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ABSTRACT

This study investigates the effects of a GSS and task type on status influence in a group decision making setting. Three support levels were examined: manual support, face-to-face GSS support, and dispersed GSS support. Intellective and preference tasks were studied. The dependent variables were status influence, sustained influence, and residual disagreement. Status influence and sustained influence were higher but residual disagreement was lower in manual groups than in face-to-face GSS groups and dispersed GSS groups. Preference task groups also experienced higher status influence, higher sustained influence, and lower residual disagreement compared to intellective task groups. These findings suggest that a GSS dampens status influence and sustained influence, though at the expense of creating greater residual disagreement, especially for a preference task.

1. INTRODUCTION

Majority influence and minority influence are two important facets of social influence (Nemeth 1986). Studies on majority influence have closely examined the concept of conformity by concentrating on situations where the majority serves as the source of influence (Kiesler and Kiesler 1969). In contrast, research on minority influence has focused on the issue of innovation and studied how individual and minority viewpoints stimulate divergent attention and thought (Moscovici 1976).

Although majority influence and minority influence can have a positive impact on group decision making under some circumstances, both these forms of influence can also cause group process losses. Potential sources of process losses that accompany majority influence include conformance pressure, evaluation apprehension, cognitive inertia, and domination (Nunamaker et al. 1991). These process losses can also result from minority influence and are of particular concern when the individual exercising minority influence has a higher status than other group members.

Group support systems (GSS) (DeSanctis and Gallupe 1987; Nunamaker et al. 1991) have been suggested as a means of alleviating these and other sources of process losses. Empirical research has examined how a GSS can reduce the effects resulting from majority influence (Clapper, McLean and Watson 1991; Connolly, Jessup and Valacich 1990; Jessup, Connolly and Galegher 1990; Watson, DeSanctis and Poole 1988; Zigurs, Poole and DeSanctis 1988) and minority influence (Dubrovsky, Kiesler and Sethna 1991; George et al. 1990). However, in spite of its relevance to the study of group decision making, influence has rarely been directly investigated by GSS researchers. Moreover, the few studies which directly measured influence (Clapper, McLean and Watson 1991; Zigurs, Poole and DeSanctis 1988) have focused on majority influence. This study manipulates minority influence directly and seeks answers to the following research questions:

1. Can a GSS reduce the influence of a higher status individual on lower status group members, a form of minority influence, when used in face-to-face and dispersed settings?

2. Will the impact of a GSS differ when groups are performing an intellective task as opposed to a preference task?

2. MINORITY INFLUENCE AND STATUS INFLUENCE

2.1 Minority Influence

Innovation research suggests that minorities can serve as sources of influence (Moscovici 1976). Reversing the conformity paradigm, Moscovici, Lage and Naffrechoux (1969) demonstrate that a consistent minority can exert considerable influence on the majority. Behavioral style or "the orchestration and patterning" of behavior (Moscovici and Nemeth 1974) is the source of minority influence. A minority which consistently stands out against the majority gains visibility and attracts the attention of the group. Furthermore, by advocating its position in the face of possible sanctions from the majority, the minority exhibits a certain amount of confidence with and commitment to its position. Hence, consistency is an important factor contributing to minority influence (Maass and Clark 1984). However, because of its opposition to the majority viewpoint, minority influence usually takes effect slowly during group decision making (Nemeth, Swedlund and Kanki 1974). Nevertheless, the impact produced by minority influence tends to be latent and more permanent (Nemeth 1986). This impact is likely to last for a long period of time even though it may not be immediately apparent.

Although consistency is a key behavioral style contributing to minority influence, other characteristics of a minority can also propagate minority influence. These include idiosyncracy credits, competence, power, and status (Hollander 1964). This study focuses on minority influence resulting from status and examines how such influence can be altered by introducing a GSS into small group meetings.

2.2 Status Influence

When making group decisions, lower status group members tend to defer to the opinions of higher status groups members (Hollander 1964). Hence, a higher status individual can exert considerable influence on the majority of lower status group members. Status influence is normative influence because it can be applied even in the absence of relevant information and logical reasoning (Clapper, McLean and Watson 1991).

When used inappropriately, status influence can bring about group process losses. A higher status individual can monopolize group discussion in an unproductive manner, resulting in domination (Jablin and Seibold 1978). Lower status group members may be reluctant to criticize the views of a higher status individual due to the fear of negative evaluation and reprisals, resulting in evaluation apprehension (Diehl and Stroebe 1987) and conformance pressure (Hackman and Kaplan 1974). Moreover, group discussion may move along the train of thought of a higher status individual when other group members refrain from contributing opposing perspectives, resulting in cognitive inertia (Jablin and Seibold 1978).

Status influence can be both harmful and beneficial to group decision making. Consider the impact of status influence on the intelligence, design, choice, and implementation phases in Simon's (1977) model of decision making. The intelligence phase includes activities such as environmental scanning, data collection, and problem detection. Status influence can bias the information collection and examination process, and reduce the completeness and accuracy of problem definition. In the design phase, problems are examined and solutions are created and evaluated. Status influence can limit the range of solutions considered and reduce the effectiveness of this phase. Thus, status influence can be harmful during the intelligence and design phases of group decision making.

The choice phase is concerned with solution selection. In this phase, higher status individuals, who often control critical resources, should be allowed to exercise status influence to ensure that adequate resources are committed to solution implementation (Pfeffer and Salancik 1978). Status influence can also ensure the availability of critical resources, reduce risks of resistance, and facilitate coordination during the implementation phase (Pfeffer 1992). Hence, status influence can have beneficial effects during the choice and implementation phases of group decision making.

Since status influence is beneficial to some but detrimental to other phases of group decision making, it is desirable to sometimes dampen and other times amplify status influence. This study tests whether a GSS can dampen status influence and so enhance the quality of some phases of group decision making.

3. RESEARCH MODEL AND HYPOTHESES

3.1 Research Model

A GSS can potentially reduce status influence by manipulating the communication network (Shaw 1978), modality (Weeks and Chapanis 1976), and strategy (Eils and John

Table 1. The Support Levels

Communication modality	Manual support	Face-to-face GSS support	Dispersed GSS support
Verbal communication	Yes	No	No
Visual communication	Yes	Yes	No
Textual communication	Yes	Yes	Yes

1980) during group decision making (Clapper, McLean and Watson 1991; McGrath 1984). This study holds communication network and strategy constant and focuses on communication modality. The three support levels provided to groups are manual support, face-to-face GSS support, and dispersed GSS support. Manual groups are allowed to communicate using verbal, visual, and textual cues. Face-to-face GSS groups can communicate with visual and textual cues. Dispersed GSS groups can only communicate with textual cues (see Table 1).

Intellective and preference tasks were used to examine whether GSS effects varied with task type. An intellective task (McGrath 1984) has some generally agreed upon guidelines for arriving at its solution. A preference task (McGrath 1984) does not have solution guidelines and group members have to arrive at a solution based on mutual agreement. Groups, rather than individuals, are often used to perform intellective (Davis 1969) and preference tasks (Daft and Lengel 1986). Therefore, these two task types are good candidates for GSS research.

The dependent variables are status influence, sustained influence, and residual disagreement. Status influence measures the influence of a higher status individual on lower status group members during a meeting. It indicates the extent to which lower status group members conform to the viewpoints of the higher status individual. Sustained influence is a measure of status influence taken after a meeting, when the higher status individual is no longer present. It indicates the amount of status influence that lasts beyond the meeting. Residual disagreement measures the proportion of disagreement among lower status group members that is not resolved during the meeting. Figure 1 illustrates the research model.

3.2 Research Hypotheses

The influence of a higher status individual on lower status group members can be predicted using social impact theory (Latane and Wolf 1981). The first principle of social impact theory suggests that the degree of social impact, or pressure to change, on an individual is a multiplicative function of the strength, immediacy, and number of other individuals who are sources of influence in the situation. An increase in the strength, immediacy, or number of sources of influence is likely to increase the impact on an individual (see Figure 2).

Strength refers to the salience, power, importance, or intensity of the sources of influence (Latane and Wolf 1981). Factors such as social position, economic power, and age of the sources of influence contribute to strength. Immediacy refers to the proximity in time or space between the sources and targets of influence (Latane and Wolf 1981). It includes the richness of the communication modality between the sources and targets of influence. Number refers to how many sources of influence are present (Latane and Wolf 1981).

In this study, strength is represented by the higher social position of the higher status individual in the group. Immediacy is represented by the richness of the communication modality or the range of communication cues permitted between group members. Manual groups can communicate using verbal, visual, and textual cues, and have the richest communication modality. They are followed by face-to-face GSS groups, who can communicate using visual and textual cues, and then dispersed GSS groups, who can communicate using only textual cues. By formulating the degree of social impact as a product of the strength and immediacy of the sources of influence, the first principle of social impact theory suggests that status influence is mediated by the richness of the communication modality between group members. It predicts that status influence is greatest in manual groups, followed by face-to-face GSS groups, and then dispersed GSS groups.

This prediction is in concordance with evidence from communication medium literature. Verbal communication, especially its paralinguistic aspects (McGrath 1984) such as the tone and loudness of voice, and rate of speech, has the potential to carry a significant amount of normative cues.

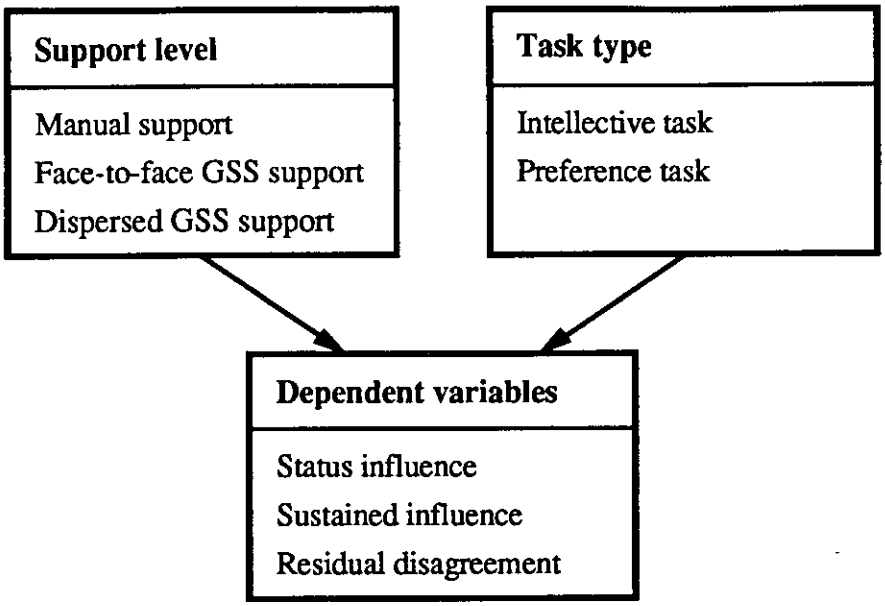

Figure 1. The Research Model

This permits higher status individuals in manual groups to exercise considerable status influence. Without verbal communication, higher status individuals in face-to-face GSS groups are unable to intimidate lower status group members through their tone and loudness of voice, and rate of speech. However, a certain amount of status influence can still be exercised through visual cues (McGrath 1984) such as visual orientation and facial expression. In dispersed GSS groups, higher status individuals are unable to exercise status influence through verbal and visual cues. Hence, status influence is likely to be minimal in this setting.

H1a: Status influence will be higher in manual groups than in face-to-face GSS groups and dispersed GSS groups.

H1b: Status influence will be higher in face-to-face GSS groups than in dispersed GSS groups.

Intellective and preference tasks consist mainly of issues located on different sides of an informational-normative continuum of influence (Laughlin and Earley 1982). Intellective tasks can be solved by addressing intellective issues for which there are correct solutions (McGrath 1984). Informational influence, which is based on the acceptance of information from others as evidence of reality, should predominate when groups are solving intellective tasks (Kaplan and Miller 1987). Preference tasks can be completed by addressing judgmental issues, which involve behavioral, ethical, or aesthetic judgements, for which no correct answers exist (McGrath 1984). Normative influence, which is based on the desire to conform to the expectations of others, should prevail when groups are performing preference tasks (Kaplan and Miller 1987).

Status influence is normative in nature (Clapper, McLean and Watson 1991). When groups are solving an intellective task through the exchange of information, higher status individuals are likely to experience more difficulties exercising status influence effectively. Conversely, when groups are performing a preference task involving personal judgements, higher status individuals are likely to have ample opportunities to exercise status influence effectively. Hence, higher status individuals are likely to be more able to exercise status influence when groups are performing a preference task compared to an intellective task.

H1c: Status influence will be higher for a preference task than an intellective task.

Research on social influence suggests that minority influence induces conversion behavior (Moscovici 1980), which tends to manifest itself at the latent or private level. Group members may privately accept minority viewpoints without publicly moving toward the minority position (Mugny 1980). As such, the actual impact of minority influence can be stronger than that revealed publicly. Furthermore, even though it is less apparent, minority influence may be deeper and more lasting (Nemeth 1986). These effects are likely to be amplified when minority influence is exercised by higher status individuals. Hence, status influence is likely to be lasting and sustainable beyond a meeting. Conditions which permit high status influence are also likely to produce high sustained influence.

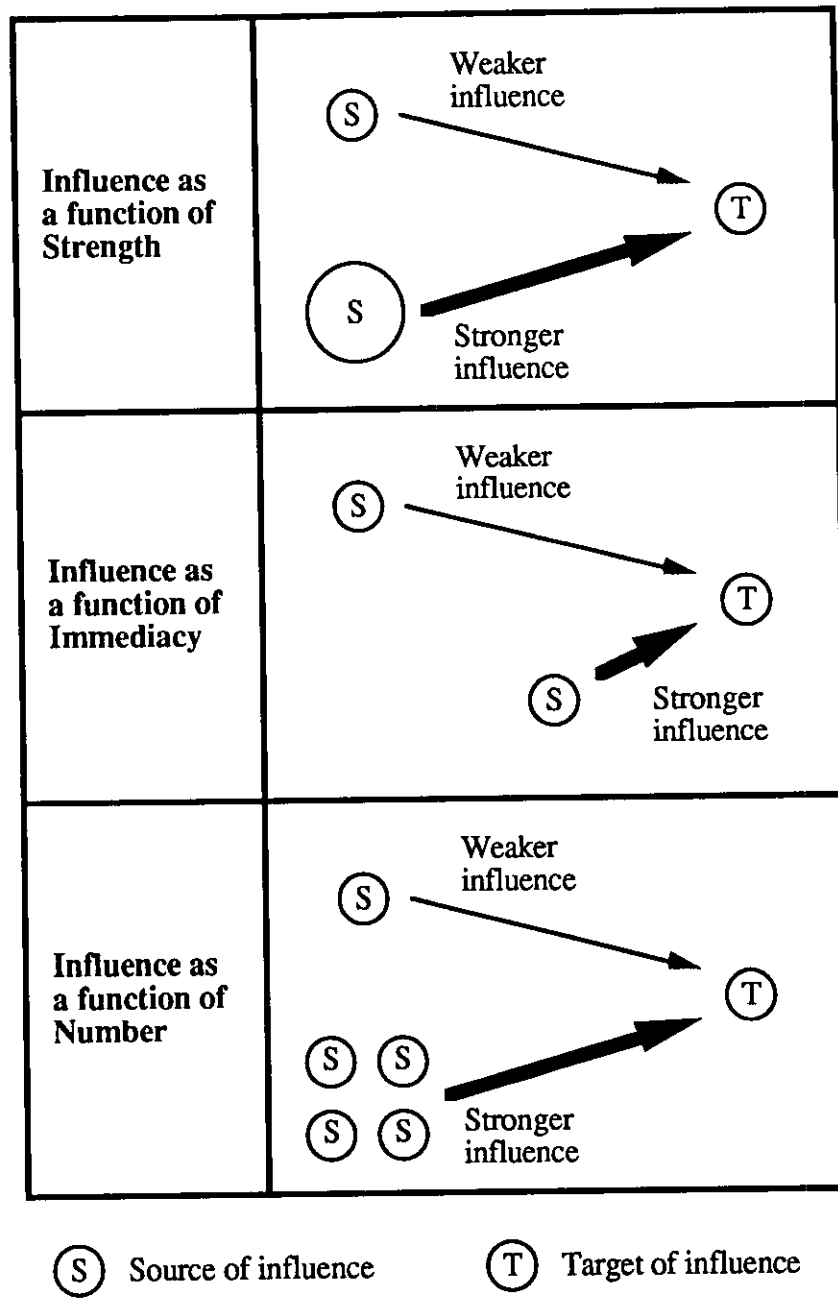

Figure 2. First Principle of Social Impact Theory

H2a: Sustained influence will be higher in manual groups than in face-to-face GSS groups and dispersed GSS groups.

H2b: Sustained influence will be higher in face-to-face GSS groups than in dispersed GSS groups.

H2c: Sustained influence will be higher for a preference task than an intellective task.

Group members usually begin meetings with a certain level of disagreement. During the meetings, opinions are exchanged and debated, and some differences are likely to be

resolved. The strength of the influence of higher status individuals can affect the proportion of disagreement resolved during meetings. In meetings characterized by strong status influence, lower status group members are likely to move toward the position advocated by the higher status individual. By providing a focal point toward which the group moves, the higher status individual can alleviate the differences among lower status group members. Hence, conditions which permit high status influence are likely to result in low residual disagreement.

H3a: Residual disagreement will be lower in manual groups than in face-to-face GSS groups and dispersed GSS groups.

H3b: Residual disagreement will be lower in face-to-face GSS groups than in dispersed GSS groups.

H3c: Residual disagreement will be lower for a preference task than an intellective task.

4. RESEARCH METHODOLOGY

The research design was a 3x2 factorial controlled laboratory experiment. Groups contained five people because this is the optimal size for face-to-face meetings (Hare 1976) and the reported average number of people attending organizational meetings (*Datamation* 1986). Status influence within each group was operationalized by having a teaching assistant, who is a confederate with a higher social position than the subjects, following a script that dictated confederate behavior during group decision making (see Section 4.6).

4.1 Support Level

The three support levels examined were manual support, face-to-face GSS support, and dispersed GSS support. The communication network used for all support levels was a wheel topology (Shaw 1978). All communication flowed from group members to a common display (white board for manual groups, shared public screen for face-to-face GSS groups, individual public screens for dispersed GSS groups). Group members were not permitted to communicate directly with each other. A sequential communication strategy was used for all support levels. Group members took turns to contribute their views during each round of group decision making. Although this resulted in a restrictive and artificial manner of communication, it was necessary to insure experimental control over the interaction between group members. There was no anonymity for all support levels. Group members were required to identify themselves when presenting their views.

The three support levels varied in terms of communication modality or the range of communication cues permitted between group members (see Table 1). Differences between manual groups and face-to-face GSS groups could be attributed to verbal communication while differences between face-to-face GSS groups and dispersed GSS groups could be attributed to visual communication.

4.2 Task Type

The intellective and preference tasks were mock jury tasks that have been used in social psychology research (Kaplan and Miller 1987) and GSS research (Clapper, McLean and Watson 1991). Both tasks required group members to judge the relative strengths of the plaintiff's arguments versus the defendant's arguments. Group members had to decide on the amounts to be awarded to the plaintiff and state their reasons.

The intellective task provided group members with some guidelines to arrive at an amount to award the plaintiff. When presenting their amounts, group members could demonstrate some logical reasoning for their amounts (Kaplan and Miller 1987). The preference task did not provide decision guidelines. Consequently, group members had to base their amounts on their ethical orientation and preferences (Kaplan and Miller 1987).

4.3 GSS and Setting

The GSS used was the Software Aided Group Environment (SAGE) system (Wei, Tan and Raman 1992). SAGE supports both face-to-face and dispersed meetings. The Idea Gathering feature of SAGE was the only module used. It permits group members to enter their names, amounts, and reasons on a screen and transmit this information to a common display. The use of simple functions of SAGE minimized the amount of training required for groups.

The settings for the three support levels are illustrated in Figure 3. In manual groups, group members read aloud their amounts and reasons, and this information, together with their names, was recorded manually by the experimental administrator on a white board. In face-to-face GSS groups, group members used their respective private terminals to enter their names, amounts, and reasons. Collective information was displayed on a shared public screen. In dispersed GSS groups, a window on each private terminal allowed group members to enter their names, amounts, and reasons while a separate window on each private terminal served as an individual public screen displaying collective information.

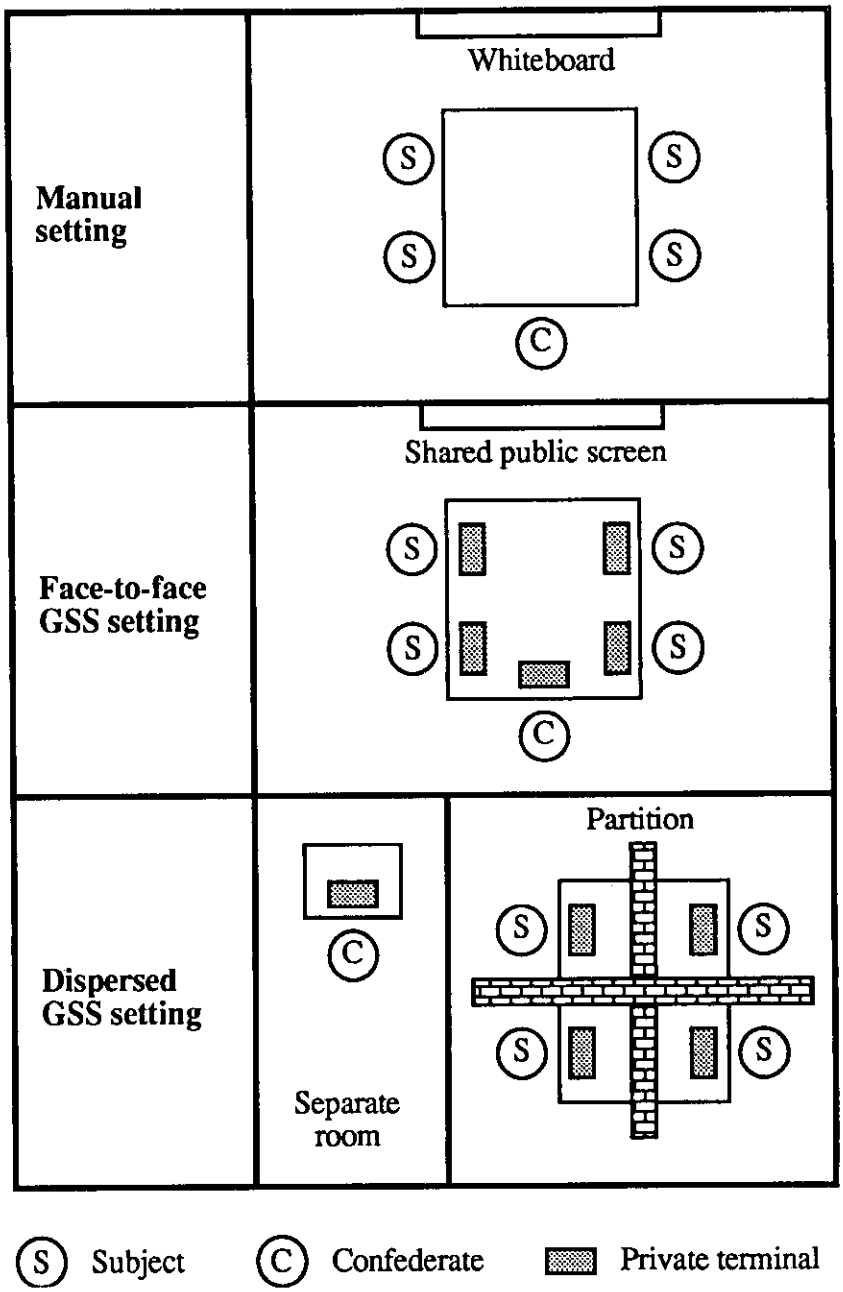

Figure 3. The Settings

4.4 Confederates and Subjects

Four confederates and 288 subjects participated in this study. The subjects were information systems and computer science undergraduates from the National University of Singapore. The confederates were from the same university and were teaching assistants to the subjects. Each group consisted of four subjects and a confederate. The subjects and confederates were randomly assigned to different groups, and groups were randomly assigned to different treatments. This helped to control for differences in individual characteristics, which might affect group decision making (Gordon, Slade and Schmitt 1986). Each subject participated in one group while each confederate participated in many groups. Subjects received course credit for their participation.

4.5 Procedure

Each group was given the case corresponding to its respective task type. The case contained the plaintiff's arguments and the defendant's arguments. Group members were given time to read the case. The steps to be followed during group decision making were explained to them. Subjects were told they had to work with a teaching assistant (the confederate) to arrive at a group decision. The group decision making process consisted of a series of rounds. In each round, group members were required to present their names, amounts, and reasons. The order of presentation was controlled by the experimental administrator so that the confederate was always the last to present this information. The meeting ended when all subjects had moved to the confederate position or when the maximum number of rounds (eight rounds) was reached. After the meeting, subjects were asked to individually restate their amounts in the absence of the confederate.

4.6 Operationalization of Status Influence

Hidden between the case given to the confederate was a script dictating the amounts and reasons to be awarded by the confederate in each round. This script was adapted from that used by Clapper, McLean and Watson (1991). Given the settings for the three support levels (Figure 3), the script was not visible to the subjects. The amount awarded by the confederate in the first round was always twice the largest amount awarded by the subjects. This created a substantial gap between the subject and confederate positions. Together with the normative statements provided in the script, this gap permitted the confederate to exercise a considerable amount of status influence, a form of normative influence (Clapper, McLean and Watson 1991), on the subjects. Examples of these normative statements are:

1. "It is not easy to get everyone in a group to agree on an amount. But I feel that the group should agree on this (my) amount."

2. "I think we have to compromise to reach a group decision. This (my) amount should be the group decision."

3. "We are not going to reach a group decision if this is not the amount. We should all agree on this (my) amount."

The use of a simple formula for the initial confederate position also helped to ensure that the confederate was able to arrive at the correct amount quickly without arousing suspicion. The amount proposed by the confederate was reduced by 5% after every other round. This served to eliminate a substantial amount of influence due to consistency, a major determinant of minority influence (Maass and Clark 1984), so that the remaining influence was mainly due to status. It also helped to reduce suspicion that might have arisen had the confederate maintained the same position throughout the meeting (Clapper, McLean and Watson 1991).

5. DATA ANALYSIS AND RESULTS

ANOVA was used to test for significant main and interaction effects. Detected significant main effects were investigated further using the Ryan-Einot-Gabrial-Welsch multiple t-test (SAS 1985). A 5% level of significance was used for all statistical tests. Table 2 presents the descriptive statistics of the dependent variables. Table 3 shows the results of the ANOVA tests.

Status influence was computed using a method shown in the appendix. The higher the measure, the stronger the influence of the higher status individual on lower status group members. A logarithm transformation (Weisberg 1985) was performed so that the homogeneity and normality requirements of the ANOVA test (Neter, Wasserman and Kutner 1990) could be met. Both support level ($p = 0.0204$) and task type ($p = 0.0001$) had significant main effects for status influence. Manual groups experienced higher status influence than face-to-face GSS groups and dispersed GSS groups. Status influence was higher for the preference task than the intellective task. Hypotheses 1a and 1c were supported, but hypothesis 1b was not supported.

Sustained influence was computed using a method shown in the appendix. The higher the measure, the greater the amount of status influence remaining after the meeting. Sustained influence was transformed using a logarithm transformation to meet the homogeneity and normality requirements of the ANOVA test. Both support level ($p = 0.0082$) and task type ($p = 0.0001$) had significant main effects for sustained influence. Sustained influence was higher in manual groups than in face-to-face GSS groups and dispersed GSS groups. Sustained influence was also higher for the preference task than the intellective task. Hypotheses 2a and 2c were supported, but hypothesis 2b was not supported.

The computation method for residual disagreement is shown in the appendix. The lower the value for residual disagreement, the greater the proportion of disagreement

Table 2. Mean (Standard Deviation, Cell Size) of Dependent Variables

Task type	Support level	Status influence	Sustained influence	Residual disagreement
Intellective task	Manual support	0.68 (0.20, 12)	0.56 (0.18, 12)	50.25 (53.83, 12)
	Face-to-face GSS support	0.63 (0.33, 12)	0.52 (0.26, 12)	60.38 (41.48, 12)
	Dispersed GSS support	0.61 (0.22, 12)	0.55 (0.24, 12)	43.09 (30.69, 12)
Preference task	Manual support	2.57 (0.77, 12)	2.08 (0.66, 12)	1.12 (3.86, 12)
	Face-to-face GSS support	1.68 (0.43, 12)	1.30 (0.49, 12)	41.40 (52.59, 12)
	Dispersed GSS support	1.73 (0.74, 12)	1.11 (0.59, 12)	62.14 (59.40, 12)

Table 3. Results of ANOVA Tests

	Status influence	Sustained influence	Residual disagreement
Task type	F = 152.50 p = 0.0001**	F = 88.56 p = 0.0001**	F = 16.21 p = 0.0001**
Support level	F = 4.13 p = 0.0204*	F = 5.18 p = 0.0082**	F = 6.38 p = 0.0029**
Task type x Support level	F = 0.92 p = 0.4025	F = 2.88 p = 0.0635	F = 2.42 p = 0.0972

* Significant at $p < 0.05$ ** Significant at $p < 0.01$

among lower status group members resolved during the meeting. A group which attained consensus by converging at the confederate position would have a value of 0 for residual disagreement. The treatment involving manual groups and the preference task had a very low residual disagreement mean value of 1.12 (see Table 2) because ten of the twelve groups in this treatment attained consensus. No transformation that met both the homogeneity and normality requirements for the ANOVA test could be found for residual disagreement. However, a reciprocal transformation was performed to allow the data to meet the more important homogeneity requirement (Weisberg 1985). Both support level ($p = 0.0029$) and task type ($p = 0.0001$) had significant main effects for residual disagreement. Manual groups produced lower residual disagreement than face-to-face GSS groups and dispersed GSS groups. The preference task also produced lower residual disagreement than the intellective task. Hypotheses 3a and 3c were supported, but hypothesis 3b was not supported.

6. DISCUSSION AND IMPLICATIONS

6.1 Research Questions

As hypothesized, the removal of verbal communication dampened status influence and sustained influence, and increased residual disagreement. However, the removal of

visual communication did not produce a significant impact. Hence, when groups are performing activities for which status influence is undesirable, a GSS can be used to reduce status influence by substituting verbal communication with textual communication. A GSS appears to reduce status influence regardless of whether the groups are meeting in face-to-face or dispersed settings.

The hypotheses predicting higher status influence and sustained influence, and lower residual disagreement with the preference task than the intellective task were all supported. Preference tasks seem to provide a higher status individual with more opportunities to exercise status influence than intellective tasks. The descriptive statistics of the dependent variables (Table 2) reveal that the impact of a GSS, through the removal of verbal communication, was more pronounced with the preference task than the intellective task. Hence, although higher status influence can result when groups are performing preference tasks, this influence can also be significantly reduced with the aid of a GSS. Besides providing answers to the research questions, the pattern of results for the dependent variables also raise several issues for discussion.

6.2 Issues for Discussion

The relative importance of verbal versus visual communication has been widely debated by social psychologists (Williams 1977). Some studies have shown that visual cues contribute to dominance (Strongman and Champness 1968), friendliness (Exline and Winters 1965), social approval (Efran and Broughton 1966), and status relationships (Hearn 1957). Other researchers have suggested that the influence of visual cues during group interaction is trivial compared to that of verbal cues, given the large body of evidence (Williams 1977) reporting no significant impact with visual cues (Duncan 1969; Mehrabian 1972). The findings of this study support the proposition that verbal cues have a greater impact than visual cues on group interaction, at least when status influence is concerned.

The findings on status influence and sustained influence suggest that the influence of higher status individuals exists even after the meeting. Since status influence is a form of minority influence (Hollander 1964), these findings agree with those of other studies which found that minority influence tends to be more permanent (Maass and Clark 1984; Nemeth 1986). However, the descriptive statistics (Table 2) reveal that sustained influence has a smaller magnitude than status influence for all treatments. This implies that although the influence of higher status individuals can last beyond a meeting, this influence may diminish with time. Future studies could measure status influence periodically after a meeting to examine the rate at which it diminishes.

In this study, high status influence is consistently associated with low residual disagreement (Table 2). Therefore, when groups are confronted with time pressure during group decision making, status influence can be used to promote consensus. Given that status influence can last beyond a meeting, it is likely that the consensus brought about by status influence is quite permanent, rather than superficial. The inverse relationship between status influence and residual disagreement also suggests that a GSS can be used to reduce status influence only at the expense of creating greater residual disagreement.

7. CONCLUSION

This study was carried out using experimental groups with neither a history nor a future, in artificial settings, and applying restrictive procedures. Given that the emphasis in a controlled experiment is placed on internal rather than external validity, any attempt to generalize the findings of this study to actual organizational groups and settings must be done with caution.

The findings of this study raise several related issues for further research. First, other characteristics of a GSS could be manipulated to examine their impact on status influence. Examples of these characteristics are anonymity and parallelism (Dennis and Gallupe 1993). Second, besides communication modality, communication network and strategy could be varied and their impact on status influence examined. Third, besides intellective and preference tasks, other task types (McGrath 1984) could be used in future studies to see how these tasks mediate the impact of GSS intervention.

Majority influence and minority influence are equally important facets of group decision making. GSS researchers need to discover the circumstances under which a GSS can change the effects of both these forms of influence. This study adds to our knowledge of the effect of GSS on minority influence. Besides demonstrating the ability of a GSS to dampen status influence, it alerts GSS researchers to issues regarding minority influence.

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9. REFERENCES

Clapper, D. L.; McLean, E. R.; and Watson, R. T. "An Experimental Investigation of the Effect of a Group Decision Support System on Normative Influence in Small Groups." In J. I. DeGross, I. Benbasat, G. DeSanctis, and C. M. Beath (Eds.), *Proceedings of the Twelfth Annual International Conference on Information Systems*, New York, 1991, pp. 273-282.

Connolly, T.; Jessup, L. M.; and Valacich, J. S. "Effects of Anonymity and Evaluative Tone on Idea Generation in Computer-Mediated Groups." *Management Science*, Volume 36, Number 6, 1990, pp. 689-703.

Daft, R. L., and Lengel, R. H. "A Proposed Integration among Organizational Information Requirements, Media Richness, and Structural Design." *Management Science*, Volume 32, Number 5, 1986, pp. 554-571.

Datamation. "Hardware: Offline." Volume 32, Number 10, May 15, 1986, p. 109.

Davis, J. H. *Group Performance*. Reading, Massachusetts: Addison-Wesley, 1969.

Dennis, A. R., and Gallupe, R. B. "A History of Group Support Systems Empirical Research: Lessons Learned and Future Directions." In L. M. Jessup, and J. S. Valacich (Eds.), *Group Support Systems: New Perspectives*, New York: Macmillan, 1993, pp. 59-77.

DeSanctis, G., and Gallupe, R. B. "A Foundation for the Study of Group Decision Support Systems." *Management Science*, Volume 33, Number 5, 1987, pp. 589-609.

Diehl, M., and Stroebe, W. "Productivity Loss in Brainstorming Groups: Towards the Solution of a Riddle." *Journal of Personality and Social Psychology*, Volume 53, Number 3, 1987, pp. 497-509.

Dubrovsky, V. J.; Kiesler, S.; and Sethna, B. N. "The Equalization Phenomenon: Status Effects in Computer-Mediated and Face-to-Face Decision-Making Groups." *Human-Computer Interaction*, Volume 6, Number 2, 1991, pp. 119-146.

Duncan, S. "Nonverbal Communication." *Psychological Bulletin*, Volume 72, Number 1, 1969, pp. 118-137.

Efran, J. S., and Broughton, A. "Effect of Expectancies for Social Approval on Visual Behavior." *Journal of Personality and Social Psychology*, Volume 4, Number 1, 1966, pp. 103-107.

Eils, L. C., and John, R. S. "A Criterion Validation of Multiattribute Utility Analysis and of Group Communication Strategy." *Organizational Behavior and Human Performance*, Volume 25, Number 2, 1980, pp. 268-288.

Exline, R. V., and Winters, L. C. "Affective Relations and Mutual Glances in Dyads." In S. S. Tomkins, and C. E. Izard (Eds.), *Affect, Cognition, and Personality*, New York: Springer, 1965, pp. 319-350.

George, J. F.; Easton, G. K.; Nunamaker, J. F.; and Northcraft, G. B. "A Study of Collaborative Work With and Without Computer-Based Support." *Information Systems Research*, Volume 1, Number 4, 1990, pp. 394-415.

Gordon, M. E.; Slade, L. A.; and Schmitt, N. "The 'Science of the Sophomore' Revisited: From Conjecture to Empiricism." *Academy of Management Review*, Volume 11, Number 1, 1986, pp. 191-207.

Hackman, J. R., and Kaplan, R. E. "Interventions into Group Process: An Approach to Improving the Effectiveness of Groups." *Decision Sciences*, Volume 5, Number 3, 1974, pp. 459-480.

Hare, A. P. *Handbook of Small Group Research*. New York: The Free Press, 1976.

Hearn, G. "Leadership and the Spatial Factor in Small Groups." *Journal of Abnormal and Social Psychology*, Volume 54, 1957, pp. 269-272.

Hollander, E. P. *Leader, Groups, and Influence*. New York: Oxford University Press, 1964.

Jablin, F. M., and Seibold, D. R. "Implications for Problem Solving Groups of Empirical Research on 'Brainstorming': A Critical Review of the Literature." *The Southern States Speech Communication Journal*, Volume 43, 1978, pp. 327-356.

Jessup, L. M.; Connolly, T.; and Galegher, J. "The Effects of Anonymity on Group Process in an Idea-Generating Task." *MIS Quarterly*, Volume 14, Number 3, 1990, pp. 313-321.

Kaplan, M. F., and Miller, C. E. "Group Decision Making and Normative versus Informational Influence Effects of Type of Issue and Assigned Decision Rule." *Journal of Personality and Social Psychology*, Volume 53, Number 2, 1987, pp. 306-313.

Kiesler, C. A., and Kiesler, S. B. *Conformity*. Reading, Massachusetts: Addison-Wesley, 1969.

Latane, B., and Wolf, S. "The Social Impact of Majorities and Minorities." *Psychological Review*, Volume 88, Number 5, 1981, pp. 438-453.

Laughlin, P. R., and Earley, P. C. "Social Combination Models, Persuasive Arguments Theory, Social Comparisons Theory, and Choice Shift." *Journal of Personality and Social Psychology*, Volume 42, Number 2, 1982, pp. 273-280.

Maass, A., and Clark, R. D. "Hidden Impact of Minorities: Fifteen Years of Minority Influence Research." *Psychological Bulletin*, Volume 95, Number 3, 1984, pp. 428-450.

McGrath, J. E. *Groups: Interaction and Performance.* Englewood Cliffs, New Jersey: Prentice-Hall, 1984.

Mehrabian, A. *Nonverbal Communication.* Chicago: Aldine-Atherton, 1972.

Moscovici, S. *Social Influence and Social Change.* London: Academic Press, 1976.

Moscovici, S. "Toward a Theory of Conversion Behavior." In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*, New York: Academic Press, Volume 13, 1980, pp. 209-239.

Moscovici, S.; Lage, E.; and Naffrechoux, M. "Influence of a Consistent Minority on the Responses on a Majority in a Color Perception Task." *Sociometry*, Volume 32, Number 4, 1969, pp. 365-379.

Moscovici, S., and Nemeth, C. J. "Social Influence: II. Minority Influence." In C. J. Nemeth (Ed.), *Social Psychology: Classic and Contemporary Integrations*, Chicago: Rand McNally, 1974, pp. 217-249.

Mugny, G. *The Power of Minorities.* London: Academic Press, 1980.

Nemeth, C. J. "Differential Contributions of Majority and Minority Influence." *Psychological Review*, Volume 93, Number 1, 1986, pp 23-32.

Nemeth, C. J.; Swedlund, M.; and Kanki, B. "Patterning of the Minority's Responses and Their Influence on the Majority." *European Journal of Social Psychology*, Volume 4, Number 1, 1974, pp. 53-64.

Neter, J.; Wasserman, W.; and Kutner, M. H. *Applied Linear Statistical Models: Regression, Analysis of Variance, and Experimental Designs.* Homewood, Illinois: Irwin, 1990.

Nunamaker, J. F.; Dennis, A. R.; Valacich, J. S.; Vogel, D. R.; and George, J. F. "Electronic Meeting Systems to Support Group Work." *Communications of the ACM*, Volume 34, Number 7, 1991, pp. 40-61.

Pfeffer, J. *Managing with Power: Politics and Influence in Organizations.* Boston: Harvard Business School Press, 1992.

Pfeffer, J., and Salancik, G. R. *The External Control of Organizations: A Resource Dependence Perspective.* New York: Harper and Row, 1978.

SAS User's Guide: Statistics. Cary, North Carolina: SAS Institute Incorporated, 1985.

Shaw, M. E. "Communication Networks Fourteen Years Later." In L. Berkowitz (Ed.), *Group Processes*, New York: Academic Press, 1978, pp. 351-362.

Simon, H. A. *The New Science of Management Decisions.* New York: Harper and Row, 1977.

Strongman, K. T., and Champness, B. G. "Dominance Hierarchies and Conflict in Eye Contact." *Acta Psychologica*, Volume 28, 1968, pp. 376-386.

Watson, R. T.; DeSanctis, G.; and Poole, M. S. "Using a GDSS to Facilitate Group Consensus: Some Intended and Unintended Consequences." *MIS Quarterly*, Volume 12, Number 3, 1988, pp. 463-478.

Weeks, G. D., and Chapanis, A. "Cooperative versus Conflictive Problem Solving in Three Telecommunication Modes." *Perceptual and Motor Skills*, Volume 42, Number 3, 1976, pp. 879-917.

Wei, K. K.; Tan, B. C. Y.; and Raman, K. S. "SAGE: A HyperCard-Based GDSS." *Proceedings of the Twenty-Fifth Annual Hawaii International Conference on System Sciences*, Volume 4, 1992, pp. 14-22.

Weisberg, S. *Applied Linear Regression.* New York: John Wiley, 1985.

Williams, E. "Experimental Comparisons of Face-to-Face and Mediated Communication: A Review." *Psychological Bulletin*, Volume 84, Number 5, 1977, pp. 963-976.

Zigurs, I.; Poole, M. S.; and DeSanctis, G. "A Study of Influence in Computer-Mediated Group Decision Making." *MIS Quarterly*, Volume 12, Number 4, 1988, pp. 625-644.

APPENDIX

Let SIn = initial amount awarded by subject n
SFn = final amount awarded by subject n
SPn = post-meeting amount awarded by subject n
CI = initial amount awarded by the confederate
CF = final amount awarded by the confederate

Let A = (SI1 + SI2 + SI3 + SI4) / CI
B = (SF1 + SF2 + SF3 + SF4) / CF
C = (SP1 + SP2 + SP3 + SP4) / CF
D = Standard deviation (SI1, SI2, SI3, SI4)
E = Standard deviation (SF1, SF2, SF3, SF4)

Status influence = (B - A) / A
Sustained influence = (C - A) / A
Residual disagreement = (E / D) x 100