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Abstract
The original working paper had no abstract. The purpose of the working paper was to document previous research undertaken in group research (broadly) from the socio-psychological perspective. Some of this directly related to work on GSS, some of it was antecedent to that research.

Keywords: Groups, Socio-psychological research parameters

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Socio-Psychological Aspects of Group Processes

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Nietzche: While madness is the exception in individuals, it is the rule in groups.

1 INTRODUCTION

Group Support Systems (GSS) has received considerable attention in the research literature over the past ten years. Many journals have, to a greater or lesser extent, published papers chiefly concerned with empirical laboratory and field study research. Many of these studies have been exploratory, with no fixed hypotheses. Those that have had hypotheses specified have not, as Rao and Jarvenpaa (1991) rightly point out, always been grounded in theory. Indeed, theories that can be tested in a systematic way have been noticeable by their absence, too much of the research being undertaken, we suspect, for the sake of exploring the technology. Rao and Jarvenpaa (1991) indicate that some existing theories (Communication Theory, Minority Influence Theory,...) have relevance to the GSS field.

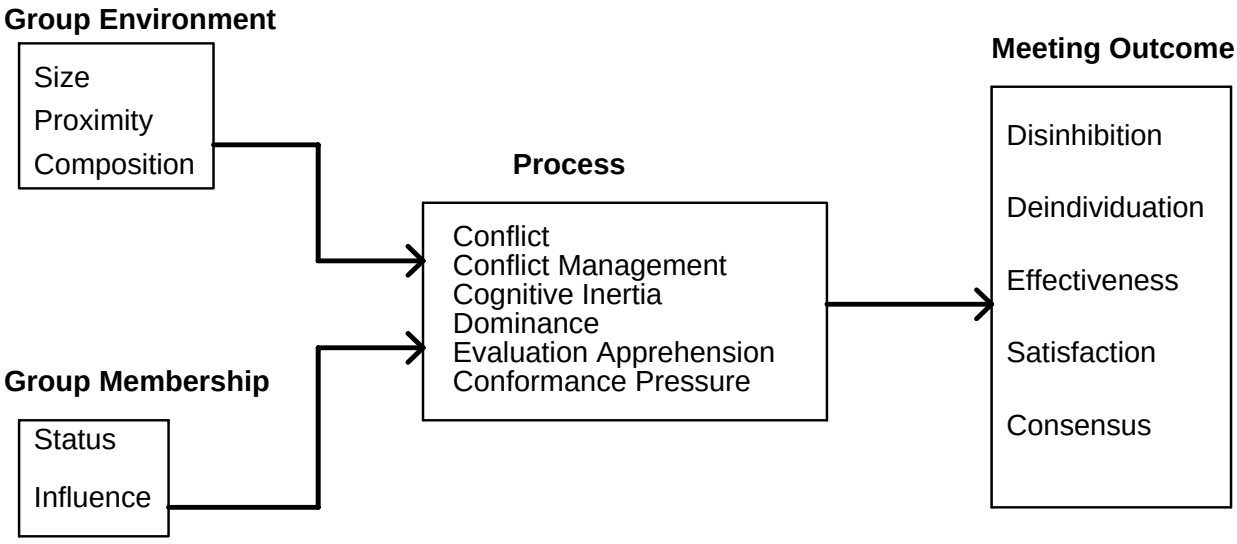
The purpose of this paper is to investigate some of the literature in the socio-psychological domain as it relates to group dynamics and interaction. Technology issues are largely ignored, though this is not to minimise their importance[1]. We do not claim that the models presented here are complete, but that they establish the foundation for the construction of frameworks that will attempt to describe the reality that we see in meetings, either with or without GSS-support.

[1] Please see Davison, 1995a, for a review of technical issues associated with GSS.

In this paper, we first present a model of the group interaction process. Models that attempt to examine the whole interaction process, from independent variables, through mediating or intermediate variables to output variables, have been proposed by a number of previous researchers, including: Dennis et al. (1988), Connolly et al. (1990), George et al (1990), Pinnsonneault and Kraemer (1990), Fjermestad et al. (1993), DeSanctis and Poole (1994). The model presented here clearly draws upon the previous work, yet is restricted to the issues that are discussed in this paper.

Following an explanation of the model we develop the items contained within the model under four main headings: Group Environment (3), Group Membership (4), Process (5) and Meeting Outcome (6). Items under these headings do not strictly follow the model as some of them, particularly conflict, conflict management and consensus, are intertwined to the extent that it would be unnecessarily artificial to separate them. This is primarily a descriptive paper and no significant analysis is attempted. This issue, however, will be addressed in the final section: conclusions and further research (7).

Fig. 1: A Causative Model of Group Factors, Processes and Meeting Outcome



2. EXPLANATION OF THE MODEL

2.1 Group Environment and Group Membership

Group size and proximity are seen as being constant, at least within a single group process. Group size does vary, but in empirical, laboratory-based research it has

tended to be small (3-5 people) or medium (5-12 people). Proximity is the degree of closeness between all or some group members. It can be measured in a variety of ways, including: time and space. Composition refers to the group make-up in terms of member experience, background and knowledge. Status and influence are two interrelated attributes of individual group members. Status refers to the hierarchical position that an individual has within the group structure at a micro level, or perhaps within a company of which the group is but a sub-unit. High status individuals are often powerful, i.e. they possess the authority to exercise control and are in a position to confirm decision results. Influence has many possible attributes and can be viewed from several angles: normative, informational, status, majority and minority. These attributes are then manifested in "influence behaviour", which is an expression commonly used to describe the extent to which individuals can exert influence that is disproportionate to their numbers. Thus, minority influence suggests that a small number of people (one or more) exert this disproportionate influence over a majority of other group members.

2.2 Process

In the process stage of the model, the environmental and group member factors combine together in the group interaction. We pay particular attention to the effects of status and influence in this section. Conflict is one such process characteristic that requires special attention, as it can have dramatic impacts on a meeting's outcome. Conflict should not be seen solely as a negative factor since it can contribute towards consensus, but rather one that naturally results from differing viewpoints and educational, social and cultural backgrounds. However, in order for conflict to produce positive outcomes it is essential to manage it. Thus conflict management is also seen as being part of the process of the meeting.

2.3 Outcomes

The Meeting Outcome part of the model illustrates possible attributes of or pertaining to the final decision and the group members. Thus the result can be coloured by:

- disinhibition, which refers to behaviour exhibited by group members, often associated with a breakdown in social constraints;

- deindividuation, which is characterised by group members no longer feeling themselves to be individuals so much as 'submerged' in the group;
- satisfaction, which relates to both the outcome itself and the route to the outcome, i.e. the process;
- effectiveness - a term that is frequently encountered in the literature, yet often vaguely defined. It is perhaps most useful to examine group effectiveness when we can compare electronically supported and unsupported groups.
- consensus - the level of agreement attained by participants in the meeting.

3 GROUP ENVIRONMENT

3.1 Group Size

Over the past 45 years, considerable research has been conducted into the impacts which different sized groups have on "various dimensions of group performance, member attitudes, and group interaction" (Cummings et al., 1974). Bass and Norton (1951) and Gibb (1951) found that as group size increases over the range from 2 to 12 members, so average member participation decreases. Gallupe et al. (1992), in a review of non-electronic group brainstorming studies, were only able to locate seven group-size studies of brainstorming in leading research journals[2]. All of these seven studies, except Renzulli and colleagues (1974), "found that 12-member groups did not generate more ideas than 3-member groups. All seven studies found that the number of ideas generated per person declined as the size of the group increased" (ibid., p.351). This is broadly in line with Dennis et al.'s (1990a) brief review of previous non-GSS research, where they found that the optimal group size is three (Mills, 1953; 1956) or five (Hackman and Vidmar, 1970; Hare, 1981; Shaw, 1981; Slater, 1958).

However, research has also shown that as group size increases so a corresponding increase in human resources becomes available to the group (Hare, 1981; Thomas and Fink, 1963). Ziller (1957), for example, reported that as group size increases from two to six members, so the objective quality of decisions made by the group also increases. Moreover, this quality was found to be more consistent for the

[2] Bouchard et al., 1974a, 1974b; Bouchard and Hare, 1970; Fern, 1982; Hackman and Vidmar, 1970; Lewis et al., 1975; Renzulli et al., 1974

larger groups over the smaller groups. Consequently, problems can be solved more efficiently, at least until some optimal size is reached (Hare, 1981; Shaw, 1981).

In electronic decision making, group sizes for empirical research have tended to be small[3] (3-5 participants: Steeb and Johnston, 1981; Jessup et al., 1988; Bui and Sivasankaran, 1987; Poole et al., 1988; Easton et al., 1989; Watson, 1987; Zigurs, 1987; Tan et al.; 1991, 1993a, 1993b) to medium (6-12 participants: Bui and Jarke, 1984; Nunamaker et al., 1987, 1989b; Vogel et al., 1987a, 1987b) (Pinnsoneault and Kraemer, 1990; Dennis et al., 1990a). The rationale for this can be partly derived from the fact that it was considered that most business meetings involve a similar number of participants (Johansen, 1988; Lyytinen et al., 1993). Barry's (1986) report that the average number of participants in an organizational meeting is five persons has often been cited as a reason for small group sizes (cf. Huang et al., 1993; Tan et al., 1993a, 1993b). However, Dennis and Valacich (1993, p.8) while observing that it is "difficult to make compelling arguments for the merits of one group size choice over another ... chose to study 6- and 12-member groups because Osborn (1957) advocated using groups between these sizes". A final reason explaining the relative consistency of using small to medium sized groups can be seen in Valacich et al.'s (1992) rationale: "Our objective in selecting the group sizes of 3- and 9- members was ... to work within the ranges of documented use..." (p.56). The main problem associated with such rationales is that they do not attempt to extend the field of research, if anything reinforcing its non-generalizability to wider domains. This appears to be self-defeating, especially in view of the oft repeated desire that GSS should realise a wider applicability and validity.

Benbasat and Lim (1993) suggest, however, that the optimal size of a group may conceivably be larger in a GSS context than a non-GSS context, given the capability of the GSS to store, retrieve and manipulate all data generated. This hypothesis is supported, in part, by Dennis et al.'s (1990c) study which found that 18-member groups generated 28% more ideas than 9-member groups, which in turn generated twice as many ideas as 3-member groups (Gallupe et al., 1992). Their support for the hypothesis is partial, since in the Dennis et al. (1990c) study, no non-GSS supported groups were investigated. Furthermore, their results clearly demonstrate the law of diminishing returns, i.e. a larger group does not necessarily produce a proportionately higher

[3] These size definitions are somewhat arbitrary, and other researchers have suggested slightly different ranges (cf. Dennis et al., 1990c). However, in the absence of a widely accepted standard for group size definition, these ranges are considered to be reasonable bearing in mind the research already undertaken into GSS.

number of comments, and so there is likely to be an optimal group size, beyond which any further increase in membership is not likely to equate with an increase in contributions.

Empirical research has in fact been conducted with larger groups since the late 1980s. In 1987, a new facility was opened at the University of Arizona with a 60-seat capacity and 26 networked microcomputers (Vogel and Nunamaker, 1990). Apart from the 3-, 9-, and 18-member studies cited above, the University of Arizona facilities have been used for a number of public and private organizations and larger groups. One such study, described by Nunamaker et al. (1987), involved an average of 15-members per group. Nunamaker et al. (1989a) report that group sizes at the University of Arizona facilities have varied from 4 to 48 members. In Nunamaker et al. (1988), the use of PlexSys in 1985 by 12 planning managers from a major computer manufacturer is described. Dennis et al. (1990a) describe a group size of 31 - all senior managers of the Burr-Brown Corporation - and Dennis et al. (1990d) describe a group size varying from 11 to 29 members.

Vogel et al. (1987a, p.124) report that in their experience working with GSS at Arizona, efficiency rises as the group size rises "by facilitating input from all group members in a relatively simultaneous fashion". Furthermore, they note that "it is difficult to demonstrate that GSS promotes group efficiency for small groups (e.g. of size 3 to 5)". DeSanctis and Gallupe (1987) help to explain this difficulty, observing that "because large groups experience more dramatic communication difficulties, [so] group decision support systems may have a more positive impact in large groups" (p.598). This is echoed by George et al. (1988).

These large group sizes seem to contradict the rationale used earlier to justify small group sizes. Dennis et al. (1989) realise that an increase in group size for empirical, laboratory-based research will increase the difficulty of the experimentation, but that nonetheless this is required. Furthermore, it is clear that sometimes groups are large and still have to have meetings. Everyday examples of such meetings in the academic world include: staff meetings, senate boards, faculty resource allocation meetings, etc. It is significant that this increase in studied group size must take place, so as to expand the scope of 'documented research' beyond the small group experience (cf. Valacich et al., 1992, above).

These more recent results indicate that larger groups may experience a higher degree of synergy and so possess the capability to overcome process losses. Indeed, it

may be that in order for the synergy to be generated, there is a minimum 'critical mass' of group size that has to be achieved. So long as additional members to the group provide new ideas or expertise, there should be no restriction on their inclusion. Rather the restrictions should be at the lower end of the group-size scale (Dennis and Valacich, 1993). Steiner (1972) has suggested that this higher degree of synergy in larger groups may be attributable to the increased heterogeneousness of the group. As new members supply new ideas or expertise, so new trains of thought among other group members can be stimulated. The degree of heterogeneousness also depends on the structure of the group. Large groups consisting of post-graduate students, academic staff and/or professionals bring widely varying degrees of experience, and so information, to a meeting. By contrast, in relatively homogeneous groups (such as undergraduate students) that have a low number of residual ideas, the degree of similarity between ideas is likely to be higher and so the same level of synergy will be harder to generate (Osborn, 1957; von Oech, 1986).

This apparent focus on an increasing group size contrasts markedly with Huber's (1988) argument that with the utilisation of GDSS technology, fewer people will become involved in meetings. It was based on the rationale, already alluded to above, that small groups are more effective and so the extra "productivity introduced by GDSS will increase the strength of the forces acting to promote smaller groups" (Dennis et al., 1988). However, there is an alternative rationale that argues that the use of GSS naturally lead to an increase in group size. Huber (1984a) observes that as the business environment becomes ever more complex, so the requirement for the presence of highly qualified experts at meetings increases, thus enlarging the group size further. This has already been witnessed, as described above. Moreover, Ackoff (1981) considers that in order for a plan or decision to be implemented most effectively, it is essential for as many of those who will be charged with that implementation to be present during the decision making process. Equally, there may be occasions when political factors come into play. As the size of the group increases, so the number of people who are available to vote for a particular plan, and so take responsibility for it, is increased. In situations such as resource allocation, it may be the case that each department or constituency demands that a representative is present during a meeting (Dennis et al., 1988).

Apart from numerical size, there is also the issue of a group's logical size (Dennis et al., 1989). A group may be considered to be logically small if the skills and domain

knowledge possessed by the group members largely overlap. In homogeneous groups, e.g. experimental groups where all members (students) come from the same course, the overlap is likely to be larger and so the logical size is smaller. In multicultural and heterogeneous groups, logical size is likely to be larger on a pro rata basis, and so logical size is likely to be relative rather than absolute when compared to actual size. When the logical size is relatively small, as with students, participants have a relatively good appreciation of the task and the resources available to accomplish it. When logical size is relatively large, as in real business organisations, participants *may* lack this common understanding or appreciation, which will have repercussions for the way that the meeting is handled and the assumptions that can be made about participants (Dennis et al., 1989, 1991). Maruyama (1987) coined the term "multi-ocularity" to refer to a holographic vision of GSS - but it can equally be applied to the problem domain itself when group participants approach the problem from a number of different, but complementary, perspectives.

3.2 Proximity

While social psychological research into group member proximity and its effect on manual group processes is well established (Latané, 1981; Milgram, 1965; Korzenny, 1978; Monge et al., 1985), the same is less true for GSS supported research. Indeed, the majority of studies, both laboratory and field, have involved face-to-face situations, largely ignoring the possibilities offered by dispersed situations (Niederman, 1990; Raman et al., 1993; Smith and Vanacek, 1990). The few empirical studies that have looked at settings other than face-to-face are: Bui et al. (1987), Gallupe and McKeen (1990), Jessup and Tansik (1991), Clapper et al. (1991), Raman et al. (1993), and Tan et al. (1993a, 1993b). Other authors refer to non-proximate meetings in the context of GSS environment variations[4], notably Dennis et al. (1988) and DeSanctis and Gallupe (1987). This section will continue with an examination of the social psychological theories of proximity and of the nature of the communication medium that is present in the various levels of proximity.

3.2.1 Theories of Proximity

[4] See Davison (1995a) for a discussion of GSS environments.

In social psychology, three distinct theories of proximity have emerged: "the linear distance approach, the functional approach and the psychological approach" (Monge et al., 1985, p.1130). The linear distance approach simply considers physical distance, often in relatively confined spaces. Functional proximity, on the other hand, is "presence over long distances. [It] can exist given the telephone, letters, telegrams, interactive radio or television. These media are what diminish the impact of physical separation" (Korzenny, 1978). Evidently computer mediated communication in its various facets can be appended to the above list. Psychological proximity refers to a sense of nearness that is perceived. Bennett (1974) argues that although people may be physically or functionally proximate, they may not feel proximate. Priest and Sawyer (1967) suggest that the number of other people who are interposed between two proximate people will determine the degree of proximity perceived by those two people. Furthermore, Quinn (1977) considers proximity in a time duration sense, distinguishing between people who are geographically proximate, and hence in frequent contact with one another, people who are involved in the same project or work-group, and people who only have occasional contact.

3.2.2 Proximity and GSS: Communication Richness

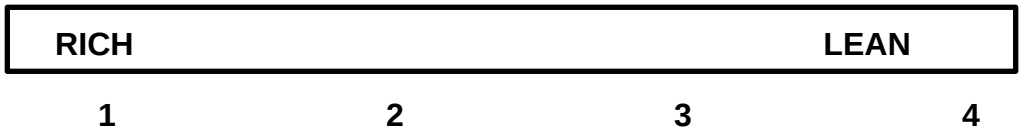
Where GSS is concerned, two variables of proximity can be identified for consideration: geographical proximity, i.e. face-to-face or dispersed modes of interaction; and temporal proximity, i.e. synchronous or asynchronous modes of interaction.

In order to examine these two variables, it is useful to adopt the model in Fig. 2 developed by Tan et al. (1993a) from what they term the 'Communication Medium Richness Continuum', originally devised by Daft and Lengel (1986) and Trevino et al. (1990). For the sake of convenient referencing, the four stages along the continuum that correspond to the combinations of the three communication modes are indicated as 1, 2, 3 and 4.

Fig. 2: Communication Medium Richness Continuum

(adapted from Tan et al., 1993a)

Verbal Communication			
Visual Communication	Verbal Communication	Visual Communication	
Textual Communication	Textual Communication	Textual Communication	Textual Communication



It should be clarified that in Communication Medium research, medium richness (Daft and Lengel, 1986; Daft et al., 1987; Trevino et al., 1990) is the "capacity to reduce equivocality and facilitate shared understanding" (Tan et al., 1993a). A rich communication medium is multifaceted, allowing for instantaneous feedback, clarification, questioning and the correcting of errors by group members. The richness can be seen in the model in that three types of communication are supported at the rich end of the continuum. At the lean end, however, only textual communication is provided, and hence the capacity of the medium to support the group members is reduced.

Communication medium research literature also refers to time and space 'bindingness' (Innis, 1972; Ong, 1982): time is 'bound' by the communication medium with the preservation of "past and present decisions and actions for future use" (Tan et al., 1993a). Space is similarly bound "by joining geographically separated group members together" (ibid.).

3.2.3 Geographical Proximity: Face-to-face and dispersed

Face-to-face settings correspond to modes 1, 2 and 3. However, for the purpose of GSS related empirical experiments, modes 1 and 2 are usually reserved for manual groups which can have varying degrees of process support. Mode 3 is commonly used for face-to-face, electronically supported groups, i.e. with only textual and visual communication permitted. Mode 4 is appropriate for dispersed electronic groups which only have textual interactive capabilities. Clearly, modes 3 and 4 are substantially leaner

than modes 1 and 2, yet the difference in richness between modes 3 and 4 will have ramifications for the group processes that take place in those face-to-face or dispersed settings.

3.2.4 Temporal Proximity: Synchronicity

In synchronous meetings, all group members participate at the same time. A review of the GSS research indicates that this is the most common empirical setting, and is often seen in the context of decision rooms for synchronous face-to-face groups. With asynchronous meetings, some members of a group participate at a later or earlier date, i.e. their participation is *bound* by the communication medium. This may be necessitated by reasons of time zone variation, and so also geographical space, or simply the difficulty involved in grouping all participants together in the same place and time. While synchronous face-to-face and synchronous dispersed settings have been examined in the literature, there is almost no published empirical research available for asynchronous settings. There are, however, reviews of how it would work (Dennis et al., 1988) and of its potential usefulness (Mashayekhi et al., 1993).

3.2.5 Aspects of Communication Modality

It is essential to consider the precise nature of verbal, visual and textual aspects of communication mode, since their very nature can influence how meetings are conducted and provide clues to the way that another major social psychological aspect of GSS interactions - status - operates.

In verbal communication, group members can avail themselves of not simply written or typed communication, but also a wide range of paralinguistic communication techniques, such as accent, tone of voice, loudness, speed, eloquence, etc. (Cook and Lalljee, 1972; McGrath, 1984). Furthermore, they can receive almost instantaneous feedback (Daft et al., 1987). These sources of information can be accompanied by visually 'attractive' techniques such as gestures, signals, visual orientation and facial expression (Rutter et al., 1977, 1978). Where textual communication is concerned, apart from pure text, i.e. words, group members may also be able to use diagrams, graphs, flow charts, etc. to illustrate their communications. The appropriate manipulation of these features can significantly enhance the ability of one or more group members to influence the course of a meeting, and so its outcome, in a manner disproportionate to

those members' *numerical* influence. This will be considered in greater depth below under Status and Influence.

Paraproximate aspects of the geographical domain are anonymity and what can be termed intimacy. Anonymity can virtually be guaranteed in dispersed GSS sessions where there is, normally, no verbal or visual contact, and textual contact can be devoid of authorial linkages. The guarantee, however, will be firmer in ad hoc groups than in established groups. Intimacy refers to the degree of group 'belongingness' felt by participants in a meeting. Intimacy is highest in traditional face-to-face meetings with full verbal, visual and textual communication support. It is lowest when only textual support is provided. Tan et al. (1993a) found that effectiveness and efficiency of meeting participants were lower for dispersed groups, i.e. those groups which were deprived of the means to exchange rich verbal and visual signals and so could be expected to have less intimate contact. Intimacy is also lost in anonymous face-to-face groups, if to a lesser extent.

3.3 Composition

In empirical research, most laboratory experiments have involved the use of undergraduate student subjects (Beauclair, 1987; George et al., 1990; Zigurs et al., 1988; Jessup et al., 1990a; Gallupe et al., 1992). However, some have also involved professionals from the business world (Jarvenpaa et al., 1988). The composition of a group is of paramount importance, because it has direct implications for how the group behaves. Student subjects tend not to have a formal, inter-group, hierarchical system, because they all have the same status within the organisation that makes them a group. The same is much less likely to be true for professionals or business people, where a marked and formal hierarchy often exists (Benbasat and Lim, 1993). Furthermore, substantial differences in knowledge, background and experience exist between student and non-student groups. This is especially true when the former consist of a relatively homogeneous sample of undergraduates (e.g. Business students) (Dennis and Valacich, 1993), and the latter are composed of post-graduate research students and academic staff members. It should not be expected that identical results will emerge from replicative empirical research involving groups of students from such diverse study areas as: MIS, Organisational Behaviour, Psychology, Computer Science and Business Administration. Given that it is a common practice to use student subjects (Dennis et al.,

1991), Gordon et al. (1986) and Remus (1986, 1989) have advised that should the participation of students be required (or perhaps unavoidable), it is preferable to use more experienced and mature (e.g. post-graduate) students.

Yet one more term used in describing group composition is Group History. It refers to the length of time a group has been formed. The usual distinction made is between ad hoc groups (Hall and Williams, 1966), i.e. those that have been formed solely for the meeting at hand, and established groups, which have had at least one prior meeting. McGrath (1984), Bormann (1970) and Mennecke, et al. (1992) have pointed out that there are inadequacies associated with using groups that have zero histories, i.e. ad hoc groups, in terms of the inconsistent results that are likely to be obtained, but unfortunately ad hoc groups have almost universally been used in laboratory experimentation when compared to the use of established groups in field studies.

Mennecke et al. (1992) review a large number of models that relate to group development. From their review, they maintain that "academics and practitioners who seek to understand and work with GSSs should understand the influence that group development and group history have on group behaviour and performance" (p.552). Describing three general categories of groups: ad hoc, developing and established, they advance eighteen propositions that are intended to "provide a theoretical justification and explanation for relationships observed in prior laboratory and field research" (p.552-3). Key among these propositions are:

> 7: Overall satisfaction with the group's product and process will be greater for established group members when compared to ad hoc members.
>
> 8: Established groups will produce better quality decisions using a more efficient process when compared to ad hoc groups.
>
> 10: For groups that interact using a GSS over a significant period of time, scores for dependent variables such as task performance or user perceptions will demonstrate an improvement after a group's initial exposure to GSS technology.

13: Groups that use a GSS will be less likely to exhibit negative social behaviour related to status and power issues when compared to groups that do not use the GSS.

15: Groups that interact via a GSS in a geographically dispersed, asynchronous manner will exhibit behaviours associated with immediacy and affection more frequently when compared to groups that interact in face-to-face meetings.

16: Leaders will be less likely to emerge in groups that are supported by process facilitation through the development process when compared with groups that are not supported by process facilitation.

As Mennecke et al. (1992) rightly point out, team composition is likely, "in the leaner, more flexible organisations emerging in today's competitive business market", to be in a constant state of flux, related to Sabel's (1991) concept of "Möbius strip"[5] organisations: "team members within these organisations will frequently be reassigned to new teams as the organisation adapts" (Mennecke et al., 1992, p.566). This concept introduces a new hazard, i.e. that the GSS must be robust enough to support a group even though it is experiencing constantly changing membership. However, it also provides the GSS tools with a great potential for facilitating group development and cohesion, and thereby supporting teams and teamwork (cf. also Wynne and Noel, 1992).

4. GROUP MEMBERSHIP

4.1 Status

Before we can look at the effects that status has on group processes, it is necessary to investigate where the origins of status lie, since it is through these origins that we can examine how status manifests itself and so how status may be moderated. Dubrovsky et al. (1991) note that most status comes from social order rather than from biological or instinctual patterning. The social order comprises a hierarchy of relative values which group members have of one another. The hierarchy may not be strictly vertical, as will be seen, since there are numerous sources for value formation which may give

individual group members higher statuses at different times, situations and places depending on circumstances.

Status can be acquired from a number of sources, including: race, gender, age, physical attractiveness, organisational position, experience, expert knowledge and task competency, and expected performance level (Sigall and Michaela, 1976; Kirchler and Davis, 1986; Dubrovsky et al., 1991). In organisations, status can also be derived from the environment, such as the location of an office in a building and its proximity to other offices, from the clothes people wear and from their titles, etc. (Jablin, 1987; Monge and Kirste, 1980; O'Reilly and Roberts, 1974). During meetings, seating arrangements become important, since they affect both verbal and non-verbal behaviour, such as eye contact and group member visibility (Mantei, 1989; Patterson, 1983; Krauss et al., 1977). Thus a person can create and maintain a high status profile by monopolising a group's attention, by positioning himself in such a way that other group members are forced to realign their own seating position to look at him, and by using authoritative gestures and other verbal and non-verbal behaviour (Mantei, 1989). All these social boundaries regulate group and inter-group communication. Status, once acquired or created, has to be maintained. This is often accomplished through the establishment of and expected adherence to norms, such as required patterns of behaviour, respect, deference to one's superiors, etc.

Perception of status is critical if that status is to be effective. In situations where group members receive weak status signals from other group members, their behaviour is less likely to be formal and restrained, more likely to be impulsive and unregulatable (Dubrovsky et al., 1991). Thus, the reduced (perceived) status may be evidenced through interaction process outcomes. Research conducted by Hiltz and Turoff (1978), Kiesler et al. (1984) and Short et al. (1976) has shown that the use of electronic mail greatly reduces the number of status-indicating cues, such as attire, affiliation, race, age, organisational position and room location, that are conveyed. That this information may be obtained from other sources is nonetheless true, but its immediacy is diminished. In line with these reduced cues, and augmented by the increased speed of computer mediated communication, field research into computer-mediated communication (Sproull and Kiesler, 1986) has indicated that group members are less aware of socially imposed boundaries.

[5] A Möbius strip is a "geometrical form that has no identifiable top or bottom, beginning or end" (Mennecke et

In lab research (McGuire et al., 1987; Siegel et al., 1986), electronically communicating groups tend to display less inhibited behaviour and so make a greater number of unconventional decisions compared to face-to-face groups, where evidently the status cues would be stronger. Reductions in evaluation apprehension (Diehl and Stroebe, 1987; Lamm and Trommsdorf, 1973), coupled with less direct feedback, can help to explain this reduced perception of status. These findings have significant implications for the use of a GSS, since they may cause unexpected side-effects, such as disinhibited behaviour to appear (see Section 8 below). This in turn may prove unacceptable to meeting organizers. As a consequence, as Dubrovsky et al. (1991) imply, the meeting process may veer off its intended course and prove to be hard to realign.

4.2 Influence

As we have already considered, status is a major factor involved in the formation of influence, and as such this kind of influence is often referred to as status influence. However, there are other aspects of influence that have to be investigated. These are normative and informational influence (Deutsch and Gerard, 1955), majority and minority influence (Mugny and Pérez, 1993). It is not likely that normative and informational influence will be entirely separate in real group settings, but rather that they will operate more or less simultaneously, if to different and varying degrees (Huang et al., 1993). Given the recognised importance of normative and informational influence in group decision making, there is a well established literature in this field (Brown, 1965; Burnstein and Sanctis, 1981; Burnstein and Vinokur, 1974; Clapper et al., 1991; Kaplan and Miller, 1987).

4.2.1 Normative Influence

There is a relatively long standing sociological basis for the study of influence in group behaviour (cf. Asch, 1951, 1956; Moscovici, 1976). Normative influence derives from norms and entails conformance with the expectations of others (Kaplan and Miller, 1987). Normative influence is often associated with status influence, in that status itself is often associated with norms and the adherence to them, as discussed above (Clapper et al., 1991; Tan et al., 1993c).

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al., 1992)

Normative influence may further be seen as emanating not so much from individuals, as from an organisation. Research undertaken by Jacobs and Campbell (1961) provided evidence for the existence and perpetuation of organisational norms. Once the norms were established, it took some time for them to be removed by successive generations of group members (Nemeth and Staw, 1989). In a summary of this organisational level research, Wanous (1980) notes that individuals must confront the demands and norms of the organisation and be able to fit in with them. Furthermore, Hollander (1960) contends that conformance and competence are prerequisites to the attainment of status, and Schein (1968) views conformity with "pivotal norms" as critical to acceptance by the organisation and later acquisition of influence in the organisation.

4.2.2 Informational Influence

Informational influence derives from information, and involves "the acceptance of information from others as evidence about reality" (Kaplan and Miller, 1987). A person who has information or knowledge may be able to use that to wield influence. When information or knowledge possession contributes to status, status may also be said to be associated with informational influence.

4.2.3 Majority and Minority Influence

Influence, whether normative or informational, is commonly experienced either as majority influence or as minority influence. In a recent work, Mugny and Pérez (1993, p.4) note that "majority influence ... takes on the form of compliance: individuals *tend* (we stress tend, since this is a general tendency, and other cases do exist) to outwardly accept what the majority advocates, whenever the majority is present or psychologically salient. Yet as soon as the majority leaves, or is no longer psychologically salient, its influence disappears". In this way, the influence exerted by the majority can be considered to be a purely transitory one. It also reflects elements of perceived status, in that the influence can only be maintained when the object of the perception (the majority) is in some way salient, whether physically or psychologically.

Minority influence, on the other hand, works in quite a different way: it performs what is conventionally known as a *conversion* (Moscovici, 1980). A minority initially

maintains its stance in the face of opposition, exhibiting, critically, commitment and consistency in this position. Although the impact of the minority may not be immediately evident, the effects are likely to be long lasting (Nemeth, 1986; Tan et al., 1993b). While consistency is a key characteristic of effective minority influence (Moscovici and Faucheux, 1972; Nemeth et al., 1974; Nemeth and Wachtler, 1974), there are other attributes of significance, which may themselves relate to status, such as: rigidity, fairness, expertise, perceived competence, and so knowledge and power (Moscovici, 1976; Hollander, 1964; Mausner, 1954).

Two key concepts already alluded to above are conformity (compliance) and innovation. Studies into majority influence have tended to focus on the way that influence encourages, or forces, conformity (Allen, 1965; Darley and Darley, 1976; Kiesler and Kiesler, 1969; Tan et al., 1993b). Where minority influence is concerned, on the other hand, research has examined innovation and the introduction of divergent and individual viewpoints (Levine, 1980; Moscovici, 1976; Moscovici and Nemeth, 1974; Tan et al., 1993b). These two concepts will reappear below in the context of influence effects and reactions to influence behaviour.

5. PROCESS: *Influence and Status Effects*

Research (Maass and Clark, 1984; Nemeth and Wachtler, 1983) has shown that "majorities exercise their influence at the manifest or public level, whereas minorities exercise their influence at the latent or private levels" (Nemeth and Kwan, 1987). This variation can be explained in terms of people's unwillingness to express *public* support for a minority's position. This should also be seen in the light of research revealing that minorities that maintain their position can actually be "disliked, ridiculed, and held with disdain" (Nemeth and Kwan, 1987). Anecdotal reports indicate that threats are made to these persistent minorities, even for hypothetical issues (Nemeth and Kwan, 1987) and even when the minority is influential, (Nemeth et al., 1974; Moscovici and Lage, 1976), while the dislike is enhanced when the minority position is seen as obstructing the attainment of a goal. This goal may be either process related, i.e. the perceived *correct* solution is the one which the numerical majority agrees upon, notwithstanding information to the contrary (cf. Janis, 1972), or may reflect normative influence, i.e. it is the position held by people in a position of authority, high status or power, or all three.

Nemeth (1986) found that opposing minority views "stimulate a reappraisal of the entire situation", leading to the generation of a number of possible innovative solutions. Nemeth and Wachtler (1983) explained this reappraisal as follows:

> where majority influence is concerned, one is often forced to choose between two alternatives, hence the pressure to conform is relatively high. Where minority influence is concerned, there is less pressure, but there are more opportunities to reassess, re-evaluate and reconsider both the minority's proposed solution(s) and one's own existing ideas. Therefore, the chance that other solutions will be found is increased.

Whilst these formulations may be seen as speculative, they are nonetheless consistent with theoretical and empirical evidence. Nemeth and Wachtler's (1983) empirical evidence supported their ideas, as group members subjected to minority influence displayed creative thinking, selecting novel, correct solutions to problems that tended to be undetected in groups not exposed to this minority influence.

The impact which high status individuals have on lower status group members can be predicted with the social impact theory (Tan et al., 1993c). According to Latané (1981), the first principle of the social impact theory implies 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 potential sources of influence in the situation" (Tan et al., 1993b). Latané (1981) indicates that strength may be taken as referring to a number of factors, most of which can be included under the generic label of status: the social position, age, economic power, proximity and/or importance of the individuals concerned. Immediacy refers to the proximity, physical or temporal, between those subjected to and emanating influence.

Influence can exert both positive and negative effects on group decision making, and this is particularly true in mixed-status groups, where there are likely to be more opportunities for 'successful' influence behaviour. There are a number of process losses that can occur as a result of influence:

- the unwillingness of lower status members to criticise the opinions of a high status member, out of a fear of negative evaluation and reprisals, resulting in *evaluation apprehension* (Diehl and Stroebe, 1987; Lamm and Trommsdorf, 1973; Taylor et al., 1958);

- the tendency of lower status members to submit to *conformance pressure* and so to comply with an expected standard (a norm) (Hackman and Kaplan, 1974; Shaw, 1981) or with the standard of higher status members (Hollander, 1964);
- the non- or low-participation of low status group members in the discussion process, resulting in *cognitive inertia* where the line of argument taken by the group will very likely adhere to that which the high status member(s) wish(es) it to (Jablin and Seibold, 1978; Lamm and Trommsdorf, 1973);
- the general *domination* of lower status group members by higher status group members (Jablin and Seibold, 1978; Cyert and March, 1963; Hoffman, 1978; Jablin, 1987; Kirchler and Davis, 1986).

As considered above, if the status effects that produce normative influence are strong, they may outweigh any informational influence, i.e. logical reasoning and relevant information, to induce these process losses. On the other hand, there are also possible process gains. Status influence may have a positive impact on the intelligence, design, choice, and implementation phases of group decision making (Simon, 1977; Tan et al., 1993b). Thus, more experienced, and so higher status, individuals should be able to exert influence over the allocation of critical resources for, reduce risks of resistance to and ensure management support for implementation of the decision result (Pfeffer and Salancik, 1978).

6. MEETING OUTCOMES

6.1 Deindividuation and Disinhibition

Deindividuation is a complex feature of group behaviour, closely linked to and sometimes confused with disinhibition, which will be discussed later in this section. The research into this form of group behaviour is long, and can be traced back to LeBon's nineteenth century work, The Crowd (1895), wherein it was argued that under some circumstances a group of people appears to develop what can be termed a 'collective mind'. The term deindividuation appears to have been used first by Festinger et al. (1952, p.382), who described individuals as being "submerged in the group". Subsequent research in a variety of situations suggested that anonymity contributed towards this deindividuation (Zimbardo, 1969; Diener et al., 1976). Hiltz et al. (1989)

define deindividuation as "a decreased reliance by individual group members on their own opinions and values, and increased conformity to group opinions and norms" (p.221).

Anonymity, however, is not the only antecedent of deindividuation. Janis (1972) examined various foreign policy fiascos, such as the disastrous Bay of Pigs invasion plan drawn up by the Kennedy administration in 1961. In this case, several members of the policy forming group subsequently revealed that they had had misgivings about the plan but had decided not to express these misgivings for fear of being seen as weak, unintelligent or disrupting the group's cohesiveness (Jessup et al., 1990a; cf. also Nemeth et al., 1974; Moscovici and Lage, 1976). Janis (1972) termed this phenomenon "groupthink", defining it as a "deterioration of mental efficiency, reality testing, and moral judgement in the interest of group solidarity" (Jessup et al., 1990a). Such a group tends: to lose sight of itself in a wider environment; to fail to take into account disconfirming or external information; and to restrict those opinions that are extraneous to what the group agrees upon. The result of this situation is a lack of creative or innovative thinking and awareness and, hence, the formulation of potentially risky decisions (Jelassi and Beauclair, 1987). This supports Nemeth's (1986) and Nemeth and Wachtler's (1983) views on the beneficial aspects of minority contributions, in that reappraisal of the situation is clearly not stimulated and novel solutions are not detected.

Deindividuation may also produce disinhibited effects. These are characterised by: individuals engaging in harmful and/or deviant behaviour (Diener et al., 1976; Diener, 1979, 1980; Jessup and Tansik, 1991; Zimbardo, 1969); the breakdown of social constraints (Hiltz et al., 1989); and the loss of objective self-awareness (Diener, 1980; Festinger et al., 1952; Swap, 1984). In one research study (Kiesler et al., 1984), it was found that "people in computer-mediated groups were more uninhibited than they were in face-to-face groups" (p.1129). There are various forms of disinhibited behaviour, notably the calling of names and display of aggressive or insulting behaviour (sometimes referred to as *flaming*), criticisms of the "corporate wisdom", the generation of attention seeking, irrelevant and/or irreverent comments, etc. (Hiltz et al., 1989; Jessup et al., 1990b). These forms of disinhibited behaviour may also be shown by majority group members to deviant and persistent minorities (Nemeth and Kwan, 1987). Deindividuation may also allow group members to indulge in what is known as 'social loafing' or 'free-riding' on the contributions of others (Jessup et al., 1990b), abdicating their responsibility to contribute to the discussion. Studies of social loafing (Kerr and

Bruun, 1981; Williams et al., 1981) indicate that anonymous group members exert less effort than identified group members.

While the above effects of deindividuation are primarily negative, or at least construed as such, there are also positive effects that may be realised. As group members perceive themselves to be 'submerged in the group' so they are more likely "to express repressed thoughts or behaviours. A member of a problem-solving group may, for example, contribute a good idea or key comment that he would not otherwise contribute" (Jessup and Tansik, 1991). Jessup et al. (1990b), in a review of three GSS experiments[6] that examined the use of anonymity and its corresponding effects in terms of group process and outcome, found that anonymity promoted the generation of more critical and more probing comments from group members. These can be explained in terms of deindividuation, itself promoted by the anonymity, in that it supports a "reduction of normal inner restraints", thereby leading to less inhibited behaviour. This less inhibited behaviour should also be seen in the light of process losses attributable to high status influence, as considered above. Such process losses as evaluation apprehension and cognitive inertia may well be diminished when group members experience deindividuation and so feel less constrained, i.e. when they are able to communicate anonymously.

6.2 Effectiveness

Effectiveness, like other variables such as efficiency and satisfaction, does not have a consistently held definition or interpretation in the GSS literature (Nunamaker et al., 1991). It is often seen as referring to the "actual performance of the group in generating options" and so can be measured in terms of "simple counts of the number of non-redundant options" or "complex schemes assessing their relative quality" (Nunamaker et al., 1991, p.1328). The measure used will necessarily depend on the situation itself. If a single best option, as opposed to a number of acceptable options, is required as an output, then this will affect the measure used. Effectiveness is also used to refer to whether or not a system is "better than traditional face-to-face problem solving" (Jessup and Tansik, 1991). Evidently this measure only has relevance when the group members can compare two or more different systems.

[6] Jessup et al., (1990a); Jessup et al., (1988); Connolly et al., (1990).

6.3 Satisfaction

Satisfaction is seen as an important outcome variable for group discussion and one that pertains to consensus, in that both the group and an individual may experience satisfaction with both the discussion process and the result (cf. Benbasat and Lim, 1993). Previous studies (e.g. Doll and Torkzadeh, 1988) have illustrated the importance of the satisfaction construct and established its validity. While a meeting participant may express a level of satisfaction experienced in a group context, this satisfaction can in fact be broken down into a considerable number of contributory or determining components. These include: the familiarity with the GSS software, and so ability to use it appropriately; the length of a meeting; the nature of the interaction that takes place between participants; the meeting outcome; the level of satisfaction a participant feels with regard to his/her own performance in the meeting; the impression that s/he was able to make on other participants, etc. (Panko, 1995; Davison, 1995b). Given the variety of contributing factors, satisfaction is difficult to measure reliably. Furthermore, it should preferably be compared with more than one other discussion session using both the same and different levels of GSS support. Published research indicates wildly varying degrees of satisfaction achieved (Nunamaker et al., 1989b) and this may be largely attributable to the complex nature of the satisfaction construct.

6.4 Conflict and Consensus

"Men are never so likely to settle a question rightly as when they discuss it freely" (Macauley, 1830; cf. also Mill, 1979).

In this section we examine the nature of conflict and consensus in groups. Although these two subjects may appear to be diametrically opposed to each other, one relating to disagreement and the other to agreement, it is necessary to consider them together to some extent since they are interrelated aspects of group interaction. Therefore, while we shall deal with conflict first and consensus second, there will be considerable cross-referencing between the two concepts.

There is a well established literature in the field of conflict research (Deutsch, 1969, 1973; Guetzkow and Gyr, 1954; Nightengale, 1976; Poole et al., 1988, 1991; Pruitt and Rubin, 1986; Robey et al., 1989; Schmidt, 1972). Deutsch (1969, p.7, original emphasis) provides a useful and concise definition of conflict, stating that it exists "whenever *incompatible* activities occur". These incompatible actions may be *intra*- or

inter- personal, group or national, reflecting incompatibilities between one or more than one entity respectively. Such an incompatible action: "prevents, obstructs, interferes with, injures, or in some way makes it [the other action] less likely or less effective" (ibid., p.8). The conflict may "arise from differences in information or belief... reflect differences in interests, desires or values ... occur as a result of a scarcity of some resource such as money, time, space, position ... or it may reflect a rivalry in which one person tries to outdo or undo the other" (ibid.). Furthermore, Deutsch (1969) refers to underlying and manifest conflict. It is the latter that is of most interest here, since conflict in groups needs to be manifested in order for it to be consciously resolved. However, mention will also be made of hidden and underlying conflicts.

6.4.1 Categorisation of Conflict Behaviour

Conflict can further, usefully, be subdivided into productive and destructive aspects. Destructive conflict has the tendency of expanding and escalating, with the added risk that it will run out of control. The strategy of the participants, or even combatants in a heated conflict, is one that does not favour reconciliation and the minimising of differences, while it does employ threats, coercion and deception. The number of pre-existing cooperative links, shared beliefs and values between participants may serve to limit the spiral of conflict. The conflict will also be affected by the perceived outcome of the process - if the situation is win-win/lose-lose, then participants may be more willing to come to an eventual accommodation. Where it is perceived to be a win-lose situation, however, the competition is likely to be more fierce as each party to the conflict tries to be the victor (cf. Deutsch, 1969).

There are many productive aspects of conflict, yet these are less well documented in the literature which tends to focus on pathological and destructive aspects of conflict (Deutsch, 1969). Productive conflict reduces entropy and stagnation, while promoting social change (Zamyatin, 1972), stimulates interest and helps to establish identities (Deutsch, 1969). Coser (1956, p.154) reports that "in loosely-structured and open societies, conflict, which aims at a resolution of tension between antagonists, is likely to have stabilizing and integrative functions for the relationship". This loose structuring can perhaps be taken a stage further to include groups, notably ad hoc groups, that have no history and so are largely *ahierarchical* in structure. Such groups are often encountered in the GSS literature. Where groups are involved in a cooperative or negotiating situation, the conflict between them can be seen as no more

than a problem that has to be overcome so as to ensure that a solution is reached that is equitable to all parties.

Deutsch (1969) identified a number of salient features that can bear upon the course of a conflict. Briefly, these include:

- Process - destructive conflict typically involves power strategies, threats, etc. Productive conflict is typified by mutual problem-solving, sharing and cooperative behaviour. Process, however, does not only depend on productive or destructive aspects. For example, a group that perceives itself to have legal authority, or else considers that it is legally "correct", may demand that the process of resolution take place within a legal or quasi-legal framework.
- Pre-existing relations - when conflicting parties have a number of things in common, such as shared beliefs, superordinate goals and common cultural values, they are more likely to resolve a conflict cooperatively. A previously successful conflict outcome may well enable the group to repeat this success. However, the converse is not necessarily true, i.e. a previous conflict that resulted in a lose-lose situation may also encourage the parties to be more cooperative on the succeeding occasion.
- Nature of conflict - "small conflicts are easier to resolve than large ones" (Fisher, 1964). Small and large should be seen in this context as referring to a number of different determinants: the size and importance of an issue; the number of individuals or groups involved in the conflict; the number of satisfactory alternatives available to affected parties; the status differences between the parties, etc. Where conflicts are multiple, i.e. there are a number of issues at stake, resolution may be possible if one party evaluates, or can be persuaded to evaluate, one issue as being more important than another party does. This opens the road to a win-win solution.
- Characteristics of the conflicting parties - soldiers and diplomats solve problems in quite different ways. So too do students and businessmen. Thus, the nature of conflict resolution will depend on

the approach that a particular group takes. Naturally this will be more complex when there is a degree of heterogeneity across the groups. Torrance (1957) found that the willingness of individuals to become involved in conflictive behaviour increased when those individuals belonged to groups that would not have "power" over them in future. Evidently this is a feature of ad hoc groups, i.e. groups that have no past and no future. This is corroborated by Dennis et al. (1990b), who found that participation in ad hoc groups was more equal (i.e. more evenly distributed) than in established groups, possibly because established groups have already formed their own social order. Furthermore, there is arguably less anonymity, and so protection, present in an established group, as the group members know each other, and hence their respective writing styles.

- Third parties - sometimes there are interested parties who are outside the immediate locale of the conflict. The strength and available resources (or powers) of these third parties may prove to have significant impacts. If a powerful third party either demands or supports a particular resolution to a conflict, then the chances that it will be accepted by the conflicting parties is increased. Evidently this relates to the status levels indicated in section 2.5.

6.4.2 Conflict Management

Conflict management tries to describe how conflicts can be overcome and their negative effects minimised. Essentially it aims to bring about conflict resolution, which is the extent to which the disagreements between group members are replaced with consensus and agreement. Such resolutions have to be agreed upon by all members and not imposed by one group on another (Robey et al., 1989). In Boehm and Ross's (1989) **Theory W** of software project management, it is suggested that if all interested parties have the will and resolve to achieve a win-win solution, then this is a realistic outcome. The theory provides specific steps to take so as to manage and minimise the lose-lose and win-lose risks. Schuman (1993) emphasizes the need for resolve, succinctly stating: "The underpinning for consensus decision making is a shared understanding of the problem".

Poole et al., (1991) identify three components of the conflict interaction process that are pertinent to conflict management.

- **Conflict level** is the level to which group members permit the conflict to develop and the degree of intensity involved in the conflict.
- **Conflict behaviour** (Ruble and Thomas, 1976; Sillars et al., 1982) can be divided into three 'modes':
  - *distributive*, where parties pursue their own goals to the exclusion of other parties, exhibiting competitive behaviour and ignoring possible alternatives;
  - *avoidance*, where parties try to avoid conflict, and the problem that causes it, altogether;
  - and *integrative*, where all parties work cooperatively together, so as to find an optimally acceptable behaviour.

  Poole et al. (1991) point out that the type of behaviour exhibited is independent of the level of conflict, so that a group that has little conflict may still engage in distributive behaviour.
- The third component is the way in which group members avail themselves of **technology** to help them in their conflict management. This is not an area which has been studied in detail. However, Benbasat and Lim (1993) have noted that the presence of a facilitator in an electronically supported environment contributes positively towards the attainment of a consensus.

Integrative behaviour is generally accepted (Fisher and Ury, 1981; Folger and Poole, 1984; Walton, 1969) as promoting constructive resolutions to problems. Pruitt (1981) contends, however, that a combination of the different modes of behaviour identified above can provide a more heterogeneous approach to productive outcomes, with, for example, initial distributive behaviour mitigated by later integrative behaviour, perhaps so as to create the impression of a serious interest in a win-win solution. Avoidance behaviour may also be used if the manifested conflict threatens to spiral out of control.

Poole et al. (1991) found that the use of GSS in conflict management allowed people to be distanced from ideas. This has the obvious effect of depersonalising conflict, and making it more task oriented. Anonymous voting allows all group members

to reveal their opinions about an issue in a low-risk way, i.e. they cannot be censured for their views, whereas this may not always be the case in brainstorming, even when it is anonymous. Thus, voting may bring otherwise hidden conflicts to the surface and so expand the volume of material under discussion. Torrance (1957, p.318) felt that there is "a need to differentiate person-centred from task-centred disagreement". The former tends to be destructive, as the participants vie for power and positions of superiority and correctness. The latter is potentially more productive, because it increases the number of issues considered and so provides for a more wide-ranging discussion. Furthermore, there is a higher chance that an acceptable alternative, or set of alternatives, will be generated by the participants. This is in line with the interactive bargaining position advocated by Anson and Jelassi (1990), since they also see that there needs to be a focus on the task in order for high joint benefits to accrue.

In the GSS context, the way in which technology can be used by meeting participants will vary from product to product, as well as from group to group. A level 2 GSS (DeSanctis and Gallupe, 1987) may, by virtue of its enhanced modelling tools, support productive conflict management in situations where a level 1 GSS does not (Sambamurthy and Poole, 1990). Another significant factor affecting how conflict management works is the size of the group. As already considered above, group size has tended to be small in GSS empirical research. In field settings, where groups often have much larger sizes, the behaviour of participants and their use of the technology may well be very different. A number of researchers (DeSanctis and Dickson, 1987; Hare, 1962, 1981; Cartwright and Zander, 1968; Thomas and Fink, 1963; Hoffman, 1979) have reported that as group size increases so the volume of ideas will also increase but only at the expense of an increased difficulty in reaching consensus where there are no clear-cut criteria that can be used for judgement.

A specific GSS that has been proposed as a tool for enabling conflict resolution is the negotiation support system (NSS) (Bui, 1993; Jelassi and Foroughi, 1989; Anson and Jelassi, 1990). Anson and Jelassi (1990) postulate that as negotiating involves what McGrath (1984) refers to as mixed-motive tasks, i.e. tasks which can result in win-win solutions, so the prime objective of an NSS, which is to improve the quality and acceptance of negotiated agreements, is singularly relevant to conflict resolution. Anson and Jelassi (1990) propose the use of the theoretical interactive bargaining (IB) framework (as opposed to the distributive bargaining (DB) framework) which contains elements of the integrative mode of conflict behaviour discussed above. Lewicki and

Litterer (1985) define IB as "the process of defining ... goals and engaging in a set of procedures that permit both sides to maximise objectives". These goals need not all be final and non-negotiable. The IB process allows parties to discuss needs and criteria as an initial stage in the negotiation process. While this is essentially a cooperative process, it is more than likely that in real life few situations exist where pure IB is viable. It is more likely that a combination of IB and DB will be combined in a process of cooperation and competition. Fisher and Ury (1981) and Pruitt (1981) identify a number of benefits that can be produced with the use of IB. These include: "agreements with high joint benefits are more likely to be carried out; agreements with high joint benefits enhance attraction and trust between parties, contributing to a more positive relationship; [the] intrinsic validity of greatest good for greatest number (Bentham's Law)" (Anson and Jelassi, 1990).

Given that the use of a GSS should "foster more even participation... and facilitate a systematic, or structured, group decision process,... resulting in effective conflict management" so "group consensus should be higher when GSS-supported groups are compared to groups without computer-based support" (Watson et al., 1988, p.464). While we have explored the issues involved in group processes involving both the group environment and the characteristics of the group's members and inter-relations, we should also pay attention to the objective of the meeting. When the objective is not a consensually based solution, but simply idea generation, for example, the importance of conflict management will be reduced. In this circumstance, participants are likely to feel more free to express their ideas, no matter how contentious or conflicting they are. If a consensual resolution is expected, this alone may be sufficient to cause some participants to withold the more contentious ideas for fear of provoking socially unacceptable conflict (DeSanctis and Dickson, 1987), and to vote according to what the overall group preference is seen to be rather than according to personal opinion (Jelassi and Beauclair, 1987). Such expectations by meeting organizers will doubtless have effects on the levels of effectiveness and satisfaction experienced by participants.

7. CONCLUSIONS AND FURTHER RESEARCH

In this paper we have conducted a major review of a number of important socio-psychological aspects of group processes. These have revealed many findings, notably in the areas of group composition, status, influence, conflict and the move towards

consensus. The model we proposed at the start of this paper is designed to offer no more than an overview of the issues involved, since they are all interrelated to a considerable extent. Indeed, it is somewhat misleading to present the model as a strictly linear set of processes, as in reality there is a significant feedback "counterflow" process. Thus, disinhibition, satisfaction and consensus will all have on-going effects in a meeting in progress. Furthermore, other independent variables not specifically identified in the model, such as GSS technology and culture (national or organisational), will also bear upon the meeting outcomes. In the light of this wider scope, it may be useful to consider the weltanschauung in a Soft Systems approach (Checkland, 1981). A key advantage of the Soft Systems model is that it encourages the inclusion of feedback mechanisms into any depiction of reality.

The author believes that there is a need for integrated theoretical models in the GSS domain. Existing theories, such as Minority Influence Theory, can be effectively applied to the problems we encounter in GSS. This paper has provided an in-depth review of the socio-psychological factors and processes germane to the study of GSS. Further research should build upon these theories and concepts, in conjunction with issues of: technology, culture and task with the aim of developing a model that can comprehensively portray meetings and their processes, and the different support mechanisms available to them.

8 BIBLIOGRAPHY

Ackoff, R.L. (1981) *Creating the Corporate Future*, John Wiley & Sons: New York.

Allen, V.L. (1965) Situational Factors in Conformity, in: Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology*, **2**, Academic Press: New York: 133-175.

Anson, R.G. and Jelassi, M.T. (1990) A Development Framework for Computer-Supported Conflict Resolution, *European Journal of Operational Research*, **46**, 2, 181-199.

Asch, S.E. (1951) Effects of Group Pressure on the Modification and Distortion of Judgements, in: Guetzkow, H. (Ed.) *Groups, Leadership and Men*, Carnegie Press: Pittsburgh, 177-190.

Asch, S.E. (1956) Studies on Independence and Conformity: A Minority of One against an Unanimous Majority. *Psychological Monographs*, **70**, 416.

Barry, T. (1986) Hardware: Offline, *Datamation*, **32**, 10, 109-110.

Bass, B.M. and Norton, F.T. (1951) Group Size and Leaderless Discussions, *Journal of Applied Psychology*, **35**, 397-400.

Beauclair, R.A. (1987) An Experimental Study of the Effects of Group Decision Support System Process Support Applications on Small Group Decision Making, *Unpublished Doctoral Dissertation*, Indiana University.

Benbasat, I. and Lim, L.H. (1993) The Effects of Group, Task, Context, and Technology Variables on the Usefulness of Group Support Systems: A Meta-Analysis of Experimental Studies, *Small Group Research*, **24**, 4, 430-462.

Bennett, D.C. (1974) Interracial Ratios and Proximity in Dormitories: Attitudes of University Students, *Environment and Behaviour*, **6**, 2, 212-232.

Boehm, B.W. and Ross, R. (1989) Theory-W Software Project Management: Principles and Examples, *IEEE Transactions on Software Engineering*, **15**, 7, 902-915.

Bormann, E.G. (1970) The Paradox and Promise of Small Group Research, Speech Monographs, **37**, 3, 211-217.

Bouchard, T.J. and Hare, M. (1970) Size, Performance, and Potential in Brainstorming Groups, *Journal of Applied Psychology*, **54**, 51-55.

Bouchard, T.J., Drauden, G. and Barsaloux, J. (1974a) Brainstorming Procedure, Group Size and Sex as Determinants of the Problem Solving Effectiveness of Groups and Individuals, *Journal of Applied Psychology*, **59**, 2, 135-138.

Bouchard, T.J., Drauden, G. and Barsaloux, J. (1974b) A Comparison of Individual, Subgroup and Total Methods of Problem Solving, *Journal of Applied Psychology*, **59**, 2, 51-55.

Brown, R. (1965) *Social Psychology*, Free Press: New York.

Bui, T.X. and Jarke, M. (1984) A DSS for Cooperative Multiple Criteria Group Decision Making, *Proceedings of the 5th International Conference on Information Systems*, Tucson, AZ, 101-113.

Bui, T.X. and Sivasankaran, T.R. (1987) GDSS Use Under Conditions of Group Task Complexity, *Working Paper*, US Naval Postgraduate School, Monterey, CA.

Bui, T.X., Sivasankaran, T.R., Fijol, Y.O. and Woodburg, M.A. (1987) Identifying Organisational Opportunities for GDSS Use: Some Experimental Evidence, *DSS-87 Transactions*, San Francisco, 8-11th June, 68-75.

Bui, T.X. (1993) Designing Multiple Criteria Negotiation Support Systems: Frameworks, Issues and Implementation, in Tzeng, et al. (1993) *MCDM: Expand and Enrich the Domains of Thinking and Application*, Lecture Notes in Mathematical and Economical Sciences, Springer Verlag.

Burnstein, E. and Vinokur, A. (1974) Testing Two Classes of Theories about Group-Induced Shifts in Individual Choice, *Journal of Experimental Social Psychology*, **9**, 123-137.

Burnstein, E. and Sanctis, K. (1981) Attitude Polarization in Groups, in: Petty, R.E., Ostrom, T.M. and Brock, T.C. (Eds) *Cognitive Responses in Persuasion*, Erlbaum: Hillsdale, NJ, 197-216.

Cartwright, D. and Zander, A. (Eds) (1968) *Group Dynamics*, Harper and Row: New York.

Checkland, P. (1981) *Systems Thinking, Systems Practice*, John Wiley & Sons: New York.

Clapper, D.L., McLean, E.R. and Watson, R.T. (1991) An Experimental Investigation of the Effect of a Group Decision Support System on Normative Influence in Small Groups, *Proceedings of the 12th International Conference on Information Systems*, 273-282.

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

Cook, M. and Lalljee, M. (1972) Verbal Substitutes for Visual Signals in Interaction, *Semiotica*, **6**, 212-221.

Coser, L. (1956) *The Functions of Social Conflict*, The Free Press: Glencoe, Ill.

Cummings, L.L., Huber, G.P. and Arendt, E. (1974) Effects of Size and Spatial Arrangements on Group Decision Making, *Academy of Management Review*, **17**, 3, 460-475.

Cyert, R.M. and March, J.G. (1963) *Behavioral Theory of the Firm*, Prentice Hall: Englewood Cliffs, NJ.

Daft, R.L. and Lengel, R.H. (1986) Organizational Information Requirements, Media Richness and Structural Design, *Management Science*, **32**, 5, 554-571.

Daft, R.L., Lengel, R.H. and Trevino, L.K. (1987) Message Equivocality, Media Selection, and Manager Performance: Implications for Information Systems, *MISQ*, **11**, 3, 355-366.

Darley, J.M. and Darley, S.A. (1976) Conformity and Deviation, in: Thibaut, J.W., Spence, J.T. and Carson, R.C. (Eds) *Contemporary Topics in Social Psychology*, General Learning Press: Morristown, NJ.

Davison, R.M. (1995a) A Survey of Group Support Systems: Technology and Operations, Working Paper 95/02, Dept of Information Systems, City University of Hong Kong.

Davison, R.M. (1995b) An Instrument for Measuring the Suitability of Using GSS for Meeting Support, under review, *Journal of Organisational Computing.*

Dennis, A.R., George, J.F., Jessup, L.M., Nunamaker, J.F. and Vogel, D.R. (1988) Information Technology to Support Electronic Meetings, *MISQ*, **12**, 4, 591-624.

Dennis, A.R., Nunamaker, J.F. and Vogel, D. (1989) GDSS Laboratory Experiments and Field Studies: Closing the Gap, *22nd Hawaii International Conference on Systems Science*, **III**, 300-309.

Dennis, A.R., Heminger, A.R., Nunamaker, J.F. and Vogel, D.R. (1990a) Bringing Automated Support to Large Groups: The Burr-Brown Experience, *Information and Management*, **18**, 3, 111-121.

Dennis, A.R., Easton, A.C., Easton, G.K., George, J.F. and Nunamaker, J.F. (1990b) Ad Hoc versus Established Groups in an Electronic Meeting System Environment, *Proceedings of the 23rd Hawaii International Conference on Systems Science*, **III,** 23-29.

Dennis, A.R., Valacich, J.S. and Nunamaker, J.F. (1990c) An Experimental Investigation of the Effects of Group Size in an Electronic Meeting Environment, *IEEE Transactions on Systems, Man and Cybernetics*, **25**, 5, 1049-1057.

Dennis, A.R., Tyran, C.K., Vogel, D.R. and Nunamaker, J.F. (1990d) An Evaluation of Electronic Meeting Systems to Support Strategic Management, *Proceedings of the 11th International Conference on Information Systems*, 37-52.

Dennis, A.R., Nunamaker, J.F. and Vogel, D.R. (1991) A Comparison of Laboratory and Field Research in the Study of Electronic Meeting Systems, *Journal of Management Information Systems*, **7**, 3, 107-135.

Dennis, A.R. and Valacich, J.S. (1993) Computer Brainstorms: More Heads are Better than One, *Journal of Applied Psychology*, **78**, 4, 531-537.

DeSanctis, G.L. and Dickson, G.W. (1987) GDSS Software: A 'Shell' System in Support of a Program of Research, *Proceedings of the 19th Hawaii International Conference on Systems Science*.

DeSanctis, G.L. and Gallupe, R.B. (1987) A Foundation for the Study of Group Decision Support Systems, *Management Science*, **33**, 5, 589-609.

DeSanctis, G.L. and Poole, M.S. (1994) Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory, *Organization Science,* **5**, 2, 121-147.

Deutsch, M. and Gerard, H.B. (1955) A Study of Normative and Informational Social Influences upon Individual Judgement, *Journal of Abnormal and Social Psychology*, **51**, 629-636.

Deutsch, M. (1969) Conflicts: Productive and Destructive, *Journal of Social Issues*, **25**, 1, 7-41.

Deutsch, M. (1973) *The Resolution of Conflict: Constructive and Destructive Processes*, Yale University Press: New Haven, Conn.

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

Diener, E., Fraser, S.C., Beaman, A.L. and Kelem, R.T. (1976) Effects of Deindividuation Variables on Stealing Among Haloween Trick-or-Treaters, *Journal of Personality and Social Psychology*, **33**, 2, 178-183.

Diener, E. (1979) Deindividuation, Self-Awareness, and Disinhibition, *Journal of Personality and Social Psychology*, **37**, 7, 1160-1171.

Diener, E. (1980) Deindividuation: The Absence of Self-Awareness and Self-Regulation in Group Members, in: Paulus, P.B. (Ed.) *Psychology of Small Group Influence*, Hillsdale, NJ: Erlbaum.

Doll, W.J. and Torkzadeh, G. (1988) The Measurement of End-User Computing Satisfaction, *MIS Quarterly*, June, 259-274.

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

Easton, A.C., Vogel, D.R. and Nunamaker, J.F. (1989) Stakeholder Identification and Assumption Surfacing in Small Groups: An Experimental Study, Proceedings of the *22nd Hawaii International Conference on Systems Science*, 344-352.

Fern, E.F. (1982) The Use of Focus Groups for Idea Generation: The Effects of Group Size, Acquaintanceship, and Moderator on Response Quantity and Quality, *Journal of Marketing Research*, **19**, 1, 1-13.

Festinger, L., Pepitone, A. and Newcomb, T. (1952) Some Consequences of Deindividuation in a Group, *Journal of Abnormal and Social Psychology*, **47**, 382-389.

Fisher, R. (1964) Fractionating Conflict, in: Fisher, R. (Ed.) *International Conflict and Behavioural Science: The Craigville Papers*, New York: Basic Books.

Fisher, R. and Ury, W. (1981) *Getting to Yes*, Penguin: Harmondsworth.

Fjermestad, J., Hiltz, S.R. and Turoff, M. (1993) An Integrated Framework for the Study of Group Decision Support Systems, *Proceedings of the 26th Annual Hawaii International Conference on Systems Science*, **IV**, 179-188.

Folger, J.P. and Poole, M.S. (1984) *Working Through Conflict*, Scott Foresman: Glenwood, IL.

Gallupe, R.B. and McKeen, J.D. (1990) Enhancing Computer-Mediated Communication: An Experimental Investigation into the Use of a Group Decision Support System for Face-to-Face versus Remote Meetings, *Information and Management*, **18**, 1, 1-13.

Gallupe, R.B., Dennis, A.R., Cooper, W.H., Valacich, J.S., Bastianutti, L.M. and Nunamaker, J.F. (1992) Electronic Brainstorming and Group Size, *Academy of Management Journal*, **35**, 2, 350-369.

George, J.F., Nunamaker, J.F. and Vogel, D.R. (1988) Group Decision Support Systems and their Implications for Designers and Managers: The Arizona Experience, *DSS-88 Proceedings*, Boston, MA, June, 13-25.

George, J.F., Easton, G.K., Nunamaker, J.F. and Northcraft, G.B. (1990) A Study of Collaborative Group Work with and without Computer Based Support, *Information Systems Research*, **1**, 4, 394-415.

Gibb, J.R. (1951) The Effects of Group Size and Threat Reduction upon Creativity in a Problem Solving Situation, *American Psychologist*, **5**, 324.

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

Guetzkow, H. and Gyr, J. (1954) An Analysis of Conflict in Decision-Making Groups, *Human Relations*, **7**, 367-381.

Hackman, J.R. and Vidmar, N. (1970) Effects of Size and Task Type on Group Performance and Member Reactions, *Sociometry*, **33**, 1, 37-54.

Hackman, J.R. and Kaplan, R.E. (1974) Interventions into Group Processes: An Approach to Improving the Effectiveness of Groups, *Decision Sciences*, **5**, 459-480.

Hall, J. and Williams, M.S. (1966) A Comparison of Decision-Making Performance in Established and Adhoc Groups, *Journal of Personality and Social Psychology*, **3**, 214-222.

Hare, A.P. (1962) *Handbook of Small Group Research*, Free Press: New York.

Hare, A.P. (1981) Group Size, *American Behavioral Scientist*, **24**, 5, 695-708.

Hiltz, S.R. and Turoff, M. (1978) *The Network Nation: Human Communication via Computer*, Addison Wesley: Reading, MA.

Hiltz, S.R., Turoff, M. and Johnson, K. (1989) Experiments in Group Decision Making, 3: Disinhibition, Deindividuation, and Group Process in Pen Name and Real Name Conferences, *Decision Support Systems*, **5**, 2, 217-232.

Hoffman, L.R. (1978) The Group Problem Solving Process, in: Berkowitz, L. (Ed.) *Group Processes*, Academic Press: New York, 101-112.

Hoffman, L.R. (1979) Applying Experimental Research on Group Problem Solving to Organisations, *Journal of Applied Behavioural Science*, **15**, 3, 375-391.

Hollander, E.P. (1960) Competence and Conformity in the Acceptance of Influence, *Journal of Abnormal and Social Psychology*, **61**, 365-369.

Hollander, E.P. (1964) *Leader, Groups, and Influence*, OUP: New York.

Huang, W., Raman, K.S. and Wei, K.K. (1993) A Process Study of Effects of GSS and Task Type on Informational and Normative Influence in Small Groups, *14th International Conference on Information Systems*, Atlanta, 91-102.

Huber, G.P. (1984) Issues in the Design of Group Decision Support Systems, *MISQ*, **8**, 3, 195-204.

Huber, G.P. (1988) Effects of Decision and Communication Support Technologies on Organizational Decision Processes and Structures, *Proceedings of IFIP WG 8.3 Working Conference on Organizational Decision Support Systems*, North Holland: Amsterdam, 317-333.

Innis, H. (1972) *Empire and Communications*, University of Toronto Press: Toronto.

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

Jablin, F.M. (1987) Formal Organization Structure, in: Jablin, F.M., Putnam, L.L., Roberts, K.H. and Porter, L.W. (Eds) *Handbook of Organizational Communication*, 389-419, Sage: Newbury Park, CA.

Jacobs, R.C. and Campbell, D.T. (1961) The Perpetuation of an Arbitrary Tradition through Several Generations of a Laboratory Microculture, *Journal of Abnormal and Social Psychology*, **62**, 649-658.

Janis, I.L. (1972) *Victims of Groupthink: A Psychological Study of Foreign Policy Decisions and Fiascoes*, Houghton Mifflin: Boston, MA.

Jarvenpaa, S.L., Rao, V.S. and Huber, G.P. (1988) Computer Support for Meetings of Medium-Sized Groups Working on Unstructured Problems: A Field Experiment, *MISQ*, **12**, 4, 645-666.

Jelassi, M.T. and Beauclair, R.A. (1987) An Integrated Framework for Group Decision Support Systems Design, *Information and Management*, **13**, 4, 143-153.

Jelassi, M.T. and Foroughi, A. (1989) Negotiation Support Systems: An Overview of Design Issues and Existing Software, *Decision Support Systems*, **5**, 2, 167-181.

Jessup, L.M., Tansik, D. and Laase, T.D. (1988) Group Problem Solving in an Automated Environment: The Effects of Anonymity and Proximity on Group Process and Outcome with a Group Decision Support System, *Proceedings of the Academy of Management*, Anaheim, CA, August.

Jessup, L.M., Connolly, T. and Galegher, J. (1990a) The Effects of Anonymity on GDSS Group Process With an Idea-Generating Task, *MISQ*, **14**, 3, 313-321.

Jessup, L.M., Connolly, T. and Tansik, D.A. (1990b) Toward a Theory of Automated Group Work: The Deindividuating Effects of Anonymity, *Small Group Research*, **21**, 3, 333-348.

Jessup, L.M. and Tansik, D.A. (1991) Decision Making in an Automated Environment: The Effects of Anonymity and Proximity with a Group Decision Support System, *Decision Sciences*, **22**, 2, 266-279.

Johansen, R. (1988) *Groupware: Computer Support for Business Teams*, Free Press: New York.

Kaplan, M.F. and Miller, C.E. (1987) Group Decision Making and Normative Versus Informational Influence Effects of Type of Issue and Assigned Decision Rule, *Journal of Personality and Social Psychology*, **53**, 306-313.

Kerr, N.L. and Bruun, S.E. (1981) Ringelman Revisited: Alternative Explanations for the Social Loafing Effect, *Personality and Social Psychology Bulletin*, **7**, 224-231.

Kiesler, C.A. and Kiesler, S.B. (1969) *Conformity*, Addison Wesley: Reading, MA.

Kiesler, S., Siegel, J. and McGuire, T.W. (1984) Social Psychological Aspects of Computer-Mediated Communication, *American Psychologist*, **39**, 10, 1123-1134.

Kirchler, E. and Davis, J.H. (1986) The Influence of Member Status Differences and Task Type on Group Consensus and Member Position Change, *Journal of Personality and Social Psychology*, **51**, 83-91.

Korzenny, F. (1978) A Theory of Electronic Propinquity, *Communication Research*, **5**, 1, 3-24.

Krauss, R.M., Garlock, C.M., Cricker, P.D. and McMahon, L.E. (1977) The Role of Audible and Visible Background Responses in Interpersonal Communications, *Journal of Personality and Social Psychology*, **35**, 7, 523-529.

Lamm, H. and Trommsdorf, G. (1973) Group versus Individual Performance on Tasks Requiring Ideational Proficiency (Brainstorming): A Review, *European Journal of Social Psychology*, **3**, 361-387.

Latané, B. (1981) Psychology of Social Impact, *American Psychologist*, **36**, 4, 343-356.

LeBon, G. (1895) *The Crowd*, Ernest Bena: London.

Levine, J.M. (1980) Reaction to Opinion Deviance in Small Groups, in: Paulus, P.B. (Ed.) *Psychology of Small Group Influence*, Erlbaum: Hillsdale, NJ.

Lewicki, R. and Litterer, J. (1985) *Negotiation*, Richard D. Irwin Ltd.: Homewood, IL.

Lewis, A.C., Sadovsky, T.L. and Connolly, T. (1975) The Effectiveness of Group Brainstorming in Engineering Problem Solving, *IEEE Transactions on Engineering Management*, **22**, 3, 119-124.

Lyytinen, K., Maaranen, P. and Knuuttila, J. (1993) Unusual Business or Business as Usual: An Investigation of Meeting Support Requirements in Multilateral Diplomacy, *Accounting, Management & Information Technology*, **3**, 2, 97-117.

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

Macauley, T.B. (1830) in Southey, R. (Ed.) *Colloquies on the Progress and Prospects of Society*, Murray Publishing Company: London.

Mantei, M.M. (1989) Observation of Executives Using a Computer Supported Meeting Environment, *Decision Support Systems*, **5**, 2, 153-166.

Maruyama, M. (1987) Communication between Mindscape Types, in: Van Gigch, J. *Decision Making about Decision Making*, Abacus Press: Cambridge, MA.

Mashayekhi, V., Drake, J.M., Tsai, W.T. and Riedl, J. (1993) Distributed, Collaborative Software Inspection, *IEEE Software*, **10**, 5, 66-75.

Mausner, B. (1954) The Effect of Prior Reinforcement on the Interaction of Observer Pairs, *Journal of Abnormal and Social Psychology*, **49**, 65-68.

McGrath, J.E. (1984) *Groups: Interaction and Performance*, Prentice Hall: Englewood Cliffs, NJ.

McGuire, T.W., Kiesler, S. and Siegel, J. (1987) Group and Computer-Mediated Discussion Effects in Risk Decision Making, *Journal of Personality and Social Psychology*, **52**, 5, 917-930.

Mennecke, B.E., Hoffer, J.A. and Wynne, B.E. (1992) The Implications of Group Development and History for Group Support System Theory and Practice, *Small Group Research*, **23**, 4, 524-572.

Milgram, S. (1965) Some Conditions of Obedience and Disobedience to Authority, *Human Relations*, **18**, 57-76.

Mill, J.S. (1979) *On Liberty*, Penguin: New York (original work published in 1859).

Mills, T.M. (1953) Power Relationships in Three Person Groups, *American Sociological Review*, **18**, 351-357.

Mills, T.M. (1956) Developmental Processes in Three Person Groups, *Human Relations*, **9**, 343-354.

Monge, P.R. and Kirste, K.K. (1980) Measuring Proximity in Human Organisations, *Social Psychology Quarterly*, **43**, 1, 110-115.

Monge, P.R., Rothman, L.W., Eisenberg, E.M., Miller, K.I. and Kirste, K.K. (1985) The Dynamics of Organizational Proximity, *Management Science*, **31**, 9, 1129-1141.

Moscovici, S. and Faucheux, C. (1972) Social Influence, Conformity Bias and the Study of Active Minorities, in: Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology,* **6**, Academic Press: New York, 149-202.

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

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

Moscovici, S. and Lage, E. (1976) Studies in Social Influence III: Majority versus Minority Influence in a Group, *European Journal of Social Psychology*, **6**, 2, 149-174.

Moscovici, S. (1980) Toward a Theory of Conversion Behaviour, in. Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology*, **13**, Academic Press: New York.

Mugny, G. and Perez, J.A. (1991) *The Social Psychology of Minority Influence*, Cambridge University Press: Cambridge.

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

Nemeth, C.J. and Wachtler, J. (1974) Creating the Perceptions of Consistency and Confidence: A Necessary Condition for Minority Influence, *Sociometry*, **37**, 4, 529-540.

Nemeth, C.J. and Wachtler, J. (1983) Creative Problem Solving as a Result of Majority vs Minority Influence, *European Journal of Social Psychology*, **13**, 1, 45-55.

Nemeth, C.J. (1986) Differential Contributions of Majority and Minority Influence, *Psychological Review*, **93**, 1, 23-32.

Nemeth, C.J. and Kwan, J.L. (1987) Minority Influence, Divergent Thinking and Detection of Correct Solutions, *Journal of Applied Social Psychology*, **17**, 9, 788-799.

Nemeth, C.J. and Staw, B.M. (1989) The Tradeoffs of Social Control and Innovation in Groups and Organizations, *Advances in Experimental Social Psychology*, **22**, 175-209.

Niederman, F. (1990) An Annotated Bibliography of a Sampling of GDSS and Related Literature: 1968-1989, *Working Paper*, MISRC-WP-90-05, University of Minnesota.

Nightengale, D. (1976) Conflict and Conflict Resolution, in: Strauss, G., Miles, R.E., Snow, C.C. and Tannenbaum, A.S. (Eds) *Organisational Behaviour: Research and Issues*, Wadsworth: Belmont, CA.

Nunamaker, J.F., Applegate, L.M. and Konsynski, B.R. (1987) Facilitating Group Creativity: Experience with a Group Decision Support System, *Journal of Management Information Systems*, **3**, 4, 5-19.

Nunamaker, J.F., Applegate, L.M. and Konsynski, B.R. (1988) Computer Aided Deliberation: Model Management and Group Decision Support, *Journal of Operations Research*, **36**, 6, 826-848.

Nunamaker, J.F., Vogel, D.R. and Konsynski, B.R. (1989a) Interaction of Task and Technology to Support Large Groups, *Decision Support Systems*, **5**, 2, 139-152.

Nunamaker, J.F., Vogel, D.R., Heminger, A., Martz, W.B., Grohowski, R., and McGoff, C. (1989b) Experiences at IBM with Group Decision Support Systems: A Field Study, *Decision Support Systems*, **5**, 2, 183-196.

Nunamaker, J.F., Dennis, A.R., Valacich, J.S. and Vogel, D.R. (1991) Information Technology for Negotiating Groups: Generating Options for Mutual Gain, *Management Science*, **37**, 10, 1325-1346.

O'Reilly, C.A. (III) and Roberts, K.H. (1974) Information Filtration in Organisations: Three Experiments, *Organisational Behaviour and Human Performance*, **11**, 2, 253-265.

Ong, W. (1982) *Orality and Literacy: The Technologizing of the Word*, Methuen: London.

Osborn, A.F. (1957) *Applied Imagination: Principles and Procedures of Creative Thinking*, Scribner's: New York.

Panko, R. (1995) Networked Communication, *gss-l@uga.cc.uga.edu*, January 17.

Patterson, M. (1983) *Nonverbal Behaviour: A Functional Perspective*, Springer-Verlag: New York.

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

Pinsonneault, A. and Kraemer, K.L. (1990) The Effects of Electronic Meetings on Group Processes and Outcomes: An Assessment of the Empirical Research, *European Journal of Operational Research*, **46**, 2, 143-161.

Poole, M.S., Holmes, M. and DeSanctis, G.L. (1988) Conflict Management and Group Decision Support Systems, *Proceedings of the 2nd CSCW Conference*, Portland, Oregon, 227-243.

Poole, M.S., Holmes, M. and DeSanctis, G.L. (1991) Conflict Management in a Computer-Supported Meeting Environment, *Management Science*, **37**, 8, 926-953.

Priest, R.F. and Sawyer, J. (1967) Proximity and Peership: Basis of Balance in Interpersonal Attraction, *American Journal of Sociology*, **72**, 633-649.

Pruitt, D.G. (1981) *Negotiation Behaviour*, Academic Press: New York.

Pruitt, D.G. and Rubin, J.Z. (1986) *Social Conflict: Escalation, Statement and Settlement*, Random House, New York.

Quinn, R. (1977) Coping with Cupid: The Formation, Impact and Management of Romantic Relationships in Organizations, *Administrative Science Quarterly*, **22**, 30-45.

Raman, K.S., Tan, B.C.Y. and Wei, K.K. (1993) An Empirical Study of Task Type and Communication Medium in GDSS, *Proceedings of the 26th Hawaii International Conference on Systems Science,* **IV**, 161-168.

Remus, W.E. (1986) An Empirical Test of the Use of Graduate Students as Surrogates for Managers in Experiments on Business Decision Making, *Journal of Business Research*, **14**, 1, 20-30.

Remus, W.E. (1989) Using Students as Subjects in Experiments on Decision Support Systems, *Proceedings of the 22nd Hawaii International Conference on Systems Science*, **IV**, 176-180.

Renzulli, J.S., Owen, S.V. and Callahan, C.M. (1974) Fluency, Flexibility and Originality as a Function of Group Size, *Journal of Creative Behavior*, **8**, 2, 107-113.

Robey, D., Farrow, D.L. and Franz, C.R. (1989) Group Process and Conflict in System Development, *Management Science*, **35**, 10, 1172-1191.

Ruble, T.L. and Thomas, K.W. (1976) Support for a Two-Dimensional Model of Conflict Behaviour, *Organisational Behavior and Human Performance*, **16**, 1, 143-159.

Rutter, D.R., Stephenson, G.M., Lazzarini, A.J., Ayling, K. and White, P.A. (1977) Eye Contact: A Chance Product of Individual Looking?, *British Journal of Social and Clinical Psychology*, **16**, 2, 191-192.

Rutter, D.R., Stephenson, G.M., Ayling, K. and White, P.A. (1978) The Timing of Looks in Dyadic Conversation, *British Journal of Social and Clinical Psychology*, **17**, 1, 17-21.

Sabel, C. (1991) Bureaucracy Blusters: How They're Breaking the Corporate Chains, *Fortune*, June 17, 36-50.

Sambamurthy, V. and Poole, M.S. (1990) The Effects of Level of Sophistication of Computerized Support on the Conflict Process and Outcomes in Groups, *Paper Presented to the Annual Meeting of the Academy of Management*, Organizational Communication and Information Systems Division, August.

Schein, E.H. (1968) Organisational Socialisation and the Profession of Management, *Industrial Management Review*, **9**, 1-15.

Schmidt, S.M. (1972) Conflict: Towards Conceptual Clarity, *Administrative Science Quarterly*, **17**, 3, 359-370.

Schuman, S.P. (1993) Networked Communication*, gss-l@uga.cc.uga.edu*, September 24.

Shaw, M.E. (1981) *Group Dynamics: The Psychology of Small Group Behaviour* (3rd Edition), McGraw Hill: New York.

Short J., Williams, E. and Christie, B. (1976) *The Social Psychology of Communications*, London: John Wiley & Sons.

Siegel, J. Dubrovsky, V.J., Kiesler, S. and McGuire, T.W. (1986) Group Processes in Computer-Mediated Communication, *Organizational Behaviour and Human Decision Processes*, **37**, 157-187.

Sigall, H. and Michela, J. (1976) I'll Bet You Say that to All the Girls: Physical Attractiveness and Reactions to Praise, *Journal of Personality*, **44**, 4, 611-626.

Sillars, A., Coletti, S.F., Parry, D. and Rogers, M.A. (1982) Coding Verbal Conflict Tactics: Nonverbal and Perceptual Correlates of the "Avoidance-Distributive-Integrative" Distinction, *Human Communication Research*, **9**, 1, 83-95.

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

Slater, P.E. (1958) Contrasting Correlates of Group Size, *Sociometry*, **21**, 129-139.

Smith, J.Y. and Vanacek, M.T. (1990) Dispersed Group Decision Making Using Nonsimultaneous Computer Conferencing: A Report of Research, *Journal of Management Information Systems*, **7**, 2, 71-92.

Sproull, L. and Kiesler, S. (1986) Reducing Social Context Cues: Electronic Mail in Organisational Communication, *Management Science*, **32**, 11, 1492-1512.

Steeb, R. and Johnston, S.C. (1981) A Computer-Based Interactive System for Group Decision Making, *IEEE Transactions on Systems, Man, and Cybernetics*, **11**, 8, 544-552.

Steiner, I.D. (1972) *Group Process and Productivity*, Academic Press: New York.

Swap, W.S. (1984) Destructive Effects of Groups on Individuals, in: Swap, W.S. (Ed.) *Group Decision Making*, Sage Publications: Beverly Hills, CA.

Tan, B.C.Y., Wei, K.K. and Raman, K.S. (1991) Effects of Support and Task Type on Group Decision Outcome: A Study using SAMM, *Proceedings of the 24th Hawaii International Conference on Systems Science*, **III**, 537-546.

Tan, B.C.Y., Wei, K.K. and Raman, K.S. (1993a) Impact of Task-Medium Fit on Effectiveness and Efficiency in GDSS Supported Meetings, *IFIP WG 8.4 Conference*.

Tan, B.C.Y., Wei, K.K. and Watson, R.T. (1993b) Neutralizing Status Influence: An Empirical Study with a Group Support System, *14th International Conference on Information Systems,* Atlanta, 77-90.

Tan, B.C.Y., Watson, R.T., Wei, K.K., Raman, K.S., Kerola, P.K. (1993c) National Culture and Group Support Systems: Examining the Situation where some People are More Equal than Others, *Proceedings of 26th Hawaii International Conference on Systems Science*, **IV**, 132-141.

Taylor, D.W., Berry, P.C. and Block, C.H. (1958) Does Group Participation When Using Brainstorming Facilitate or Inhibit Creative Thinking?, *Administrative Science Quarterly*, **3**, 23-47.

Thomas, E.J. and Fink, C. (1963) Effects of Group Size, *Psychological Bulletin*, **60**, 4, 371-384.

Torrance, E.P. (1957) Group Decision-Making and Disagreement, *Social Forces*, **35**, 314-318.

Trevino, L.K., Daft, R.L. and Lengel, R.H. (1990) Understanding Managers' Media Choices: A Symbolic Interactionist Perspective, in: Fulk, J. and Steinfield, C. (Eds) *Organizations and Communication Technology*, Sage: Newbury Park, CA. 71-94.

Valacich, J.S., Dennis, A.R. and Nunamaker, J.F. (1992) Group Size and Anonymity Effects on Computer-Mediated Idea-Generation, *Small Group Research*, **23**, 1, 49-73.

Vogel, D.R., Nunamaker, J.F., Applegate, L. and Konsynski, B. (1987a) Group Decision Support Systems: Determinants of Success, *DSS-87 Transactions*, San Francisco, 118-128.

Vogel, D.R., Martz, B. and Nunamaker, J.F. (1987b) Automated Support for Groups: Implications for the Management of Information Systems, *Working Paper*, University of Arizona.

Vogel, D.R. and Nunamaker, J.F. (1990) Group Decision Support System Impact: Multi-Methodological Exploration, *Information and Management*, **18**, 1, 15-28.

von Oech, R. (1986) *A Kick in the Seat of the Pants*, Harper & Row: New York.

Walton, R.E. (1969) *Interpersonal Peacemaking: Confrontations and Third Party Consultation*, Addison-Wesley: Reading, MA.

Wanous, J.P. (1980) *Organisational Entry*, Addison Wesley: Reading, MA.

Watson, R.T. (1987) *A Study of Group Decision Support Use in Three- and Four-Person Groups for a Preference Allocation Decision*, Unpublished Doctoral Dissertation, University of Minnesota.

Watson, R.T., DeSanctis, G.L. and Poole, M.S. (1988) Using a GDSS to Facilitate Group Consensus: Some Intended and Unintended Consequences, *MISQ*, **12**, 3, 463-478.

Williams, K., Harkins, S. and Latané, B. (1981) Identifiability as a Deterrent to Social Loafing: Two Cheering Experiments, *Journal of Personality and Social Psychology*, **40**, 2, 303-311.

Wynne, B.E. and Noel, T. (1992) *GSS - A Promising Beginning*, IRMIS Monograph Series, 92-101, Bloomington: University of Indiana.

Zamyatin, Y.I. (1972) *We*, Penguin: Harmondsworth.

Zigurs, I. (1987) *The Effect of Computer-Based Support on Influence Attempts and Patterns in Small Group Decision-Making*, Unpublished Doctoral Dissertation, University of Minnesota.

Zigurs, I., Poole, M.S. and DeSanctis, G.L. (1988) A Study of Influence in Computer-Mediated Group Decision Making, *MISQ*, **12**, 4, 625-644.

Ziller, R.C. (1957) Group Size: A Determinant of the Quality and Stability of Group Decisions, *Sociometry*, **20**, 165-173.

Zimbardo, R.G. (1969) The Human Choice: Individuation, Reason and Order Versus Deindividuation, Impulse and Chaos, in: Helmer, J. and Eddington, N.A. (Ed.) *Urbanman: The Psychology of Urban Survival*, The Free Press: New York, 196-238.

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