

# Cohesion in Distributed Teams

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## ABSTRACT

*In today's educational and work environments, teams often consist of members who are not co-located, and who interact through computer-mediation. Research on such distributed teams has focused on the effects of computer-mediation on decision making, performance, and performance measurement, but, with the exception of a few studies, little research has been done on the social-psychological effects of team distribution with regards to cohesion. This paper describes our current research investigating the effects of team member distribution on team cohesion.*

**Keywords:** Computer-mediated communications; Human-computer interaction, Teams, Cohesion

## INTRODUCTION

In today's educational and work environments, teams often consist of members who are not co-located, and who interact through computer-mediation. Research on such distributed teams has focused on the effects of computer-mediation on decision-making, performance, and performance measurement. With the exception of a few studies, (e.g.; Dewiyanti, Brand-Gruwel, Jochems & Broers, 2007) little research has been done on the social-psychological effects of team distribution with regards to cohesion.

This paper describes our current research investigating the effects of team member distribution on cohesion. We begin with a brief review of the literature on distributed teams, followed by a review of the cohesion-performance literature. We then briefly describe our method, and conclude with some discussion regarding further areas of research, and possible implications of our study.

## DISTRIBUTED TEAMS

We know that communication technology has social system effects that result from changes in what and who people know, what people care about, and altered system interdependencies (Sproull & Kiesler, 1991). On a more specific level, we know that communications media may cause a variety of effects not found in face-to-face communications. It is, however, difficult to make sweeping generalizations about the impact of media on communications beyond those two points, as media vary in their richness and effects. One approach to discussing communications effects was suggested by Clark and Brennan (1991), who categorized different communication modes along the dimensions of sequentiality, audibility, visibility, co-presence, simultaneity, and co-temporality.

Co-temporality refers to whether a message is received at the time it is sent. Simultaneity means that interactants can send messages at the same time, and sequentiality means that interactants' messages stay in sequence. These three media characteristics regulate the flow and continuity of conversation. Without these attributes, the logical sequence of discussions becomes disjointed, and as a result, the psychological distance between communicators increases. This psychological distance brings about increased focus on the task, and a decreased emphasis on the transmission of social information (Kiesler, Siegel & McGuire, 1984; Silvester, Anderson, Haddleton, Cunningham-Snell & Gibb, 2000; Tu, 2000).

Visibility and audibility generate effects on communication through the presence or absence of non-verbal cues. These non-verbal cues also reduce psychological distance and regulate the flow of conversation (Daly-Jones, Monk & Watts, 1998; Grahe & Bernieri, 1999; O'Malley, Langton, Anderson & Doherty-Sneddon, 1996; Rockwell, 2000).

Co-presence simply means that interactants are located in the same physical setting; however, the implications of co-presence on communications are complex.

One effect of co-presence is to make the dyadic partner more salient, more "real;" as a result, the primary impact of social presence is on psychological closeness. The absence of social presence results in: a) reduced other-awareness, b) more uninhibited behavior, c) less responsiveness to another's ideas, d) less public self-awareness, e) more social loafing, and e) more conflict (Anderson, Newlands, Mullin & Fleming, 1996; Chidambaram & Tung, 2005; Fletcher & Major, 2006; Hinds & Mortensen, 2005; Mortensen & Hinds, 2001; O'Malley, Langton, Anderson & Doherty-Sneddon, 1996; Sellen, 1995; Short, Williams & Christie, 1976; Wilson, Straus & McEvily, 2006).

## COHESION

Cohesion is an important component of teamwork. With regards to cohesion and team performance, Mullen and Copper (1994) performed a meta-analysis and found a "small but significant effect," while Carron, Colman, Wheeler and Stevens (2002) conducted a meta-analysis of the cohesion-performance relationship in sports and found a significant moderate to large relationship.

In terms of specific studies, rather than meta-analyses, Michalisin, Karau, and Tanpong (2004) used a resource-based view of firm performance to test the idea that strategic assets, in this case top management team cohesion, would be significantly associated with superior performance, and found that cohesion was, in fact, associated with firm performance. Shamir, Brainin, Zakay, and Popper (2000) investigated the relationship between the perceived combat readiness of Israeli Defense Forces and a number of predictors, and found that the strongest predictor of perceived readiness was identification with the unit. Spink, Nickel, Wilson, and Odnokon (2005) examined male ice hockey players and found that task cohesion predicted variance in team task satisfaction. Zaccaro, Gualtieri, and Minionis (1995) focused on task cohesion as a facilitator of team decision making under stress, and found that highly cohesive teams under pressure performed better than teams low in cohesion. Similarly, Eys, Hardy, Carron and Beauchamp (2003) examined the effect of group cohesion on anxiety in sports teams, and found that cohesion was negatively correlated with anxiety.

## METHOD

Two identical undergraduate classes, one on-line and one classroom-based, will be assigned a team project. At the end of the semester, students in both classes will be asked to evaluate their team's functioning and cohesion, using a modified version of a scale developed by Powers, Sims-Knight, Topciu, and Haden (2002).

Each team's final product and satisfaction with the process will be evaluated by two independent raters. Therefore, determining inter-rater reliability (IRR) is a pre-requisite before aggregating the data. Several methods exist for evaluating IRR; percentage agreement (Linn & Gronlund, 2000), the  $r_{wg}$  statistic proposed by James, Demaree, and Wolf (1993), Cohen's kappa ( $k$ ), pairwise correlation, various chi-square tests, and Kendall's coefficient of concordance (Tinsley & Weiss, 1975). Unfortunately, there is no obvious choice of an index of agreement. Dunlap, Burke, and Smith-Crowe (2003) suggest that IRR should assess that a reasonable consensus exists to aggregate individual level data to the group level, and that it should allow the conclusion that the apparent agreement for the group is significantly different from chance responding. Burke, Finkelstein, and Dusig (1999) proposed the average deviation (AD) index, which is the method chosen in this study.

Only those groups with AD on satisfaction scores that indicate acceptable levels of agreement will be used in further analysis. For the ratings of product quality, AD will be used as the metric to determine whether further rater training is required to reach acceptable levels of inter-rater agreement.

For all satisfaction measures, t-tests will be used to compare means between the two groups. In addition, we plan to stratify respondents by project quality, and examine differences in responses by strata.

## CONCLUSION

In today's educational and work environments, virtual teams are becoming more common. Although the specific effects vary by the type of media used, commonalities are: increased psychological distance between communicators, increased focus on the task and a decreased emphasis on the transmission of social information; less responsiveness to another's ideas; more social loafing, and more conflict.

Improving cohesion in virtual teams may be a solution to some of these problems, as research indicates there is a significant relationship between cohesion and performance; cohesion and task satisfaction; cohesion and stress, and cohesion and perceived social loafing. One of the few studies that examined group cohesion in distance learning found that cohesion influenced students' satisfaction (Dewiyanti, Brand-Gruwel, Jochems & Broers, 2007). While not directly examining cohesion, Hinds and Mortensen (2005) investigated the relationship between distributed teams and conflict, and found that shared identity – an aspect of cohesion – moderated the effect of distribution on conflict.

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