Journal of the Association for Information Systems

Volume 9
Issue 10 *Special Issue in Honor of Gerry DeSanctis*

Article 3

10-29-2008

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Joey F. George
Florida State University, jgeorge@cob.fsu.edu

Kent Marett
Mississippi State University

Gabriel Giordano
IESE Business School

Recommended Citation

George, Joey F.; Marett, Kent; and Giordano, Gabriel (2008) "Deception: Toward an Individualistic View of Group Support Systems," *Journal of the Association for Information Systems*, 9(10), .
DOI: 10.17705/1jais.00174
Available at: https://aisel.aisnet.org/jais/vol9/iss10/3

Journal of the Association for Information Systems
JAIS

Special Issue

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Joey F. George
College of Business
Florida State University
jgeorge@cob.fsu.edu

Kent Marett
Mississippi State University

Gabriel Giordano
IESE Business School

Abstract

Many of the ideas we take for granted about group support systems originated from work conducted at the University of Minnesota by DeSanctis and colleagues. One of the lesser known concepts is an analysis of the theoretical basis for group support system research. This analysis groups five theories that support GSS research into two camps: individualistic and collective. Individualistic theories are seen as prevalent in GSS research. From the individualistic perspective, technology is an active tool that works to enhance individual power. Our recent work has focused on deception and its detection, including deception stemming from individual agendas among group members in a GSS setting. This work demonstrates how group members can take advantage of the individually-focused emphasis in GSS design to successfully advance their own agendas. The purpose of this paper is to further examine the individualistic theoretical underpinnings of GSS research. To do so, we examine deception and explore its implications for groups and for GSS.

* Marshall Scott Poole and Jonathon Cummings were the accepting guest editors.

Volume 9, Issue 10/11, pp. 653-676, Special Issue 2008

Deception: Toward an Individualistic View of Group Support Systems

1. Introduction

Many of the ideas we take for granted about group support systems (GSS) originated in work conducted at the University of Minnesota by DeSanctis and colleagues. Some of the key contributions from their early work include the three levels of group support systems; decision rooms; time, space, and task taxonomies of GSS; and adaptive structuration theory (DeSanctis and Gallupe, 1987; DeSanctis and Poole, 1994). From this body of work also comes a lesser known contribution, an analysis of the theoretical basis for GSS research. In this analysis, the theories that support GSS research are divided into two camps: individualistic and collective (DeSanctis, 1993). According to DeSanctis, the individualistic view, traditionally held by economists and psychologists, holds that groups are assemblies of individuals, and that the goal of the assembly is the same as the goal of the individual: maximization of individual gain. She states that the collectivist view holds that a group "is not merely an aggregate of individuals but rather a social structure in its own right" (1993, p. 100). In this view, institutions can take priority over the individual, and acts of individuals can be evaluated in terms of their contributions to society.

DeSanctis (1993) points out the prevalence of individualistic theories in GSS research, as derived from rational decision making theory, group process theory, and communication theory. Individualistic views place great trust in management and technology. From this perspective, technology is an active tool that works to enhance individual power and overcome human limitations. DeSanctis found the general MIS approach to the study of GSS to be too technocentric, i.e., the tendency to give crucial importance to a technical object (Papert, 1990), demonstrating the influence of individualistic theories. As she said, "We are, alas, 'technocentric' in our belief that GSSs, like the technologies before them, have the potential to bring positive change to organizations" (p. 98). Such views ignore the potential for negative change or for unintended consequences from unfaithful appropriation of the technology. Despite the reliance on individualistic views of technology use in the study of GSS and all they imply, DeSanctis wrote, "We tend to think of GSS technology as advancing collectivist goals, such as 'collaboration,' 'cooperation,' and benefit to the 'group.' In fact, the opposite is true" (p. 103). Instead of exclusively fostering cooperation, GSS use just as easily fosters competition, conniving, control and coercion (cf. Kling, 1991; Lyytinen, Maaranen, and Knuuttila, 1994).

To further investigate the individualistic nature of GSS design and use, we have conducted studies that intentionally pit one member of a group against the other members, heightening competition and dampening cooperation. In these studies, four of which are described later in the paper, one of our primary research questions is how group process and outcome are affected when the individualist nature of GSS use is enhanced through a focus on individual goals. In our work, we have focused on deception as a means to sharpen individual goals in a computer-mediated communication (CMC) setting. Our studies show how conniving members of a technology-supported group can take advantage of the technocentric, individually-focused emphasis in GSS design to successfully advance their own agendas. While our work has focused on deception, other individual anti-group activities are also possible within a GSS setting. "Individualistic assumptions about organizations lead researchers to view GSSs as instruments for democracy and individual gain" (p. 99), DeSanctis tells us, and there are many paths to individual gain in a group, especially in a technology-supported setting. DeSanctis also wrote, "A more expansive view of the role of GSS in organizations is needed, with clear articulation of goals with regard to who is to gain from the technology use, and why, and how" (p. 111). It is important to recognize that group members are also individuals as well as members of many other groups, both work- and socially-related, and each role that a group member plays comes with an agenda and goals (Putnam and Stohl, 1990). Conflict among agendas and goals and the drive for self-interest and individual gain can lead to self-serving behaviors such as deception (Grover, 1993a). The purpose of this paper is to further examine the individualistic theoretical underpinnings of GSS research. To do so, we examine deception and explore its implications for groups and for GSS.

As part of our research program on deception and CMC, we conducted a series of four studies that investigate deception in a group context. Studying deception in groups has rarely been done, as the

bulk of work investigating deception has focused on dyads. Research on deception in CMC environments has also been rare, with the focus generally being on face-to-face (FtF) verbal communication. GSS research, on the other hand, has extensively investigated groups using information technology, and our work on groups and deception comes out of that tradition.

In the next section, we discuss the theoretical background for deceptive and self-serving behavior in groups. We then present brief overviews of our studies, with a focus on their study designs and their findings that relate to deceptive behavior among group members. We end the paper with a discussion of our findings and how they relate to questions raised about the individual and technocentric focus of GSS work, with its emphasis on individual gain in group settings.

2. Theoretical Background

2.1. Individuals and Group Membership

In today's work environment, work done by teams and groups is commonplace. Individuals belong to many groups at the same time, both inside and outside of the workplace. DeSanctis recognized that much of the research on groups in MIS was focused on the individuals that made up groups rather than on groups themselves. "The many studies that focus on member influence, consensus, agreement, and user satisfaction are evidence that an individualistic view underlies much of GSS research" (DeSanctis, 1993, p. 100). In addition to the individualistic nature of much GSS literature, other assumptions about groups include a view of group work as cooperative and collegial, and a view of groups as closed systems. Yet group work can be both cooperative and combative, and viewing groups as open systems adds both realism and complexity to their study. From an open systems perspective, individuals in groups often have conflicting goals that cross group boundaries, and they have to choose which goals to pursue. How individuals perform in groups is also influenced by the incentive systems under which the groups work. Goal conflict and certain incentive systems can sometimes lead individuals to pursue goals that are not aligned with group goals. Sometimes individuals are best served by being deceptive about their motives and goals in these situations. These assumptions about group work, and evidence about individual goal-seeking behavior in groups, are discussed in the following paragraphs.

DeSanctis (1993) found that five types of theories were the basis for most of the GSS research that had been conducted up to that time. Those theories were: (1) decision making, (2) group process, (3) communication, (4) institutional, and (5) coordination theories. DeSanctis posited that the first three theory types were individualistic in nature, while the latter two types were collectivist. As stated earlier, individualistic views place great trust in management and technology. The individualistic nature of these three theory types is revealed in a closer examination of them. According to decision making theories, decision makers maximize utility for personal gain. In group process theories, groups are largely treated as collections of individuals, according to DeSanctis, and change resulting from technology use by groups is largely deterministic. Communication theory also takes an individualistic view, with a focus on systems rationalism, or the idea that different media can bring predictable costs and benefits to the communicating parties, again with individualistic assumptions about organizations and technology change.

The individualistic view of groups and technology, as reflected in the decision making, group process, and communication theories cited by DeSanctis, accounts for the possibility of conflict among group members (cf. Sambamurthy and Poole, 1992). The individualistic view is in line with the rational actor perspective put forth by Markus and Robey (1988). This perspective suggests that, along with the potential good uses for technology within the workplace, there is any number of "bad uses" of technology that rational individuals may choose to partake in, despite any negative social outcomes. Research on groups should not fail to consider this potential (Markus, 1994). Similarly, Kling wrote, "Many CSCW articles impede our understanding of the likely use and impact of CSCW since they rely on concepts with strong positive connotations such as 'cooperation,' 'collaboration,' and images of convivial possibilities to characterize workplace relationships, while understating the levels of conflict, control, and coercion--also common in professional workplaces" (p. 84). However, work is neither all

cooperation nor all conflict but is some combination of these conditions: "*In practice, many working relationships can be multivalent with and mix elements of cooperation, conflict, conviviality, competition, collaboration, commitment, caution, control, coercion, coordination and combat* (the 'c-words')" (Kling, 1991, p. 85, original emphasis). A view of technology use by groups that emphasizes cooperation and collaboration, while deemphasizing conflict and coercion, misrepresents the nature of group work in organizations and the role that information technology could play in supporting that work.

The individualistic perspective of technology-supported groups also views group efforts as part of an open system within organizations. According to Arrow, McGrath, and Berdahl (2000), most empirical work on groups treats them as if they were isolated or closed systems. The context of the group and its relationships with its environment are largely ignored. Current theories in small group research are addressing this assumption, however. For example, Arrow and colleagues developed the theory of groups as complex systems, which begins with the proposition that groups are open systems: "Groups are open and complex systems that interact with the smaller systems (i.e., the members) embedded within them and the larger systems (i.e., organizations) within which they are embedded. Groups have fuzzy boundaries that both distinguish them from and connect them to their members and their embedding contexts" (p. 34). Arrow and colleagues also point out that group members belong to multiple groups and thus have multiple overlapping loyalties. What an individual will contribute to a particular group depends on what the individual can contribute to the group and on what the group can contribute to the individual. Individual members have needs they expect groups to help them fulfill, and these include needs for achievement, affiliation, power, and resources. If groups do not help satisfy their members' needs, the group will not function well for long. Groups must find ways to reconcile the interests and goals of their members with goals of the group (Arrow et al., 2000).

A related theory that also recognizes the open systems nature of groups is the theory of *bona fide* groups (Putnam and Stohl, 1990). According to this theory, in most studies of groups, "the group is treated as a distinct entity… contained within a limited and structured social space with fixed and immutable boundaries" (1990, p. 149). Bona fide group theory posits as a central theme that, in reality, groups have permeable and fluid boundaries and are interdependent with their organizational contexts. The idea of fluid group boundaries recognizes that individual group members are simultaneously part of many, sometimes overlapping, groups. Each group membership has its own role demands, and these demands may conflict with each other. Individual behavior in a group, then, is more complicated than would be indicated by simple conflict between group goals and individual goals. Instead, the conflict is among individual goals, the goals of the group the individual is currently engaged in working with, and the goals of all the other groups to which the individual belongs.

If we recognize that individual group members primarily pursue their own individual goals, even while working in groups; that group work in organizations is just as easily characterized as cooperative as it is conflictual; and that groups are open systems with permeable boundaries and overlapping memberships, then what would we expect from individuals who are members of such groups? How do individual members react when their goals conflict with group goals, or when their goals for one of the organizational roles they play conflict with the goals of one of their other groups? What happens when organizational incentive structures are designed to further individual goals rather than group goals? We would expect individuals to pursue their own goals first, and where individual goals conflict, we would expect individuals to pursue one set of goals over the other. Further, we would expect individuals to use whatever means they have at their disposal to attain their goals, including the use of deception, if necessary.

In fact, deception has been found to result directly from role conflict in the workplace. Deception is seen as a stress-relieving mechanism available to those caught in role conflict (Grover, 1993a, 1993b). (There are four other such mechanisms: choice (choosing one role over others to guide behavior), avoidance (pretending the conflict does not exist), compromise, and voice (changing the role demands)). According to Grover, the chances that employees will lie are enhanced as the possibility of role conflict increases. Whenever there is a strong enough conflict for an employee —

between the demands of two bosses, between an employee's values and those of the organization, between performance expectations and the time and resources the employee has to meet those expectations — there will be an increased chance of lying by the affected individual. Grover (1993b) also found that the likelihood of lying for one role or the other was related to role commitment; those with high levels of professional commitment reported less likelihood to lie in their professional role than did those with low levels of professional commitment. Further, those with more attachment to the organization were more aroused by role conflict, while those with more attachment to the profession were less aroused. Additional research, by Sweetland and Hoy (2001), supports Grover's findings about the relationship between role conflict and deception. They found that high levels of role conflict in schools were associated with high levels of "spinning the truth."

Other research has found that the amount of deception in work groups depends on incentive systems. Barkhi (2005) designed a study whereby some groups worked under incentives that favored individual effort, while others worked under incentives that favored group effort. All of the groups used GSS to work together and to communicate with each other, although some groups' members all worked in the same room, while other groups' members were separated from each other. Barkhi found that, for face-to-face GSS groups working under group incentives, the amount of untruthful task information members exchanged with each other was 20 percent. For distributed groups working under group incentives, almost all of the information exchanged was untruthful, at 83 percent. Under individual incentives, the proportions of untruthful information were lower for both face-to-face (11 percent) and distributed (54 percent) GSS groups. Performance was better overall for groups working under individual incentive schemes, compared to their peers working under group incentive schemes, regardless of whether the group members were co-located or dispersed.

Whether group members act in response to incentive schemes, as a result of role conflict, or from a motivation to maximize utility for personal gain, we argue that they can and do pursue their own goals, either at the expense of or in addition to pursuing the goals of the many groups to which they belong. We also argue that information technologies even in the form of GSS, which is ostensibly designed for the support of groups — can serve as "instruments for … individual gain" (DeSanctis, 1993). Before we go on to describe our studies of groups and member deception, though, we need to first discuss research on deception from the communication discipline. We focus on one particular theory of deception from communication, called Interpersonal Deception Theory. There are other theories about deception in the communication discipline, such as Information Manipulation Theory (McCornack, 1992), which concerns itself with the amount and manner in which communications are altered, and the general Theory of Deception (Johnson et al., 2001), which deals with the intentional alteration of information, typically that which could be stored within a database, spreadsheet, or some other archive, with the purpose of misleading others. Interpersonal Deception Theory (IDT) focuses on deception that occurs during an interactive communication event, such as occurs among group members, as opposed to deception within an information repository.

2.2. Interpersonal Deception

We begin our discussion of deception by defining the term. *Deception* is defined by Buller and Burgoon as "a message knowingly transmitted by a sender to foster a false belief or conclusion by the receiver" (Buller and Burgoon, 1996, p. 205). Although deception is commonly thought of as outright lying, i.e., presenting intentionally inaccurate information as true, other potentially deceptive behaviors include selectivity, oversimplification, and the omission of information (Miller and Stiff, 1993). We know from past research that deception is a common part of everyday communication, occurring in 20 percent to 33 percent of all discourse (DePaulo, Kirkendol et al., 1996; Hancock, Thom-Santelli, and Ritchie, 2004). Yet despite the pervasiveness of deception, it is generally accepted that people are not very good at detecting deception in dyadic face-to-face communication (Miller and Stiff, 1993). Successful detection accuracy rates typically run at about 35 percent (Levine, Park, and McCornack, 1999). Deception detection rates have been measured in many different settings and under many different contexts, but one general conclusion seems apparent: generally people are not very good at detecting deception. This may be due to an inherent *truth bias* found in the vast majority of people (McCornack and Parks, 1986). Due to this truth bias, we tend to believe people by default until given

reason to think otherwise, or as Stiff and his colleagues (1992) illustrate the heuristic, "My partner has been truthful in the past, therefore he or she is being truthful now" (p.328). This way of thinking has a profound impact on one's judgments of another's truthfulness. We believe that the inability to detect deception when it occurs in group deliberations can ultimately affect group process and outcomes, thus making deception detection a worthy topic to research within group settings.

IDT, developed by Buller and Burgoon (1996), views deceptive communication as a strategic activity, with interaction between conversational participants influencing future behavior and cognition for all involved (Figure 1). According to IDT, deceivers will judge the success of their deception by assessing the behavior and reactions of its receivers, and deceivers will then adjust their own behavior and deceptive content if necessary. In other words, the behavior displayed by communicative participants influences their subsequent behavior and decisions (Buller and Burgoon, 1996). As shown in Figure 1, the deceptive communication event between a deceiver and a receiver begins with a deceptive message. The receiver is not passive; rather, the receiver interprets the message, judges its veracity, then acts accordingly. If the receiver judges the message to be truthful, no behavioral adaptation is called for. On the other hand, if the message is judged to be dishonest, the receiver may decide to adapt his or her behavior to either hide his or her suspicions or to confront the deceiver outright about the deception. Meanwhile, the deceiver monitors the receiver's reaction and decides to proceed with the deception or to stop. The receiver then observes and interprets the deceiver's response, and the dynamic dance of the deceptive act continues to its conclusion. Prior studies show that, once receivers become suspicious and start to overcome their natural truth biases, they take a more dominating approach to the discussion, becoming less pleasant and less composed. Those who become highly suspicious will in fact attempt to conceal their distrust, feigning pleasantness and relaxation, with some doing so better than others (Buller, Strzyzewski, and Comstock, 1991; Burgoon et al., 1995).

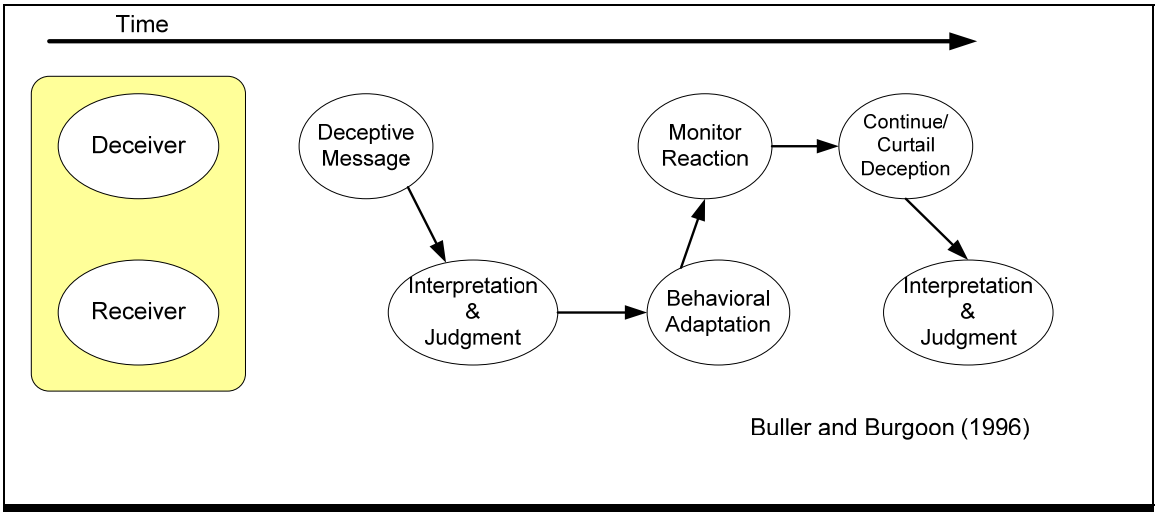

Figure 1. Interpersonal deception theory

IDT stipulates that these changes in behavior are often enough to tip off a deceiver, thus confronting the deceiver with a decision to stay the course or to change strategies. Prior experiments have traditionally induced suspicion in participants through the use of warnings issued and incentives offered by researchers or confederates (e.g., Zuckerman, Koestner, and Alton, 1984; Stiff et al., 1992; Biros, George, and Zmud, 2002). Once deceivers feel others are suspicious of them, they tend to adapt and behave more strategically, from adding details to their deceitful accounts to possibly reducing their overall levels of participation (Buller et al., 1991). As mentioned before, deception detection accuracy rates are generally poor, and researchers like Ekman (1992) and Vrij (2000) suggest that the deceivers — who are better able to control their behavior and the content of the message are expected to be highly successful at deceiving others. Much research in the deceptive

communication literature has focused on uncontrollable behavior and content that gives away the deceiver's intentions, which Ekman (1992) refers to as "leakage." Reviews of the literature by Zuckerman and Driver (1985) and DePaulo et al. (2003) list some of the cues that indicate deception and are observable to receivers, such as higher voice pitch, more eye blinking, and fewer specific details and more negative statements within the message. The modality being used for communication renders some of these indicators inaccessible at times, so deceivers may be able to benefit from the limited capacity of a modality (particularly an electronic one), which shields visual and aural cues from receivers (Buller and Burgoon, 1996; Carlson and George, 2004). For groups meeting via a group support system, the chances for successful deception detection are reduced because there are fewer cues, thereby increasing the potential for a deceiver's actions to affect group performance.

Other researchers have developed an interactive view of deception that opposes IDT (DePaulo, Ansfield, and Bell, 1996; Kashy and DePaulo, 1996; DePaulo et al., 2003). This alternative view explains most deception as part of everyday life (resulting, for example, from attempts to avoid embarrassment). These deceptions require little cognitive effort, and so cue leakage is likely minimized. While this view recognizes that deceptions with larger consequences exist (such as those that can affect an individual's reputation), it predicts that signs of deception will be subtle, and that social norms will lead others to trust deceivers. However, this alternative view does not recognize that consequential deceptions, particularly in work settings, often happen in complex environments, where individuals are working in groups or on other tasks while deceiving. The additional cue leakage from these demands, as well as the motivation to perform that many individuals have in collaborative work settings, particularly in collaborative groups, will likely lead individuals to investigate cues from deceivers, leading to the strategic process outlined by IDT. IDT seems to be the better fit for understanding interactive deception in these complex, collaborative task settings.

Marett and George (2004) extended the original model of IDT to incorporate group settings (Figure 2). In group communication, deceivers must perform the same behavior assessments as in dyadic communication, but the inclusion of additional receivers results in more communication to monitor. The group IDT model also includes the additional communication that takes place between receivers, or "crosstalk," which a vigilant deceiver must also monitor to fully gauge reactions. In either dyadic or group settings, IDT stipulates that successful deceivers must watch for signs of suspicion from others and then decide whether to continue deceiving or not. It is incumbent on successful deceivers to delay other group members' suspicions for as long as possible, which is difficult enough in dyadic communication, and even more difficult in group settings. Depending on the group membership, groups should possess a larger, more diverse body of knowledge and experience with the discussion topic than that found in dyads. As Marett and George (2004) proposed, the deceiver can rely on his or her past experience with the communicative medium, with the context of the discussion, and with the other group members themselves to establish initial credibility and to assess receiver reactions while pushing his or her agenda. With regard to decision-making using a GSS, a deceiver who has prior experience with the technology will be in a more advantageous position and better able to monitor signs of suspicion and any related crosstalk.

The experience of the group as a whole also affects the deception process. While communicative technologies like anonymity-based GSS tends to reduce the influence of group norms and inhibitions (Walston and Lissitz, 2000), groups can be composed of people who are already suspicious of computer-mediated communication. In established groups, especially groups that faced and detected deception in the past, suspicious attitudes could permeate the overall group norms, presenting deceivers with a serious challenge. And if potential deceivers recognize an overall suspicious attitude in a group, deception might be less likely to happen.

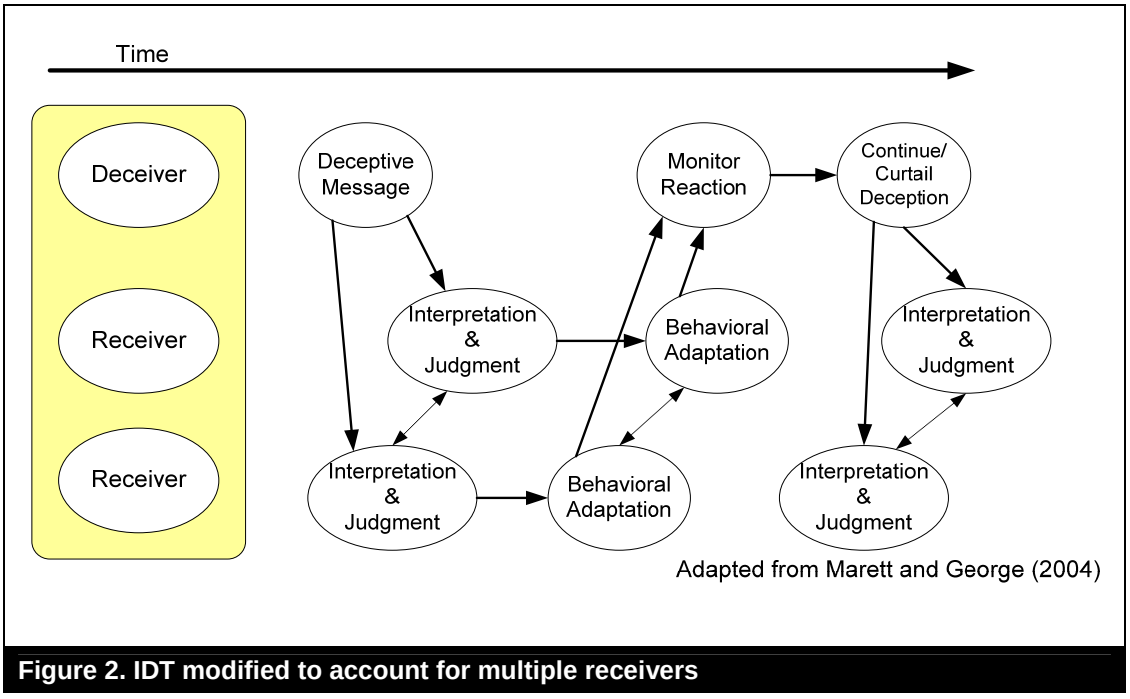

Figure 2. IDT modified to account for multiple receivers

2.3. Individuals and Group Process and Outcomes

Our research question is how group processes and outcomes are affected when the individualistic nature of GSS use is enhanced through a focus on individual goals. The rationale for expecting individuals to work toward their own goals at the expense of group goals has already been presented. Individual group members behave in groups based on their commitment to the group and its goals, but also according to how they react to role conflict and based on the incentive structures under which their groups operate. Sometimes individuals resort to deception in order to deal with the role conflict and incentive pressures they face as group members. Interpersonal Deception Theory shows how individuals are able to act strategically to push their agendas by deceiving others. Deceivers have natural advantages over those they attempt to deceive, as most people do not expect deception, due to the truth bias and other contextual factors, in their dealings with others. We expect GSS use to enhance the focus on individualistic goals and to further facilitate deceiver dominance in the group. Yet we know little about how deception might work where information technology is used as a chief communication channel. If IT for groups is, indeed, designed and used based on individualistic principles, deceivers may well be able to use the individualistic characteristics of group support systems to their advantage, thus influencing group process and decision outcomes. We wanted to study what happens when groups supported by GSS (or CMC) are influenced by group members who attempt to deceive the group while promoting their own goals at the expense of group goals.

To better understand the ability of an individual to affect group processes and outcomes, we turned to theories of group decision making that deal specifically with minority influence. Ostensibly, the deceiver is a minority in the group, working toward furthering his or her own goals rather than furthering group goals. Social Decision Scheme Theory (Davis, 1973) claims that there are a multitude of factors that influence group decision making, but the most consistent factor is the common attitude that "the majority wins." However, Laughlin and Ellis (1986) claim that it is possible to predict when a minority within the group is more likely to prevail, depending on where the group task falls along their intellective-judgmental task dimension. Groups with tasks positioned closer to the intellective end of the continuum, with a demonstrably correct decision (what they call a "Eureka task"), are more prone to minority influence. Once an individual arrives at the correct solution and provides proof to the others, it takes very little effort to sway the rest of the group toward the individual's solution. On the other end of the continuum, groups that have intellective tasks with lower

demonstrability tend to make decisions based on a plurality. In other words, when there is no objectively correct answer, and the decision is instead based on judgments, the amount of social support given to each position is compared, and the majority position usually becomes the final decision (which Davis' theory predicts). The minority opinion is not likely to prevail.

In such a situation, minority members who seek to become more influential may try different tactics in order to convince other group members to consider a wider range of alternatives, including their own. Among other tactics, minority members may attempt to appeal to common beliefs, experiences, or norms shared by the rest of the group (Mugny, 1975), or attempt to sway opinions through expert or authoritative information (Quiamzade et al., 2003). Otherwise, the majority can frame the discussion in their favor using a "shared task representation" (Tindale et al., 1996), which can be a concept, norm, or perspective subscribed to by the majority of group members. Out of desperation, minority members can make use of their own ideas, experiences, goals, and so on, in order to achieve a shared task representation and hopefully make inroads with group members holding other opinions (Smith, Tindale, and Anderson, 2001). Deception is one method a minority member can use to influence group opinion, where the deceiver can invent expert or authoritative information or ideas and experiences to influence the other members of the group.

Minority influence has been studied previously in a GSS context. Zigurs, Poole, and DeSanctis (1988) suggested that influence behavior is not only exerted toward the group outcome but toward the meeting process as well. Much GSS research dealing with minority influence focuses on group polarization and how group members can influence the final decision. Tan, Wei, and Watson (1999) observed that a common way to overcome "majority wins" outcomes tends to occur when a minority opinion is held and expressed by high status members; but due to reduced social presence and anonymity in a GSS supported exchange, differences in status among members are less apparent. For groups charged with completing preference tasks, where status has more influence on group outcome, a GSS should then have more impact than it would in other tasks (Tan et al., 1999). The minority is reduced to finding an alternative way to exert influence on the group preference. In GSS groups, especially those engaged in judgment tasks, the key for minority opinion holders resides in effectively making persuasive arguments with informative resources rather than using normative influence (El-Shinnawy and Vinze, 1998). It is not unheard of for GSS group members to exhibit "choice shift," possibly because the reduced social presence and anonymity allows GSS members to submit more novel arguments and to more easily engage in one-upmanship than group members in socially-rich environments (Sia, Tan, and Wei, 2002). In other words, minority members in GSS groups are likely to make the same attempts at either establishing an expert opinion or attempting to form shared task representations as minority members in traditional groups.

2.4. Context

Prior small group research has provided a number of contextual variables that affect group process and performance (Gruenfeld et al., 1996; Rice and Gattiker, 2001), and the same is true of prior research on GSS groups (Dennis et al., 1988; Fjermestad and Hiltz, 1999). Although there has been little research involving groups and deception, context has traditionally been important to deception research involving dyads (Miller and Stiff, 1993). Obviously, as these studies and reviews indicate, there are a large number of contextual variables to choose from when conducting group, GSS, and deception research. Given the early stage of our research on groups and deception, we focused on three contextual variables: task, proximity, and familiarity.

As should be clear from the prior discussion, task type is highly influential. According to Poole and Baldwin (1996, p. 233), "The most widely studied explanatory variable in decision development research is the group's task." Task type has a large influence on how the group works together and on the outcomes that result. The importance of task type on the success or failure of minority influence attempts has already been noted. Task type also has an obvious relationship to deception, as the type of task will influence the tactics chosen to introduce and support a deception (Aquino, 1998). Beyond variations in task type (McGrath, 1984), there are other task characteristics that are important parts of group context, and one of these is task complexity.

Task complexity is one of the most visible influences on group work, especially when group work involves deception (Goldman-Eisler, 1968). Individuals facing a high-complexity task need to participate more actively in their task and handle more task processes. They are also likely to be presented with more information cues than individuals performing a low-complexity task (Wood, 1986). Because of this tendency, a complex task can result in information overload, which happens when individuals are confronted with more information than they can handle. The presence of ambiguous information (such as deception) and a time-pressured environment (which is true of most group decision-making situations) can further increase the likelihood of an information overload (Schneider, 1987; Schick, Gorden, and Haka, 1990). An information overload often causes individuals to subconsciously process information that is clear and easily accessible before processing ambiguous and partially hidden information (such as cues to deception), which can reduce their deception detection accuracy.

Another variable, group member proximity, has been explored more frequently by researchers, as technology has allowed more work to be conducted by group members in separate locations. Proximity is important to group processes, as proximate group members focus less on their individualistic "private selves" and more upon their "public selves," which pertains to the social interaction with the other proximate members (Valacich et al., 1994). This suggests that proximity is a potential factor for a deceptive group member to consider when working toward an individualistic outcome. Within co-located groups, individuals' perceptions of group member mutuality (Burgoon et al., 2002) and social facilitation (Zajonc, 1965), which help enforce group norms, could hinder the efforts of deceivers who seek to defy those norms through deception. Computer-mediated communication allows for group members to be located virtually anywhere, so if deceivers find it easier to deceive others when physically separated from the rest of the group, GSS and other applications of CMC could create a preferential environment. Barkhi, Jacob, and Pirkul (2004) found that proximate group members exchanged information more truthfully with their partners compared to dispersed group members, who were less truthful during information exchange.

Yet another influence on collaborative groups is the experience shared by group members. Over time, communicators gain experience that changes their communication styles over different communication channels. According to channel expansion theory (Carlson and Zmud, 1999), experiences with a communication channel, a messaging topic, an organizational context, and communicative co-participants lead to the development of knowledge bases that can be used to communicate richer messages via a given communication channel. Individuals develop knowledge through experiences, and this allows them to encode and decode messages effectively. Communicators who have experience with each other can encode messages into a format that is specific to an individual, allowing richer and more efficient communication through a channel. Many researchers predict that communication partner experience, communication partner familiarity, and baseline knowledge of a communication partner lead to better overall deception detection accuracy (Brandt, Miller, and Hocking, 1980; Feeley, deTurck, and Young, 1995; Anderson, Ansfield, and DePaulo, 1997). In a computer-mediated group setting, experience between group members can lead to more efficient sharing of suspicions (due to richer communication), more baseline knowledge of deceivers, and more cue leakage.

2.5. A Conceptual Model

Pulling together the relevant pieces from the various theoretical perspectives presented above, we can assemble the following simple conceptual model (Figure 3). The model is based on the one developed 20 years ago for the study of GSS by Dennis and colleagues, where characteristics of the group, task, context, and technology affect group process, which, in turn, affects group outcome (Dennis et al., 1988). Based on the literature on individual behavior in groups, we posit that, given the proper motivation, an individual in a group will seek to fulfill individual rather than group goals. The context of the group – their task, its complexity, the members' proximity to each other, how well the members know each other, and other aspects of the situation – will affect individual goal seeking behavior, further promoting it or discouraging it. Communication media has the same effect, we propose, either promoting self-seeking behavior or discouraging it. For example, face-to-face

communication may discourage some behaviors, while computer-mediated communication may encourage others, due to individuals' perceptions of their abilities to influence others over different media. Individual goal seeking behavior then affects group process, depending on the tactics used by the deviant individual. In our case, we are most interested in deceptive behavior and how it influences group process. As a minority member of the group, the deceiver will invent expertise and/or personal experiences to win the rest of the group over to his or her position. The group process then influences group outcomes. A successful deceiver will have convinced the group to support his or her preferred outcome, an outcome that also supports a goal of the deceiver.

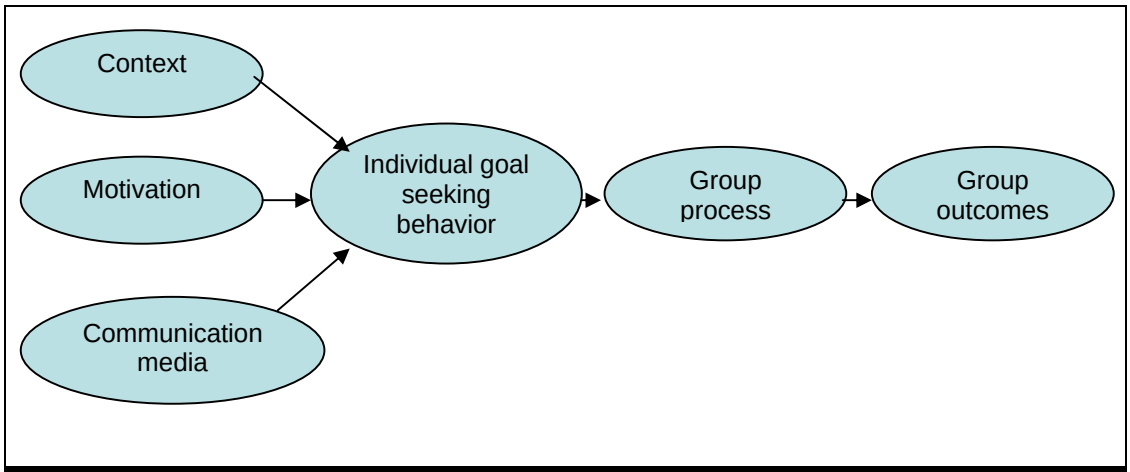

Figure 3. Conceptual model for individual deception in groups

To gain insights into possible answers to our research question — how group process and outcomes are affected when the individualist nature of GSS use is enhanced through a focus on individual goals — we designed and conducted four experimental studies. The following section outlines the research designs and findings for these studies, where we investigated deception in IT-supported groups.

3. Four Studies of Groups and Deception

Table 1 illustrates the basic study design for our four experiments. All four studies had several common aspects: 1) Groups worked together to solve a problem given to them by a researcher; 2) An individual was provided with an alternative solution to the problem to promote to the group using deception (the deceiver was in effect provided with an individual goal that competed with the goals given to the group); 3) The researchers gave the deceiver incentives to argue successfully for the alternative's selection by the group as its first choice; 4) Deception was defined as the intent to foster a false belief or conclusion in the receiver, and while there are various types of deceptive communication behavior – e.g., selectivity, oversimplification, and the omission of information – we were only interested in lying; 5) Groups were made up of undergraduate business students. In all but one study (the last one), there were three people in each group; and 6) Both deceiver success and deceiver detection were measured as dependent variables, where deceiver success was a surrogate measure of group outcomes.

There also were some differences, as would be expected in a set of four different but related experimental studies. One difference related to communication media. Two of the studies used GroupSystems, while the other two used StrikeCom, a group game designed for cooperative problem solving, where dispersed group members communicated through a chat facility. The two GroupSystems studies were closely related in design. The major difference between the two was a slight change in task and the addition of a second independent variable, the contextual variable proximity. Similarly, the two StrikeCom studies were closely related: The only substantive difference in the two was the addition of a second independent variable. The group task in the GroupSystems studies involved the selection of a community project, while the group task in the StrikeCom studies

was the detection of hidden missiles and their destruction through coordinated bombing runs. We made several changes to the designs of the StrikeCom studies based on what we learned in the GroupSystems studies. In the StrikeCom studies, we studied different independent variables, investigating task complexity and group member familiarity instead of communication mode and member proximity. Further, the second StrikeCom study used groups of four instead of three. We next briefly describe each of our studies, with a focus on design and findings of the GroupSystems studies and then the StrikeCom studies. We provide information about the experimental procedures used in all four studies in the appendix.

Table 1: Design Basics for Four Experimental Studies

Study	Communication Mode (Media)	Task	Group Size	Independent Variable(s)	Dependent Variables
GS 1	GSS vs. manual	Tourism	3	Communication mode	1) Number of lies 2) Deceiver detection 3) Deceiver success
GS 2	GSS vs. manual	Foundation	3	1) Communication mode 2) Proximity	1) Number of lies 2) Deceiver detection 3) Deceiver success
StrikeCom 1	Chat	Find and destroy the missiles	3	Task complexity	1) Deceiver detection 2) Deceiver success
StrikeCom 2	Chat	Find and destroy the missiles	4	1) Task complexity 2) Group familiarity	1) Deceiver detection 2) Deceiver success

3.1. GroupSystems Studies of Deception

In line with the individualistic perspective described above, we conducted two studies investigating the occurrence of deceptive communication within groups utilizing GSS technology. As mentioned before, the individualistic perspective views organizations as being composed of individuals who see the organization as a vehicle for achieving personal gain. However, the goals of the organization and the goals of the individual sometimes come into opposition. This prospect is perhaps no better illustrated than in these two GSS studies, in which a group member, taking an individualistic stand in order to further his or her self-interests, exploits the environment made possible by the technology and covertly adapts rules and processes for personal reasons.

GSS Study 1 (GS 1)

In the first study, we wanted to explore the incidence of deception within computer-supported groups, compared to more traditional groups meeting face-to-face, as well as the ability of group members (the "receivers" of the deceptive communication) to detect lies. If group members are able to detect deception from their one deceptive member, then group performance would be affected, and the group would be less likely to be persuaded by the deceiver. We convened eighteen groups of three students each for the purpose of testing these expectations. The discussion task required them to generate and then vote on ideas to help improve tourism in the local area. One of the students served in a quasi-confederate "deceiver" role, as we assigned a specific potential attraction to argue for, and offered a financial reward to the deceiver for successfully leading the other group members to vote for it. The deceiver was instructed to persuade the others by any means necessary, including the use of deception. The receivers also contributed ideas, and through voting, a group decision was achieved. Afterward, the deceiver remained behind and identified any lies he or she submitted in the discussion transcript. Lying was completely voluntary on the part of the deceiver.

The results showed that deceivers communicating via GSS submitted more lies than those communicating in the traditional face-to-face modality. However, there was no significant difference between the two modalities with regard to deception detection. The detection rate overall was poor, with 11.1 percent of the lies being detected. The deceiver was successful 33 percent of the time in having his or her idea for increasing tourism selected as the top choice. Success rates for deceivers were approximately the same for both GSS and manual groups (28.5 percent vs. 37.5 percent,

respectively).

GSS Study 2 (GS 2)

These findings from the first GSS study motivated us to expand the study to explore varying group member proximity. From the first study, we believed that the transmission of deceptive communication might have been enabled by the use of the GSS technology, but due to the experiment's same-room settings, we were unsure whether further deception would have ensued had group members been working remotely from one another. The decision room setting likely discouraged the deceivers from further lying. In such a co-located setting, individuals tend to be overly concerned with "saving face" in front of peers and maintaining seemingly normative behavior (Ferris et al., 1985). Lying, or more importantly, being suspected of lying, is a socially unacceptable behavior, especially when proximally communicating with group members who believe the entire group effort is progressing toward a shared outcome. Thus, we conducted a second GSS study, this time adding group member dispersion to computer-mediated communication as independent variables.

In the follow-up study, a total of 60 three-person groups participated. Subjects were not only assigned to groups using either GSS or face-to-face communication in a proximate setting, but they were also assigned to groups either using GSS or audio-conferencing in dispersed settings. Prior research has shown that groups working in proximate settings are more likely to establish a sense of mutuality between group members, resulting in positive evaluations among partners and an added emphasis on establishing group norms (Burgoon et al., 2002). In other words, proximate settings are likely more conducive to collectivistic rather than individualist efforts. As was pointed out, we employed a different and more salient task in the follow-up study. We used the Personal Foundation task, which has been used in studies of group conflict (Watson, DeSanctis, and Poole, 1988) to elicit higher feelings of self-interest among the subjects. Through the use of the Personal Foundation task, we were able to evoke an additional measure of self-interest beyond the promise of a financial reward for deception success. Deceiver success was measured as the deceiver's ability to persuade the rest of the group to fund the assigned project over the other five choices, earning a reward that was unbeknownst to the other group members.

Again, the results showed that deceivers using GSS tended to lie more during group discussion than did deceivers communicating face-to-face (without GSS) or via audioconferencing. The most deceptive group member, on average, was the one using GSS when physically removed from the rest of the group, submitting an average of 2.33 admittedly deceptive statements. However, there was no significant difference in deceptive communication between proximate groups and dispersed groups, suggesting that the use of GSS is conducive for contributing false information to group discussions, regardless of where group members are located. The increased incidence of lying among GSS deceivers may be part of a learning curve associated with learning to lie in a novel technological environment, where feedback is less immediate and evidence of successful persuasion is less direct.

Increased lying did not lead to higher chances of deception success, however; in fact, there was no significant correlation between the amount of deceptive communication and detection success. Overall, the detection rate was poor, with only a little more than eight percent of the deceptions being detected. However, the groups in this study were successfully swayed by the deceiver 70 percent of the time (illustrating the potential differences in outcome occasioned by variations in group task). Regardless of the technology used or of the amount of deception employed, individuals using deception to argue for their own goals over group goals were able to profoundly influence group decision outcomes. We also found a relationship between group member proximity and deception success. Deceivers had a significantly higher chance of success in the decision room environment than did those who were physically dispersed. This result is consistent with the expectations of mutuality among proximate communicators (Burgoon et al., 2002). In this study, we believe that mutuality was exploited by the deceivers, whose individualistic needs outweighed any desire for meeting a common goal. The exploitation of mutuality is illustrated by the types of lies told by proximate deceivers. Deceivers in proximate groups were much more provocative — telling lies castigating other members' favored projects — than dispersed deceivers, who submitted less risky

lies that tended to boost their own projects. This result was surprising in that we believed dispersed deceivers would lie more than proximate deceivers. Instead, we found that they lied differently, and were less successful, than their proximate counterparts.

3.2. StrikeCom Studies of Deception

The second set of group deception studies we conducted focused on the effects of deceivers in groups performing a computer-mediated collaborative task. The task was based on a multiplayer computer simulation called StrikeCom, which was built by researchers at the University of Arizona (Twitchell, Wiers, Adkins, Burgoon, and Nunamaker, 2005). The object of the StrikeCom game is for a team of players to cooperatively search a grid-like game board for a fixed number of enemy targets, which they attempt to destroy with bombs on their final turn. The game includes a built-in chat area that allows for real-time computer-mediated communication between players.

In both of these studies, we manipulated task complexity: and in the second study, we also manipulated group member experience. Task complexity can lead to an information overload, which happens when individuals are confronted with more information than they can handle (Hiltz and Turoff, 1985). Such an overload can cause individuals to subconsciously process information that is clear and easily accessible before processing ambiguous and partially hidden information, such as cues to deception, potentially reducing their deception detection accuracy and increasing the effectiveness of a deceiver. Group member experience can lead to the development of knowledge that can then be used to communicate richer messages over a communication channel (Carlson and Zmud, 1999).

StrikeCom Study 1

In our first StrikeCom study, we studied 20 student groups, with half performing a more complex task than the other half. Each group had three members, with one member acting as a deceiver. The deceivers were given the target locations that their group members were trying to find, and they were told that their goal in the game was to deceive their team members about the true locations of the enemy targets and to get them to target empty grid squares on the game board. These task goals were very different from those given to the rest of the group members. Non-deceivers were told to work with the rest of the group to find and share information that would lead to finding and destroying enemy targets. We increased the number of grid squares and the number of targets in the game to make the game more complex for half of the groups. The settings were piloted beforehand, and pilot participants perceived the complex settings as being significantly harder than the easy settings. Group members were in the same room during the experiment, but they were situated so they could not see one another, and so they only communicated using the chat feature of StrikeCom. Groups were scored on their task performance, and members rated each other as deceptive, honest, or unsure after they completed the game.

Our findings showed that deceivers were very successful in not being detected in the computer-mediated group settings. Many participants mentioned that there was someone incompetent in their group rather than someone being deceptive. Only 10 percent of group members correctly judged deceivers, and there were no differences in detection across the two complexity settings. When looking at task performance, we found that groups with the more complex task performed worse (22.5 percent success rate on the final turn) than did groups with the less complex task (38.3 percent success rate on the final turn), and both groups had low success rates on their final turns. The low success rates were likely a result of undetected deception, especially in the low complexity setting. The influence of deceivers on task performance was also evident from the fact that not all groups carried out a common bombing plan, even though it was implied that they should do this (35 percent of the groups did not have a common bombing plan). Group members were likely frustrated with the deceivers at the end of the games, even though most of them did not realize that the deceivers were being deceptive and had a goal that was opposite their own.

StrikeCom Study 2

We studied 40 student groups in a second StrikeCom study that was an extension of the first one. In addition to task complexity, we manipulated group member experience in this study. Twenty groups

had members that had experience with each other, and twenty groups had members with no experience. We also made a few changes: we used a multi-item, 7-point Likert-type scale to measure participants' perceived deception (Grazioli and Jarvenpaa, 2000), and we increased the difference in the task complexity settings.

In the second study, we again found that deceivers were able to avoid detection in a computer-mediated group environment. On average, groups judged deceivers as being more honest than deceptive (3.32 on a 7-point level of deceptiveness scale). Deceivers were detected more often in groups with the less complex task than in groups with the more complex task (3.5 vs. 3.14 group deceiver ratings), and these groups also had higher task performance (0.53 average game score on a scale from 0 to 1) than did groups with the more complex task (0.43 average game score). Groups with members who were familiar with each other were not able to better detect deception, but they were better able to perform their task (0.55 average game score) than were groups with unfamiliar members (0.41 average game score). This study revealed that deceivers might be particularly harmful in settings where computer-mediated groups are performing complex tasks and where group members are unfamiliar with each other.

4. Discussion

The research we reviewed previously on group member reactions to role conflict and incentive structures showed that individuals were willing to engage in deception when they felt it was helpful to the furtherance of their individual goals (Grover, 1993a; Barkhi, 2005). Other research we reviewed showed that lying is relatively common in everyday discourse (Hancock et al., 2004). Given the right situation, individuals will use deception to further their goals. In our studies, in order to investigate such behavior in groups, we provided one group member with a conflicting goal and instructed him or her to pursue that goal at the expense of group goals. Certainly other behaviors that people engage in to deal with such situations can be studied, but we focused on deception.

Our findings have implications for using Interpersonal Deception Theory in studying groups, particularly groups supported by information technology. The results of our four studies contribute to our understanding of feedback monitoring activities for both deceivers and receivers. In our GSS studies, deceivers using group support systems demonstrated difficulty in gauging feedback from the other group members and determining whether they had even acknowledged the deceptive statements, and this frequently resulted in deceivers repeating their own lies for reinforcement. IDT proposes that deceivers will base their upcoming communication on the feedback provided by receivers (usually in a reciprocal manner), but the relatively risky strategy of uttering repetitive lies is not foreseen by IDT (Buller et al., 1991). Such behavior would rarely make sense in a face-to-face verbal dyadic interaction, the type of interaction IDT was developed to explain. The StrikeCom studies showed that receivers also face monitoring problems. Computer-mediated communicators in these studies seldom detected deceivers at all, but their groups were much less successful when faced with a highly complex task. This suggests that whatever deceptive cues were present became lost in the effort to perform well on the task, which used more cognitive resources in the high complexity condition. Clearly, these findings cast doubts on the judgment abilities of receivers in groups facing tough demands in a limited-cue CMC setting.

The findings from our studies of deception in GSS and CMC groups also provide some insight into questions DeSanctis raised about the individualistic and technocentric focus of GSS work, with its emphasis on individual gain in group settings. Our primary research question asked whether and how group process and outcome were affected when the individualistic nature of GSS use was enhanced through a focus on individual goals. Our findings indicate that individual agendas, enacted through deception, do appear to affect group performance, if the deception goes undetected. Despite the hope for positive change, GSS and CMC can be manipulated by deceivers for their own ends. Investigating deception in a GSS context gives us "a new opportunity for studying old questions about the role of technology in organizations" (DeSanctis, 1993, p. 98). Our findings indicate that deception is a winning strategy for individuals in groups; hence, there are problems with the belief that GSS and CMC technologies are exclusively instruments of positive change and collectivism in organizational

settings.

Based on our findings, it does seem that deception can be a winning strategy for a group member to use to pursue individual goals that conflict with those of the group. In general, people can only detect deceptive communication about one time out of three (Levine et al., 1999). Even when warned that deception might be present, group members in our studies were worse at detecting deception than we expected. In the first three of the four studies we discussed, successful detection rates were only around 10 percent. In the fourth study, deceivers were judged to be more honest than dishonest. In the StrikeCom studies, group members perceived that something was wrong with their groups' behavior, but they were more likely to ascribe the oddities to incompetent group members rather than to deceptive group members. The most likely explanation for the low detection rates is not that we were able to find expert liars to fill our deceivers' roles – deceivers' roles were in fact filled randomly. Instead, the truth bias appears to be both common and robust. People tend to believe what they are told, even when told by strangers. Deciding to engage in deception to further his or her ends seems to result in a clear advantage for the deceiver.

The decision to engage in deception also seems to help the deceiver shape group outcomes according to his or her preferences. In the GroupSystems studies, the groups tended to vote to support the deceivers' preferred projects. In the second of these studies, the group supported the deceivers' projects 70 percent of the time. In the context of the task, groups voted to spend tens of thousands of dollars on projects about which they were being actively lied to. In the StrikeCom studies, group success rates were low, due in part to the role of the deceiver. In the context of the task, groups voted to bomb the wrong places, letting potential enemy combatants escape, because the deceivers wanted them to bomb the wrong places. Although it seems clear to us that deception was used skillfully as a tool to shape group outcomes to the deceivers' liking, deceivers could probably achieve some of the same results by persuading fellow group members in other ways. Such an explanation does not lessen the conclusion that individuals pushing for goals that conflict with those of the group can affect group outcomes in their favor in a GSS or CMC setting, settings designed to advance collectivist goals.

Finally, our studies demonstrated that determined deceivers can still influence the rest of their groups even by communicating through information technologies they have never used before. In both the GroupSystems and StrikeCom studies, none of the group members had ever previously used these exact information technologies. While both systems are easy to use, and while all group members had some training for using the technologies during the experiments, all of the group members using these technologies had to adjust to them in order to work with each other. In all four studies, deceivers were able to adjust to the technology and lie effectively. In the GroupSystems studies, deceivers using the technology adjusted by lying more than their counterpart deceivers who communicated without using GroupSystems. Since the amount of lying had no effect on group outcome, we interpret the increased volume of lies as an adjustment mechanism. Even in synchronous CMC, there is still a delay in receiving messages from others, whether due to network issues or time to compose and type messages. For some of the GroupSystems deceivers, the volume of lies appears to be associated with that delay. According to IDT, part of deception is watching how receivers respond to dishonest messages. Receivers' reactions, whether they indicate belief or suspicion, can affect the timing, tone, and content of the next message from the deceiver. With a delay between issuing a deceptive message and getting a response from receivers, the GroupSystems deceivers sent out additional messages as a way to reinforce their positions (see Exhibit 1). Adjusting to the new technology worked for these deceivers. They were just as successful as their counterparts who did not use GroupSystems.

In the StrikeCom studies, deceivers learned to employ particular tactics to misguide the other members of their groups. For example, they lied outright about what they were searching for and maintained that they had found targets when they really hadn't. They also tried to keep their group members from discovering information that would hurt their individual goals. In one example, a deceiver took advantage of the game board layout, convincing the group to divide the game board into quadrants, with each member responsible for one quadrant. The deceiver took responsibility for

the quadrant with the most real targets, as the deceiver had been informed of where all the actual targets were before game play began.

Receiver 1: *Especially because in XXXXX, being an urban area, i see many homeless people. I get asked for change from people every day when walking to school. #6* (a community religious retreat) *would also be very good because located near the school, a lot of various and strongly religious students could benefit*
Receiver 2: *I don't think that #4* (an off-track horse-racing betting facility) *is that deserving of much, if any money. Uncle Sylvester wasn't a betting man and he hated horses anyway.*
Deceiver: *i would agree with that but there are already 12 shelters in* (name of the city) *and 4 around the school* **(*)**. *they have enough already.*
Deceiver: *i worked in one and it wasn't even close to being full* **(*)**

Exhibit 1 (Admitted lies denoted by asterisks)

Given how deception was a good strategy for subjects in our studies, and given how skillful they were both at using deception effectively and at persuading others, our findings indicate that there may be an overly optimistic view of how information technology supports groups. An exclusive belief that GSS, CMC, and other related technologies bring only positive change to organizations or advance only collectivist goals is problematic. As we have seen, DeSanctis pointed out problems with such technocratic views in her writings over a decade ago. Kling (1991) also pointed out the problems associated with an unrealistic view of systems for group support that relied on an exclusively collaborative and cooperative perspective. Regarding information technology and deception, in particular, Zmud (1990) warned that new information technologies have created the potential for strategic information manipulation to impact organizations in significant ways. Such a view presupposes the willingness of individuals to engage in such manipulations for their own ends. We have seen, both in the literature and in our own work, that simply providing a goal and the right incentive to pursue it can result in both willingness to deceive and success in doing so.

5. Conclusion

We started out by reviewing one of DeSanctis's lesser known articles, a book chapter published in 1993 that focused on the prevailing individualistic and technocentric view of group support systems as contained in the literature through that point in time. In that chapter, DeSanctis called for a more collectivist focus for GSS, yet we have little reason to believe that the call has been widely answered. In the chapter, she also called for a "more expansive view of the role of GSS," and we believe we have contributed to that more expansive view in our work on deception in groups — in particular, in groups supported by information technology. We know that, under the right circumstances, an individual will try to deceive his or her fellow group members in order to pursue his or her individual goals. Group work is as marked by conniving and coercion as it is by collaboration, coordination, and cooperation. Deception is just one way individuals seek their own goals in group settings – there are others. More research is called for to investigate deception and other anti-social but instrumental behaviors in groups, to further DeSanctis' work on the competing individualistic and collectivistic natures of groups and their work.

Acknowledgement

Portions of this research were supported by the U.S. Air Force Office of Scientific Research under the U.S. Department of Defense University Research Initiative (Grant #F49620-01-1-0394). The views, opinions, and/or findings in this report are those of the authors and should not be construed as an official Department of Defense position, policy, or decision. We would like to thank John Wells for his feedback on an earlier version of this paper.

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Appendix 1. Experimental Procedures for the Four Experimental Studies Described in this Paper.

GroupSystems Study 1: This study was the initial investigation into the impact of media differences on both the incidence of deception and deception detection in groups. Subjects, who were drawn from four senior-level sections of the MIS capstone course, attended the experimental sessions in groups of three, and they were not informed of the true nature of the study, that being accuracy in detection of deception. Extra course credit and an entry into a cash lottery were automatically awarded to all subjects participating. The subject randomly drawn as the deceiver was asked to arrive alone. Without exception, the subject agreed to submit inaccurate statements during the meeting. After the other two subjects arrived, all three read and signed consent forms. Each group began the session by engaging in training using GroupSystems. The meeting began with a practice group generative task, the goals of which were to both familiarize subjects with the software and to demonstrate the order of discussion activities that would be conducted in the experimental task. Following the practice task, half of the groups conducted the experimental task using the GSS, while the other half performed it using oral FTF communication. All face-to-face discussions were recorded by audio tape. Discussions typically lasted between ten and fifteen minutes.

The participants were each given a written description of the experimental task, another group generative exercise compiling a list of suggestions to help boost tourism in the local community. The deceiver's instructions also detailed a particular suggestion for the subject to argue for, with the promise of a cash reward if the assigned suggestion was voted into the top two at the end of the task. Following the voting phase of the experimental task, subjects were given a questionnaire measuring perceptions of the group and the decision making process. Receivers were also asked to identify any information they felt was dishonest. If the receivers could correctly identify anything as deceptive, they would be eligible for a cash reward.

The receivers were dismissed from the experimental site, with instructions not to discuss the experiment with anyone until being debriefed. With the experimenter either displaying the written discussion from the GSS group meetings or playing the audio recording of the face-to-face discussions, the deceiver was asked to identify specific statements that he or she judged to be deceptive. The dependent variable representing the detection of deceptive information was measured by dividing the number of deceptive statements correctly detected by a receiver into the total number of deceptive statements entered by the deceiver, which was obtained by collecting the number of statements each deceiver admitted to containing false information. Each individual statement or sentence was tallied as one lie. Deceiver success occurred when the deceiver successfully swayed the group into voting his or her assigned tourist attraction into the top two choices.

A more complete description of this study can be found within the Proceedings of the 37th Annual Hawaii International Conference on System Sciences.

GroupSystems Study 2: The second study was planned in response to the lack of deception detection observed in either face-to-face or CMC groups in GroupSystems Study 1. The purpose of the study was to determine if the proximate settings for the group discussions had any influence on the receivers' level of suspicion. Groups in proximate settings often establish mutuality (Burgoon et al., 2002) among their members, and combined with the social facilitation (Zajonc, 1965; Sussman and Sproull, 1999) found among co-located groups, this might prevent a receiver from reaching an adequate level of suspicion needed for lie detection. In addition to the effects of media differences hypothesized in Study 1, we believed that dispersed group members would be more apt to detect deception due to being removed from a setting prone to mutuality and social facilitation. Likewise, we also believed that deceivers would lie more in dispersed settings for the same reasons. We also expected that deceivers would be more successful in swaying the group decision his or her way when using GSS or when dispersed. Prior literature did not lend credence toward hypothesizing any interaction effects.

This resulted in a 2x2 factorial design, mixing two levels of computer supported communication (with or without) with two levels of group proximity (collocated and dispersed group members). Thus, the four settings were a traditional board table setting (co-located/no computer support), a board table setting with GSS (co-located/computer support), an audio-conference

conducted in separate rooms within an interview suite (dispersed/no computer support), and a GSS meeting within the same interview suite (dispersed/computer support). Student subjects from courses throughout the College of Business participated, and no two group members knew one another. A personal value assessment survey was administered to determine where each subject rated six value dimensions (Hall, Paradice, and Courtney, 2003), and the subject in the deceiver role was instructed to argue for the Personal Foundation project that aligned with his or her lowest value dimension. In doing so, the deceiver would have to adapt his or her stance on a normally-disfavored project and deceptively argue for it as if it were the most appropriate project to fund. We found that the deceivers and receivers were very similar with regard to their lowest rated value dimension, so the majority of the groups would have normally had a high level of initial concordance (Kahai, Avolio, and Sosik, 1998). This made the task of persuading group members to fund an unpopular project even more difficult. As mentioned in the main text, the task differed (although it was also a judgmental task), but the procedures, the practice task, and the operationalization of variables were similar to those in Study 1. Deceiver success occurred when the deceiver successfully swayed the group into allocating the most funding to his or her assigned project.

A more complete description of this study is currently under journal review elsewhere.

StrikeCom Study 1: This study looked at the influence of task complexity on computer-mediated collaborative groups facing deception. The task subjects performed was based on a multiplayer game named StrikeCom, which provided a simulation environment designed to foster group communication in a cooperative activity. The game included a built-in text messaging area that allowed for computer-mediated communication among the players. The goal in the game was for players to find enemy bases in a grid board with their group members. Players were instructed to discuss their search results with their teammates and to work together to locate the targets.

One participant was randomly selected to be a deceiver in each group. The deceivers were told to pretend that they were from the area being targeted in the simulation and that they still had friends and family in the area; further, they knew that the enemy was hiding among civilians, and so their family could be killed in the strikes. They were then told that their goal in the game was to deceive their team members about the true locations of the enemy and to get them to destroy empty targets. In order to protect their family, they could not reveal their true motive at any time. They were given information as to where the targets were located, and they were told to get their teammates to avoid those squares by deceiving in any way they saw fit.

There were three turns in the game. On each turn participants conducted a search using two search tools, and on their final turn they were told to work with their teammates to devise a common bombing plan in an attempt to destroy the enemy targets. They were told to bomb at least three areas on their final turn. During the game, they were able to communicate with their teammates at any time using a text-messaging component of the game. Also, half of the groups were randomly selected to have a more complex game setup than the others. The number of grid squares and the number of targets in the simulation were increased to make the game more difficult. Both settings were piloted beforehand, and pilot participants perceived the complex settings as being significantly harder than the easy settings. The easy games had a 3-by-3-sized game board with three targets, and the complex games had a 4-by-4-sized game board with four targets. Group members were in the same room during the experiment, but they were situated so they could not see each other, and so they only communicated using the chat feature of StrikeCom. Participants had code names in the game (Air, Space, and Intel), so they did not know who they were communicating with during the experiment.

Participants were given the chance to win monetary awards to motivate them to perform well. The groups that received the highest scores in the game were given cash awards (not including the deceivers). The deceivers were in a separate competition. The deceivers that were able to get their groups to miss the greatest number of targets were given similar awards. The deceiver competition was secret, and so non-deceptive group members were not aware of the deceivers' goals.

Questionnaires were administered after the experiment. Non-deceptive participants were asked if they thought any group members had been deceptive during the game and why they felt individuals that they rated as deceptive were deceptive. Also, deceivers were asked to explain how they had been deceptive. Specifically, non-deceptive participants were asked "Did you believe that any person was deceptive or dishonest during this exercise?" and they were told to decide if each group member had been "dishonest," "honest," or if they were "unsure." Detection success was

measured by counting one point for each correct rating and subtracting one point for each incorrect rating. No points were added or subtracted for an "unsure" rating. Group ratings were calculated by taking the average of individual group members' ratings. Task performance was calculated by averaging group members' total correct strikes divided by the number of targets in the game.

A more complete description of this study can be found within the Proceedings of the 38th Annual Hawaii International Conference on System Sciences.

StrikeCom Study 2: This study extended the first StrikeCom study by also looking at group member familiarity, which influences the communication process between group members. For this new manipulation, half of the subjects played the game with individuals they already knew from a class group. These were groups that had already had at least five formal meetings for class-related projects. Most of the study design was the same as the previous study, however, several areas were updated to improve the study. A first change was that we allowed participants to rate group members as being more deceptive or less deceptive without having to label them as being totally honest or deceptive.

The game complexity settings were also changed to ensure that the complex task setting was significantly more complex for participants than the low-complexity setting. The high complexity setting was increased to a 7-by-7-sized game board with six targets. The low complexity setting stayed the same with a 3-by-3-sized game board with three targets. Lastly, we decided not to give groups a minimum number of areas to target on their strike turn, so that they would not be influenced by outside information.

Group detection accuracy was calculated by taking deception detection and truth detection into account. We took the average of each group member's level of deceptiveness ratings for the deceiver minus the sum of their ratings for the non-deceivers. Maximum deception detection accuracy was achieved by group members rating the deceiver at the highest level and the other participants at the lowest level on the deceptiveness scale. Deceivers did not rate the other group members. The task performance calculation was also updated. Since we did not give groups a minimum number of strikes or any information about how many targets might be on the board, we measured performance by dividing non-deceptive group members' hits by their total number of strikes (correct strikes plus misses).

A more complete description of this study is currently under journal review elsewhere.

About the Authors

Joey F. George is a Professor of Information Systems and the Thomas L. Williams Jr. Eminent Scholar in Information Systems in the Management Information Systems Department in the College of Business at Florida State University. His research interests include the detection of deceptive computer-mediated communication, computer-based monitoring, group support systems, and information systems development. He currently serves as Editor-in-Chief of *Communications of the Association for Information Systems*. He is also an Associate Editor for *Information Systems Research*.

Kent Marett is an assistant professor of Management Information Systems at Mississippi State University. He holds a Ph.D. in MIS from Florida State University. His primary research interests include deceptive communication in computer-based media, user security and privacy in online environments, and the use of technology in individual and group decision-making.

Gabriel A. Giordano is an assistant professor of Information Systems at IESE Business School. His research focuses on differences between computer-mediated and traditional work settings and on computer-mediated deception and deception detection.

Journal of the Association for Information Systems

ISSN: 1536-9323