity about who is actually on the team that they cannot reliably distinguish between the people who share responsibility and accountability for the collective outcome and others who may help out in various ways but are not team members." (Hackman 2002, p. 44). In this view, the success of a team as well as its fundamental definition rests on the premise that a team's members can be clearly distinguished from non-members.

Taken together, Hackman's and Alderfer's conceptualizations yield the foundations upon which much subsequent theory and research on teams builds. Their views of boundaries and boundedness have been widely cited, with more than 500 citations to Alderfer's works and almost 3500 to Hackman's.[1] Additionally, other scholars who themselves are highly cited have built explicitly on this foundational work by making the requirement that a group be an intact social entity with clear boundaries central to their definition of a team (e.g. Cohen and Bailey 1997; Guzzo and Dickson 1996; McGrath 1984; Sundstrom et al. 1990).

In these early writings, Alderfer (1976a, b, 1980) also pointed out that teams vary in the extent to which their boundaries are permeable, such that it is useful to locate them along a spectrum from "under-bounded" (highly permeable) to "over-bounded" (highly impermeable). That is, while some teams engage in extensive exchanges of information and other resources with their environment, metaphorically lowering the walls that surround them, others engage in very little or no boundary-spanning activities or

[1] As of July 15, 2016, Google Scholar listed 382 citations to Alderfer (1977), 146 to Alderfer (1980), 2470 to Hackman (1987), and 1026 to Hackman (2002).

resource exchanges, metaphorically heightening those walls and isolating themselves from their environments. This view of teams recognizes that the boundedness of team can vary in important ways, and it sparked several influential streams of literature on the interactions between teams and their external environments, including research on boundary-spanning activities (e.g. Aldrich and Herker 1977; Ancona 1990; Ancona and Caldwell 1992a; Tushman and Scanlan 1981a, b) as well as more recent research on knowledge seeking and network ties (e.g. Cummings 2004; Haas and Hansen 2007; Reagans and McEvily 2003). These now substantial bodies of research show the extent and type of resource flows and interactions across the team's boundary can vary, consistent with the concept of boundary permeability. Yet both the concept and the related research fundamentally assume that the boundaries of a team are basically clear.

It is worth noting that Alderfer and Hackman recognized that a team's "concrete" or objective boundaries may not always converge with their subjective boundaries. While objective boundaries are publicly observable and can be specified by, for example, membership lists or organization charts, subjective boundaries "refer to the human feelings that are often associated with concrete boundaries. They pertain to how much the individuals and groups develop a sense of territoriality, feel that events have begun or ended, and participate in a spirit of cohesion and community with their fellows" (Alderfer 1976a, p. 114). Alderfer argued that "under long-term stable conditions, concrete and subjective boundaries tend to parallel each other" (1976a, p. 114). But many teams today do not operate under such conditions, suggesting that their objective and subjective boundaries may not always converge. Moreover, a central argument of this paper is that objective team boundaries are increasingly unclear. Indeed, Hackman himself observed in some of his later work that field researchers often encounter the reality of boundaries that are much less clear than might be expected. For example, he noted that researchers sometimes ask managers for membership lists of teams they wish to study, and encounter responses along the lines of "Well, that's not entirely clear – it depends on how you want to define the team" (Hackman 2002, p. 47). Still, despite such recognition that team boundaries perhaps should not be taken for granted,

the basic premise that teams can be defined as clearly bounded systems has remained largely taken for granted in the intervening decades since it was framed by Alderfer and Hackman in the 1970s and 1980s, as described next.

Subsequent Views of Team Boundaries and Boundedness: A 25-year review

To assess conceptualizations of boundaries and boundedness in subsequent research on teams, we conducted a review of articles on teams published between 1990 and 2015 in a sample of five top management journals.[2] We found a total of 231 articles (199 empirical and 32 theoretical), but in order to maintain comparability across the sample, we dropped 47 that focused on top management teams, yielding a final sample of 184 articles (154 empirical, 30 theoretical).[3]

Of the 184 articles in the sample, only 18 (3 theoretical and 15 empirical) explicitly define teams. All three of the theoretical articles build on the view of teams as clearly bounded systems laid out by Alderfer and Hackman. O'Leary et al. (2011a) argue that "teams are bounded sets of individuals who work interdependently toward a shared outcome"; Carton and Cummings (2012) state "…a team is a group (e.g., project team or management team) whose membership and task are formally recognized by the organization"; and Hinds and Bailey (2003) define teams as "…groups of individuals that work together interdependently to accomplish a task, constitute distinct social entities, and jointly manage their team boundaries."[4]

Of the 15 empirical articles, only Wageman (2001) explicitly refers to boundaries in her definition, arguing that teams are "…bounded social systems with clear membership that is reasonably stable over time, thereby providing the capability for members to behave as a collective." Three empirical papers define teams without explicitly referring to team boundaries, but implicitly assume that the team's

---

[2] We included all articles with the term "team" in the title that were published between 1990 and 2015 in the following journals: *Organization Science, Management Science, Academy of Management Journal, Academy of Management Review,* and *Administrative Science Quarterly*.
[3] Performing the analyses with the full sample yielded similar results.
[4] Looking at the remaining 27 theoretical papers that do not directly define teams, five cite Hackman (one of which also cites Alderfer) and two more cite articles directly drawing on Hackman or Alderfer.

boundaries are clear through references to defined membership and/or by differentiating the team from the rest of the organization. For example, Edmondson (1999) states: "Organizational work teams are groups that exist within the context of a larger organization, have clearly defined membership, and share responsibility for a team product or service." Ancona (1990) refers a team as "…a set of organization members who see themselves as a group, are seen by others as a group…" And Gibson and Gibbs (2006) state: "Teams—a set of interdependent parties, small in number, who recognize themselves as a team and have some degree of shared accountability." The only authors who explicitly address a lack of boundedness are Peretti and Negro (2006, p. 760), who note: "A team can be regarded as an open and complex system made up of a set of members who perform specific functions and interact through a coordination network with one another, as well as with the larger social context in which the team is embedded." The remaining 10 empirical papers with definitions do not address boundedness directly. A typical example is Mathieu and Shulze's (2006, p. 605) definition: "Work teams are interdependent individuals who share responsibility for specific outcomes for their organization," or Ellis (2006, p. 576) who notes: "Organizations were shifting to team-based work structures, in which two or more employees, each assigned a specific role or function to perform, interact interdependently toward a common and valued goal or objective".

To gain some insight into how teams are conceptualized in the remaining 166 articles (27 theoretical and 139 empirical, all of which include team in the title but provide no explicit definition), we examined the citations in those papers. We found that five of the theoretical papers directly cite Alderfer or Hackman, while two more cite papers that themselves define "team" in line with Hackman and Alderfer (such as Cohen and Bailey 1997; Guzzo and Dickson 1996; Sundstrom et al. 1990), indicating that they view teams in line with Hackman and Alderfer's conceptualizations. Of the empirical papers, 38 (28%) cite Hackman, three of which (2%) also cite Alderfer.[5] An additional 16 (12%) cite papers that

---

[5] None of the papers in the sample cite Alderfer without also citing Hackman

them themselves explicitly define teams in line with Hackman and Alderfer (such as Cohen and Bailey 1997; Guzzo and Dickson 1996; Sundstrom et al. 1990). Two studies focus specifically on boundary-spanning behavior, but assume that the boundaries spanned themselves are clear (Ancona and Caldwell 1992a and Marrone et al, 2007).

Taken together, the evidence indicates that one-third of theoretical papers and 45% of empirical papers in our sample draw on the intellectual tradition of boundedness laid out by Alderfer and Hackman, either explicitly or implicitly. Importantly, the remaining papers offered no alternative competing definition of teams or discussions of boundedness that contest, replace, or refine those put forth by Alderfer and Hackman. This leaves boundedness a largely unexplored issue in our current thinking about teams and raises the question of whether the perspective on boundedness taken by Hackman and Alderfer is as applicable today as it was when they put it forth, or whether changes in the nature of team membership make it necessary to reexamine how we think about boundedness in teams.

Changing Nature of Team Boundaries: Fluidity, Overlap, and Dispersion

As outlined above, much of the extensive literature on teams is built on the premise that clear team boundaries are the norm. This is the case even in those studies that address issues directly related to boundaries and boundedness, such as boundary spanning behavior (e.g. Ancona 1990; Ancona and Caldwell 1992a; Joshi et al. 2008), boundary objects (e.g. Carlile 2002, 2004), role transitions across boundaries (e.g. Ashforth et al. 2000), boundary perception (e.g. Watson-Manheim et al. 2002), and entitativity (e.g. Castano et al. 2002; Lickel et al. 2001). However, in recent years we have begun to see the emergence of a growing body of scholarship that suggests that teams are increasingly fluid, overlapping and dispersed. These changes in team boundaries have important implications for boundary clarity, in the form of increased potential for both individual uncertainty and collective disagreement about where the team's boundaries lie.

Team Fluidity

Team fluidity refers to the extent to which the team's membership changes over time as individuals enter or leave the team in response to the evolving demands of the team's work and its environment. It is driven both by the number of individuals who enter and exit the team over time (e.g. a team in which 75% of membership changes over a 6-month period vs. one in which only 10% changes) and by the frequency of these changes (e.g. teams in which membership change occurs daily, weekly, or monthly). Teams thus vary along the dimension of fluidity such that teams with high fluidity change more members and/or change members more frequently than teams with low fluidity.

Team fluidity is becoming common in many organizational settings. In one recent study of 123 teams in a large semiconductor manufacturing company, for example, 84% had changed their membership over the life of the team (Espinosa et al. 2012); in another study of 285 teams in a multinational conglomerate, 69% had fluid membership (based on author correspondence regarding data in: Cummings and Haas 2012; and Espinosa et al. 2012 respectively). A primary reason for this growing phenomenon is that teams are increasingly designed around project-based tasks that require specific skills and expertise that change over the duration of the project (Prencipe and Tell 2001). In such teams, domain experts are often brought in to fulfill unique, short-term needs and released once that expertise is no longer needed (Zika-Viktorsson et al. 2006). Since team members start and end their work on the project at different times, the composition of the team changes, often substantially, over the project's lifespan. Notably, Hackman himself came to recognize the increasing importance of project-based work and its implications for team membership, when he introduced the concept of "sand dune teams" (Hackman and Wageman 2004). He argued that such teams "are not in any traditional sense a bounded work team at all" because they have fluid rather than fixed composition and "form and re-form within a larger organizational unit as external demands and requirements change" (Hackman 2011). Such teams, he noted, may be especially well suited to the shifting demands of managerial and professional work within a

stable organizational unit, such as analytic work in the policy unit of a government agency (Hackman and Wageman 2004).

In response to the increasing fluidity of many organizational teams, Edmondson (2012) recently advocated a shift from thinking about teams to thinking about "teaming" as an ongoing process through which teams are constituted and re-constituted. Fluidity is increasingly seen not only in temporary project teams within organizations, but also in teams with greater longevity and ongoing work. In such teams, membership changes have come to be viewed as a means to promote knowledge transfer, stimulate creativity, and reenergize the members (Kane 2010; Kane et al. 2005). Additionally, fluidity is characteristic of the growing domain of teams whose membership is comprised of individuals who come from different organizations or work as independent contractors (e.g. Barley and Kunda 2004; Belous 1989; Davis-Blake and Uzzi 1993; Evans et al. 2004). These range from disaster relief teams (Majchrzak et al. 2007) to film crews (e.g. Bechky 2002, 2006), to product design teams (e.g. Majchrzak et al. 2000; Malhotra et al. 2001). Like many intra-organizational teams, such cross-organizational or non-organizational teams tend to have shifting membership as individuals are brought on to the team on as add-needed basis.

Team Overlap

Team overlap refers to the extent to which members of a team are concurrently members of other teams. It is a function of how many of a team's members are simultaneously working on other teams (e.g. one, some, or all members), and of how many other teams they work on simultaneously (e.g. members work on the same other team or on different other teams). As with fluidity, teams vary along the dimension of overlap, such that teams with high overlap share more members and/or share members with more other teams than those with low overlap.

Concurrent membership of several teams is sometimes referred to as "multiple team membership" (Mortensen et al. 2007; O'Leary et al. 2010) or "multi-teaming" (Matthews et al. 2011). A major driver of the growing prevalence of such work arrangements is the increasing complexity of many team

assignments, especially in knowledge-based organizations (Argote et al. 2003; Bunderson 2003; Dahlin et al. 2005). As the work of many teams becomes more complex, teams increasingly share members in an effort to leverage differentiated skills (Cross et al. 2008; Lindkvist 2004; Rulke and Galaskiewicz 2000). Consequently, overlapping team membership is very common in firms where specialists devote a portion of their time to several projects simultaneously, such as management consulting firms, or in parts of organizations such as R&D units where highly technical skills are required in cross-functional teams. For example, in a study of 425 individuals across multiple industries, approximately 80% of those working on teams reported working on more than one team at a time (O'Leary et al. 2011b). In a sample of over 1200 employees at Intel, more than 60% were members of three or more teams concurrently (Chudoba et al. 2005). And in a study of 83 individuals in an Italian consulting firm, members worked simultaneously on 8.92 project teams (Bertolotti et al. 2013).

Some teams whose members are concurrently members of other teams adopt a "core and periphery" structure, where the core members devote all or most of their time to the focal team while the more peripheral members devote a smaller proportion of their time to several teams simultaneously. For example, in Haas's (2006) survey-based study of 1,021 members of 120 project teams in an international development agency, team leaders were readily able to identify "core" and "noncore" members from lists of names of those who had contributed to the team. In other teams, all the members devote part of their time to the focal team and part of their time to one or more other teams: In their study of time allocation across teams in a multinational conglomerate, for example, Cummings and Haas (2012) found that the 2,055 individual team members in the study spent an average of between 20-40% of their time on the focal team in an average work week, and worked on an average of 5.3 other teams at the same time as the focal team. The result of such multiple team memberships is that each team has a partial claim on an individual's limited time and attention (e.g. Cummings and Haas 2012; Hobday 2000; Zika-Viktorsson et al. 2006).

Team Dispersion

Team dispersion refers to the extent to which members of a team are geographically and/or organizationally dispersed. Team members are geographically dispersed when they are physically located in different sites, cities, or countries; they are organizationally dispersed when they belong to different functional areas, divisions, or business units within an organization, or to different organizations altogether. Teams vary along the dimension of dispersion such that more dispersed teams have members who are distributed across more geographic and organizational areas, whereas less dispersed teams have members who are more geographically and organizationally concentrated.

While traditional views of work teams typically assume that effective teams are – and should be – fairly small in size, often in the range of 5-12 members, scholars have recognized for some time now that many teams are larger (e.g. Hackman 2002). The pull toward larger teams is partly a function of a tendency toward over-inclusiveness for political or administrative reasons, but in recent years, it has been amplified by the increase in cross-border, cross-functional, and cross-organizational teams. For example, one survey of 600 employees of multinationals found that approximately 80% of workers collaborated with colleagues in different geographic locations, with almost 63% reporting that nearly half of their team worked outside their home country (Solomon 2010); another survey by the Economist Intelligence Unit of over 400 managers found similar numbers (78%) worked virtually with people in other locations (Witchalls et al. 2010). Meanwhile, cross-organizational teams are increasingly common, in contexts ranging from strategic alliance teams (e.g. Leung and White 2006) to teams involved in megaprojects (e.g. Edmondson et al. 2015).

The result of the increase in geographic and organizational dispersion within teams is that many teams effectively operate as "multi-team systems" (Mathieu et al. 2001) – collections of sub-teams (or "component teams") that pursue different proximal goals but work together toward a common superordinate goal. Another possible consequence is that teams whose members are geographically or organizationally dispersed may be more likely to splinter into informal subgroups or cliques, along

"faultlines" arising from differences in time zones, languages, or cultures between their members (e.g.

Carton and Cummings 2012; Polzer et al. 2006), or from differences in "thought worlds" in different parts

of the organization (Dougherty 1992a). These resulting barriers between team members can impede

communication and knowledge sharing within the team (e.g. Haas and Cummings 2014).

Implications of the Changing Nature of Team Boundaries

Why does the fluidity, overlap, and dispersion of team membership matter? We argue that the increasing

fluidity, overlap, and dispersion of teams in many organizational settings has substantial implications for

boundary clarity, in the form of increased potential for both individual uncertainty and collective

disagreement about where the team's boundaries lie. The resulting reduced boundary clarity, in turn, has

the potential to undermine two emergent states that are important for team effectiveness: shared identity

and mutual understanding. Additionally, increased team fluidity, overlap, and dispersion can also

undermine shared identity and mutual understanding directly, even if the team's boundaries are

reasonably clear. These arguments are summarized in Figure 1 and developed more fully below.

----- Insert Figure 1 about here -----

Implications of Team Fluidity, Overlap and Dispersion for Boundary Clarity

Boundary clarity is a function of both individual certainty and collective agreement about the team's

membership. Individual uncertainty arises when a team member is unsure about who is and is not a

member of the team, whereas collective disagreement arises when team members have different views on

who is and is not a team member. In recent years, scholars have started to become aware of the

possibilities of both individual uncertainty and collective disagreement about team membership (e.g.

Edmondson et al. 2007; Fiol and O'Connor 2005; Wageman et al. 2012; Wageman and Hackman 2010;

Watson-Manheim et al. 2002), and both have been identified as growing trends (Hackman and Katz 2010).

Individual uncertainty about team boundaries. Each team member holds his or her own

individual mental model (or psychological representation) of who is and who is not a team member. As

Mortensen (2014) pointed out, this mental model may be based on a variety of possible criteria for who

should be considered a team member. An individual may consider the team's membership to be composed of the set of individuals named on an official team roster (a formal criterion); those who are labeled as team members by themselves or by other team members (an identity-based criterion); or those whose patterns of interaction identify them as team members (an interaction-based criterion). Notably, there may be inconsistencies across the set of team members that emerges under each criterion: the official roster may not match the list of those who are labelled as team members, which in turn may not match the network of those who interact most frequently, and so on. Thus, as Alderfer recognized many years ago in distinguishing between concrete and subjective team boundaries, there is considerable room for individual uncertainty about team membership simply as a result of lack of alignment among these different perspectives on the criteria for establishing team membership.

Beyond this, however, increasing team fluidity, overlap, and dispersion further increases the potential for individual uncertainty about who is and is not a team member. Mental models are strengthened and reinforced over time (see Mohammed et al. 2010 for a review). Accordingly, stable team boundaries make the team's membership increasingly obvious over time. But when teams are fluid, an individual team member has to be sure to update his or her mental model of the team's membership every time someone enters or leaves the team, if it is to remain current. Such mental updating takes time and effort (Rentsch and Hall 1994; Rentsch and Klimoski 2001), and existing team members may sometimes fail to invest the necessary time and effort, especially if the team's membership is changing frequently. Consistent with this, work on "dynamic teaming" (Matthews et al. 2012) finds that membership change makes it more difficult for members to hold a cohesive picture of their team. Meanwhile, new team members are often thrown into the deep end of the team's work and left to figure out for themselves who is who, rather than being carefully introduced to all the members of the teams they join. As a result, members of a team with fluid boundaries may find themselves uncertain about who the current members of their team actually are at any given point in time.

Additionally, when teams overlap such that members simultaneously belong to other teams, those members will have more competing demands on their attention (Cummings and Haas 2012). These competing demands may distract them from paying enough attention to ensure that they are clear about the membership of the focal team. Concurrently being on multiple partially overlapping teams can also be a source of confusion because team members are uncertain as to which boundaries are relevant for which teams (Bresnen et al. 2004). Thus, the more other teams a member works on simultaneously, and the lower the proportion of their time assigned to the focal team, the less likely they are to be clear about who all the members of that focal team are.

Increasing team dispersion likewise increases the potential for individual uncertainty about team membership. Keeping track of everyone on the team can become increasingly difficult when teams are more dispersed, as it is likely that a more geographically or organizationally dispersed team will divide up into subgroups where each individual tends to interact primarily with a small subset of the other team members (Desportes and Lemaine 1988; Levine and Moreland 1998). Because team members interact primarily with those within their own subgroups, their knowledge of the team's complete membership may be shaky. Even if they make an effort to communicate electronically, team members in different locations have fewer opportunities to interact face-to-face, which makes it harder for them to get to know each other (Hinds and Mortensen 2005). They may also be more likely to view their distant colleagues more abstractly, resulting in stereotyping and making them harder to distinguish from each other (Wilson et al. 2013). Thus, individuals may be uncertain about who is and is not a member of their team as a result of the physical, social and psychological distance created by increased dispersion.

 Not only can increased team fluidity, overlap, and dispersion all independently increase individual uncertainty about team membership, but they can also interact with each other to create further uncertainty. For example, there is a compound effect of overlap and fluidity, such that individuals who belong to other teams simultaneously are less likely to expend additional time and effort updating their team membership models when the members of that focal team change as individuals enter and leave the

team. There is a compound effect of dispersion and fluidity, such that it will be even harder for members of teams with more dispersed members to be fully aware of who all the other members of their team are when those other members of their team are changing more frequently. And there is a compound effect of overlap and dispersion, such that team members who work on more other teams simultaneously are less likely to be able and willing to devote the greater time and effort required to ensure that they know who all the members of a focal team are when that team includes members who are more geographically or organizationally dispersed.

Collective disagreement about team boundaries. Even if individual team members feel reasonably certain in their own minds about who is and is not a team member, they may disagree with each other on the team's membership. In a study of 24 product development teams in five organizations, for example, Mortensen and Hinds (2002) found that teams frequently did not agree upon their membership, with up to 25% of a team's membership disagreed upon at any point in time. Building on this, Mortensen developed the concept of "membership model divergence", defined as "misalignment among team members' models of who are - and who are not - team members" (2014, p. 911). Such misalignment can arise because individual team members are relying on different underlying assumptions about how to define their team; that is, members may vary in whether they view the team's membership as defined by formal, identity-based, or interaction-based criteria. While one individual views team membership as defined by the official roster, for example, another may view team membership as defined by identification with the team, and another may view team membership as defined by interaction patterns. Even if they utilize the same underlying assumptions for how team membership should be defined, however, individuals may still disagree on the membership of their team because of the lack of clarity created by increasing team fluidity, overlap, and dispersion.

When individuals belong to teams with more fluid membership, they may hold different mental models of the team's membership because they are assessing the team's composition based on different criteria – in this case, different points in time (Mortensen 2014). Individuals form mental models as a

result of their experiences (for a review, see: Mohammed et al. 2010), but in teams with fluid boundaries, those experiences are not the same. One longstanding member may be thinking about the team's membership prior to a recent membership change, for example, while another longstanding member may have taken that change into account. New team members may have a different picture of the team's membership than established members because they have not yet been fully exposed to everyone on the team – or because they have been more fully briefed on its current membership than some established team members who have not been made fully aware of recent changes.

Similarly, when individual members belong to other teams simultaneously, they may be more likely to disagree with each other about the membership of a focal team because they spend less time with that team and therefore are less well informed about that team's membership. This is consistent with Van den Bulte and Moenart (1998)'s findings that information flow was strongly shaped by the subgroups with whom team members interacted most, in that case due to geography. Additionally, individual members may be less likely to hold converging models of the team's membership because they have spent less time together developing a joint understanding of the team. For example, in his analysis of 38 product development teams in a multinational software company, Mortensen (2014) found evidence that belonging to more teams simultaneously was associated with members dedicating less time to the focal team, which in turn was associated with increased membership model divergence among them.

Lastly, when individual members belong to teams that have more geographically or organizationally dispersed members, they may be more likely to disagree with each other because their views of the team are partial rather than complete as a result of subgroup-based myopia. That is, because they interact primarily with a subgroup of the team's membership, their understanding of the team's entire membership may be inaccurate. Moreover, the inaccurate view of a team member from one subgroup is likely to be different from the inaccurate view of a team member from a different subgroup, given their different vantage points. Thus, for example, the members of a global team that spans Brazil, France, and China may disagree with each other because the Brazilian members interact primarily with the French,

and have only a hazy sense of who the Chinese members are, and the Chinese members have a similarly hazy sense of who the Brazilian members are, while the French have a more accurate sense of who the Brazilian and Chinese members are. Situations like this echo the findings of Mortensen and Hinds (2002) who found that geographic distribution increased disagreement over team boundaries, and Mortensen (2014) who found that a larger team size reduced the mean level of interaction in the team and increased the variance in patterns of interaction, which again led to increased membership model divergence.

As with individual uncertainty, collective disagreement about team membership is likely to be greater when teams are both fluid and overlapping, fluid and dispersed, overlapping and dispersed, or all three. For example, the members of the Brazilian subgroup above are even more likely to disagree with the members of the Chinese subgroup about who is on the team if their understanding of the Chinese membership is even less clear because those team members change more often, or devote less of their time to the focal team because they are working on other teams simultaneously. And at the same time, if the members of the Chinese subgroup change more often, or devote less time to the focal team, they will have an even less clear understanding of the Brazilian membership in return. Thus, there is increased potential for membership model divergence as a result of increased inaccuracies in both the Chinese' views of the Brazilians and the Brazilians' views of the Chinese.

We have argued so far that increased team fluidity, overlap and dispersion can result in reduced boundary clarity, as manifested in both individual uncertainty and collective disagreement about team membership. Next, we propose that reduced boundary clarity matters because it can undermine two emergent states that are important for team effectiveness: shared identity and mutual understanding. Moreover, increased team fluidity, overlap and dispersion can undermine shared identity and mutual understanding not only via their effects on boundary clarity, but also directly.

Implications of Team Fluidity, Overlap, and Dispersion for Shared Identity

Shared identity refers to the extent to which the members of a team hold the same identity, or sense of who they are. A substantial body of research on social identity theory posits that individuals use

social categories (for example, "teammate") to simplify and make sense of their environment (for a review see Hogg and Terry 2000). A category is constructed based on an individual's sense of its prototypical member, representing the "central tendency" of category members (Medin et al. 1984). That category is then subsequently used in the creation of that individual's own identity, and shapes individuals' perceptions of, and attitudes towards, those categorized as "ingroup" versus "outgroup" members (Tajfel and Turner 1986). Within a team, a strong sense of shared identity can reduce conflict and (Hinds and Mortensen 2005), encourage the internalization of team values, norms, and roles (Ashforth and Mael 1989), and increase group cohesion (Reynolds et al. 2003), support (Wiesenfeld et al. 1999), effort (Shapiro et al. 2002), rapport and consensus building (Moore et al. 1999), and learning (van der Vegt and Bunderson 2005), ultimately improving team performance (Bezrukova et al. 2009). Increased team fluidity, overlap, and dispersion can undermine the emergence and maintenance of a shared identity, however, both through their effects on boundary clarity as well as more directly.

First, increased fluidity, overlap, and dispersion can undermine shared identity through their effects on boundary clarity. When individual team members are uncertain about the membership of their team, it is more difficult for them to confidently construct a clear mental prototype of what a "team member" is. The less clear that prototype, in turn, the less strongly they will identify with the team. Lack of boundary clarity also reduces the vividness and therefore the salience of the team as a social category, an important driver of identity strength (Hogg and Turner 1987). Additionally, prototypes are highly contextual, based on and maintained by features of the immediate context (Fiske and Taylor 2008), and group members' interactions with other group members thus shape their interpretation of what group membership entails (Postmes et al. 2005a; Postmes et al. 2005b). To the extent that lack of boundary clarity arises from disagreement across team members, it can lead to misaligned reference groups (Lawrence 2006) and thus divergent prototypes, introducing the potential for identity conflict and further impeding the development of a strong shared identity (Mortensen 2014). Moreover, lack of boundary clarity also reduces a team's sense of entitativity, where "entativity" refers to the degree to which a group

of individuals is perceived as being bonded together in a coherent unit (Hamilton et al. 1998; Lickel et al. 2001; Lickel et al. 2000). Entitativity is an important shaper of a shared sense of identity as it ensures that a team is readily distinguishable from other teams and the rest of the organization (Castano et al. 2002; Lickel et al. 2000).

Second, increased fluidity, overlap, and dispersion can also undermine shared identity directly. Individuals construct their identities in part through narrative rationalization of their experiences (Ibarra 1999; Ibarra and Barbulescu 2010), but to the degree that team members' experiences vary – due to different entry and exit times, different demands from other teams, or different experiences within the focal team – they will be more likely to hold an independent, isolated self-images, thereby weakening their identification. Team fluidity means that membership is constantly changing, which means in turn that a sense of shared identity must be constantly rebuilt; every time a member leaves or a new member joins the team, the each team member's definition of the prototypical team member must be reassessed (Fiske and Taylor 2008). Furthermore, as members enter and exit at different times, they reduce the amount of time others have to learn about each other and to reinforce and strengthen the identities they have constructed. Thus, changes in team membership weaken the strength and increase the variance of identification, even in teams in which membership is clear. Team overlap means that members have competing demands not only on their attention but also on their loyalties. This provides a source for identity conflict and confusion (Ashforth and Johnson 2001) by increasing the salience of multiple, misaligned identities and providing potentially attractive alternative targets for their identification. To the extent that they spend more time on other teams, or time on more other teams, these team members may be more likely to identify with those other teams rather than with the focal team. And team dispersion means that a shared identity must be forged among a set of individuals who are more geographically or organizationally distributed and diverse. Teams are more likely to forge strong shared identities when they are smaller or more homogeneous, in part because being linked to widely variant external contexts decreases the likelihood of a single prototypical identity matching all team members (Jetten et al. 1997,

1998) When team members have less in common, they are likely to find it more difficult and be less motivated to view themselves as "we" rather than "us and them". Additionally, as groups get larger, their relative salience decreases (Mullen 1991), which has been shown to affect strength of identification (Shih et al. 1999).

Taken together, the implication is that as teams become more fluid, more overlapping, and more dispersed, team members are likely to identify less strongly with the team, both because greater fluidity, overlap, and dispersion reduces boundary clarity, which in turn reduces shared identity, and also because greater fluidity, overlap, and dispersion can reduce shared identity directly.

Implications of Team Fluidity, Overlap, and Dispersion for Mutual Understanding

Mutual understanding refers to the extent to which team members have a commonly held view of their team's expertise, task, and context. Such shared mental representations can benefit teams by reducing coordination costs (DeChurch and Mesmer-Magnus 2010; Klimoski and Mohammed 1994; Kraut et al. 2002; Mohammed et al. 2010) and intra-team conflict (Jehn 1997), while facilitating the storage and retrieval of information (Lewis and Herndon 2011). With respect to mutual understanding about the team's expertise, for example, researchers have shown that a key contributor to effective coordination is an understanding of "who knows what" (Fussell and Krauss 1992). This is highlighted in the growing body of research on "transactive memory systems" (TMS) – a division of labor for the encoding, storage, and recall of information that is understood and shared by all the team members (Wegner 1987). As a team's members develop a mutual understanding of where particular expertise lies within the team, they become increasingly specialized in the information they both hold and attend to (Hollingshead 2001) and consequently more efficient at information storage, access, and retrieval. An effective TMS is characterized by specialization, coordination, and credibility (Lewis 2003; Liang et al. 1995), and can lead to improved coordination of activities (Jarvenpaa and Majchrzak 2008) and ultimately to better performance (Jeong-Yeon et al. 2014; Moreland and Myaskovsky 2000). With respect to mutual understanding about the team's task, similarly, researchers have shown that greater similarity in

mental models of the task can increase collective sensemaking abilities (Hill and Levenhagen 1995) and improve decision-quality (Cannon-Bowers et al. 1993), resulting in better team performance (Lim and Klein 2006). Conversely, a lack of mutual understanding about the team's task, including who is responsible for specific sub-tasks, predicts team breakdowns (Foushee 1984; Wilson et al. 2007) and task conflict is more common when team members hold different understandings of the work being done (Jehn 1997) And with respect to mutual understanding about the team's context, research on geographically distributed teams in particular has shown not only that lack of a shared context increases the difficulty of making and interpreting references to physical objects (Schober 1998), but also that in the absence of a shared understanding about each other's context, team members have difficulty establishing common behavioral norms (Hinds and Bailey 2003) and communicating effectively (Cramton 2001), often resulting in increased conflict within the team (Hinds and Mortensen 2005).

Increased team fluidity, overlap and dispersion can impede the development and maintenance of mutual understanding through their effects on boundary clarity. When individual team members are uncertain about the membership of their team, their ability to create and maintain an accurate individual mental model of the team's expertise, task, and context is reduced, as they are not clear about whose expertise, task, and context should be taken into account (Mortensen 2014). Absent an accurate mental model of the team, individuals may find it difficult to coordinate the encoding of new information or the retrieval of information already held in the team – for example due to uncertainty about who is the most knowledgeable person in the team about a particular topic, or whether a recognized expert can be trusted with the team's proprietary information. This, in turn affects the team's ability to make good decisions, establish common norms, communicate effectively, and avoid breakdowns. Similarly, to the extent that lack of boundary clarity arises from disagreement across team members as to where team boundaries lie, members of the team may include different information in their mental models, reducing the extent to which they are shared. For example, when two teammates disagree on whether a third individual is or is not a team member, that individual's expertise will be included as part of the shared team repertoire for

one but not for the other, leading to a different overall model of the team's knowledge and potentially its capabilities. Ultimately, each team member's behavior will reflect his or her model of the team – resulting in actions that other team members have difficulty interpreting through the lens of their own model of the team. The resulting unpredictable behavior can drive reduced trust (for a discussion see: Mayer et al. 1995). This underlies the negative relationship between membership model divergence and performance, mediated by transactive memory system effectiveness (Mortensen 2014).

While team fluidity, overlap and dispersion thus can reduce mutual understanding as a result of their effects on boundary clarity, they can also reduce mutual understanding directly. Multiple studies have shown that effective creation of shared cognitive models requires time together in a group (Liang et al. 1995; Moreland and Myaskovsky 2000). The less time a team has had working together, the less likely it is that the members are able to establish a shared understanding of their team's knowledge and abilities (Moreland, 1999). That team's understanding must be repeatedly reconstructed as old members exit and new members enter the team. The information that is uniquely held by old members must be noted, made explicit rather than left implicit, and ideally codified in transferable form if it is to be retained in the team once they leave, and the information that is uniquely held by new members must be actively elicited when they join. Without deliberate efforts to retain and elicit such uniquely held information, the team is increasingly likely to fall prey to a "common knowledge effect", whereby members tend to raise and discuss information that is shared by the other members rather than their uniquely held information (Larson et al. 1994). This can create a false sense of mutual understanding that leaves potentially valuable ideas and insights unrecognized in the team. When teams have overlapping boundaries, members must concurrently manage the formation of multiple partially-overlapping mental models, increasing the likelihood they experience cognitive overload as a result of the need to manage across and develop mutual understandings with multiple teams simultaneously (Zika-Viktorsson et al. 2006). In addition, members have less time to dedicate to any one focal team, leaving them less able to invest the requisite effort to ensure that they develop a strong understanding of the team's expertise, task, and context. Finally, when

teams are more dispersed, the members experience higher barriers to mutual understanding because as their geographic and organizational dispersion increases, there is less "common ground", both physical and psychological, in the team (Clark and Brennan 1991). That is, the greater dispersion of the team means that its members have to cover a larger and more varied terrain in order to understand each other's diverse knowledge, views, and contexts. Having to bridge more significant physical distances and cognitive gaps between thought worlds makes it more difficult to ensure that information is shared across the team, and that it is understood when it is shared (e.g. Dougherty 1992b; Dougherty and Dunne 2012).

Discussion

The increasing fluidity, overlap and dispersion of many teams' membership suggest that new ways of studying and theorizing about teams are needed. By describing how the changing nature of team membership affect the clarity of team boundaries as well as the emergence of shared identity and mutual understanding in the team, we advance a perspective that illuminates promising directions for future research. In this section, we highlight the implications of rethinking team boundaries for how we conceptualize teams, how we develop theoretical insight into how they work, and how we conduct empirical research in this domain.

Conceptualizing Teams: From Clearly Bounded to Tightly versus Loosely Bounded

As described earlier, the classic conceptualization of a team holds that – by definition – a team is a clearly bounded system, with a membership that is known and agreed upon by both insiders and outsiders (e.g. Alderfer 1977a; Hackman 1987). Despite the long history and continuing prevalence of this definition in academic research on teams, as summarized in our literature review, it is becoming increasingly apparent that many task-performing units that are appropriately called "teams" do not actually meet this definition. In reality, many teams today are fluid rather than stable, overlapping rather than separate, and dispersed rather than concentrated both geographically and organizationally – and accordingly, there is often individual uncertainty and collective disagreement rather than clarity about their membership. This

growing disconnect between our predominant scholarly definition of a team and the reality of many teams today suggests that our definition needs revisiting.

In light of this, we propose that teams should no longer be conceptualized as clearly bounded by definition. Instead, teams should be conceptualized as falling along a spectrum from "tightly bounded" to "loosely bounded." To the extent that a team's membership is more fluid, overlapping, and dispersed, it is more loosely bounded; to the extent that a team's membership is more stable, separate, and concentrated, it is more tightly bounded. This approach is consistent with recent work suggesting that teams can be characterized empirically in terms of where they fall on a dimensional scale that captures key team attributes (Hollenbeck et al. 2012), but it focuses on attributes that are particularly relevant for the changing nature of work in today's organizations. An important corollary of this shift in the conceptualization of a team is that it is likely that where a team falls on the spectrum from tightly to loosely bounded will depend substantially on its task. To the extent that the task itself is more dynamic, distributed, and project-driven, the membership of the team is likely to be more fluid, more overlapping, and dispersed, and thus more loosely bounded.

Theoretical Directions for Future Research

Conceptualizing teams as tightly versus loosely bounded rather than as clearly bounded by definition raises important questions about our existing theories of teams, as well as opening up promising new directions for scholarly research. Scholars have already begun to explore some of these avenues in the studies on team fluidity, overlap, and dispersion already discussed, but many questions still remain to be explored.

Boundary conditions on existing theories. One set of questions relates to the need to recognize that existing theories may need to be modified to recognize the boundary conditions created by the assumption that teams are clearly bounded entities. For example, consider theories of identification in loosely bounded teams. When a team has clear boundaries, identification will be driven by the same underlying factors that have been extensively studied in the past, such as observation of ingroup members

or group norms (e.g. Ashforth and Kreiner 1999; Postmes et al. 2005b). But when teams are loosely rather than tightly bounded because they are fluid, overlapping, or dispersed, the effects and strength of those underlying factors will be constrained by the team's boundedness and the extent to which it is perceivable as a cohesive, "entitative" unit (Castano et al. 2002; Sherman et al. 1999). Consequently, phenomena like subgroup faultlines (e.g. Bezrukova et al. 2009; Jehn and Bezrukova 2010) may be more likely to emerge – but they may be based on different criteria than those that have received most attention in research to date, such as demographic characteristics (e.g. Lau and Murnighan 2005); instead, in teams with fluid, overlapping or dispersed membership, subgroups may emerge around the criteria of old timers versus newcomers, core versus peripheral members, or local versus distant members (e.g. Mansour-Cole 2001; Webster and Wong 2008).

Similarly, consider theories of transactive memory systems in loosely bounded teams. Research on transactive memory originated with studies of the ultimate clearly-bounded group: couples (Wegner et al. 1985). Subsequent research on TMS in teams has assumed that the membership of those teams remains clear and agreed upon. Such research has identified three clear pre-requisites for effective TMS: specialization, credibility, and coordination (e.g. Lewis 2003). What remains unclear, however, is whether and how these three conditions can be established in teams that are loosely bounded. Specialization requires that members of a TMS have differentiated domains of knowledge expertise; credibility requires that members of the system trust in the accuracy and completeness of the knowledge of others; and coordination requires that members know where within the system any required piece of knowledge lies. When a team's members are changing, overlapping, or widely dispersed, however, it can become difficult to ensure there is clear differentiation in team member knowledge, and members may lack the time required to establish the trust needed for credibility or to learn enough about one another to establish effective coordination. Taking these concerns together suggests that prior findings as to the drivers and consequences of TMS may not apply well to teams that are loosely bounded. We may, therefore, have to

limit our application of prior TMS research to those teams that are tightly bounded – and explore new avenues of research or constructs for conceptualizing TMS in loosely-bounded teams.

Extending current theories. Another set of questions that arise when teams are conceptualized as tightly versus loosely bounded relates to the opportunity to revise and extend our existing theories and research to address the changes generated by the changing nature of teams. For example, returning to our discussion of TMS, while tightly bounded teams can facilitate the development of effective transactive memory systems among their fixed sets of members, transactive memory systems in loosely bounded teams may be understood as the product of processes and knowledge sources both inside the team and in its broader context. Thus, a TMS shifts from a single-level to a multi-level phenomenon, where there may be both positive and negative cross-level effects of states and processes at each level. Recognizing such possibilities, some researchers have recently begun to explore the relationship between team-level transactive memory systems and the team's context (e.g. Mell et al. 2014), but much work remains to be done (for a review, see: Lewis and Herndon 2011). And many new questions remain to be explored, such as how team members can incorporate extra-team resources into their TMS, or how a TMS can be effectively established when the membership of a team is uncertain.

Another area that could benefit from revisiting in light of rethinking team boundaries as we have proposed is the extensive literature on team boundary spanning. This literature has greatly advanced research on teams by drawing attention to the importance of the interactions of team members with others outside the team (e.g. Aldrich and Herker 1977; Ancona and Caldwell 1992a, b; Tushman and Scanlan 1981a, b), but the underlying assumption that the boundary of the team itself is clear. If instead we recognize that a team's boundary may be fuzzy, the concept of "boundary spanning" starts to seem outdated and in need of revisiting. When teams are fluid, overlapping, and dispersed, we may need to reconceptualize the work of their members not as spanning a clear boundary but instead as continually generating and integrating inputs such as information from sources both "internal" to the team and "external" to the team, in ways that are much more seamless and multi-directional than theorizing about

26

boundary spanning typically assumes. Some recent approaches to studying teams have made some progress in this direction by emphasizing the importance of interaction patterns for understanding teams. For example, social network researchers have suggested that teams can be viewed as networks of actors (e.g. Murase et al. 2012), and that this approach can allows scholars to leverage established techniques for identifying clusters or cliques that can facilitate the identification of groups "from the bottom up" (for a review see Carton and Cummings 2012). Others have suggested viewing teams as adaptive systems driven by intra-group and group-context interactions, and using computational modeling to assess and understand them (e.g. Arrow et al. 2000). Such approaches can offer valuable methods for identifying teams whose membership is fluid, overlapping, and dispersed, but it is important to note that they still implicitly require the existence of a common task, to avoid mistaking "coacting groups" (such as a row of five spectators interacting at a baseball game) for teams that have a collective task to perform (for a discussion, see: Hackman and Katz 2010).

Catalyzing the development of new theories. Another promising set of opportunities that opens up when we recognize that teams are increasingly loosely rather than tightly bounded lies in the need to better understand the positive aspects of organizing work in loosely bounded teams. In this paper we have focused on explaining how increasing team fluidity, overlap, and dispersion can undermine boundary clarity, shared identity, and mutual understanding. But of course, we do not mean to suggest or imply that these changes in the nature of team membership are always or necessarily negative in their effects. In fact, organizations are making clear choices to utilize teams that are loosely rather than tightly bounded because they view such teams as offering important benefits. There are enticing opportunities here for organizational scholars to develop theoretical insight into what these benefits might be, and to empirically test whether, to what extent, and under what conditions such benefits can actually be realized in organizations. For example, one possible benefit is flexible knowledge utilization; another is efficient resource allocation. Some questions that could be addressed to help develop greater insight into the potential value of these benefits include: Do teams with fluid membership facilitate the timely

deployment of expertise and avoid inefficient allocation of valuable human resources to a project when they are not needed, and how can such teams minimize delays in accessing necessary expertise and loss of valuable knowledge when members leave? Do teams with overlapping membership enable specialists to contribute to multiple teams simultaneously and transfer learning across them, and how can these teams ensure that they get the attention they need from members with multiple assignments? Are teams with dispersed members able to be more responsive to conditions and opportunities in different locations, or to access and integrate knowledge from different parts of the organization, and how can these teams overcome the barriers to their effectiveness that arise from their dispersion? Does being loosely bounded promote the recombination of information across and within teams in novel ways that increase team-level creativity or innovation?

Finally, while the increasing fluidity, overlap, and dispersion of teams have important implications at the group level, such as their effects on shared identity and mutual understanding, they are also likely to affect both the experience and the conduct of work at the individual level, opening up additional new directions for theorizing and research. For instance, when teams are more fluid, their members may be less likely to build individual commitment to the group, since they have fewer opportunities to receive the social support and interaction required to build that commitment (e.g. Bishop et al. 2000). When teams are more overlapping, their members may be more likely to experience overload and burnout due to the competing demands on their attention (e.g. Zika-Viktorsson et al. 2006). And when teams are more dispersed, their members may feel isolated (Finholt and Sproull 1990), and be less likely to speak up about problems or engage in prosocial behaviors that can assist others or contribute to group cohesion.

Conceptualizing teams as tightly versus loosely bounded thus has substantial implications for the theoretical questions we choose to engage and address as well as for the theories we develop to address them. Moreover, recognizing the increasing fluidity, overlap, and dispersion of team membership also requires that researchers reconsider their traditional empirical methods for studying teams.

Empirical Considerations for Future Research

In teams characterized by fluidity, the membership of a team varies over its life cycle, such that it depends on the point in time at which the team's boundary is assessed. However, with the exception of a small number of studies that explicitly examine the implications of membership change as their central phenomenon, either experimentally (e.g. Choi and Thompson 2005; Kane 2007; Kane et al. 2005; Lewis et al. 2007) or in the field (e.g. Chandler et al. 2005), our current research methodologies for studying teams rarely address the possibility of changing team boundaries. Typically, experimental studies of team dynamics constrain the possibility of ambiguity in team boundaries by design, with most experimental studies relying on stable sets of people working together on a task in a laboratory. Likewise, data collection instruments in many field studies are typically designed to eliminate any ambiguity in team membership, for example by providing respondents with a list of members and asking them to respond with respect to that list (e.g. Ancona and Caldwell 1992a; Ancona and Caldwell 1992b).

The problems with assuming team stability are most clearly visible in longitudinal studies, since team fluidity raises the question of whether the relevant set of team members under study at time *n* are in fact the same as that considered at time *n+1*. In correlational studies, the frequent use of questions that refer to a team by name without time-bounding the period over which the phenomenon is assessed run the risk that the data being compared are in fact measuring different sets of individuals. Even if membership does not change during data collection itself, assuming that all members respond with reference to the same set of actors may be incorrect when data collection does not explicitly delineate a reference time period. Even qualifiers such as "current" leave room for interpretation, which may yield differing reference points when teams have fluid boundaries. The consequence is that researchers may be relying on inaccurate empirical measures and overlooking unobserved heterogeneity in team membership when modeling the relationships between team inputs, processes, and outcomes.

Likewise, an important implication of team overlap is that membership is not exclusive, since individuals serve on multiple teams simultaneously, necessitating that teams be treated as interdependent

rather than independent units. Yet most current studies overlook this reality of much contemporary teamwork, and assume that teams operate essentially in isolation from one another, rather than taking into account how they share key resources such as team members (for exceptions, see the recent lab and field studies explicitly testing the theoretical models put forth by O'Leary and colleagues, (e.g. Bertolotti et al. 2013; Woolley et al. 2013). Furthermore, when team members devote only a small proportion of their time to a focal team, it can be difficult to decide whether or not they should be included in the formal roster of team members. If they are included and treated like full team members, with their attitudes and behaviors given the same weight in research studies, they may be given disproportionate representation relative to their contributions to the team. If they are excluded, on the other hand, key contributors may be overlooked entirely in analyzing the team's inputs, processes, and outputs.

Additionally, changes in team dispersion have implications for researchers that include the importance of accurately understanding the distribution, diversity, and size of a team at any given point in time. A substantial part of the challenge here lies in the need to consider and address the possible existence of sub-team structures when examining larger teams. Is the team under scrutiny a simple autonomous entity? A component team within a multi-team system? Or a complete multi-team system? This is critical not only to ensure accurate and informative identification of team members, but also because recent scholarship suggests that researchers should pay careful attention to the faultlines that may divide the members of teams that span geographic, cultural, demographic or other forms of distance (e.g. Cummings and O'Leary 2002; Gibson and Gibbs 2006), as well as to the configuration of members in different locations (O'Leary and Mortensen 2010; Polzer et al. 2006).

Going forward, such concerns about the empirical implications of team fluidity, overlap, and dispersion should lead scholars to more consistently consider and explicitly address the possibility of changes in team membership, multiple team membership, and membership dispersion in their studies of teams, in order to improve their data collection processes and strengthen the internal and external validity of their research. Furthermore, statistical tools such as the intra-class correlation (ICC) and within-group

reliability *(r_{wg})* statistics are widely used in studies of teams to justify the aggregation of data to the team level, yet both measures require a defined group over which to assess agreement, posing problems for loosely bounded teams. In cases of greater team fluidity, overlap, and dispersion, it may be unclear whose ratings must be compared to calculate ICC or r_{wg} statistics. In addition, individual uncertainty or collective disagreement about team boundaries may result in overly weak ICC or r_{wg} statistics due to divergent mental models of the team's membership. Both cases suggest that such statistics must be used with considerable care if they are to be valuable for research on teams with boundaries that are fluid, overlapping, or broad in scope. Finally, recognizing that teams are increasingly fluid, overlapping, and dispersed may require more sophisticated forms of analytic modelling, such as models that take temporality into account and multi-level models that can incorporate individual, subgroup, team, and environmental variables simultaneously (Klein et al. 1999; Klein et al. 1994).

Conclusion

As teams become more fluid, more overlapping and more dispersed, our traditional conceptualization of teams as clearly bounded systems is increasingly challenged. To reduce the disconnect between our theoretical and empirical approaches to studying teams and the phenomenon they are intended to address, we must recognize that today's teams vary along a spectrum from tightly bounded to loosely bounded. Where teams lie along this spectrum has implications for emergent states such as shared identity and mutual understanding, and also raises a wealth of new questions for future theoretical and empirical consideration. These include the extent to which our current insights about teams depend on underlying assumptions about boundedness, how increasing team fluidity, overlap, and dispersion affects processes and outcomes at both the group and individual level, and whether our typical approaches to data collection and analysis rely on inaccurate assumptions or artificially induced constraints. Engaging with such questions provides a critical and compelling research agenda for scholars concerned with understanding how today's – and tomorrow's – teams function, and how they can function more effectively.

Figure 1. Implications of the Changing Nature of Team Boundaries
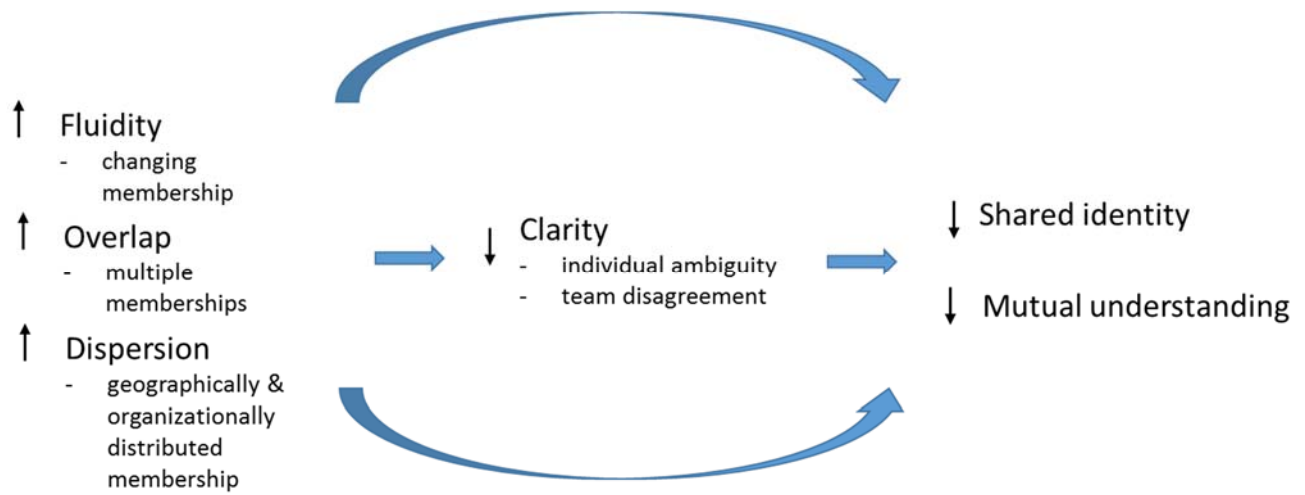
References

Alderfer, C.P. 1976a. Boundary relations and organizational diagnosis. H. Meltzer, F. Wickert, eds. *Humanizing organizational behavior*. Charles C Thomas, Springfield, IL, 109-133.

Alderfer, C.P. 1976b. Change processes in organizations. M. Dunnette, ed. *Handbook of industrial and organizational psychology*. Rand McNally, Chicago, 1591-1638.

Alderfer, C.P. 1977a. Group and intergroup relations. J.R. Hackman, J.L. Suttle, eds. *Improving the quality of work life*. Goodyear, Santa Monica, CA, 227-296.

Alderfer, C.P. 1977b. Organization development. *Annual Rev. of Psych.* **28** 197-223.

Alderfer, C.P. 1980. Consulting to underbounded systems. *Advances in experiential social processes* **2** 267-295.

Aldrich, H.E., D. Herker. 1977. Boundary spanning roles and organization structure. *Acad. of Management Rev.* **2**(2) 217-230.

Ancona, D.G. 1990. Outward bound: Strategies for team survival in an organization. *Acad. of Management J.* **33**(2) 334-365.

Ancona, D.G., D.F. Caldwell. 1992a. Bridging the boundary: External activity and performance in organizational teams. *Admin. Sci. Quart.* **37**(4) 634-661.

Ancona, D.G., D.F. Caldwell. 1992b. Demography and design: Predictors of new product team performance. *Organ. Sci.* **3**(3) 321-341.

Argote, L., B. McEvily, R. Reagans. 2003. Managing knowledge in organizations: An integrative framework and review of emerging themes. *Management Sci.* **49**(4) 571-582.

Arrow, H.A., J.E. McGrath, J.L. Berdahl. 2000. *Small groups as complex systems: Formation, coordination, development and adaptation*. Sage Publications, Thousand Oaks, CA.

Ashforth, B.E., S.A. Johnson. 2001. Which hat to wear? The relative salience of multiple identities in organizational contexts. M.A. Hogg, D.J. Terry, eds. *Social identity processes in organizational contexts*. Psychology Press, Philadelphia, PA, 31-48.

Ashforth, B.E., G.E. Kreiner. 1999. "How can you do it?" Dirty work and the challenge of constructing a positive identity. *Acad. of Management Rev.* **24**(3) 413-434.

Ashforth, B.E., G.E. Kreiner, M. Fugate. 2000. All in a day's work: Boundaries and micro role transitions. *Acad. of Management Rev.* **25**(3) 472.

Ashforth, B.E., F. Mael. 1989. Social identity theory and the organization. *Acad. of Management Rev.* **14**(1) 20.

Barley, S.R., G. Kunda. 2004. *Gurus, hired guns and warm bodies: Itinerant experts in a knowledge economy*. Princeton University Press, Princeton, NJ.

Bechky, B.A. 2002. Coordination and role enactment in film production. *Academy of Management Proceedings & Membership Directory* 6p.

Bechky, B.A. 2006. Gaffers, gofers, and grips: Role-based coordination in temporary organizations. *Organ. Sci.* **17**(1) 3-21.

Belous, R. 1989. How human resource systems adjust to the shift toward contingent workers. *Monthly Labor Review* **112**(3).

Bertolotti, F., E. Mattarelli, M. Mortensen, M. O'Leary, V. Incerti. 2013. How many teams should we manage at once? The effect of multiple team membership, collaborative technologies, and polychronicity on team performance *International Conference on Information Systems*. Association for Information Systems, Milan, Italy.

Bezrukova, K., K.A. Jehn, E.L. Zanutto, S.M.B. Thatcher. 2009. Do workgroup faultlines help or hurt? A moderated model of faultlines, team identification, and group performance. *Organ. Sci.* **20**(1) 35.

Bishop, J.W., K.D. Scott, S.M. Burroughs. 2000. Support, commitment, and employee outcomes in a team environment. *J. of Management* **26**(6) 1113-1132.

Bresnen, M., A. Goussevskaia, J. Swan. 2004. Embedding new management knowledge in project-based organizations. *Organ. Stud.* **25**(9) 1535-1555.

Brown, J.S., P. Duguid. 2001. Knowledge and organization: A social-practice perspective. *Organ. Sci.* **12**(2) 198-213.

Bunderson, J.S. 2003. Recognizing and utilizing expertise in work groups: A status characteristics perspective. *Admin. Sci. Quart.* **48**(4) 557-591.

Cannon-Bowers, J.A., E. Salas, S.A. Converse. 1993. Shared mental models in expert decision-making teams. N.J.J. Castellan, ed. *Current issues in individual and group decision making*. Erlbaum, Hillsdale, NJ, 221-246.

Carlile, P.R. 2002. A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organ. Sci.* 442-455.

Carlile, P.R. 2004. Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. *Organ. Sci.* **15**(5) 555-568.

Carton, A.M., J.N. Cummings. 2012. A theory of subgroups in work teams. *Acad. of Management Rev.* **37**(3) 441-470.

Castano, E., V. Yzerbyt, M.P. Paladino, S. Sacchi. 2002. I belong, therefore i exist: Ingroup identification, ingroup entitativity, and ingroup bias. *Person. and Soc. Psych. Bul.* **28**(2) 135-143.

Chandler, G.N., B. Honig, J. Wiklund. 2005. Antecedents, moderators, and performance consequences of membership change in new venture teams. *Journal of Business Venturing* **20**(5) 705-725.

Choi, H.-S., L. Thompson. 2005. Old wine in a new bottle: Impact of membership change on group creativity. *Organizational Behavior and Human Decision Processes* **98**(2) 121-132.

Chudoba, K.M., E. Wynn, M. Lu, M.B. Watson-Manheim. 2005. How virtual are we? Measuring virtuality and understanding its impact in a global organization. *Inform. Systems J.* **15**(4) 279-306.

Clark, H.H., S.E. Brennan. 1991. Grounding in communication. L.B. Resnick, J.M. Levine, S.D. Teasley, eds. *Persoectives on Socially Shared Cognition*. American Psychological Association, Washington DC, 127–149.

Cohen, S.G., D.E. Bailey. 1997. What makes teams work: Group effectiveness research from the shop floor to the executive suite. *J. of Management* **23**(3) 239-290.

Cramton, C.D. 2001. The mutual knowledge problem and its consequences in geographically dispersed teams. *Organ. Sci.* **12**(3) 346-371.

Cross, R., E. K., R. Dawson, Helferich. 2008. Managing collaboration at the point of execution: Improving team effectiveness with a network perspective. *California Management Review* **50**(4).

Cummings, J.N. 2004. Work groups, structural diversity, and knowledge sharing in a global organization. *Management Sci.* **50**(3) 352-364.

Cummings, J.N., M.R. Haas. 2012. So many teams, so little time: Time allocation matters in geographically dispersed teams. *J. of Organ. Behavior*.

Cummings, J.N., M.B. O'Leary. 2002. The spatial, temporal, and configurational characteristics of geograhpic dispersion in work teams. D. Nagao, ed. *Academy of Management*, Denver, CO.

Dahlin, K.B., L.R. Weingart, P.J. Hinds. 2005. Team diversity and information use. *Acad. of Management J.* **48**(6) 1107-1123.

Davis-Blake, A., B. Uzzi. 1993. Determinants of employment externalization: A study of temporary workers and independent contractors. *Admin. Sci. Quart.* **38**(2) 195-223.

DeChurch, L.A., J.R. Mesmer-Magnus. 2010. Measuring shared team mental models: A meta-analysis. *Group Dynamics: Theory, Res. and Practice* **14**(1) 1-14.

Desportes, J.-P., J.-M. Lemaine. 1988. The sizes of human groups: An analysis of their distributions *Environmental social psychology*. Springer, 57-65.

Dougherty, D. 1992a. Interpretive barriers to successful product innovation in large firms. *Organ. Sci.* **3** 179-202

Dougherty, D. 1992b. Interpretive barriers to successful product innovation in large firms. *Organ. Sci.* **3**(2) 179-202.

Dougherty, D., D.D. Dunne. 2012. Digital science and knowledge boundaries in complex innovation. *Organ. Sci.* **23**(5) 1467-1484.

Edmondson, A. 1999. Psychological safety and learning behavior in work teams. *Admin. Sci. Quart.* **44**(2) 350-383.

Edmondson, A., J.A. Dillon, K.S. Roloff. 2007. Three perspectives on team learning. *Acad. of Management Annals* **1** 269.

Edmondson, A.C. 2012. *Teaming: How organizations learn, innovate, and compete in the knowledge economy*. Jossey-Bass.

Edmondson, A.C., M.R. Haas, J. Macomber, T. Zuzul. 2015. The Role of Megaprojects and Multiplier Firms in Leading Change for Sustainability. R.M. Henderson, R. Gulati, M. Tushman, eds. *Leading Sustainable Change: An Organizational Perspective* 273 - 298.

Ellis, A.P.J. 2006. System breakdown: The role of mental models and transactive memory in the relationship between acute stress and team performance. *Acad. of Management J.* **49**(3) 576-589.

Espinosa, J.A., J.N. Cummings, C. Pickering. 2012. Time separation, cordination, and performance in technical teams. *IEEE Transactions on Engineering Management* **59**(1) 91-103.

Evans, J.A., G. Kunda, S.R. Barley. 2004. Beach time, bridge time, and billable hours: The temporal structure of technical contracting. *Admin. Sci. Quart.* **49**(1) 1-38.

Finholt, T., L.S. Sproull. 1990. Electronic groups at work. *Organ. Sci.* **1**(1) 41.

Fiol, C.M., E.J. O'Connor. 2005. Identification in face-to-face, hybrid, and pure virtual teams: Untangling the contradictions. *Organ. Sci.* **16**(1) 19-32.

Fiske, S.T., S.E. Taylor. 2008. *Social cognition: From brains to culture*. McGraw-Hill Higher Education, Boston.

Foushee, H.C. 1984. Dyads and triads at 35,000 feet. *Amer. Psych.*(39) 885-893.

Fussell, S., R.M. Krauss. 1992. Coordination of knowledge in communication: Effects of speakers' assumptions about what others know. *J. of Personality and Soc. Psych.* **62**(3) 378-391.

Gibson, C.B., J.L. Gibbs. 2006. Unpacking the concept of virtuality: The effects of geographic dispersion, electronic dependence, dynamic structure, and national diversity on team innovation. *Admin. Sci. Quart.* **51**(3) 451-495.

Guzzo, R.A., M.W. Dickson. 1996. Teams in organizations: Recent research on performance and effectiveness. *Annual Rev. of Psych.* **47** 307-338.

Haas, M.R. 2006. Acquiring and applying knowledge in transnational teams: The roles of cosmopolitans and locals. *Organ. Sci.* **17**(3) 367-384.

Haas, M.R., J.N. Cummings. 2014. Barriers to knowledge seeking within MNC teams: Which differences matter most [quest]. *Journal of International Business Studies* **46**(1) 36-62.

Haas, M.R., M.T. Hansen. 2007. Different knowledge, different benefits: Toward a productivity perspective on knowledge sharing in organizations. *Strategic Management Journal* **28**(11) 1133-1153.

Hackman, J.R. 1987. The design of work teams. J. Lorsch, ed. *Handbook of organizational behavior*. Prentice-Hall, Englewood Cliffs, NJ, 315-342.

Hackman, J.R. 2002. *Leading teams: Setting the stage for great performances*. Harvard Business School Press, Boston.

Hackman, J.R. 2011. When teams, when not? *Collaborative intelligence: Using teams to solve hard problems*. Berrett-Koehler Publishers, San Francisco, 22-25.

Hackman, J.R., N. Katz. 2010. Group behavior and performance. S.T. Fiske, D.T. Gilbert, G. Lindzey, eds. *Handbook of Social Psychology*, 5th ed. Wiley, New York, 1208-1251.

Hackman, J.R., R. Wageman. 2004. When and how team leaders matter. *Res. in Organ. Behavior* **26** 37-74.

Hamilton, D.L., S.J. Sherman, B. Lickel. 1998. Perceiving social groups: The importance of the entitativity continuum. C. Sedikides, J. Schopler, C.A. Insko, eds. *Intergroup cognition and intergroup behavior*. Erlbaum, Hillsdale, NJ, 47-74.

Hill, R.C., M. Levenhagen. 1995. Metaphors and mental models: Sensemaking and sensegiving in entrepreneurial activities. *J. of Management* **21**(6) 1057-1074.

Hinds, P.J., D.E. Bailey. 2003. Out of sight, out of sync: Understanding conflict in distributed teams. *Organ. Sci.* **14**(6) 615.

Hinds, P.J., M. Mortensen. 2005. Understanding conflict in geographically distributed teams: The moderating effects of shared identity, shared context, and spontaneous communication. *Organ. Sci.* **16**(3) 290-307.

Hobday, M. 2000. The project-based organisation: An ideal form for managing complex products and systems? *Res. Policy* **29**(7-8) 871-893.

Hogg, M.A., D.J. Terry. 2000. Social identity and self-categorization processes in organizational contexts. *Acad. of Management Rev.* **25**(1) 121-140.

Hogg, M.A., J.C. Turner. 1987. Intergroup behaviour, self-stereotyping and the salience of social categories. *British Journal of Social Psychology* **26** 325-340.

Hollenbeck, J.R., B. Beersma, M.E. Schouten. 2012. Beyond team types and taxonomies: A dimensional scaling conceptualization for team description. *The Academy of Management Review (AMR)* **37**(1) 82-106.

Hollingshead, A.B. 2001. Cognitive interdependence and convergent expectations in transactive memory. *J. of Personality and Soc. Psych.* **81**(6) 1080-1089.

Ibarra, H. 1999. Provisional selves: Experimenting with image and identity in professional adaptation. *Admin. Sci. Quart.* **44**(4) 764-791.

Ibarra, H., R. Barbulescu. 2010. Identity as narrative: Prevalence, effectiveness, and consequences of narrative identity work in macro work role transitions. *Acad. of Management Rev.* **35**(1).

Jarvenpaa, S.L., A. Majchrzak. 2008. Knowledge collaboration among professionals protecting national security: Role of transactive memories in ego-centered knowledge networks. *Organ. Sci.* **19**(2) 260-276.

Jehn, K.A. 1997. A qualitative analysis of conflict types and dimensions in organizational groups. *Admin. Sci. Quart.* **42** 530-557.

Jehn, K.A., K. Bezrukova. 2010. The faultline activation process and the effects of activated faultlines on coalition formation, conflict, and group outcomes. *Org. Behavior & Human Dec. Processes* **112**(1) 24-42.

Jeong-Yeon, L., D.G. Bachrach, K. Lewis. 2014. Social network ties, transactive memory, and performance in groups. *Organ. Sci.* **25**(3) 951-967.

Jetten, J., R. Spears, A.S. Manstead. 1997. Distinctiveness threat and prototypicality: Combined effects on intergroup discrimination and collective self-esteem. *European Journal of Social Psychology* **27**(6) 635-657.

Jetten, J., R. Spears, A.S. Manstead. 1998. Defining dimensions of distinctiveness: Group variability makes a difference to differentiation. *J. of Personality and Soc. Psych.* **74**(6) 1481.

Joshi, A., N. Pandey, G. Han. 2008. Bracketing team boundary spanning: An examination of task-based, team-level, and contextual antecedents. *J. of Organ. Behavior*.

Kane, A.A. 2007. Superordinate social identity, knowledge demonstrability, and knowledge transfer across groups. *Working Paper*.

Kane, A.A. 2010. Unlocking knowledge transfer potential: Knowledge demonstrability and superordinate social identity. *Organ. Sci.* **21**(3) 643-660.

Kane, A.A., L. Argote, J.M. Levine. 2005. Knowledge transfer between groups via personnel rotation: Effects of social identity and knowledge quality. *Organizational Behavior and Human Decision Processes* **96**(1) 56-71.

Klein, K.I., H. Tosi, A.A. Cannella. 1999. Multilevel theory building: Benefits, barriers, and new developments. *Acad. of Management Rev.* **24** 243-248.

Klein, K.J., F. Dansereau, R.J. Hall. 1994. Levels issues in theory development, data collection, and analysis. *Acad. of Management Rev.* **19**(2) 195-229.

Klimoski, R., S. Mohammed. 1994. Team mental model: Construct or metaphor? *J. of Management* **20**(2) 403-437.

Kraut, R.E., S.R. Fussell, S.E. Brennan, J. Siegel. 2002. Understanding the effects of proximity on collaboration: Implications for technologies to support remote collaborative work. P.J. Hinds, S. Kiesler, eds. *Distributed work*. MIT Press, Cambridge, MA, 137-162.

Larson, J.R., P.G. Foster-Fishman, C.B. Keys. 1994. Discussion of shared and unshared information in decision-making groups. *J. of Personality and Soc. Psych.* **67**(3) 446.

Lau, D.C., J.K. Murnighan. 2005. Interactions within groups and subgroups: The effects of demographic faultlines. *Acad. of Management J.* **48**(4) 645-660.

Lawrence, B.S. 2006. Organizational reference groups: A missing perspective on social context. *Organ. Sci.* **17**(1) 80-100.

Leung, K., S. White. 2006. Exploring dark corners: An agenda for organizational behavior research in alliance contexts. O. Shenkar, J. Reuer, eds. *Handbook of Strategic Alliances*. Sage, Thousand Oaks, CA, 199-218.

Levine, J.M., R.L. Moreland. 1998 Small groups. D.T. Gilbert, S.T. Fiske, eds. *Handbook of social psychology*, 4th ed. McGraw-Hill, New York, NY, US, 415-469.

Lewis, K. 2003. Measuring transactive memory systems in the field: Scale development and validation. *J. of Appl. Psych.* **88**(4) 587-604.

Lewis, K., M. Belliveau, B. Herndon, J. Keller. 2007. Group cognition, membership change, and performance: Investigating the benefits and detriments of collective knowledge. *Organizational Behavior and Human Decision Processes* **103**(2) 159-178.

Lewis, K., B. Herndon. 2011. Transactive memory systems: Current issues and future research directions, 1254-1265.

Liang, D.W., R.L. Moreland, L. Argote. 1995. Group versus individual training and group performance: The mediating factor of transactive memory. *Person. and Soc. Psych. Bul.* **21**(4) 384-393.

Lickel, B., D.L. Hamilton, S.J. Sherman. 2001. Elements of a lay theory of groups: Types of groups, relational styles, and the perception of group entitativity. *Person. and Soc. Psych. Rev.* **5**(2) 129–140.

Lickel, B., D.L. Hamilton, G. Wieczorkowska, A. Lewis, S.J. Sherman, A.N. Uhles. 2000. Varieties of groups and the perception of group entitativity. *J. of Personality and Soc. Psych.* **78**(223-246).

Lim, B.-C., K.J. Klein. 2006. Team mental models and team performance: A field study of the effects of team mental model similarity and accuracy. *J. of Organ. Behavior* **27**(4) 403-418.

Lindkvist, L. 2004. Governing project-based firms: Promoting market-like processes within hierarchies. *Journal of Management and Governance* **8**(1) 3.

Majchrzak, A., S.L. Jarvenpaa, A.B. Hollingshead. 2007. Coordinating expertise among emergent groups responding to disasters. *Organ. Sci.* **18**(1) 147-161.

Majchrzak, A., R.E. Rice, A. Malhotra, N. King, S. Ba. 2000. Technology adaptation: The case of a computer-supported inter-organizational virtual team. *Management Inform. Systems Quart.* **24**(4) 569-600.

Malhotra, A., A. Majchrzak, R. Carman, V. Lott. 2001. Radical innovation without collocation: A case study at boeing-rocketdyne. *Management Inform. Systems Quart.* **25**(2) 229-249.

Mansour-Cole, D. 2001. Team identity formation in virtual teams. M.M. Beyerlein, D.A. Johnson, eds. *Virtual teams.* Elsevier Science/JAI Press, Ukraine, 41-58.

Mathieu, J.E., M.A. Marks, S.J. Zaccaro. 2001. Multiteam systems. N. Anderson, D. Ones, H.K. Sinangil, C. Viswesvaran, eds. *International Handbook of Work and Organizational Psychology*. Sage Publications, Thousand Oaks, CA, 289-313.

Mathieu, J.E., W. Schulze. 2006. The influence of team knowledge and formal plans on episodic team process-performance relationships. *Acad. of Management J.* **49**(3) 605-619.

Matthews, T., S. Whittaker, T.P. Moran, S.Y. Helsley, T.K. Judge. 2011. Productive interrelationships between collaborative groups ease the challenges of dynamic and multi-teaming. *Computer Supported Cooperative Work (CSCW)* 1-26.

Matthews, T., S. Whittaker, T.P. Moran, S.Y. Helsley, T.K. Judge. 2012. Productive interrelationships between collaborative groups ease the challenges of dynamic and multi-teaming. *Computer Supported Cooperative Work (CSCW)* **21**(4-5) 371-396.

Mayer, R.C., J.H. Davis, F.D. Schoorman. 1995. An integrative model of organization trust. *Acad. of Management Rev.* **20**(3) 709-734.

McGrath, J.E. 1984. *Groups: Interaction and performance*. Prentice-Hall, Englewood Cliffs, N.J.

Medin, D.L., M.W. Altom, T.D. Murphy. 1984. Given versus induced category representations: Use of prototype and exemplar information in classification. *Journal of Experimental Psychology: Learning, Memory, and Cognition* **10**(3) 333.

Mell, J.N., D. Van Knippenberg, W.P. Van Ginkel. 2014. The catalyst effect: The impact of transactive memory system structure on team performance. *Acad. of Management J.* **57**(4) 1154-1173.

Mohammed, S., L. Ferzandi, K. Hamilton. 2010. Metaphor no more: A 15-year review of the team mental model construct. *J. of Management* **36**(4) 876.

Moore, D.A., T.R. Kurtzberg, L.L. Thompson, M.W. Morris. 1999. Long and short routes to success in electronically mediated negotiations: Group affiliations and good vibrations. *Org. Behavior & Human Dec. Processes* **77**(1) 22-43.

Moreland, R.L., L. Myaskovsky. 2000. Exploring the performance benefits of group training: Transactive memory or improved communication? *Organizational Behavior and Human Decision Processes* **82**(1) 117-133.

Mortensen, M. 2014. Constructing the team: The antecedents and effects of membership model divergence. *Organ. Sci.* **25**(3) 909-931.

Mortensen, M., P.J. Hinds. 2002. Fuzzy teams: Boundary disagreement in distributed and collocated teams. P.J. Hinds, S. Kiesler, eds. *Distributed Work*. MIT Press, Cambridge, MA, 281-308.

Mortensen, M., A.W. Woolley, M.B. O'Leary. 2007. Conditions enabling effective multiple team membership. K. Crowston, S. Sieber, E. Wynn, eds. *Virtuality and Virtualization*. Springer, Boston, 215-228.

Mullen, B. 1991. Group composition, salience, and cognitive representations: The phenomenology of being in a group. *Journal of Experimental Social Psychology* **27**(4) 297-323.

Murase, T., D. Doty, A. Wax, L.A. DeChurch, N.S. Contractor. 2012. Teams are changing: Time to "think networks". *Industrial and Organizational Psychology* **5**(1) 41-44.

O'Leary, M.B., M. Mortensen. 2010. Go (con)figure: Subgroups, imbalance, and isolates in geographically dispersed teams. *Organ. Sci.* **21**(1) 115-131.

O'Leary, M.B., M. Mortensen, A.W. Woolley. 2010. Working together effectively before it all goes downhill. *IESE Insight*.

O'Leary, M.B., M. Mortensen, A.W. Woolley. 2011a. Multiple team membership: A theoretical model of its effects on productivity and learning for individuals and teams. *Acad. of Management Rev.* **36**(3) 461-478.

O'Leary, M.B., A. Williams Woolley, M. Mortensen. 2011b. Multiteam membership in relation to multiteam systems. S.J. Zaccaro, M.A. Marks, L.A. DeChurch, eds. *Multiteam Systems: An Organization Form for Dynamic and Complex Environments*. Routledge, New York, 141-172.

Perretti, F., G. Negro. 2006. Filling empty seats: How status and organizational hierarchies affect exploration versus exploitation in team design. *Acad. of Management J.* **49**(4) 759-777.

Polzer, J.T., C.B. Crisp, S.L. Jarvenpaa, J.W. Kim. 2006. Extending the faultline concept to geographically dispersed teams: How colocated subgroups can impair group functioning. *Acad. of Management J.* **49**(4) 679-692.

Postmes, T., S.A. Haslam, R.I. Swaab. 2005a. Social influence in small groups: An interactive model of social identity formation. *Eur. Rev. of Soc. Psych.* **16**(1) 1-42.

Postmes, T., R. Spears, A.T. Lee, R.J. Novak. 2005b. Individuality and social influence in groups: inductive and deductive routes to group identity. *J. of Personality and Soc. Psych.* **89**(5) 747.

Prencipe, A., F. Tell. 2001. Inter-project learning: Processes and outcomes of knowledge codification in project-based firms. *Res. Policy* **30**(9) 1373-1394.

Reagans, R., B. McEvily. 2003. Network structure and knowledge transfer: The effects of cohesion and range. *Admin. Sci. Quart.* **48**(2) 240-267.

Rentsch, J.R., R. Hall. 1994. Members of great teams think alike: A model of team effectiveness and schema similarity among team members. M.M. Beyerlein, D.A. Johnson, S.T. Beyerlein, eds. *Advances in interdisciplinary studies of work teams: Theories of self-managing work teams*. JAI Press, Greenwich, CT, 223-261.

Rentsch, J.R., R.J. Klimoski. 2001. Why do 'great minds' think alike?: Antecedents of team member schema agreement. *J. of Organ. Behavior* **22**(2) 107-120.

Reynolds, K.J., J.C. Turner, S.A. Haslam. 2003. Social identity and self-categorization theories' contribution to understanding identification, salience, and diversity in teams and organizations. J.T. Polzer, ed. *Identity Issues in Groups*. JAI Press, Greenwich, CT, 279-304.

Rulke, D.L., J. Galaskiewicz. 2000. Distribution of knowledge, group network structure, and group performance. *Management Sci.* **46**(5) 612-625.

Schiller, S., M. Mandviwalla. 2007. Virtual team research: An analysis of theory use and a framework for theory appropriation. *Small Group Res.* **38**(1) 12.

Schober, M.F. 1998. Different kinds of perspective-taking. S. Fussell, R. Kreuz, eds. *Social and cognitive approaches to interpersonal communication*. Lawrence Erlbaum, Mahwah, New Jersey.

Shapiro, D.L., S.A. Furst, G.M. Spreitzer, M.A. Von Glinow. 2002. Transnational teams in the electronic age: Are team identity and high performance at risk? *J. of Organ. Behavior* **23**(4) 455.

Sherman, S.J., D.L. Hamilton, A.C. Lewis. 1999. Perceived entitativity and the social identity value of group memberships. D. Abrams, M.A. Hogg, eds. *Social Identity and Social Cognition*. Blackwell, Oxford, UK, 80-110.

Shih, M., T.L. Pittinsky, N. Ambady. 1999. Stereotype susceptibility: Identity salience and shifts in quantitative performance. *Psych. Sci.* **10**(1) 80-83.

Solomon, C.M. 2010. The challenges of working in virtual teams. RW3 Culture Wizard, New York, NY.

Sundstrom, E., K.P. De Meuse, D. Futrell. 1990. Work teams: Applications and effectiveness. *Amer. Psych.* **45**(2) 120-133.

Tajfel, H., J.C. Turner. 1986. The social identity theory of intergroup behavior. S. Worchel, ed. *Psychology of Intergroup Relations*, 2nd ed. Nelson-Hall Publishers, Chicago, 7-24.

Thiry, M., M. Deguire. 2007. Recent developments in project-based organisations. *Int. J. of Proj. Management* **25**(7) 649-658.

Tushman, M.L., T.J. Scanlan. 1981a. Boundary Spanning Individuals: Their Role in Information Transfer and Their Antecedents. *Acad. of Management J.* Academy of Management, 289.

Tushman, M.L., T.J. Scanlan. 1981b. Characteristics and External Orientations of Boundary Spanning Individuals. *Acad. of Management J.* Academy of Management, 83.

Van den Bulte, C., R.K. Moenaert. 1998. The effects of r&d team co-location on communication patterns among r&d, marketing, and manufacturing. *Management Sci.* **44**(11) S1-S18.

van der Vegt, G.S., J.S. Bunderson. 2005. Learning and performance in multidisciplinary teams: The importance of collective team identification. *Acad. of Management J.* **48**(3) 532-547.

Wageman, R. 2001. How leaders foster self-managing team effectiveness: Design choices versus hands-on coaching. *Organ. Sci.* **12**(5) 559-577.

Wageman, R., H. Gardner, M. Mortensen. 2012. The changing ecology of teams: New directions for teams research. *J. of Organ. Behavior* **33**(3) 301-315.

Wageman, R., J.R. Hackman. 2010. What makes teams of leaders leadable. *Handbook of leadership theory and practice* 475-505.

Watson-Manheim, M.B., K.M. Chudoba, K. Crowston. 2002. Discontinuities and continuities: A new way to understand virtual work. *Information Technology & People* **15**(3) 191-209.

Webster, J., W.K.P. Wong. 2008. Comparing traditional and virtual group forms: Identity, communication and trust in naturally-ocurring project teams. *International Journal of Human Resource Management* **19**(1) 41-62.

Wegner, D.M. 1987. Transactive memory: A contemporary analysis of the group mind. G.R. Goethals, ed. *Theories of Group Behavior*. Springer-Verlag, New York, 185-203.

Wegner, D.M., T. Giuliano, P.T. Hertel. 1985. Cognitive interdependence in close relationships. W.J. Ickes, ed. *Compatible and incompatible relationships*. Springer-Verlag, New York, 253-276.

Wiesenfeld, B.M., S. Raghuram, R. Garud. 1999. Communication patterns as determinants of organizational identification in a virtual organization. *Organ. Sci.* **10**(6) 777.

Wilson, D.C., E. Salas, H. Priest, D. Andrews. 2007. Errors in the heat of the battle: Taking a closer look at shared cognition breakdowns through teamwork. *Human Factors: The Journal of the Human Factors and Ergonomics Society* **49** 243-256.

Wilson, J., C.B. Crisp, M. Mortensen. 2013. Extending construal-level theory to distributed groups: Understanding the effects of virtuality. *Organ. Sci.* **24**(2) 629-644.

Witchalls, C., M. Woodley, J. Watson. 2010. Managing virtual teams: Taking a more strategic approach. Economist Intelligence Unit.

Woolley, A.W., B.L. Aven, E. Zhang, M.B. O'Leary, M. Mortensen. 2013. Multiple team membership and time allocation *Academy of Management Conference*. Academy of Management, Lake Buena Vista, Florida.

Zika-Viktorsson, A., P. Sundstrom, M. Engwall. 2006. Project overload: An exploratory study of work and management in multi-project settings. *Int. J. of Proj. Management* **24**(5) 385-394.