Identification in Face-to-Face, Hybrid, and Pure Virtual Teams: Untangling the Contradictions

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Identification is a person's sense of belonging with a social category. Identification in virtual organizational teams is thought to be especially desirable because it provides the glue that can promote group cohesion despite the relative lack of face-to-face interaction. Though research on virtual teams is exploding, it has not systematically identified the antecedents or moderators of the process by which identification develops, leaving a number of gaps and apparent contradictions. The purpose of this paper is to begin to untangle the contradictions and address some of the gaps by tracing the mechanisms and moderating processes through which identification develops in hybrid and pure virtual settings, and the ways that these processes differ from face-to-face settings.

Key words: virtual teams; identification development

Identification is a person's sense of belonging with a social category (Ashforth and Mael 1989). Individuals use social categories to define themselves in terms of perceived shared similarities with members of their group in contrast to other social categories (Turner et al. 1994). Member identification with a group has been linked to greater employee compliance, higher motivation and job satisfaction, higher group cohesion, lower attrition, lower in-group conflict, and an increase in behaviors that are congruent with the group's identity (Kramer 1991).

The cohesion-building consequences of identification may be especially important in virtual settings (Wiesenfeld et al. 2001), given the reduced physical contact among members. Though there is little consensus about how to define virtual teams (as we discuss below), most researchers agree that one of the key features of virtualness is the relative absence of face-to-face contact (Griffith et al. 2003a). Virtual interactions reduce emphasis on visible, tangible dimensions that define a group (offices, colocated workers, etc.), instead emphasizing togetherness based on members' perceptions of belonging (Wiesenfeld et al. 2001). Identification in virtual teams thus promotes a sense of togetherness despite a relative lack of physical contact (Pratt 2001).

Despite the importance of member identification in virtual teams, we know very little about its development and maintenance over time. Though researchers have conjectured that it is difficult for members to identify with a virtual team (e.g., Mannix et al. 2002), there is very little evidence to substantiate such a claim. Part of the challenge has to do with the various definitions of "virtual," each of which implies a somewhat different set of issues about the development of identification. Virtual teams have been defined variously, ranging from geographic and temporal member distribution, adaptability, use of multiple or a variety of media, and member diversity (see Griffith and Meader 2004). Each of these definitions holds somewhat different implications for the development of member identification. For example, as we note below, physical distance among team members, interrupted by only occasional face-to-face contact, is likely to pose a different set of barriers to member identification than a complete absence of face-to-face contact. There also remain questions about whether virtualness lies on a continuum or whether it is a discrete state that is qualitatively different than nonvirtualness. Again, this holds implications for understanding the development of member identification. If virtualness does not lie on a single continuum, from nonvirtual to purely virtual, it is unlikely that the same factors influence identification development across the different settings.

These definitional discrepancies and ambiguities have led to a number of apparent contradictions. For example, is the development of team awareness in virtual settings a slow and difficult process (Kraut et al. 2002), or do team-level boundaries emerge easily and swiftly (Walther 1996)? Is member proximity a critical driver of team identification (Rock et al. 2003), or can identification develop across great distances in virtual settings (Wiesenfeld et al. 2001)? Does team member diversity alone make identification less likely as Griffith and Neale (2001) proposed, or is it the visibility (Walther 1996) and/or the arrangement (Thatcher et al. 2003) of the diversity that affect group processes? And do distinctive and unique individuating cues facilitate

identification (Pratt 1998), or can individuating cues actually inhibit the formation of strong social boundaries around a group (Postmes et al. 1998)?

Identification is, in fact, only implied or tangentially explored in most of the studies just noted. The scant research that has focused specifically on member identification in virtual teams (Bouas and Arrow 1996, McGrath and Arrow 1996, Mortensen and Hinds 2001, Pratt et al. 2000, Rock et al. 2003) has not systematically described the process by which identification develops in such settings, nor has it clearly distinguished between antecedents (i.e., member motivations to identify) and moderators (i.e., facilitators/impediments) of the process. The prior work has also focused primarily on the characteristics of virtual teams and the communication technology they utilize (e.g., Pratt et al. 2000, Rock et al. 2003), largely ignoring the effects of the broader situational context or of individual characteristics on identification development. As a result, we know very little about the interrelationships among individual, group, and situational factors in the development of identification in virtual teams.

The explosive growth in the use of virtual teams, the potential importance of identification for such teams, and the incomplete and less-than-conclusive research on the topic all beg for a deeper understanding of identification in virtual teams, both hybrid and pure. This paper seeks to fill the gaps and untangle some of the apparent contradictions by presenting a model that traces the development of member identification in pure virtual, hybrid, and face-to-face teams.

Pure Virtual, Hybrid, and Face-to-Face Teams

Given that virtual teams are a relatively recent phenomenon, it is perhaps not surprising that there is little consensus about how to define them. Definitions of virtualness have been variously based on percentage of time on the team task not spent face to face (Griffith and Neale 2001), physical distance among members (Hinds and Bailey 2003), level of technological support (Griffith and Neale 2001), and technological variety (Griffith and Meader 2004). To enable systematic empirical research, it is important to begin to distinguish between those characteristics of virtual teams that are likely tendencies and the traits that are true by definition.

Toward this end, we define *virtualness* as the extent of face-to-face contact among team members (encompassing amount as well as frequency of contact) and suggest that technological support and dispersion represent tendencies, rather than definitional attributes of virtual teams. Griffith and Neale (2001, p. 384) support this view with their observation that virtual teams are largely, "though not necessarily," facilitated by the use of technology. Virtual teams may make no use of technology, and face-to-face teams may make great use of

technology (Griffith and Neale 2001), so even though technological use is a tendency in virtual teams, we posit that it does not define them.

We further suggest that physical dispersion of team members is a defining element of virtualness only to the extent that it deters members from meeting face to face, or conversely, if proximity encourages members to meet face to face. Though it seems likely that members of virtual teams will often be physically dispersed (Hinds and Bailey 2003), this is not a necessary feature. The effects of proximity among team members fall off rapidly with even very small distances (Kraut et al. 2002). This suggests that team members who reside near each other, but who never meet, may experience dynamics very similar to those who interact across great distances.

Another definitional issue has to do with whether virtualness is continuous. Griffith and Neale (2001) defined virtualness as a continuous variable, though Griffith et al. (2003b) later speculated that teams that never meet face to face are different in a nonlinear way than those who do meet, even if only occasionally. The arguments developed in this paper suggest that both face-to-face and pure virtual teams differ in nonlinear ways from hybrid teams that meet occasionally.

In sum, we describe numerous tendencies of virtual teams, including dispersion, diversity, and technological support, and discuss the effects of these on identification processes. However, our model depicts the extent of face-to-face contact among members as the single defining feature of team virtualness, suggesting that it most significantly determines the effects of the other variables on identification processes. The results of Mortensen and Hind's (2001) recent study of 12 collocated and 12 distributed new product development teams support this view. The distributed teams did not experience less shared identity than did the collocated teams; the authors speculated that the similar number of face-to-face meetings in both the collocated and distributed settings may have served to promote the similar development of shared identity in both settings.

Our modeling also suggests that it may not be appropriate to view virtualness on a continuum—from face to face to pure virtual—given that the antecedents and moderators of identification appear to interact differently in pure virtual, hybrid, and face-to-face settings.[1] And though hybrid teams do lie on a continuum from more to less virtual, the relative frequency of their face-to-face meetings would seem to matter considerably in identification processes. We, therefore, limit our discussion to hybrid teams that meet face to face only occasionally.

Figure 1 schematically depicts the general model developed in the sections of this paper that follow, beginning with the three team settings—pure virtual, face to face, and hybrid (the two lines show hybrid teams beginning either virtually or face to face)—based on the extent

Figure 1 *Predominant* **Antecedents and Moderators of Identification in Pure Virtual, Hybrid, and Face-to-Face Teams**
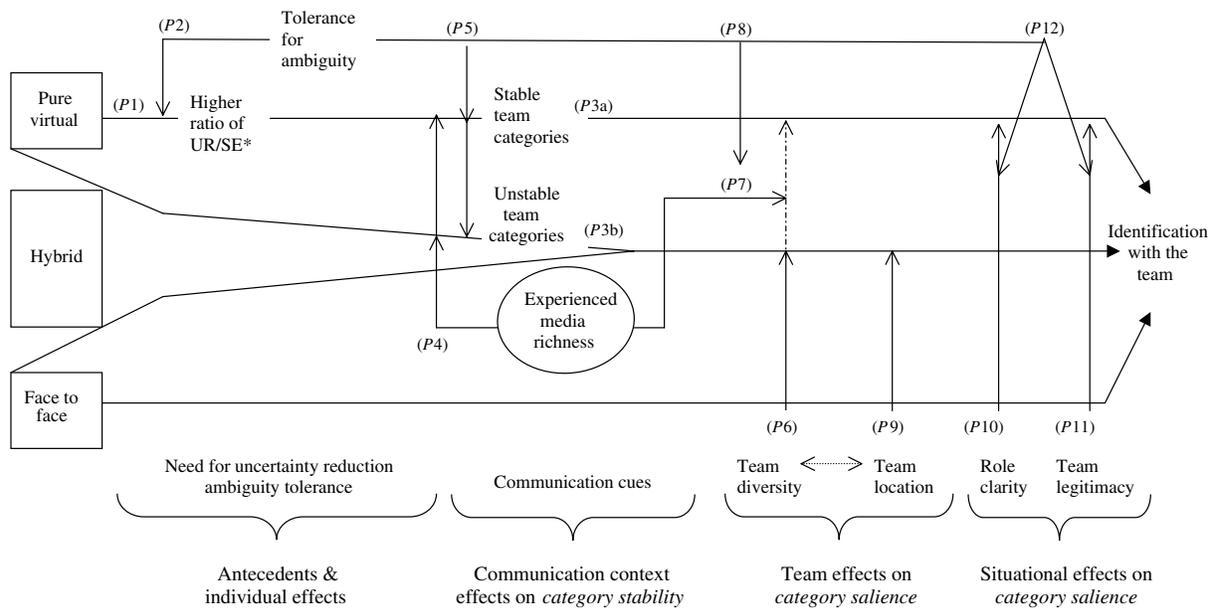
*UR = Uncertainty reduction needs as motivators for identification. SE = Self-enhancement needs as motivators for identification.

of face-to-face contact among team members. The dependent variable in the model is team member identification. The relationships depicted with arrows in the figure represent the proposed *predominant* antecedents (UR/SE) and moderating effects (individual, communication context, team and situational). They are summarized in the discussion that follows in the form of hypotheses, as indicated in the figure.

Teams are composed of individuals who bring their unique attributes to the group, and teams operate within broader situational contexts that affect their identity. Our modeling of identification development is thus explicitly multilevel, examining the impact of factors beyond the most commonly studied team-level factors, such as composition and location. It is also cross-level, in that it identifies the effects of variables at one level (e.g., individual) on the proposed role of variables at other levels (e.g., communication context or situational factors).

For identification to occur, individuals must be motivated to belong to a group. Because of the uncertainty in many virtual team settings, we argue that uncertainty reduction (UR) is a key motivator (relative to self-enhancement [SE]), moderated by individual team member differences in tolerance for ambiguity. Once motivated to identify, individuals form what social identity theorists call a social category, a grouping of perceptual elements that characterize the target group. The *stability* and *salience* of the social category are thought to significantly affect the strength of member identification (Fiol 2002, Turner 1987). For example, even though you may feel the need to reduce the uncertainty in your professional world by identifying with your college, to the extent that you perceive the elements characterizing

the college as constantly in flux and if those elements are not particularly salient to you, you are not likely to be highly identified with the college. We describe the communication context of the team as the primary driver of social category stability, and we discuss both team-level and situational factors as influencing category salience.

Antecedents of Identification

Why do people identify with groups? Some identity research has suggested that people seek group membership to fill self-enhancement needs (e.g., Schlenker 1980). Self-enhancement involves making comparisons with out-groups that increase members' feelings of self-worth. If self-enhancement needs are the primary motivator for belonging to a group, identification is likely to the extent that members consider worthy and attractive the distinctive qualities of the group, and if they believe that outsiders also notice them and perceive them as worthy and attractive (Ashforth and Mael 1989, Dukerich et al. 2002).

Self-enhancement needs may not always be the primary motivator for identification, however. Members' desire to reduce uncertainty and/or make sense of ambiguous events and situations is a motivator that is at least as, if not more, important than self-enhancement (Hogg and Terry 2000). Uncertainty can be reduced by checking one's cognitions against physical reality, or if that is not possible, against social reality—i.e., comparing one's perceptions with similar others. Uncertainty is reduced when there is even just the appearance of agreement and the appearance of similarity (Hogg and Terry 2000, Hogg and Mullin 1999). Identification represents

a means of creating that experienced similarity, thereby reducing uncertainty.

Do the antecedent motivators of identification differ across face-to-face, hybrid, and pure virtual settings? Though there is no direct evidence that we are aware of in the literature, we posit that in pure virtual teams the need to reduce uncertainty is likely to be a relatively more powerful antecedent than self-enhancement for at least two reasons. First, people will tend to believe that their self-enhancement needs will less likely be met in pure virtual than in face-to-face or hybrid settings because of the less visible nature of pure virtual teams. For a team to fill the self-enhancement needs of its members, it must be visible and salient as a worthy and attractive entity for both insiders and outsiders (Dukerich et al. 2002). The low visibility of membership in pure virtual teams makes them less likely to be perceived as potential sources for filling members' self-enhancement needs. In contrast, the relatively greater visibility of team membership in face-to-face and even in hybrid teams allows self-enhancement needs to be met to the extent that the team is seen as worthy and attractive.

Second, pure virtual settings are often more uncertain and ambiguous than face-to-face interactions (Cramton 2001, Griffith and Neale 2001). An ambiguous or uncertain situation is "...one which cannot be adequately structured or categorized by an individual because of the lack of sufficient cues" (Budner 1962, p. 30). While people tend to rely on a wide variety of physical cues to reduce uncertainty when they meet face to face (e.g., smiles or nods), the absence of these in a pure virtual environment heightens the need for uncertainty reduction. This need for uncertainty reduction appears to be met through a rather unique categorization process in pure virtual settings (Lea and Spears 1992). Hogg (2001) noted that in situations where people have little individuating information about team members (as is often the case in pure virtual teams), they project self-properties onto the team to furnish it with meaning. So, faced with the uncertainties inherent in many pure virtual settings, people tend to use themselves as the information base from which to project knowledge about the team and its members, thereby reducing the uncertainty.

As we discuss later, hybrid teams that begin virtually also face a great deal of uncertainty because of highly unstable team categorizations that are likely to emerge over time. One might expect members of hybrid teams that begin virtually to initially use the same uncertainty reduction mechanisms as in pure virtual teams. However, as discussed below, the subsequent face-to-face interactions would likely inject individuating information that would call aspects of these initial projections into question, thereby exacerbating rather than reducing the uncertainty.

In sum, in pure virtual teams there is often a limited possibility of satisfying members' self-enhancement needs, there are great uncertainties, *and* there is the possibility of reducing the uncertainties through members' self-projections onto the team. All of these conclusions, taken together, suggest that identification in pure virtual teams, as compared to other settings, will tend to be motivated more by members' uncertainty reduction needs than by their self-enhancement needs. This is noted (*P*1) in the ratio of UR to SE in Figure 1.

PROPOSITION 1. *The need for uncertainty reduction compared to self-enhancement is a relatively stronger motivator for member identification in pure virtual teams than in face-to-face or hybrid settings.*

Tolerance for Ambiguity Moderates Need for Uncertainty Reduction

Though we proposed that pure virtual settings as compared to the other team settings are associated with stronger motivations for *all* members to reduce uncertainty, this general tendency will be moderated by each person's individual tolerance for ambiguity. Those highly intolerant of ambiguity find great discomfort with uncertainty, and therefore tend to resort to black-and-white solutions characterized by premature closure (Frenkel-Brunswick 1949). They are chronically more motivated than others to resolve the uncertainty around them (Weary and Edwards 1996). This suggests that even in the face of the uncertainty of pure virtual settings, some individuals may feel less need for uncertainty reduction than others, depending on their tolerance for ambiguity, shown as *P*2 in Figure 1.

PROPOSITION 2. *Greater team member tolerance for ambiguity will reduce the relatively strong need for uncertainty reduction as a motivator for identification in pure virtual settings.*

Communication Context Effects on Category Stability

Categorization underlies all processes of identification (Tajfel 1982, Turner 1987). Given the need to belong, members rely on communication cues to develop social categories, perceptual elements by which they characterize the group (Turner et al. 1994). The more stable the team category, the more likely that member identification will develop and be sustained (Fiol 2002, Turner 1987). For example, Fiol (2002) described the *dis*identification that resulted from members' perceptions that the centrally defining elements of their organization were changing. The extent of face-to-face contact among team members (distinguishing face-to-face, hybrid, and pure virtual teams) largely determines the types of communication cues by which members come to perceive the elements that characterize their team (Kiesler and Sproull 1992), and the nature of the cues influences the stability of members' team categorizations, as we discuss below.

Bettenhausen and Murnighan (1985) provided an account of how implicit knowledge about a team develops in face-to-face settings, beginning with members' imported beliefs about the team and moving to the deliberate testing of those beliefs to assess their appropriateness in the situation. Team categorizations result from such a process. The rich social and physical cues available to members in face-to-face teams allow for continuous retesting of the beliefs, suggesting the emergence of relatively unstable (changing) team categorizations. However, politeness rituals that inhibit team disruptions tend to emerge in face-to-face teams (Lea and Spears 1992), attenuating the instability. It is therefore difficult to predict the stability of resulting team categorizations.

With no face-to-face contact in pure virtual settings, one might intuitively believe that members would be more tentative about categorizing the team, leading to less stable categorizations. Interestingly, research based on the Social Identity Model of Deindividuation Effects (SIDE) suggests that in the absence of individuating cues about others, as is often the case in pure virtual teams, team categories tend to emerge quickly and in an exaggerated and polarized fashion (Lea and Spears 1992; Walther 1995, 1996, 1997), leading to relatively rigid adherence to early team categorizations. Faced with uncertainty, people often search for "an answer...any answer...compared to confusion and ambiguity" (Kruglanski 1996, p. 467), resulting in rapid and overconfident attributions (Thalbourne and Houran 2000). To find that answer in the absence of physical cues, members will tend to assume that others on the team have similar beliefs about the team, and they will project perceived attributes of the team onto all members without verification. The relative absence of visible cues makes the assumed beliefs about the team difficult to disconfirm and encourages rigid adherence to them. Team categories in pure virtual teams thus tend to develop through rapid and highly stable attributions, noted as *P3a* in Figure 1.

PROPOSITION 3A. *Members of pure virtual teams develop more stable categorizations of their team than do members of face-to-face teams.*

In hybrid teams, where members meet only occasionally, team categories emerge from a mixed bag of cues—rich face-to-face cues and the leaner cues of a virtual medium. If initial face-to-face contact occurs early on, the formation and deliberate updating of initial team categories based on the rich cues from early physical collocation is likely, much as in face-to-face teams. Subsequent virtual interactions would tend to simply follow in line with those categories.

In contrast, if the initial face-to-face contact occurs after the team has begun virtually, members' assumptions about the team may have developed early on into swift and rigid categorizations, much as in pure virtual teams. Many of the subsequent face-to-face cues are likely to disconfirm aspects of those early assumptions, even in the face of politeness rituals, leading to a disintegrating effect (Postmes et al. 1998). This requires members to start over, in effect, redeveloping new team categorizations based on face-to-face cues. This pattern of switching between cues is therefore likely to have a destabilizing effect in the short term because of changing team categorizations that, as we noted earlier, impede identification. Of course, over time the new categorizations may become stable and identification may result, but in the short run, the lack of stability is likely to inhibit member identification. Though prior research has not examined the short-run destabilizing effect of switching from virtual to face-to-face cues, we suspect that it accounts for much of the difficulty and slowness often attributed to identification development in virtual settings (Cramton 2001, Lipnack and Stamps 2000). We further suggest that this effect is likely to be greatest in hybrid teams that begin virtually, depicted as *P3b* in Figure 1.

PROPOSITION 3B. *Members of hybrid teams that begin in virtual settings develop less stable categorizations of their team in the short term than do team members in the other settings.*

Experienced Media Richness Moderates Communication Context Effects

Technological solutions have been proposed to enhance communication cues in virtual settings that may lack such cues. Technology-induced media richness has been viewed as a bandwidth issue (Daft and Lengel 1986), ranging from no technology support, to textual asynchronous technologies like e-mail, and finally to very rich support such as synchronous high-quality videoconferencing. Experienced bandwidth is a combination of the technology's capabilities; the users' choice of the technology's features; and the users' experience with the technology, the group, and the task (Carlson and Zmud 1999, DeSanctis and Poole 1994). Experienced bandwidth may affect the amount of social context information available during group communication.

The greater social context information available through the use of advanced technology and user skills is likely to moderate the relationships we proposed between the team setting and the degree of stability of members' team categories. The richer media make individuating cues more visible in *pure* virtual settings, thereby making it more difficult for people to simply project attributes of team categories onto all members of the team without verification. Resulting team categories are likely to be less stable than they would be without those cues. Similarly, if *hybrid* teams that begin virtually utilize technologies that provide more individuating cues

early on, there is likely to be less category destabilization when members do meet face to face, because the initial categories are likely to reflect more individualized attributes. Proposition 4 summarizes these media effects, shown as *P*4 in Figure 1.

PROPOSITION 4. *Rich media will weaken the proposed relationship between pure virtual teams and the development of stable team categorizations and between hybrid teams (beginning virtually) and the development of unstable categories, leading to the development of more moderately stable categories in both of these team settings.*

Tolerance for Ambiguity Moderates Communication Context Effects

Individuals who are more intolerant of ambiguity will tend to be more concerned about reducing uncertainty quickly than about being correct (Hogg and Mullin 1999). They will not seek to find out anything that may require changing what they know. Their tendency to create clarity by ignoring threatening discrepancies between what is and what they think should be often results in a lack of accuracy (Fiol and O'Connor 2003, Stark et al. 2002). There is also evidence that people low in tolerance for ambiguity tend to have illusions of understanding and high confidence, and are therefore often unaware of their lack of understanding (Kruglanski 1996, Stark et al. 2002).

These cognitive tendencies are likely to influence the negotiation process by which social categories become teamwide targets for identification. As team categories begin to form, attempts to persuade others to adopt one's own perspective are likely to ensue. Individuals' reactions to persuasion vary with their relative tolerance for ambiguity and with the timing of persuasive attempts (Kruglanski 1996). If persuasive attempts occur early in the process, those relatively intolerant of ambiguity will tend to seize these early cues and be easily persuaded. If the attempts to persuade occur later in the process, when other cues regarding the team have already taken hold, the persuasion attempts will tend to be resisted by those with low ambiguity tolerance. In contrast, those with higher ambiguity tolerance are more likely to remain open to reconsider their beliefs.

We proposed earlier that pure virtual settings are most conducive to the swift development of highly stable team categories, and hybrid teams that begin virtually and then meet face to face are conducive to the development of highly unstable team categories (Propositions 3a and 3b). Tolerance for ambiguity will encourage members to question early categorizations that emerge quickly during the virtual beginnings in both of these settings. This moderator of category development will thus likely have the most pronounced effects in pure virtual settings and in hybrid teams that begin in virtual settings, shown as *P*5 in Figure 1.

PROPOSITION 5. *Greater team member tolerance for ambiguity will weaken the proposed relationship between pure virtual teams and the development of stable team categorizations and between hybrid teams (beginning virtually) and the development of unstable categories, leading to the development of more moderately stable categories in both of these team settings.*

Team Effects on Category Salience

In addition to social category stability, category salience also facilitates the development of identification (Fiol 2002, Pratt 2001). We model category salience, as we modeled stability, not as a motivating driver of identification, but as a facilitator of its development to the extent that identification fills members' needs for uncertainty reduction and/or self-enhancement, as discussed above. Building on early work in categorization theory (Turner 1987), researchers have emphasized that category salience is a function of both team composition and location (Brewer and Harasty 1996, Griffith and Neale 2001, Hogg 2001, Hogg and Terry 2000). That is, the attributes of similar others and those who are physically nearby are thought to be most salient.

Both similarity and proximity are potentially disrupted through increasing reliance on virtual teams. Virtual teams tend to be more diverse (Kiesler and Cummings 2002), leading some researchers to the general proposition that identification is more difficult to develop in virtual than in face-to-face teams (e.g., Cramton 2001, Lipnack and Stamps 2000, Mannix et al. 2002). As discussed below, diversity may hinder team identification by raising perceptions of otherness and thereby the salience of social categories other than the team (e.g., demographic subgroups).

Virtual team members also tend to be located farther from each other, making local subgroup categories more salient. As a result, some have argued that in virtual teams, the default option may often be subgroup identification by diversity fault line[2] (e.g., Pratt 2001, Thatcher et al. 2003) or by locational fault line (e.g., Kiesler and Cummings 2002, Polzer et al. 2004), rather than identification with the team as a whole. As noted below, technological approaches for promoting team identification by creating richer media have recently come under fire for potentially exacerbating diversity-based subgrouping tendencies (Pratt et al. 2000).

In general, there are seemingly conflicting views in the literature about the relationships among diversity, location, and technology and about their influence on identification processes. The following sections begin to untangle the arguments and integrate the findings.

Team Diversity

Perceptions of difference and similarity lie at the heart of categorization (Turner 1987). The social categories with which members identify maximize perceived similarities

within and differences between groups. When minimal similarity exists among members of a group, identification is thought to be less likely to occur.

Jehn et al. (1999) discussed three types of diversity. First, informational diversity is difference in knowledge bases and perspectives. Social category diversity is difference in social and demographic category memberships. Value diversity is difference in the beliefs about a group's task, goals, or mission. All three are likely to be greater in a more virtual setting. Virtual teams are often formed to take advantage of specialized expertise and other resources, so information and values associated with roles and skills tend to be more diverse (Kiesler and Cummings 2002). And they are often drawn from different populations, so they also tend to be demographically more diverse (Kiesler and Cummings 2002, Mortensen and Hinds 2002).

Lau and Murnighan (1998) suggested that demographic diversity often splits a work group into subgroups based on visible fault lines, and both Thatcher et al. (2003) and Cramton and Hinds (2004) have extended that work, suggesting that all three sources of diversity may lead to fault line effects. All of these researchers have noted that when extreme diversity differentiates everyone in a group, fault lines are less likely than in situations of moderate diversity, where some overlap exists between subgroups. Fault line effects—the polarization and politicization of a group's interactions—are thus most likely when groups are only moderately diverse *and* when that diversity is especially visible. This suggests an interesting relationship among degree of virtualness, diversity, and identification. In face-to-face settings, fault lines are less likely than in more dispersed team settings, because members tend to share more similarities, and politeness rituals attenuate the potential for polarization when diversity does exist.

Hybrid teams tend to be only moderately diverse because occasional meetings often reduce value and informational diversity (Cramton 2001), even if members remain demographically diverse. This leads to the greater possibility of overlaps between the subgroupings. Because they sometimes meet, members of hybrid teams can also readily see the visible individuating cues of diversity. Hybrid teams are thus likely to be susceptible to subgroup identification by diversity fault line, as shown by the solid arrow linking diversity and hybrid teams in Figure 1 above.

Members of pure virtual teams are likely to be highly diverse for reasons noted above, but that diversity may not as easily result in fault lines because of the widespread nature of the diversity and the relative lack of visibility of demographic differences. However, informational and value differences may be quite apparent in pure virtual teams, leading to possible information- or value-based fault lines, even if identification with demographic subgroupings is not as likely. The broken arrow

linking team diversity and pure virtual teams in Figure 1 depicts this proposed weaker relationship in pure virtual as compared to hybrid teams.

PROPOSITION 6. *Subgroup identification by diversity fault line is relatively most prevalent in hybrid teams, and to a lesser extent in pure virtual teams, potentially reducing the salience of the entire team as a target for identification.*

Experienced Media Richness Moderates Team Diversity Effects

The effects of diversity discussed above mainly involve the extent to which subgroup identification is likely to occur, and the potential for this to interfere with teamwide identification. Rich technological media make more visible the cues that may highlight the subgroup fault lines. Rich media may thus exacerbate the splintering effects because they promote the salience of subgroups, rather than the team as a whole.

Researchers have noted that media effects are generally a combination of the technological capabilities of the medium and channel expansion mechanisms—how well the medium is understood and how it is actually used in the group (Carlson and Zmud 1999, Griffith et al. 2003b). They have suggested that lean media that are expanded because of user skill, experience, and knowledge may provide the information needed to enhance identification without making the fault lines more salient (Pratt et al. 2000). Though expanded lean media may eliminate some of the rich social cues, they do not eliminate many of the diversity cues embedded in a lean medium (e.g., the conflicting information or values of production versus sales people reflected in their e-mails). Channel expansion is thus only a partial solution, at best, to the potential splintering effects of technology.

The effects of media on team splintering are likely to vary across face-to-face, hybrid, and pure virtual teams. In face-to-face teams, rich cues exist without technological support. Moreover, face-to-face team members tend to be relatively similar and collocated. Even when diversity exists and becomes salient, face-to-face team members often engage in politeness rituals that counteract the potential splintering effects of the very rich cues (Kiesler and Sproull 1992).

In hybrid teams, which tend to be moderately diverse, experienced media richness is likely to further exacerbate the splintering tendencies we already discussed, encouraging identification among similar subgroup members. The occasional face-to-face contact makes individuating cues salient, while the remaining virtual interactions tend to reduce the polite acknowledgement of differences that is more characteristic of face-to-face interactions (Kiesler and Sproull 1992). We suggested earlier that diversity fault line subgroups are most likely to emerge in hybrid teams. Employing rich

media under these conditions simply further facilitates already existing tendencies for subgroup identification by highlighting the visible differences even when apart.

In pure virtual teams, the splintering effects of technology appear to be the greatest in that rich media tend to raise awareness of visible differences that would otherwise be largely hidden. In fact, theorists have argued that lean (less rich) media are conducive to identification in pure virtual teams because being isolated with few communication cues helps individuals "deindividuate" and view themselves as prototypical group members (Postmes et al. 1998), without regard to visible individuating details about other members. Such deindividuation allows the rapid and stable category development we noted earlier. Providing visible individuating information through rich media would tend to make the team a less salient category, and thus promote subgroup identification in pure virtual teams. The experienced media richness arrow (*P7*) in Figure 1 indicates the effects of technology in making more visible the otherwise largely hidden individuating cues regarding team diversity in pure virtual teams.

PROPOSITION 7. *Rich media in virtual teams facilitate the transmission of cues that highlight visible diversity fault lines, thereby promoting identification with subgroups based on those fault lines, and this effect is relatively most pronounced in pure virtual teams.*

Tolerance for Ambiguity Moderates Experienced Media Richness Effects

As noted, team members may resort to subgroup identifications when diversity fault lines draw attention away from the team as a whole. The familiarity of similar others in a subgroup may act as a convenient safety net, especially in the face of the relatively greater uncertainties in virtual settings. Rich media may exacerbate this subgrouping tendency by highlighting visible differences, especially in pure virtual settings, where those differences would otherwise be hidden. However, the need for such safety nets is reduced if individuals have high tolerance for ambiguity, thus weakening this moderating effect of rich media, shown as *P8* in Figure 1.

PROPOSITION 8. *Greater team member tolerance for ambiguity will weaken the proposed effects of experienced media richness on the tendency for individuals in virtual teams (especially pure virtual) to identify with subgroups based on visible diversity fault lines.*

Team Location

Research on team location has primarily focused on the proximity of team members, referring to the physical distance between people measured in units such as meters or miles (Kiesler and Cummings 2002). Close proximity of members of a team is associated with territoriality and visibility of membership (Wilson et al. 1994), and territories have long been thought to contribute to group identity (Newman 1972). The presence of others may also lead to familiarity and liking (Kiesler and Cummings 2002), leading some theorists to suggest that proximity among team members facilitates identification (Hogg 2001, Pratt et al. 2000, Rock et al. 2003, Wiesenfeld et al. 2001).

Armstrong and Cole (2002) tracked nine distributed work groups in a company's software engineering organization. Their findings appeared to support the proposed effects of proximity on identification noted above. The authors found that communications among collocated versus noncollocated subgroup members happened more often and in more situations, and that the local subgroup was relatively more salient to its members than the entire team. These findings do not necessarily suggest that the distance among team members inhibited teamwide identification, however. They do provide evidence that members of collocated subgroups place attention disproportionately at the local rather than the team level, potentially distracting them from attending to the team as a whole. This suggests that proximity is a moderating variable in identification processes, but not necessarily in the direct fashion (i.e., greater proximity facilitates team identification) that earlier identity theorists have implied. The proximity effect appears to manifest in localized attention and greater salience of local subgroups relative to the team as a whole.

In fact, local distractions are typically present in any team setting, dispersed or not. They provide background noise that is likely to divert attention, representing a variable that is constant across all settings. Beyond this background noise, it is important to clarify those aspects of proximity that account for variance in the identification patterns across face-to-face, hybrid, and pure virtual teams. Kraut et al. (2002) suggested that if some members of distributed teams are collocated, ease of local communication and information acquisition might bias the information tracked by the local subgroup, causing them to overattend to the local information at the expense of more remote information. The reverse logic suggests that when *all* team members are physically dispersed, the added distractions of subgroup linkages are not as likely. It is thus the collocation of subgroups that likely exacerbates the distraction effects of local cues, leading to the tendency to form subgroup identification with collocated members (Cramton 2001).

Another theoretically underdeveloped issue has to do with the assumed continuousness or linearity of proximity effects. Though we agree with Griffith et al. (2003b) that proximity is a continuous variable, its effects appear to be nonlinear. Kraut et al. (2002) found that the proposed effects of proximity fall off rapidly with even very small distances. In their study, team members from the same department were two-thirds more likely to

collaborate if their offices were on the same corridor than if the offices were only on the same floor. So only very close proximity (approximating face-to-face contact) of subgroup members is likely to have the proposed influence on identification.

Because it is only very close proximity (with at least the potential for frequent face-to-face contact) that appears to facilitate local subgroup identification, it seems likely that regular face-to-face contact among all team members would counteract this effect by fostering identification at the team versus subgroup level. And very close proximity of members without any face-to-face contact (possible even if not likely) would tend to lead to experiencing an "out-of-sight, out-of-mind" phenomenon (Mortensen and Hinds 2002), even if members resided near one another. In contrast, hybrid teams with some collocated members who have enough face-to-face subgroup contact to focus attention on local elements (meeting occasionally makes the local elements more visible and salient), but not enough contact among all team members to override the effects of the local attention, seem most likely to be influenced by subgroup proximity. These arguments suggest that local subgroup distractions are likely to interfere most with teamwide identification in hybrid teams that have some collocated members, as shown by the arrow linking location and hybrid teams in Figure 1.

PROPOSITION 9. *Subgroup identification by locational fault line is relatively most prevalent in hybrid teams with some collocated members, potentially reducing the salience of the entire team as a target for identification.*

Though team diversity and location have been theoretically defined as two separate variables influencing the identification process (Hogg 2001, Rock et al. 2003), in practice, the two seem highly intertwined, illustrated in Figure 1 by the two-way arrow linking them. They often overlap because physically distributed teams tend to be drawn from different populations, making it highly likely that they comprise individuals who differ along multiple demographic, informational, and value dimensions of diversity (Kiesler and Cummings 2002, Mannix et al. 2002).

Situational Effects on Category Salience

Identification does not happen in a vacuum. As Ashforth and Humphrey (1995) noted, categorization theory has generally ignored the contextual situation within which meaning is constructed, and the context surrounding the process is notably absent in many studies of team identification. Yet individuals are embedded in contexts that influence processes of identification.

Rennecker (2001) provided a detailed account of the various situational influences on teams, both virtual and collocated, including technology infrastructure, performance metrics, organizational policies, role status,

organizational relationships, and communication and information management practices. Beliefs about belonging develop largely through negotiated group labeling and categorizing (Cheney 1991). For this reason, communications regarding members' internal roles and the team's external image seem especially relevant situational influences to the study of team member identification. They shape the level of clarity and visibility of the labels demarcating the internal roles and relationships of team members as well as the boundaries between the in-groups and out-groups. We first discuss the influence of role labeling in clarifying members' ties to the team. We then examine external team labels that enhance the salience of the team as a target for member identification by delineating boundaries between insiders and outsiders (Ashforth and Humphrey 1995).

Role labeling in teams includes definition of the task goals of the team as well as the distribution of member roles for achieving those goals (Rennecker 2001). Anecdotal and case-based evidence suggests that roles in virtual teams tend to be somewhat ambiguous, leading to members' need for role definition (Kayworth and Leidner 2002). All of the self-doubting questions that any team member asks (What am I doing here? Am I included? Do I belong?) seem to often be even more exaggerated in a virtual setting (Lipnack and Stamps 2000). Virtual teams often lack clean areas of responsibility, preventing members from clearly claiming their "turf" (Wilson et al. 1994), which makes members' linkages to the team and its task especially tenuous. Clear definition of roles in relation to task goals thus strengthens members' sense of belonging on the team. Because of the greater ambiguity, this effect is likely to be more pronounced in virtual than in face-to-face teams, and most pronounced in pure virtual settings, noted as *P*10 in Figure 1.

PROPOSITION 10. *The greater the clarity of members' roles in relation to the team's task, the more salient will be the team as a target for identification, and this effect will be relatively most pronounced in pure virtual teams.*

Labels that confer external legitimacy to the team itself (beyond members' roles) are also important in demarcating the boundaries between the in-groups and out-groups (Ashforth and Humphrey 1995). Leaders of virtual teams may have little or no position power in settings where pay and appraisal decisions are not made in the organization to which members are permanently assigned. And they may have little to do with the career path of members (Wilson et al. 1994). So the legitimacy of virtual teams is often uncertain, at best. As noted earlier, pure virtual teams are relatively invisible to both members and outsiders, making their existence less obvious and less taken for granted than teams that occasionally or always meet face to face, suggesting especially low levels of perceived legitimacy in pure virtual teams.

Mortensen and Hinds (2002) emphasized the pivotal role in team dynamics of members seeing themselves and being seen by others as an intact social entity. Labels of team boundaries are most visible, and thus potentially most boundary defining, when they are assigned from an external position of relatively high authority (Ashforth and Humphrey 1995). To the extent that more visible labels of legitimacy are conferred on the team, the team becomes a more salient target for identification, and this is especially relevant in pure virtual teams where perceived legitimacy is often lowest, shown as *P*11 in Figure 1.

PROPOSITION 11. *The more visible the external legitimacy conferred on a team, the more salient the team will be as a target for identification, and this effect will be relatively most pronounced in pure virtual teams.*

Tolerance for Ambiguity Moderates Situational Effects
Individual differences among team members will moderate the proposed influence of role clarity and team legitimacy, even if these are imposed from positions of authority. Individuals with low tolerance for ambiguity will tend to more readily accept the influence attempts of those in positions of authority than will those with higher ambiguity tolerance (Kruglanski 1996), especially in the face of the greater uncertainties of pure virtual settings, shown as *P*12 in Figure 1.

PROPOSITION 12. *Greater team member tolerance for ambiguity will weaken the proposed effects of role clarity and external team legitimacy on the development of team identification, and this effect will be relatively most pronounced in pure virtual teams.*

Discussion and Conclusions
This paper has adopted a multivariate and multilevel approach to unraveling seemingly contradictory findings and addressing gaps of understanding that remain about the development of identification in virtual and face-to-face teams. Though some degree of virtualness is becoming a way of life in most organizations today, and though research has begun to uncover some of the unique characteristics of virtual teams, there is a great deal we still do not know about them. The purpose of this paper has been to pull together various disparate findings and address gaps that remain to build an integrative framework that will guide future research on identification processes. Table 1 summarizes the central arguments of this paper and their implications.

The characteristics of pure virtual, hybrid, and face-to-face teams noted in Table 1 are all relative to one another and represent common tendencies across each of the three settings, rather than absolute conditions. So even though a given pure virtual team may not be at

all diverse, we have noted the likelihood that virtual teams tend to be more diverse than face-to-face teams. As we become clearer about general tendencies and the most common characteristics of virtual teams, research can move forward to uncover more subtle distinctions. For example, research has documented the large amount of effort and resources required to build and maintain an identified work force (Gossett 2002). Beyond initial attraction of membership, it is thought that organizational leaders need to continually communicate and reinforce the target group's values and provide opportunities for members to express their identification through all kinds of rituals. Our examination of identification development across the different team settings suggests that this is not uniformly so. Very little effort appears to be required to induce swift (though fragile) identification in pure virtual settings. And we have suggested that the most critical efforts vary across settings, from nurturing politeness rituals in face-to-face teams, to providing role clarity and team legitimacy in pure virtual teams, and to encouraging familiarity with lean media in both pure virtual and hybrid teams. It seems clear that one size does not fit all when it comes to identification processes in pure virtual, hybrid, and face-to-face teams.

The implications summarized in the final column of Table 1 suggest reasons why each of the three team settings may be more appropriate for different circumstances and purposes. The implications for face-to-face teams point to the development of long-term identification based on mutual knowledge. In contrast, the implications for teams beginning virtually seem to support mutually shared ignorance among team members. This would not appear to be a reasonable approach for long-term team functioning, but may well be appropriate for short-term projects that benefit from rapid team identification. If longer term functioning is required, it may be wise to initiate hybrid team processes in a face-to-face setting. As we noted earlier, this is likely to result in identification processes that more closely resemble face-to-face teams.

Integrating the various aspects of team identification development allowed us to address and begin to make sense of a number of apparent contradictions in prior research. For example, while some have argued that the development of team awareness in virtual settings is a difficult and slow process (Kraut et al. 2002), others have suggested that team-level boundaries emerge swiftly and easily (Walther 1996); we have proposed that both are true, the former more often in hybrid settings, and the latter in pure virtual teams. Second, while proximity among team members is thought to be a critical driver of identification (Rock et al. 2003), identification often develops across large distances (Wiesenfeld et al. 2001). We have suggested that the moderating effects of proximity are indirect, manifesting in subgroup local distractions, and that these are more likely

Table 1 A Summary View

Common characteristics	Implications for identification	Managerial implications
Pure virtual teams: Absence of face-to-face contact		
• Most uncertainty	• Highly stable category development	• Utilize when rapid identification is important in a distributed and diverse team setting
• Least visibility	• Lack of all face-to-face contact overrides subgroup proximity effects	• Select members with low tolerance for ambiguity to increase speed of identification development
• Fewest rich individuating cues	• Extreme diversity and relative lack of social cues inhibit fault line subgroups, unless media provide visible individuating cues	• Utilize lean media and provide role clarity and team legitimacy
• Most diversity		
• Fewest politeness rituals		
Hybrid teams: Occasional face-to-face contact		
• Moderate degrees of uncertainty	• Highly unstable category development, especially with virtual beginning	• Utilize when speed of identification development is not required in a distributed setting
• Moderate levels of visibility	• Not enough face-to-face contact to override subgroup proximity effects	• Select members with high tolerance for ambiguity to override subgroup proximity and diversity fault line effects
• Intermittent rich individuating cues	• Insufficient diversity and too few politeness rituals to inhibit fault line subgroups	• Utilize lean media to reduce fault line effects
• Moderate degrees of diversity		
• Intermittent politeness rituals		
Face-to-face teams: Frequent face-to-face contact		
• Least uncertainty	• Stability of category development indeterminate	• Utilize when moderately stable long-term identification is important
• Most visibility	• Frequent face-to-face contact overrides subgroup proximity effects	• Select similar (or highly dissimilar) members to inhibit fault line effects
• Greatest number of rich individuating cues	• Politeness rituals keep fault lines from flaring	• Nurture politeness rituals to override fault line effects
• Least diversity		
• Greatest influence of politeness rituals		

in hybrid versus pure virtual settings. Third, while some researchers have proposed that team member diversity makes identification less likely (Griffith and Neale 2001, Pratt et al. 2000), others have noted that a sense of being part of a social group develops easily and quickly in highly diverse settings (Walther 1996). Our model provides a theoretical rationale for claiming that the splintering effects of diversity are greatest in hybrid teams that tend to be only moderately diverse and where that diversity is especially visible. Finally, while visible social cues often facilitate identification (Pratt 1998), those same cues can also act as a hindrance in the process (Postmes et al. 1998). We suggest that visible cues may be a hindrance when they highlight potentially splintering fault line differences in moderately diverse teams, but support identification in more homogeneous teams by making similarities more salient. This paper thus begins to untangle apparent contradictions and to weave a more finely textured and coherent theory of

identification development in pure virtual, hybrid, and face-to-face settings.

Integrating the disparate research on identification across the three settings also allowed us to identify and address gaps of understanding that remain, especially regarding the antecedents of identification and the moderating processes by which it develops. Little has been written about how the antecedents of identification may differ in virtual versus face-to-face settings. Though self-enhancement is one motivating driver of identification, we have provided arguments for why uncertainty reduction needs may be a relatively more powerful motivator in pure virtual settings. In addition, prior research on virtual team identification has focused primarily on characteristics of the team itself (compositional and locational factors), largely ignoring the moderating influences of individual and situational factors. Our model explicitly traced the cross-level interactions among individual, team, and situational factors.

Implications for Future Research

Wonderful research challenges lie ahead. Identification has traditionally been examined in limited settings; that is, in *Fortune 500* companies (Gossett 2002). As various types of virtual settings become more common and better understood, finer grained examinations of identification processes are needed to reveal differences in the antecedents and moderating effects across the different settings. Our paper sets the stage for such finer grained research.

A number of limitations of our model also provide opportunities for future work. Numerous aspects of the model must be further fleshed out. For example, there are many variations of hybrid teams that we did not explore; there are other fault line opportunities in addition to diversity and location; and there are other individual and situational variables that our model does not encompass. We have provided an overarching framework within which such elaboration can occur.

Another limitation is that we held constant the antecedent conditions for team member identification, so as to systematically examine the moderators of the process by which identification develops. In other words, we assumed members' desire to identify so we could uncover and describe the mechanisms that either inhibit or support the process of reaching that end. Future research might examine the extent to which members' desire to *dis*identify with a group is associated with similar or an entirely different set of moderating conditions.

The effects of subgroup identifications also require further study. We have built on prior research that suggests a negative relationship between subgroup and teamwide identifications. The primary rationale for this argument is that subgroup identification distracts attention from the team as a whole, making the team a less salient target for identification. Subgroup linkages may be distracting, but do they necessarily preclude teamwide identification? Cannot both identifications happen simultaneously? People may have as many social identities as they have group memberships. Subgroups and the entire team are distinct targets for identification (Barker and Tompkins 1994, Scott 1997), but they are not likely to be entirely unrelated (Gossett 2002). Might they be positively related? Might not the collocated subgroup members of a dispersed team remind each other that they are part of the team as a whole, thus increasing the salience of the team? Does greater team member mindfulness make it more likely for members to hold both subgroup and teamwide identifications simultaneously?

We noted earlier that proximity and face-to-face contact among team members are highly correlated, and that the proposed proximity effects drop off rapidly when members are not close enough for face-to-face contact. There is a need to tease out the effects of proximity on identification development in virtual teams. How do the effects of proximity differ from the effects of face-to-face contact? How quickly do the effects of proximity fall off with increasing distance?

Diversity is thought to get in the way of team member identification in that it tends to splinter a group along fault lines, especially in hybrid teams. As noted above, there are three dimensions of diversity: informational, value, and demographic. Do different dimensions of diversity have different effects? For example, are fault line subgroups less likely to form around people with similar informational backgrounds than around people with similar demographic features? This question is especially important as it relates to channel expansion, which may reduce demographic diversity cues that potentially splinter a group, but is not likely to eliminate informational or value differences.

We have proposed that communications of role clarity and external team legitimacy are situational factors that have an important influence on boundary definitions, especially in pure virtual teams where those boundaries are often most ambiguous. Given the negotiated nature of identification, it made sense to begin with the effects of situational factors that delineate perceived boundaries. Other more structural aspects of the situation are also likely to inhibit or support identification processes, including team size and hierarchical structure. The influence of these and other relevant aspects of the situation needs to be examined in face-to-face and virtual settings.

Finally, we have suggested that this paper opens the door to finer grained examinations of identification processes in face-to-face, hybrid, and pure virtual teams. How would one operationalize and test the propositions we have put forth? Five sets of variables are required to test the multilevel approach proposed by our model, including measures of (1) identification, (2) team virtualness, (3) team members' perceptions of the likelihood of the team filling their self-enhancement and uncertainty reduction needs, (4) moderating conditions (e.g., diversity, location, and situational factors), and (5) individual and technological effects on those moderating conditions. As noted above, while conceptually distinct, likely covariance among several of these variables (e.g., diversity and location) demands careful selection of measures and statistical analyses appropriate to addressing such potential colinearity. In addition, the tests of the model should longitudinally consider multidirectional causalities. For example, while our model suggests that similarity and proximity moderate the relationship between antecedents and identification, the sense of identification experienced by a team member might also be expected to influence his or her assessments of diversity and location (e.g., because I identify with the team, I perceive us as quite similar and close). Similarly, while the model suggests that clarity of role and team labeling will influence team members' sense of identification, feeling highly identified with a team might also be

expected to influence a member's interpretation of the degree to which the team's roles have been well defined.

According to predictions from the Gartner Group, more than 60% of the professional work force will work in virtual teams by 2004 (Kanawattanachai and Yoo 2002). They also predicted that more than half of all virtual teams would fail to meet either strategic or operational objectives because of the inability to manage a distributed work force. This paper has addressed the pressing need to untangle the confusing array of prescriptions currently facing those attempting to maneuver in a virtual world, and to provide a more integrative framework for understanding and managing identification development in such settings.

Acknowledgments

Endnotes
[1]When not otherwise specified in this paper, "virtual" refers to both hybrid and pure virtual team settings. Moreover, throughout this paper we use the terms "group" and "team" interchangeably.
[2]Fault lines are fractures because of splintering of a group based on characteristics that define a priori subgroups (Lau and Murnighan 1998).

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