

2004

# Prelude to virtual groups: Leadership and technology in semi-virtual groups

Terri L. Griffith

*Santa Clara University*, [tgriffith@scu.edu](mailto:tgriffith@scu.edu)

David K. Meader

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## Recommended Citation

Griffith, Terri L. and David K. Meader. "Prelude to Virtual Groups: Leadership and Technology in Semi-Virtual Groups." *Virtual Teams: Projects, Protocols and Processes*. IGI Global, 2004. 231-254.

This chapter appears in *Virtual teams: Projects, protocols and processes* edited by David J Pauleen Copyright 2004, IGI Global, [www.igi-global.com](http://www.igi-global.com).

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<http://doi.org/10.4018/978-1-59140-166-7.ch010>

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# **Virtual Teams: Projects, Protocols and Processes**

David J. Pauleen  
Victoria University of Wellington, New Zealand



**IDEA GROUP PUBLISHING**

Hershey • London • Melbourne • Singapore

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Cover Design: Lisa Tosheff  
Printed at: Integrated Book Technology

Published in the United States of America by  
Idea Group Publishing (an imprint of Idea Group Inc.)  
701 E. Chocolate Avenue, Suite 200  
Hershey PA 17033  
Tel: 717-533-8845  
Fax: 717-533-8661  
E-mail: [cust@idea-group.com](mailto:cust@idea-group.com)  
Web site: <http://www.idea-group.com>

and in the United Kingdom by  
Idea Group Publishing (an imprint of Idea Group Inc.)  
3 Henrietta Street  
Covent Garden  
London WC2E 8LU  
Tel: 44 20 7240 0856  
Fax: 44 20 7379 3313  
Web site: <http://www.eurospan.co.uk>

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#### Library of Congress Cataloging-in-Publication Data

Virtual teams : projects, protocols and processes / David Pauleen,  
editor.

p. cm.

ISBN 1-59140-166-6 -- ISBN 1-59140-167-4 (ebook) -- ISBN 1-59140-225-5  
(pbk.)

1. Virtual work teams. 2. Teams in the workplace. I. Pauleen, David,  
1957-

HD66.V56 2003

658.4'022--dc22

2003014947

Paperback ISBN 1-59140-225-5

#### British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

## Chapter X

# Prelude to Virtual Groups: Leadership and Technology in Semivirtual Groups

Terri L. Griffith  
Santa Clara University, USA

David K. Meader  
University of Arizona, USA

### Abstract

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*A study of 76 more and less virtual investment clubs examines the relationships between communication technologies used for club business (from face-to-face to more highly technologically enabled), group leadership role behaviors, and club portfolio value. The results are interesting, with more and less virtual clubs benefiting from different forms of leadership behaviors. Clubs using fewer technologies seem to benefit from a greater focus on socioemotional role (communication) behaviors, while the opposite is found in clubs using more technologies. The effect for procedural role behaviors (agenda setting and the like) appears to run in the opposite direction: clubs using more technologies seem to benefit from a greater*

*focus on procedural role behaviors, while the opposite is found in clubs using fewer technologies. Managers take into account obvious and subtle differences between more and less virtual groups.*

## Introduction

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Virtual groups, groups that use technology to navigate the physical or temporal separation of their members, are expected to increase as markets expand globally and communication technologies proliferate. However, research on virtual groups is still in its infancy (e.g., see the brief reviews in Griffith & Neale, 2001; Warkentin, Sayeed, & Hightower, 1997), even though almost one third of 100 sampled Fortune 500 firms report they have virtual work in place (Davenport & Pearlson, 1998). Not surprisingly, of this same sample of Fortune 500 firms, only a “few” addressed the skills needed for managing in a more virtual environment.

In the last few years, the research landscape has begun to change. Across the range of traditional and more virtual groups, there are theoretical considerations of information processing (Griffith & Neale, 2001), group identification (Pratt, Fuller, & Northcraft, 2000), and conflict management (Mannix, Griffith, & Neale, 2002). There is also empirical work focused on trust (Jarvenpaa & Leidner, 1999), the formation of group norms (Postmes, Spears, & Lea, 2000), communication dynamics (Tidwell & Walther, 2002), and the development of relationships (Walther, 1995). However, field-based research (versus laboratory, often student-based research) forms the minority of the empirical studies (though see Gibson & Cohen, 2003; Hinds & Kiesler, 2002; Majchrzak, Rice, Malhotra, King, & Ba, 2000; Maznevski & Chudoba, 2000, for some current examples of field-based research). Our purpose in this chapter is to examine, in the field, the most prevalent form of work group—semivirtual groups—to describe certain important leadership dynamics in these groups. In particular, we aim to answer these questions:

- What role does leadership play in the success of more virtual groups?
- Which leadership behaviors have which impacts?
- Why do these behaviors have the impacts they do?

We draw the answers from a study of investment clubs that vary in their internal communications across the continuum of traditional interaction (face-to-face) to semivirtual interaction (both face-to-face and electronically mediated interaction; Wiberg & Ljungberg, 2001). These clubs allow their members to pool their

money, expertise, and efforts for the purposes of investment success, and to a greater or lesser degree, financial education and social interaction. As of 1998, there were over 36,000 of these clubs in existence, and their numbers were growing at a rate of 40 a day (Kadlec, 1998).

In the sections to follow, we present background information on semivirtual teams and leadership role behaviors. The background information is followed by a discussion of how the need for various leadership role behaviors may vary in semivirtual teams. We then present the description of our investment club study followed by an overview of the study's results and our subsequent recommendations. We conclude with suggestions for how managers and researchers can learn more about the obvious and subtle differences across the full range of group contexts.

## **Background**

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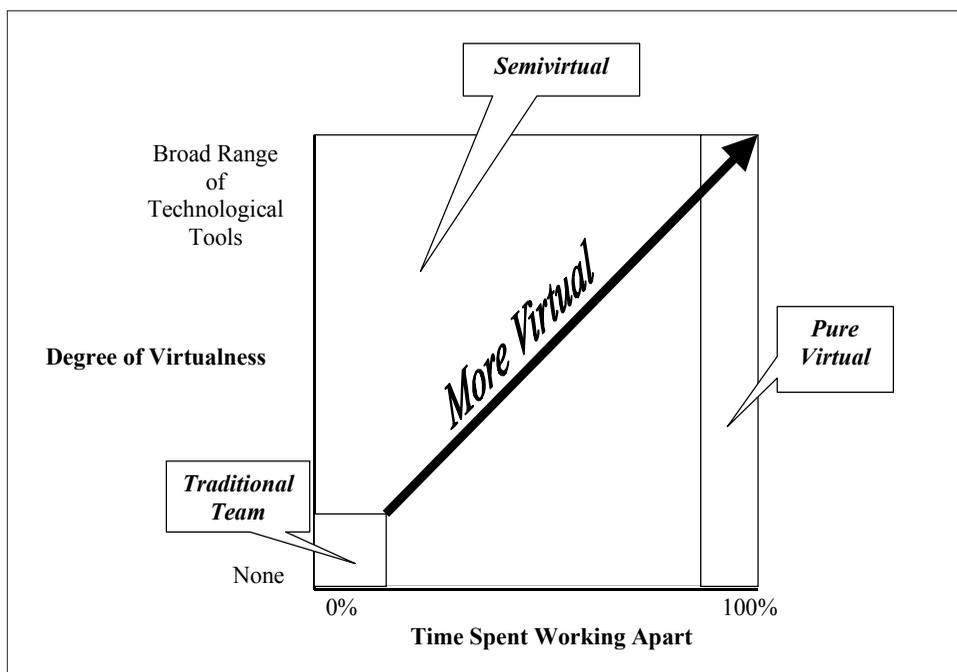
### **Traditional, Semivirtual, and Pure Virtual Groups**

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There is no real reason that groups must work face to face. Classic characteristics of a "group" include interaction, interdependence, mutual awareness, a past, and an anticipated future (McGrath, 1984, p. 6). Being a group means that group members must communicate, directly (perhaps through electronic media<sup>1</sup>) or indirectly (e.g., by passing along different stages of completed work), in order to complete the group's work and to develop a sense of being a group. Purely virtual groups, then, are groups that work without any face-to-face contact. However, precisely what the structure of a virtual group is remains tough to pin down. Researchers use the term "virtual group" to mean different things, with no one definition universally accepted (Mowshowitz, 1997). Many take it to mean, simply, geographically or temporally distributed (Nunamaker, Briggs, Romano, & Mittleman, 1998; Warkentin et al., 1997), while others focus on qualities that make virtual groups different from face-to-face groups. Turoff (1997) focused on the adaptability and resiliency of virtual teams to meet unanticipated needs. Others discussed the need for multiple media to support group member interaction (Nunamaker et al., 1998), while still others focused on the global and intercultural natures of many of these groups (e.g., Maznevski & Chudoba, 2000). We acknowledge the value of these dimensions but believe at this stage of our understanding that we should focus on the variety of technologies used in the group's work. This approach is then applicable to groups a world or a cubicle apart, culturally heterogeneous or homogeneous, synchronous or asynchronous, linguistically familiar or different.

We see virtualness more as a continuum of context rather than a discrete differentiation of face-to-face and virtual [at the higher level of virtual organization, Venkatramen (1998) argued for a similar view]. While the bulk of computer-mediated communication research focuses on the dichotomy of face-to-face versus virtual (such as media richness theories), the existence of semivirtual groups, groups that meet face to face as well as virtually, seems to predominate the industrial scene (Griffith, in press; Nunamaker, 1998; Warkentin, 1997; Ziguers, 2003). We suggest that managers can fruitfully consider two dimensions of virtualness in designing and managing such groups: level of face-to-face interaction and variety of technological support. Within these dimensions, we see three categories of groups. Members of traditional groups perform group activities only face-to-face and without technology support. Members of pure virtual groups perform their activities completely apart, though generally with varying amounts and types of technology support (such as e-mail, videoconferencing, or knowledge management systems). Members of semivirtual groups probably make up the majority of all groups in businesses. These groups interact over time, according to the needs of the moment, and use a variety of technological tools. While we reserve the term “pure virtual” for groups that never work face to face, we propose that this two-dimensional approach to the

*Figure 1. Two-Dimensional Model of Virtual Groups (Adapted from Griffith & Neale, 2001)*



range of virtualness will help managers plan for and run productive groups across the range of virtualness likely to be seen in organizations. Illustrated in Figure 1 is this perspective, though it is beyond the scope of this chapter to examine the framework in detail.

In our field study of investment clubs, we adopt this emerging view of varying degrees of virtualness, rather than a simple dichotomy between face-to-face and virtual. Virtualness means the degree to which group members use a variety of communication technologies for their interaction. High virtualness means extensive use, and low virtualness means minimal use. However, we have had to exclude purely virtual groups in the current field study based on the limited availability of such investment clubs (only two such clubs were identified at the time of our study). So, in this chapter, we look at the range of traditional and semivirtual groups. Situations where face-to-face communication never occurs are left for future work. This approach lets us consider the most common parts of the continuum (semivirtual groups), while also letting us focus our analyses on the technology dimension of virtualness.

## **What We Know about Leadership Roles in Groups**

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We look at the dynamics of virtual groups from the perspective of how virtualness and leadership roles work together in groups. We examine groups on a continuum based on the variety of technology used for communicating about club business. Below we present background on group leadership roles, and then in the next section make the link: How do degree of virtualness and leadership behaviors work together to determine a group's success?

Leadership behaviors are important in organizations generally, and in groups specifically. The study of leadership has an extensive background in the social sciences, and specific leadership roles that people play are useful for understanding how technologically enabled groups perform (e.g., Ziguers & Kozar, 1994). Groups need people who can do the task, people who can organize the task, and people who can motivate the members to participate (Steiner, 1972). Certain combinations of these observable behaviors constitute leadership *roles*. However, in this line of thinking, any member of a group can demonstrate leadership behaviors at various times and situations—leadership then is not restricted to just one person, even the “official” leader. The key is that someone performs a specific behavior, and this action provides structure for the group's functioning. We chose to study group leadership role behaviors (versus other leadership topics such as information processing, conflict management, leader identification, leader style, etc.), because they provide an effective and basic lens through which we can see the structure and dynamics of semivirtual groups. Without the presence of these roles, it is difficult for a group to succeed.

Current research describes task, procedural, and socioemotional leadership roles. Ketrow (1991) summarized the different leadership role categories as follows:

- The **task leadership role** (also sometimes called the analytical role) deals with the generation and evaluation of information necessary to the goal of the group.
- The **procedural leadership role** deals with directing the group's actions.
- The **socioemotional leadership role** deals with the activities that motivate contribution and cooperation within the group.

## What We Need to Know

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### Group Leadership Roles and Technology

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What we know about the different communication technologies provides mixed insight into how group leadership roles will function in semivirtual groups. Most studies focus on e-mail, chat rooms, bulletin boards, and videoconferencing, but do not consider these activities under the lens of leadership role behaviors. For example, communication in media with fewer social context cues is more likely to result in uninhibited communication (Sproull & Kiesler, 1986), yet in some circumstances may also lead to more personal relationships than communication through media with more social context cues (Walther, 1995). Computer-mediated work is likely to be more task focused (Jarvenpaa, Rao, & Huber, 1988) and direct (Tidwell & Walther, 2002), yet people may be less likely to notice the passage of time (Webster, Trevino, & Ryan, 1993). Sproull and Kiesler (1991) noted that electronic communication creates situations where “People don’t establish or enforce deadlines; they lack norms for smooth teamwork; they fail to resolve inefficient or inequitable time demands” (p. 53). Broadly, semivirtual teams may experience more and different types of conflict than traditional teams, resulting in undesirable outcomes, unless team processes are effectively managed (Mannix et al., 2002). Leadership role behaviors are key to this management.

When group leadership role behaviors and degree of virtualness are considered together, moderated effects may surface—that is, both the type of behavior exhibited and the type of group (more or less virtual) may matter to the outcome. For example, groups further toward the pure virtual end of the continuum may perform their tasks in enriched information contexts (if they are using a broad

range of technologies) and so will have to manage the additional complexities presented by using these multiple technologies before they can gain any benefit of the enrichment. Let us look at the investment club field study to investigate these issues in a real-world context.

## Field Study

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Our field study of investment clubs lets us examine the relationships between three factors: the variety of communication technologies used for club business (from traditional to semivirtual settings), group leadership role behaviors, and club portfolio value. These results generalize to a broader range of public and private groups that function in semivirtual settings, given that we are looking at these issues within the context of functioning groups with real money on the line. As we noted earlier, investment clubs are comprised of groups of people who combine their money, efforts, and expertise to make pooled stock market investments. As of January 2003, investment clubs had more than \$125 billion (USD) invested (<http://www.better-investing.org/about/fact.html>).

All of the clubs in this study met once a month to share their investment research and to make group investment decisions. These clubs vary in whether and how they communicate the rest of the month. The traditional clubs have limited interactions and rely on their monthly face-to-face meetings to exchange information. The semivirtual clubs interact to varying degrees over varying technologies over the course of the month.

In the sections below, we provide a full description of the hypotheses and analysis. This is a relatively “academic” section. If this is not your interest, we suggest going directly to the “Overview of Results,” “Recommendations,” and “Conclusions,” sections, where we present the results in context with the implications for management.

## Hypotheses

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### *Socioemotional Leadership Role Behaviors*

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Socioemotional leadership role behaviors affect the management of contributions and cooperation within the group. In particular, the goal of socioemotional leadership role behaviors is to make the information stored within the members of the group available for the use of the group as a whole. That is, get people to engage themselves in the work. There are two ways to explain how the degree of virtualness will interact with socioemotional leadership role behaviors. The

first is that more socioemotional leadership role behaviors may be needed to manage members' communications and contributions effectively in context with more virtualness. Communication may be electronic (e-mail, fax, etc.), reducing the availability of visual, nonverbal cues (Sproull & Kiesler, 1986). Members may have to deal with information from a variety of sources, each with different perceived media richness (Carlson & Zmud, 1999).

The second argument is that socioemotional leadership role behaviors are actually less necessary in groups with more virtualness. There are two components to this argument. First, the more complex technological context may reduce the socioemotional expectations for the group, and so less socioemotional effort is necessary. This latter contrast is similar to Locke's (1976) range-of-affect argument for job satisfaction (i.e., level of satisfaction is a function of what is expected, what is received, and how important the issue is overall). Group members in settings with high virtualness may understand and expect that various technologies will likely filter the leadership behaviors for contribution and cooperation and so will take more individual responsibility to perform as needed. That is, group members may structure their social and technical interactions to incorporate this understanding (e.g., DeSanctis & Poole, 1994). The second component of this argument is that a broader range of technological tools may provide more opportunities to communicate over time as well as greater ability to document and maintain access to information that is communicated. In essence, the technology may be performing socioemotional leadership role behaviors by enabling enhanced communication within the group (though prior research suggests that the group members will not perceive the role of the technology in this way) (Zigurs & Kozar, 1994).

To summarize these two arguments:

1. The successful performance of these leadership behaviors is important to the group's performance, yet these behaviors will be harder to pull off in groups with more virtualness.
2. Groups understand that socioemotional leadership role behaviors will be harder to pull off in groups with higher virtualness; however, as a result, these group members may have reduced expectations regarding the performance of these role behaviors and may be motivated to contribute anyway because of their expectations and through the opportunities provided by the technology.

Indeed, if group members in highly virtual groups perceive high levels of socioemotional leadership behaviors occurring, then these behaviors may be occurring at a level that is actually harmful to the group's performance. Both of these arguments suggest that the degree of virtualness will moderate the effect

of socioemotional leadership role behaviors, though prior research does not provide much evidence for the direction of this moderation. In summary:

*H1: The effect of socioemotional leadership role behaviors on group outcomes will be moderated by degree of virtualness.*

## **Procedural Leadership Role Behaviors**

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Procedural leadership role behaviors, in general, affect how the group does its work. We expect virtualness to increase a group's procedural complexity; that is, make it more complex to do their task. More virtual groups have to manage more information, more information sources, and more communication media than do less virtual groups. Groups adopt technology tools, because they provide increased capability or other relative advantages, such as speed of communication, ability to work around time zones, etc. (e.g., Igarria, Zinatelli, Cragg, & Cavaye, 1997). However, these benefits only come to fruition if the group manages the technology effectively (e.g., DeSanctis & Poole, 1994). The greater the variety of procedural leadership role behaviors, the better the group may manage their increased capabilities for the benefit of the groups' outcomes.

*H2: The effect of procedural leadership role behaviors on group outcomes will be positively moderated by degree of virtualness.*

## **Task Leadership Role Behaviors**

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Task leadership role behaviors, in general, affect the generation and evaluation of ideas relating to the group's goals. Here, we expect the impacts of task leadership role behaviors to be moderated by degree of virtualness, the degree of reliance on technology tools. People become more task focused in computer contexts in general, and in successful virtual teams, more specifically (Jarvenpaa, Knoll, & Leidner, 1998). This research finding is also supported by Walther's (1995) study of face-to-face versus purely computer-mediated virtual groups. If teams with higher virtualness are already task focused (perhaps an implicit focus on evaluation of ideas), we believe that group members may actually hurt, or at least offer no improvement, if they perform task leadership role behaviors (such as additional explicit evaluation of ideas).

*H3: The effect of task leadership role behaviors on group outcomes will be negatively moderated by degree of virtualness.*

Finally, we must also acknowledge that the relationship between leadership role behaviors and degree of virtualness is more complex than we will look at here. The nature of the task is clearly an additional moderator of technology and group outcomes (e.g., McGrath & Hollingshead, 1994, pp. 66–70). However, in this study, the nature of the task is the same across all groups, so task cannot be empirically examined. Also, the cross-sectional nature of this study limits our ability to study groups' evolution. Barley (1986) and DeSanctis and Poole (1994), to name a few, noted that technology use and technology structure vary over time and with use. Examination of these processes is beyond the scope of the current work.

## **Method**

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### *Sample and Procedure*

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We identified prospective subjects with three different methods. First, we asked the National Association of Investors Corporation (NAIC, the association guiding most investment clubs in the United States) for their support. The NAIC then provided us with the names of regional contacts for Arizona and Missouri. These contacts then provided us with the names of individual club presidents, who we then contacted and asked to distribute surveys at their next meeting. (Although many respondents had access to the Internet, we used a hard-copy survey to control for methods bias across the respondents.) Ninety-three surveys were obtained in this manner. The second method involved posting an electronic call for participation on the NAIC listserv. Interested parties contacted one of the authors via e-mail and were then mailed hard copies of the survey. Fifty-five surveys were obtained in this manner. The third method involved extracting e-mail addresses from every NAIC member club website. Calls for participation were e-mailed to this list of addresses, and hard-copy surveys were sent to those indicating an interest. Seventy-one surveys were obtained in this manner. All participants were offered the results of the study in return for their participation, as well as an opportunity to win \$40 worth of lottery tickets in their home state. Two hundred and nineteen investment club members completed surveys. From this group, we selected 76 respondents who were members of clubs that had existed for at least one year; provided full data on the study variables; met face-to-face at least once a month; and in case of multiple respondents from a particular club, had the longest tenure. The third hurdle resulted as respondents

from only two clubs indicated that their club met without any face-to-face interaction. These represented pure virtual groups. Although very interesting, this small sample size prevented us from including them with the rest of the sample.

The clubs had an average of about 16 members (Standard Deviation = 7.31). Thirty-nine percent of the respondents were female, and the average age was about 47 (Standard Deviation = 13.82). While 100% of the clubs reported once a month face-to-face meetings, 88% indicated that they also used the telephone, 63% e-mail, 29% fax, and 33% the World Wide Web to conduct group business. Thus, 88% of the clubs fall into the “semivirtual” category in Figure 1, and 12% fall into the “traditional” category.

## Measures

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We measured the degree of virtualness by assessing all methods of communication used by the club in addition to their scheduled face-to-face meetings (recall that all respondents come from clubs who have one scheduled face-to-face meeting per month). Face-to-face, phone, e-mail, fax, and the World Wide Web were all offered as responses. Degree of virtualness is equal to the sum of the number of technologies group members reported using. Thus, a respondent from a club using only face-to-face communication would have a degree of virtualness = 1; a respondent from a club making use of all five listed forms of communication would have a degree of virtualness = 5.

As noted above, this research represents a conservative test of the hypotheses. Our measure of degree of virtualness does nothing to distinguish between uses of the technologies that are effective versus ineffective or sporadic versus constant; the level of information transmitted; or the richness the particular technology (channel) is perceived to have (e.g., Carlson & Zmud, 1999). The degree of virtualness measure does, however, provide an objective assessment of the complexity of the club’s communication context. An ideal approach for this study (and many others) would be access to the full content of all communication between the group members. In this setting, that would have required full e-mail logs, tracks of Internet use, videotapes of club meetings, and recordings of all other communication. We chose, instead, to collect the data from real groups without in any way affecting their actions. This type of research has been called for (e.g., O’Mahony & Barley, 1999) to balance the wealth of excellent laboratory and e-mail studies, which allow access to the full content of group communication. The error variance in our approach should be unbiased, and the noise serves to decrease our likelihood of a significant result, making our results more robust. This is in contrast to other methods, where error variance

*Table 1. Adapted Ketrow (1991) Leadership Role Behavior Descriptions*

Procedural1	Tries to keep the group's interaction focused on the agenda
Procedural2	Integrates the actions and contribution of others
Procedural3	Makes certain the discussion or meeting keeps moving
Procedural4	Restates ideas and suggestions of others for clarity
Socioemotional1	Encourages each participant to give his/her best effort
Socioemotional2	Encourages individuals to participate
Socioemotional3	Encourages people to work as a team
Task1	Amplifies ideas and comments when he/she thinks it is needed
Task2	Encourages participants to engage in the critical examination of ideas
Task3	Introduces information from qualified sources to confirm, dispute, or otherwise explore ideas being presented

might be biased toward one media or another (e.g., time spent communicating—typing takes longer than speaking; word counts—fewer in text versus oral media; or number of communications—a series of e-mails may in fact be one conversation).

We assessed socioemotional, procedural, and task leadership role behaviors using an adapted form of Ketrow's (1991) leadership role behavior descriptions (see Table 1). Ten behavioral descriptions (three socioemotional, four procedural, and three task) were presented on the questionnaires, and the respondents were asked to identify by name people in the club who best fit the given description. The survey indicated that "none" and "don't know" were also appropriate answers. Percentage of leadership role behavior coverage (that is, the number of behaviors occurring in a group) for each of the three categories was constructed by whether or not at least one person had been indicated for the behavior, divided by the number of behaviors represented in that leadership role behavior category. For example, percentage of socioemotional leadership role behavior coverage was created by adding the number of socioemotional leadership role behaviors attributed to group members (i.e., not left blank or answered with "none" or "don't know"), divided by three. We believe this measure of leadership role behavior coverage is the most conservative approach to assessing leadership role behaviors from a survey instrument. This approach is also consistent with the idea that different people in a group can perform leadership role behaviors, and that over time, such behaviors can rotate among group members (see for example, Zigurs, 2003). It is not necessary or even likely in many groups for just one person to do all the leadership behaviors. We measure whether or not the group member perceived others acting on the particular behavior, rather than asking the respondent to retrospectively speak to the number of behaviors, the quality of behaviors, etc.

Club age and number of members serve as control measures, as described below. Current portfolio value is a self-report measure, though a salient and objective one. All respondents provided data during the same three-month period (Spring 1997), during which time the S&P 500 Index grew 18% (760 to 900). We were not able to explicitly disentangle the portfolio value attributable to club dues versus stock appreciation, dividends, etc. However, we control for the number of members contributing dues (the only source of capital for these clubs) and club age (the number of years capital contributions have been made to the club's portfolio). (Specific levels of dues for each club were not measured, but are generally \$25 to \$50 per person per month) (O'Hara & Janke, 1996.) As the relationship between capital contributions and the study variables is a multiplicative one (current portfolio value = number of members  $\times$  age of club  $\times$  management of capital in terms of degree of virtualness and leadership role behaviors), we made a log transformation to enable analysis by ordinary least squares.<sup>2</sup>

## Results

Provided in Table 2 are correlations and descriptive statistics. We conducted a multiple regression analysis to test for the hypothesized effects (see Table 3). As noted above, we used the number of members and the club's age as control variables to focus the examination on the part of portfolio value that was not a simple function of the deposit of club dues over time.

Table 2. Descriptive Statistics and Correlation Coefficients<sup>a</sup>

Variable	Mean sd	1	2	3	4	5	6
1. % Socioemotional Leadership Role Behaviors Covered	.80 .29						
2. % Procedural Leadership Role Behaviors Covered	.85 .26	.45					
3. % Task Leadership Role Behaviors Covered	.83 .25	.47	.54				
4. Degree of virtualness	3.13 1.08	.13	.29	-.01			
5. ln(Number of Members)	2.71 .43	-.01	.06	.04	.03		
6. ln(Club Age)	.99 .78	-.24	-.25	-.24	-.30	.07	
7. ln(Current Portfolio Value)	9.80 1.13	-.22	-.12	-.24	-.09	.44	.71

<sup>a</sup> $N=76$ , critical value = .22 ( $p < .05$ , two-tailed).

Table 3. Regression Results

Variable	ln(CPV) F(9, 66) = 21.69 p < .0001 R <sup>2</sup> = .75 Adj. R <sup>2</sup> = .71
Constant <sup>a</sup>	5.70***
% Socioemotional Leadership Role Behaviors Covered	3.18***
% Procedural Leadership Role Behaviors Covered	-2.30
% Task Leadership Role Behaviors Covered	-.20
Degree of virtualness	.20
Degree of virtualness x % Social Leadership Role Behaviors Covered	-.94***
Degree of virtualness x % Procedural Leadership Role Behaviors Covered	.77*
Degree of virtualness x % Task Leadership Role Behaviors Covered	-.07
ln(Number of Members)	.89***
ln(Club Age)	1.11***

<sup>a</sup>Parameter estimates are non-standardized \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

This is what the parameters of the resulting regression mean:

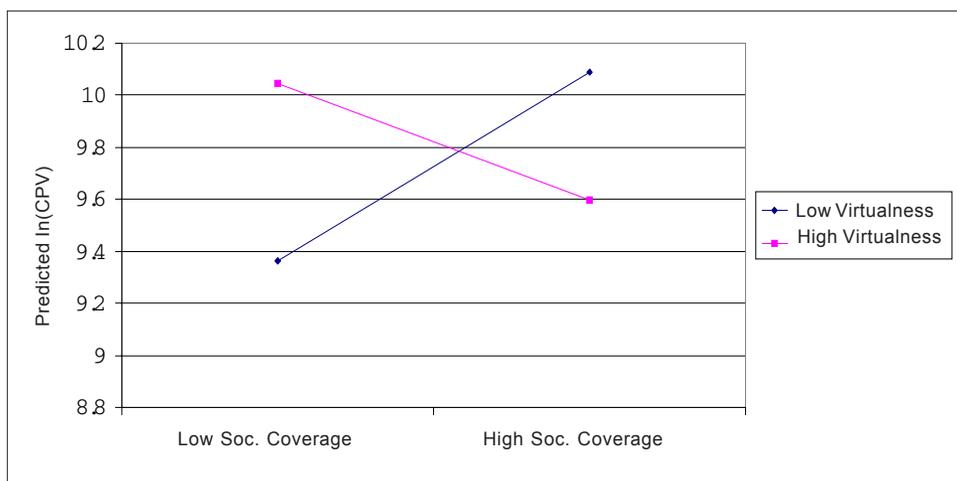
- For each percentage change in the number of members or the club age there is a predicted percentage change in current portfolio value
- For each unit change in the remaining terms, there is a predicted percentage change in current portfolio value

The overall model  $F$ -test for the log of current portfolio value (lnCPV) was significant. As a result, it was appropriate to test the separate hypotheses (Pedhazur, 1982). These results are presented in Table 3.

**Hypothesis 1** proposed that the effect of socioemotional leadership role behavior coverage on group outcomes would be moderated by degree of virtualness. As shown in Table 3, the regression analysis revealed a significant negative interaction between degree of virtualness and socioemotional leadership role behavior coverage. Shown in Figure 2 is an illustration of these effects. Following from Cohen and Cohen (1983, pp. 320–325), the regression parameters are used to generate predicted scores for high and low values of the moderating variables. Mean scores are entered for all predictors except the moderators. High and low values of the moderators are created by adding or subtracting one standard deviation from the mean. By examining these predicted scores, it appears that percentage of socioemotional leadership role behavior coverage had a positive impact in groups with a low degree of virtualness but a negative one in groups with a high degree of virtualness.

**Hypothesis 2** proposed that the effect of procedural leadership role behavior coverage on group outcomes would be positively moderated by degree of

Figure 2. *Socioemotional Role Coverage by Virtualness Interaction*



virtualness. As shown in Table 3, the regression analysis of lnCPV found a significant positive interaction for degree of virtualness and percentage of procedural leadership role behaviors covered. Shown in Figure 3 is an illustration of these effects. Examination of the predicted scores suggests that level of procedural leadership role behaviors had a positive impact in high degree of virtualness groups but a negative one in low degree of virtualness groups.

**Hypothesis 3** proposed that the effect of task leadership role behavior coverage on group outcomes would be negatively moderated by degree of virtualness. Hypothesis 3 was not supported. Discussion of this, and the preceding results, follows.

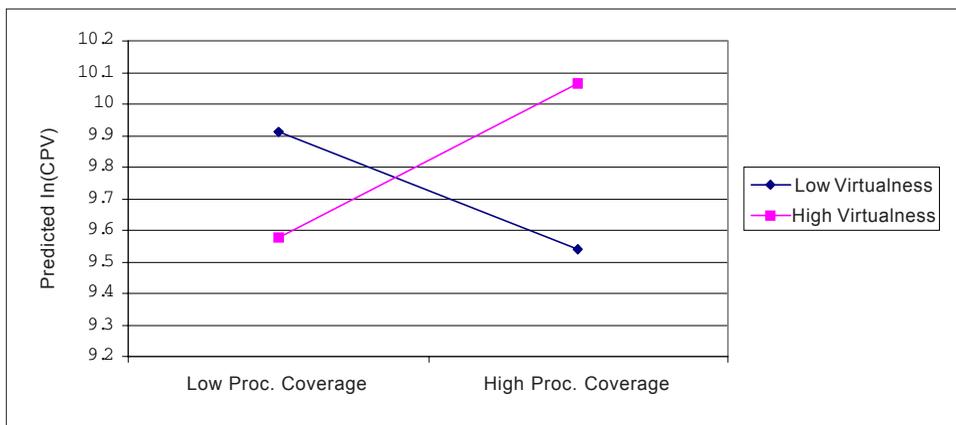
## Overview of Results

We asked three questions at the beginning of this chapter:

- What role does leadership play in the success of more virtual groups?
- Which leadership behaviors have which impacts?
- Why do these behaviors have the impacts they do?

In the following sections, we provide the answers suggested by our research in investment clubs.

Figure 3. Procedural Role Coverage by Virtualness Interaction



*What role does leadership play in the success of more virtual groups?* This has a complicated answer. We found opposite results for socioemotional (activities that motivate contribution and cooperation within the group) and procedural leadership role behaviors (activities that direct the group's actions). That is, we found that the more virtual a group was, the *less* socioemotional leadership behaviors benefited the group. Also, we found that the more virtual a group was, the *more* procedural leadership behaviors benefited the group's performance. Shown in Figures 2 and 3 are these results, and we discuss them more below. We found no clear effect for task leadership role behaviors (activities related to the generation and evaluation of information related to the task).

*Which leadership behaviors have which impacts?* As expected from some prior research, members in more traditional clubs (less virtual) had greater success when they performed more of the socioemotional leadership role behaviors. However, in more virtual clubs, these behaviors appear to hurt club performance. We anticipated the latter result, but nevertheless, it remains intriguing.

The results for procedural leadership role behaviors were also interesting. More virtual clubs with members who performed more procedural leadership role behaviors tended to be more successful in terms of portfolio value. However, in more traditional clubs, this variety of procedural leadership role behaviors tended to result in less successful performance.

*Why do these behaviors have the impacts they do?* Club members may be making informed decisions relating to the way they work. For example, in more virtual settings, they may have learned that fewer socioemotional leadership role behaviors are necessary to effectively perform. More virtual settings provide

opportunities for all members to contribute. Requests for contributions beyond some perceived threshold may create information overload or other process losses. In less virtual settings, more traditional management of group communication may be required to obtain effective levels of contribution.

The results for procedural leadership role behaviors mean several things. First, analyzing and making decisions about stock investments with real money is a complex task, requiring interdependent work and access to large amounts of specialized data. Nearly a third of the respondents reported using the Web, and two thirds reported using e-mail to conduct club business. Because the 1996 NAIC guidelines (O'Hara & Janke, 1996) provide no advice on the use of electronic communication media in group work, group members must create protocols and cues to use these media well. If members do not pay attention to work procedures, then the group will likely be ineffective in sharing vital information and, therefore, make poor investment decisions. Or, they could make fewer decisions in a given time period and miss, at least in the bull market alive during this study, opportunities for substantial portfolio appreciation.

However, the negative effect in the less virtual clubs is surprising given prior research on group leadership roles and outcomes. The structure of the NAIC may again provide an explanation. Although the NAIC does not provide advice on how to run group work in more virtual clubs, it provides detailed advice on how to run face-to-face meetings (O'Hara, 1996). It may be that for less virtual clubs, high levels of procedural leadership role behaviors, in addition to the focus on running a meeting already provided by NAIC guidelines, may drive out opportunities for profitable work.

## **Recommendations**

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We found two clear managerial implications about leadership in semivirtual groups. First, more virtual groups benefit from less effort to motivate members' contributions and cooperation (socioemotional leadership behaviors). Less virtual groups benefit from more effort to motivate members' contributions and cooperation. This means that members and managers of semivirtual groups should gauge their attempts at facilitating contribution and cooperation based on their group's context. It may be that, at some point, greater use of technology provides ample opportunities for participation and cooperation, and beyond that point additional socioemotional leadership role behaviors just get in the way of productive action.

Second, more and less virtual groups also respond in opposite ways to procedural facilitation of the group. In the investment clubs studied here, more virtual groups

benefit from more focus on procedure, while less virtual groups benefit from less focus on procedure. Members and managers of groups need to consider their virtualness if they are to perform to their highest potentials. More virtual groups, and their more complex contexts, may need additional efforts to maintain high levels of performance. These groups may need more standard operating procedures to manage the variety found in their work context.

The fact that more and less virtual teams respond in such different ways to basic management techniques is crucial to note. We are moving into uncharted organizational territory and must take into account the areas where our actions may need to adapt.

## **What Should Managers Consider in the Future?**

Our research focused on groups doing real work, using a variety of evolving technologies and processes. This context provides a level of realistic complexity that may limit our ability to illustrate clear effects—such a world makes it hard for researchers to identify the “most” powerful impact on group success. We need additional study and practice with semivirtual groups in field settings to address the intricacies of the results documented here and to explain the lack of some expected outcomes. We suggest that future research and practice focus on elaborations of leadership role theory, as well as on more complex examinations of teams working in this continuum of virtual environments.

Elaboration of leadership role theory would be valuable in at least two areas. The first is a consideration of whether it is more appropriate to consider these as curvilinear effects. A curvilinear effect here means that, unlike a straight line effect that constantly moves in one direction, certain leadership behaviors are good up to a point, but after that, the effects are harmful. The results for socioemotional and procedural leadership role behaviors suggest the possibility that in certain settings, a group or its leaders can focus too much on leadership role behaviors. Our results can be explained by curvilinear effects, if we also consider a second elaboration—that of substitutes for these leadership behaviors.

Kerr and Jermier (1978) put forth the idea that characteristics of the people, the task, and the organization may act in place of, or substitute for, leadership behaviors. Here, we suggested that technology may substitute for socioemotional leadership role behaviors by creating opportunities and tools for group members to better contribute or by creating a situation in which group members are more likely to contribute without leadership support. We also suggested that the NAIC guidelines may be providing procedural support at a level that substitutes for procedural leadership role behaviors—in other words, standard operating proce-

dures. These substitutes for leadership may provide support that renders further intervention (in the form of members performing more leadership behaviors) that is unnecessary and perhaps even harmful to the group's performance.

Further understanding of leadership role behaviors, and of situations that may play the role of substitutes for leadership, may help explain the lack of results for task leadership role behaviors. There may be resisting forces at work, or even leadership neutralizers (Kerr & Jermier, 1978), which limit the effectiveness of these behaviors in our context. While Kerr and Jermier (1978) raised the issues of substitutes and neutralizers of leadership, they did not break these forces down to the level of leadership role behaviors. Researchers and managers could pay more attention to the relationships between and across the types of leadership role behaviors. While Kelloway (1991) and other leadership role researchers suggested that these are separate concepts, it is also possible that behaviors interact in interesting ways.

Methodological advances may also be valuable for future research. This field study provided a unique opportunity to study a range of teams. Future research might benefit by greater focus on the intricacies of the team's work process and use of technology. Future research will need to consider the full continuum of communication context. In this study, technology provided added capabilities beyond the standard once a month, face-to-face meeting. Investment clubs or other groups that use complex communication capabilities to perform complicated tasks may find even stronger interactions between group leadership role behaviors and group outcomes when technology is used as an alternative, rather than a supplement, to face-to-face meetings.

Finally, the pattern of media use over time is an important aspect of technologically supported group behavior that has been insufficiently studied. Existing research, as discussed earlier, tends to dichotomize virtualness (face-to-face only or pure virtual only) or pit one medium against another (e.g., teleconferencing versus e-mail). (For an approach that considers location, time spent working apart, and technological support, see Griffith, Sawyer, & Neale, 2002.) More realistically, groups use combinations of media over time, and over tasks. Here, we only addressed groups that used technology in addition to a monthly meeting. More expansive research should vary the use and timing of periodic face-to-face meetings in more virtual groups as a way to attenuate any depersonalizing effect of mediated communication (e.g., Lakoff & Boal, 1995). Additionally, by looking at patterns of media use in virtual work, researchers may discover when face-to-face meetings augment electronically mediated work in order to enjoy the benefits provided by electronic media while minimizing the process losses created by them (Nohria & Eccles, 1992).

## Conclusion

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Semivirtual groups are an emergent and inevitable work structure in organizations. As the trends of globalization, technology proliferation, mergers and acquisitions, e-commerce, and project-oriented work continue, semivirtual groups will play an increasingly critical role. But more virtual groups can be as dramatically ineffective as many traditional groups have been. Managers and academics need to be aware of and understand the sometimes obvious, often subtle, impacts that leadership role behaviors play in semivirtual groups.

The investment clubs in this field study provide an interesting sample from which to study the effects of leadership in groups working more, or less, virtually. Leadership role behaviors certainly play a part in group success. However, the results presented here suggest an interaction among leadership role behaviors and the degree of virtualness. Leadership in these settings is complicated and must be sensitive to the needs of the group.

## Acknowledgments

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We thank the National Association of Investors Corporation and the hundreds of investment club members who participated in the formation and conduct of this research.

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## Endnotes

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- <sup>1</sup> Electronic media includes these microprocessor-based technologies: e-mail, voice mail, fax, phone, bulletin boards, chat rooms, instant messaging, paging, and videoconferencing. We will use the terms electronic communication or communication technologies interchangeably.
- <sup>2</sup> Note that the above approach does not assess the internal rate of return, a widely recognized method for taking into account the amounts and the timing of the cash flows of an investment, and the measure of club performance suggested by the NAIC (1998). However, current portfolio value provides a measure that may be more reliable when asking for survey data from individual club members. Popular reports of the Beardstown Ladies investment club's bookkeeping errors support our more simple request for current portfolio value (Kadlec, 1998).