

AN EXPERIMENTAL MODIFICATION OF THE  
NOMINAL GROUP TECHNIQUE

by

Patricia S. Shifflett

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APPROVED:

---

Robert R. Richards, Co-Chairman

---

Jim C. Fortune, Co-Chairman

---

Wayne M. Worner

---

Kenneth E. Underwood

---

Robert S. Fleming

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Blacksburg, Virginia

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(ABSTRACT)

The Nominal Group Technique (NGT) is a group decision making process which was developed to minimize the process losses of the traditional, interacting method. While proven to be superior to the widely-used interacting method by earlier research studies, NGT does not appear in the school administration literature as a useful technique for participatory problem solving. Because the original NGT can take one or more hours to complete, the assumption was tested that NGT could be made more useful to school administrators if it were modified for use into two brief sessions on successive days. This study modifies the NGT process by dividing the phases of the process into brief, two day sessions.

The NGT problem question was a problem identification task of identifying major teacher stressors in an elementary school setting. This study is a post-test only, control group design involving 36 elementary school teachers. Dependent measures were (1) the perceived satisfaction of participants with the processes and outcomes, and (2) the similarity of responses generated by NGT and modified NGT (MNGT) groups. Similarity of response data were analyzed using a chi-square

test, and satisfaction data were analyzed by applying a t-test.

Conclusions of this study were that NGT and MNGT yield similar results with regard to participant satisfaction and similarity of responses. As a result of this study, school administrators have access to a reliable process for obtaining in-put from the total faculty within the contractual school day.

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Dedicated to Amy and Jeffrey with pride and loving  
aspirations for the future

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## CHAPTER I

### INTRODUCTION

Today, in a time of increasing organizational and technological complexity, organizations are pressed for greater efficiency and effectiveness. Managers are pressed to meet not only organizational goals, but the needs of the individuals within the organizations as well. William Ouchi's "Theory Z" (1981), the import and spread of Quality Circles, the QWL (Quality of Work Life) Movement, and John Hawley's Vertical Linking Program (1984), all represent recent efforts to accommodate both individuals and organizations through participatory organizational processes.

The school principalship has not been exempted from the problems of other administrators; increasing efficiency and effectiveness are also mandates for the school organization. As school administrators strive to meet the demands of the public and the central administration, teachers also continue to press for a voice in organizational decision-making.

Also, as with all administrators, time continues to be a precious commodity for the school principal. The principals' time for activities is limited and, unfortunately, segmented. In a study of five elementary principals, Kmetz and Willower (1982:72-73) found that the administrators undertook a new task every four minutes, engaged in an average of 14.7

activities every hour, and devoted under thirty-five minutes per session to scheduled meetings, which were often interrupted more than once. Martin and Willower (1981) obtained similar findings for secondary principals. They comment that "priority usually went to tasks that required immediate action or could be quickly completed". Considering the circumstances of the pace and intensity of the principals' job, it is not surprising that principals often retreat to maintenance functions rather than initiating ones, such as those found in leadership definitions (Lipham and Hoeh, 1975:185).

School administrators who perceive leadership as initiation of "...change in the goals, objectives, configurations, procedures, inputs, processes, and ultimately the output..." (Lipham and Hoeh, 1975:185) of the school organization; who want to utilize the expertise of individuals within the building and to increase teacher's participation in problem identification and problem solving, must operate within rigid time constraints. These include time necessary for the duties of the principals, as well as principals' limited access to teachers, often short periods of time before and after the students' day, or contractual time when teachers are not otherwise employed in teaching. Typically, principals receive input from teachers in face-to-face, one-on-one meetings or in scheduled faculty meetings in which a show of hands indicates faculty opinions. Information obtained in this manner may be incomplete, biased, or inaccurate. Committees formed by the administrator may not function any better.

In order to more fully involve staff and to obtain more accurate input from faculty, the proactive principal, as other initiating

administrators, must overcome the problem of time and task constraints by identifying and utilizing appropriate group processes. This may mean formulating new strategies or adapting established processes to meet specific needs. A variety of techniques and adaptations are already available for group use, including traditional, interacting discussion, brainstorming, Delphi technique, Nominal Group Techniques, consensus, and more.

Nominal Group Technique, referred to hereafter as NGT, is a process formulated by Andre Delbecq and Andrew Van de Ven in 1968. Structured to overcome many of the problems of other group processes, NGT has been established as an effective technique for idea generation and problem identification and evaluation.

In the introduction to a users guide to NGT (Delbecq, Van de Ven, and Gustafson, 1975:viii), Alberta Parker describes NGT as being designed to:

...increase the creativity of group action, facilitate group decision, help stimulate the generation of critical ideas, give guidance in the aggregation of individual judgments and, in all these endeavors, save human effort and energy and leave participants with a sense of satisfaction.

While NGT is one of a growing number of formats used in problem solving and decision-making, the rationale for selecting NGT for use by school administrators is based upon the nature of the constraints upon staff meeting time, the effectiveness of the process, and the potential for modification to meet the schools' needs.

The NGT process can take from one to four hours to complete, depending upon the complexity of the problem. Few administrators have time within a school day to permit frequent or even occasional

use of this process to obtain staff input. An administrator's access to faculty is limited by the teachers' daily contractual hours, which allow little time unencumbered from supervision of students. The majority of the teachers' work day is also spent in isolation from other teachers. This is especially true at the elementary school. Interviews with a number of elementary principals revealed that many school schedules contained only one half hour per day for possible staff meetings. School administrators might be encouraged to utilize aggregated staff input had they a tight, valid process which could be implemented within contract time.

NGT appears to be just such a group process which has, therefore, been selected for modification into segments, or two sessions of one half hour each, to be utilized over a two day period. The assumption is that most faculties have at least 30 consecutive minutes of non-teaching time per day. A question is whether or not the integrity of the original NGT design can be retained when modified.

This study experimentally compared the problem identification results of the standard NGT process with results of an NGT process modified (MNGT) for use by principals within teachers' contractual hours. For the purposes of this comparison, the study asked teachers to identify the events in the school day which they found most distressful (major job-stressors).

### Description of the Group Processes of NGT and MNGT

Because the Nominal Group Technique is still not widely known, a brief description of the process is in order. Referred to as NGT in this study, the process format, developed by Delbecq et al. (1975) encompasses two phases: fact-finding and evaluation. The fact-finding phase includes (1) silent generation of ideas in writing, and (2) round-robin feedback from participants, recording ideas one-at-a-time on a flip chart. The evaluation phase includes (1) discussion of each idea for clarification and evaluation, and (2) individual voting on priorities, followed by a mathematically derived group decision. The NGT phases are sequential and continuous, spanning one to four hours of one day, depending upon the complexity of the problem.

#### The Nominal Group Technique - NGT

##### Fact-Finding Phase

1. Five to nine group members, seated around a table, silently write their ideas or responses to a problem.
2. Each member reads one item from his/her list, in round-robin manner, until all items are exhausted. Every item is recorded on a flip chart when read.

##### Evaluation Phase

3. An interacting discussion follows to provide clarification of each item on the chart and to allow evaluation of each item. Debate, however, is not permitted.
4. The cards are collected and scores tabulated on the master list,

providing a mathematically pooled group decision.

The modified Nominal Group Technique, referred to as MNGT in this study, retains the NGT format, including both the fact-finding and evaluation phases. The modification, however, divides the format by its two phases, each of which is to be completed in one half hour on successive days.

### The Modified Nominal Group Technique - MNGT

FIRST DAY: One-half hour

#### Fact-finding Phase

1. silent idea generation
2. round-robin recording of each idea

SECOND DAY: One-half hour

#### Evaluation Phase

1. interacting group discussion
2. individual voting
3. mathematically derived group decision

### Purpose of the Study

The purpose of this study was to determine the reliability of a modified NGT for use by administrators who are constrained by specific time limitations. Elementary principals, who might utilize group processes for teacher participation in planning and in decision making, often have access to their teachers limited by both contractual hours and time employed in teaching students. This study attempted to

compare an established group process with a modification intended to overcome the time constraints of the teachers' contractual school day.

#### Statement of the Problem

The problem of this study was to answer the question: would modification of the Nominal Group Technique (MNGT) into a two day process of one half hour each day, yield the same results as the originally structured Nominal Group Technique (NGT) in terms of:

1. the similarity of ideas generated,
2. the perceived satisfaction of participants with the process and its results?

#### Limitations of the Study

The following were limitations of this study:

1. This study was limited to the perceptions of the teaching staff of one suburban elementary school in Virginia.
2. The scope of this study was the examination of the process, not the content question of teacher stressors.

#### Assumption

Both the Nominal Group Technique and the Modified Nominal Group Technique will yield comparable results with regard to participant satisfaction and similarity of responses to the question of identification of teacher stressors.



### Significance Of The Study

Despite the use of NGT in a wide variety of settings, a review of the literature revealed no evidence that this process has been utilized by school principals to obtain information, input, or feedback from their teachers. There were also no empirical studies of NGT modified into segments for use on successive days. This study was undertaken to determine the reliability of NGT, modified for use in the elementary school setting.

### Definition of Terms

For the purposes of this study the following definitions apply:

NGT: The Nominal Group Technique (See Chapters I and III)

MNGT: The particular modification to NGT in which the NGT format is divided by its two phases, each of which is to be completed in one half hour on successive days. MNGT is described in detail in Chapters I and III.

Nominal Group: Uncapitalized, the terms which refer to a technique in which participants sit with each other while working on the same task, but do not communicate verbally.

Process Losses: Any conditions which diminish the productivity of a problem solving group, including individual member's behavior or perceptions.

Interaction Format: An unstructured meeting in which a leader emerges or is appointed, open discussion provides for the pooling of ideas, and group decision is a show-of-hands majority vote. Often referred to as traditional or committee meeting format.

Brainstorming Format: Basically an interacting, unstructured meeting, except for minimal guidelines to group members, which attempt to eliminate interpersonal criticisms. Described more fully in Chapter II.

Consensus Format: An interacting format with guidelines provided to group members in order to foster tolerance for conflict and to avoid premature decisions. Described more fully in Chapter II.

Delphi Technique: A totally structured format developed to obtain consensus opinion from experts through questionnaires and feedback.

Gordon Technique: Also known as the Gordon Effect. A method for disguising the real purpose or problem for the group meeting, by substituting a similar or related problem. This represents another effort to overcome group inhibitors and encourage creativity.

Perceived Satisfaction of Participants: The rating of participants on a five-point scale (5-1) for each of five satisfaction variables (See Chapter III).

Similarity of Responses: A dependent variable measured by the frequency of participants' responses and an evaluation by 5 independent judges (See Chapter III).

MNGT Process Reliability: When measures of perceived satisfaction and similarity of responses, compared with the same measures for NGT are not significantly different at the .05 level.

### Organization Of The Study

Chapter I includes the introduction, descriptions of the NGT process and its modification, the purpose of the study, and the statement of the problem. The significance of the study, the limitations, the definition of terms, and the assumption are also presented in this chapter.

Chapter II contains a review and description of group processes, previous applications of NGT, the bases of the design of NGT from the literature, and a review of relevant empirical studies. Chapter III describes the research design, including the NGT problem question, and details of the methods and procedures used in collecting and analyzing the data. Chapter IV includes the presentation and analysis of data. Chapter V includes the summary, conclusions and recommendations for future research and for utilization by school administrators.

## CHAPTER II

### REVIEW OF LITERATURE

Background information considered essential to this study is presented in this chapter. This includes descriptions of relevant group processes, previous applications of the NGT process, the bases of the NGT design and a review of relevant empirical studies

#### Introduction

The school principal who determines to improve conditions, programs, efficiency and/or effectiveness of staff faces a formidable task. Stiles and Robinson (1973:58) describe educational change as "typically unsystematic and disruptive", with strategies generally being selected and developed without in-depth examination of factors which effect success or failure. They also describe communication among school personnel as "sporadic and superficial" (1973:58), suggesting a need for the leadership to consider improving relationships among the personnel to facilitate desired changes.

Stiles and Robinson (1973:272) suggest:

There is usually too much dependence on changing individuals, and not enough concern with the fact that the setting for educational innovation is social and organizational in nature, involving formal and informal relationships in an organizational structure with goals, rewards, and decision making sub-structures.

During the 1970s, organizational research focused on the inter-

relationships between individuals and groups of individuals, and the organizational environment in which the individuals and groups functioned (Payne and Cooper, 1981).

Handy (1976:1) lists organizational uses of groups, teams, and committees for a wide variety of tasks and situations; among these are

1. For the distribution of work. To bring together a set of skills, talents, and responsibilities, and allocate them their particular duties.
2. For problem-solving and decision-making. To bring together a set of skills, talents, and responsibilities so that the solution to any problem will have all available capacities applied to it.
3. For information and idea collection. To gather ideas, information or suggestions.
4. For testing and ratifying decisions. To test the validity of a decision taken outside the group, or to ratify such a decision.
5. For increased commitment and involvement. To allow and encourage individuals to get involved in the plans and activities of the organization.
6. For inquest or inquiry into the past.

Pearson and Gunz (1981:138), in a study of project groups, cite conclusions that all organizational members are affected by organizational level decisions, either as providers of information or as those affected by the decisions. They suggest that from a purely practical point of view, such decisions as project selection and resource allocations must be based on information gathered from "as wide a range of sources as the organization has available to it" (1981:143).

### Group Problem Solving Processes

It is imperative that the school principal, who intends to maximize use of the individual and group resources available to him/her, select appropriate group processes for each task.

Ivan Steiner (1972) is credited with providing a major contribution to current research on groups and processes in his studies of group productivity. Steiner developed a concept:  $\text{Actual Productivity} = \text{Potential Productivity} - \text{Process Losses}$ , following which, others have built on the theory to show that direct intervention into group process can lead to process gains rather than losses, and therefore to more efficient group performance (Nagao et al., 1978). Steiner concludes, the more appropriate the process is to the demands of the tasks, the closer actual productivity corresponds to potential productivity.

The experience of this researcher, interviews with principals, and a search of relevant literature, indicate, unfortunately, that many organizational leaders, including principals, are unaware of, or inexperienced in the use of a variety of existing group processes and rely solely upon a traditional, unstructured, interacting format. This format fosters process losses, described later, when improperly applied to certain tasks.

Research suggests that it is necessary to differentiate problem-solving phases which require different strategies within group processes (Delbecq, Van de Ven, and Gustafson, 1975). Delbecq et al. (1975) describe two unique phases of creative (judgmental) problem solving: fact-finding and evaluation.

The fact-finding phase deals with problem search and the generation of data about the problem or, alternatively, about proposed solutions. The evaluation phase is concerned with information

synthesis, screening, and choosing among strategic elements of a problem or component elements of alternative solutions (Delbecq et al., 1975:9).

Several formats have been designed to provide appropriate strategies, through interventions, in order to overcome process losses. Some formats do not distinguish between problem-solving phases, but are non-the-less designed to minimize process losses.

The interaction format can be described as an unstructured group meeting in which a leader emerges or is appointed, and in which "open discussion" takes place to pool ideas. The group decision is usually a majority vote by a show of hands. This is the traditional group or committee meeting format and is most often used as a control in group studies.

Interacting groups are often a source of great frustration for both leaders and participants, to the end that many group members dread the thought of attending "another meeting", and leaders become reluctant to call one. Researchers, such as Gustafson et al. (1973:282) support these attitudes, citing many dysfunctions of interacting processes, including:

1. a central tendency effect where groups tend to pursue a limited train of thought (Taylor et al., 1958; Dunnette et al., 1963).
2. the self weighting effect where the individual will participate or seek to exercise influence to the extent that he feels equally competent with others (Kelly and Thibaut, 1954; Collaros and Anderson, 1969).
3. the hidden agenda effect, where covert judgments are made but not expressed (Collaros and Anderson, 1969).
4. group pressures for conformity and the implied threats of sanctions from the more knowledgeable members (Dalkey and Hilmer, 1963).
5. a tendency to reach "speedy decisions" before all problem dimensions have been considered (Maier and Hoftman, 1960).

Dysfunctions of this nature lead directly to process losses, resulting in reduced group productivity (efficiency and effectiveness).

Dissatisfaction with interacting groups and research on the dysfunctions of interacting groups led to the development of interventions to improve the quality and the degree of participation, as well as the satisfaction of the participants. The most widely used of these formats are brainstorming, consensus, Delphi, and NGT, and various modifications of each.

A brief review of these formats will provide a rationale for the selection of NGT for use with school personnel.

Brainstorming (Osborne, 1963) represented an early effort to eliminate interpersonal criticisms in group processes. As in interacting groups, the brainstorming format is unstructured, except for verbal guidelines given to participants. They are urged to be as creative as possible in generating ideas; nothing is too extreme. Participants are also encouraged to generate as many ideas as possible. Although brainstorming techniques were found to be superior to the interacting process (Bouchard, 1969; Osborn, 1957), further research showed that the group interaction in brainstorming still inhibited creative thinking (Bouchard, 1969; Dunnette et al., 1963). Participants often leave without a sense of closure, also.

The consensus format also attempts to improve creativity and participation while minimizing unproductive conflict among group members. Guidelines developed by Hall and Watson (1970) were intended to foster tolerance for conflict and to avoid premature decisions and compromises until information was completely shared. Hall and Watson (1970) compared

traditional interacting and consensus groups, finding consensus groups superior in measures of decision-making effectiveness. In similar studies Nemiroff and King (1975), however, found consensus groups to be less than optimal improvement over interacting groups in participants' acceptance of the groups' decision, which was not increased. Subjects' attitudes toward the group process were also not improved. Contrary findings resulted from a study by Erffmeyer (1981) in which consensus groups produced greater acceptance than interacting groups. Besides conflicting evidence on the effectiveness of this format, this minor intervention does not differentiate between problem-solving phases.

The Delphi technique, a totally structured format, was developed in defense research by RAND Corporation for the Air Force (Dalkey and Helmer, 1963). The objective was to obtain consensus opinion from experts through questionnaires and feedback. Delphi groups never meet each other, communicating through the questionnaires only. In fact, the communication is channeled through a central staff who compiles responses and returns them to participants for further consideration. The process is repeated until consensus or stalemate is reached, sometimes taking as many as seven rounds. Many studies validate the decision-making superiority of Delphi over interacting group processes (Dalkey et al., 1972; Campbell, 1966; Dalkey and Helmer, 1963). While Delphi may reduce most of the process losses of interacting formats, the great amount of time needed to complete the task and the obvious expense of staff time and materials represent genuine constraints on the selection of this process.

The Nominal Group Technique represents another intervention to reduce the process losses of interacting groups. The topic of this study,



NGT, was selected for possible use by school administrators because of the limitations of the other formats and because of the research endorsements validating the efficiency and effectiveness of the NGT design for gaining consensus.

#### Development of NGT

The nominal group process was developed by Andre Delbecq in 1968 as a technique for use by the community Action Agency of the Office of Economic Opportunity. Because it was necessary to involve disadvantaged citizens, Delbecq sought a way to overcome various inhibitors to group consensus, utilizing the results of socio-psychological studies of decision conferences (Delbecq and Van de Ven, 1971). Originally a nominal group sat face-to-face, in total silence, generating ideas which would then be submitted to a vote. Hence, it was a "group" in name only--nominal (Delbecq, Van de Ven, and Gustafson, 1975). Nominal groups have been frequently employed to study the effects of the presence of others on participant creativity and problem solving (Vroom et al., 1969).

As early as 1967, Delbecq advocated the utilization of different strategies for different types of decision making (Delbecq, 1967). His studies of the nature of interacting groups suggested the use of creative or judgmental techniques when participants could not agree on a method for dealing with a specific problem (Delbecq, 1967). He had already concluded that it was necessary to separate idea generation from idea evaluation, to separate problem definition from solution strategies, and to suspend judgment and avoid early preoccupation with solutions (Delbecq, 1967). All of these strategies were to become part of the fully developed technique of 1975.

By 1968, the modified, nominal process involved the silent generation of ideas, a round-robin recording of the ideas on a flip-chart, a brief non-judgmental clarification-of-ideas phase and nominal majority voting (Delbecq, 1968).

Studies by Van de Ven and Delbecq in 1971 led them to conclude that the "optimal combination of processes for problem solving groups included: (1) nominal idea generation or fact-finding, (2) structured feedback and interacting discussion, and (3) nominal group voting. Again, the attempts to reduce inhibitors justified the greater structuring of behavior in specific problem solving phases (Van de Ven and Delbecq, 1971). It may be noted that although highly structured, the interaction phase now included discussion beyond simple clarification, permitting statements of support and non-support from group members.

In a 1972 study (Van de Ven and Delbecq), the evolving technique was referred to as NGP, for Nominal Group Process, and was utilized as an exploratory research instrument. Following research conclusions of Huber and Delbecq (1972) that "arithmetic means have greater accuracy for aggregating individual judgments", a ranked nominal vote was added to the process. For increased accuracy, especially on highly complex subjects, they recommended a re-vote which was to be rated.

Van de Ven (1974) validated the superiority of the Nominal Group Process in decision-making effectiveness for specific types of problems. His experimental study of traditional (unstructured, interacting), nominal, and Delphi processes also emphasized the importance of participant satisfaction with the process and its outcomes as a significant consideration in the selection of a strategy. A complete guide to the use of the

strategy, now called NGT for Nominal Group Technique, in what may be its finalized form, was published in 1975 (Delbecq, Van de Ven, and Gustafson).

### Applications Of NGT

Since 1971, NGT, or the nominal group process has been used in a wide variety of setting: in business, industry, government, education and health care operations; and for a variety of purposes. Its uses include the analyses of office environments (Haskell, 1981); the analysis of organizational training needs (Scott and Deadrick, 1982); the facilitation of training within an organization (Green, 1974); the change and development of organizations through intervention (Mosely and Green, 1974); the identification of organizational barriers to productivity (Burton et al., 1978; Haskell, 1981); the incorporation of a variety of community or consumer inputs (Scott and Deadrick, 1982; Delbecq and Van de Ven, 1971; Van de Ven and Delbecq, 1972); the identification of critical health care problems (Delbecq, 1972); the improvement of organizational performance through creative decision-making (Summers and White, 1976); the design of technical solutions for computer systems (Stephenson and Franklin, 1981); the improvement of organizational communication (Green and Pietri, 1974); pilot research (Van de Ven and Delbecq, 1972); and a role as part of a program planning process (Delbecq and Van de Ven, 1971).

### Nominal And Interacting Strategies In NGT Design

The format of NGT (the silent generation of ideas, round-robin-feedback, serial discussion of ideas, and nominal voting with mathemati-

cally derived scores was specifically designed to reduce process losses of traditional, interacting groups. Van de Ven and Delbecq (1971) include in this design different problem-solving strategies for different phases of the decision-making process. These strategies are intended to increase NGT effectiveness by facilitating the generation of a larger number of ideas than traditional interacting groups and by facilitating creative problem solving. The design incorporates the nominal group process which is utilized for idea generation and individual voting; the interacting process is utilized for structured feedback, clarification and evaluation of ideas.

#### Nominal Processes

Van de Ven and Delbecq (1971:206-207) suggest that nominal groups:

1. Stimulate creative tension by means of the presence of others, the silence, and the evidence of activity. This tension is important for individual commitment to the search process. Thus the social facilitation of the group setting is retained and amplified.
2. Avoid evaluation or elaborating comments while problem dimensions are being generated (Maier and Hoffman, 1960).
3. Provide each individual time and opportunity to engage in reflection (search) and force participants to record their thoughts (Dunnette, 1964; Horowitz and Newman, 1964; Maier and Solem, 1952).
4. Avoid the dominance of group output by strong personality types (Maier and Maier, 1957).
5. Prevent premature closure to the alternative search process and decision-making (Bennette, 1955; Maier and Hoffman, 1960).
6. Allow all participants to share in the opportunity for influencing the direction of group decision outcome (Goldman et al., 1961; Pelz, 1956).
7. Encourage the generation of minority opinions and ideas which

consequently are more likely to be voiced (Maier and Solem, 1952; Shukla, 1970).

8. Tolerate conflicting, incompatible ideas since all ideas are revealed in writing (Deutsch, 1949; Guetzkow and Gyr, 1954; Vroom et al., 1969).
9. Avoid 'hidden agendas' or covert political group dynamics which are difficult to develop when writing (Fourezos et al., 1950).
10. Induce a sense of responsibility in the members for achieving group success (Benne and Sheats, 1948).
11. Impose a burden upon all participants to work and produce their share in the necessary task (Bales, 1953; Deutsch, 1949).
12. By means of written expression, induce a greater feeling of commitment and a greater sense of permanence than does spoken expression (Bouchard, 1969; Horowitz and Newman, 1964).

Van de Ven and Delbecq (1971:209) conclude, "...research indicates that interacting groups produce a smaller number of problem dimensions, fewer high quality suggestions, and a smaller number of different kinds of solutions than groups in which members were constrained from interaction during the generation of critical problem variables".

### Interacting Processes

Although the nominal process is the most effective strategy for idea generation, the interacting processes "stimulate individuals to consider other dimensions of a problem and help synthesize and evaluate alternative solution possibilities" (Delbecq and Van de Ven, 1971; Zogona et al., 1961). Hall, Mouton, and Blake's (1963) studies indicated that groups' final decisions following an interacting phase were superior to choices based solely upon mathematical aggregation of individual judgments. The structure of the interacting process is the key to minimizing the previously described process losses (Van de Ven and

Delbecq, 1971). For this reason, the designers of NGT structured "recorded round robin" technique which facilitates equal sharing of ideas by each group member. Research also supports the contention that the round-robin strategy facilitates self-disclosure of ideas, even from insecure group members (Culbert, 1968:47-74). Van de Ven and Delbecq also suggest that when discussion (interaction) follows the round-robin listing, "clarification and syntheses occur naturally" (1971:209). The design of NGT is an obvious reflection of the various research conclusions.

#### NGT Design Problems

Although NGT has proven itself more effective than a traditional interacting format, and appears to be more useful for many decision-making situations, Delbecq et al. (1975) indicate that the technique is none-the-less not free of several residual problems. Among these they cite (1975:34):

1. Extensive preparation is necessary for an NGT meeting, so it cannot be used as 'a spontaneous meeting technique'.
2. The highly structured NGT format makes it difficult to change topics during a meeting, so it must be considered a 'single purpose, single topic meeting'.
3. A highly structured format requires conforming behavior of every participant, which may make inexperienced group members uncomfortable.

Despite these problems, NGT merits seem to out-weigh the format constraints when comparing NGT with other processes for effectiveness and usefulness within a school organization. Because the effective administrator must select the process most appropriate to the task, NGT has been selected to most fully utilize the potential resources

of the faculty for input into typical school issues.

Sullivan (1978:6), citing Mosely and Green (1974) "summarized the advantages of NGT by noting it was faster, less expensive, and involved more people in a shorter time frame than most interactive meetings". Additional research generally supports the greater effectiveness of NGT over interacting formats; some of the recent studies have also attempted modifications to enhance that effectiveness. Relevant empirical studies follow.

#### Relevant Empirical Studies

While there have been a great number of applications of NGT to group problem solving situations, and many modifications to the original format, there are relatively few empirical studies. A number of these validate the superiority of NGT over the traditional, interacting formats. Of the modified NGT formats, only a few studies have empirically tested the modifications for the retention, increase or decrease of effectiveness.

A review of the literature was undertaken to examine studies relevant to the present research:

Chung and Ferris (1971) compared NGP with interacting formats to validate the superiority of the nominal group process in a problem solving task of analyzing case problems in administration. They concluded that NGP reduced process losses by utilizing resources of non-interacting high performers, which resulted in NGP's generation of better alternatives and solutions.

Gustafson, Shukla, Delbecq and Walster (1973), in a problem re-

quiring subjective likelihood estimates, concluded NGT decisions were superior to interacting and Delphi formats, as well as to individual estimates. Van de Ven and Delbecq (1974) suggest that the modified Delphi process utilized, and its results, represented "invalid experimental manipulations and testing". The NGT format was also a modification (open discussion permitted before voting or estimating). Conclusions based on this study, are, therefore suspect.

Van de Ven (1974) removed comparative research or group processes from the laboratory to study a problem that personally affected the subjects. Because House Fellows (dormitory counselors) at a mid-western university had ambiguous job descriptions, there was inconsistency in their training and no objective criteria to evaluate or dismiss them. As the subjects in this experiment, 420 counselors and dormitory residents were randomly assigned to 60 groups of seven participants each. Each treatment, NGT, Delphi, and interacting, involved 20 groups. The task was to specifically define the job activities for the counselors. Relative effectiveness of the group formats was tested using the following variables: (1) quantity of unique ideas generated, (2) perceived participant satisfaction with respect to (a) felt freedom to contribute ideas; (b) feeling that their time was well spent; (c) quantity of ideas; (d) quality of ideas; (e) feeling that the method was an effective way of dealing with the problem.

Van de Ven concluded that NGT and Delphi groups generated 50 percent more ideas than interacting groups, with NGT generating slightly more than Delphi. NGT groups also perceived significantly higher levels of



satisfaction than interacting groups. There was no significant difference in satisfaction between interacting and Delphi groups. Results of this study were also reported by Van de Ven and Delbecq (1974).

Green (1975) examined problem identification tasks and the leadership style utilized in interacting groups in a comparison of NGT groups with interacting groups. Subjects were 70 data processing students who addressed the problem "In your EDP course, what problems have you noted?" Green concluded no significant differences between the two formats, regardless of interacting leadership style, in quantity or quality of ideas generated. Because of the omission of the discussion phase of the NGT format, the NGT procedure must be regarded as a modification, even though it was not claimed or tested as such.

Frederick (1976) on a task of ascertaining and analyzing barriers to specific goals, compared nominal and interacting groups. The subjects were 140 management students, who were randomly assigned to 20 groups. The author concluded that the nominal groups did not produce a greater quantity of ideas or a greater quantity of high quality ideas than interacting groups, but the number of ideas of average quality was greater for the nominal groups. Satisfaction was also greater for nominal group members than for interacting members. Because this study, a dissertation, was examined in abstract form, it was impossible to determine whether or not the NGT format was used.

Nemiroff, Pasmore and Ford (1976) conducted one of few studies utilizing an evaluative task rather than a generative task to compare a nominal group process with other formats. The authors used a "Lost

At Sea" problem (Nemiroff and Pasmore, 1975) to compare a modified NGT with consensus and interacting group formats. The modification to NGT required that after serial listing, each participant must present all his/her rankings at once and then spend five minutes giving the rationale for the rankings to the group. After each participant had done this, an open discussion ensued, followed by final voting. On one performance measure, quality, the modified NGT outperformed consensus and interacting groups.

On two other performance measures consensus groups were superior to nominal and interacting groups. Analyses of satisfaction questionnaire items revealed no significant differences between nominal groups and the others. The nominal groups, however, outperformed consensus and interacting groups in time necessary to complete the task. The conclusions led Nemiroff et al. (1976) to suggest that the nominal technique should be selected when time is a critical factor and decision quality must be high, but not necessarily highest.

Nutt (1976) developed three models for comparison in four field settings: Systems, Behavioral, and Heuristic. The Systems Model combined the interacting format with NGT; after objectives were identified through the interacting process, groups developed services needed to meet the objectives through the NGT format. The Behavioral Model used NGT solely to identify problems of clients and potential solutions. The Heuristic Model was an interaction format used by the groups to identify solutions. The three models were compared for group performance as measured by (1) the number of new ideas, (2) quality of ideas,

and (3) participant satisfaction. Conclusions of the experimenter were that the Heuristic Model was ineffective; that when high quality decisions were needed, the Systems approach was most useful; and that the Behavioral Model was superior for innovation or new idea generation. The NGT format was insufficiently described to determine whether or not the process was modified.

White, Blythe, and Corrigan (1977) as cited by Sullivan (1978) conducted a field study comparing NGT, brainstorming and interacting groups. Five groups of six members each were assigned to each format to undertake the task of determining the personal and organizational changes necessary for a hospital expansion program. Quantity of ideas generated was the sole performance measure. The authors concluded that there was no significant difference between NGT and brainstorming group performances, but that the interacting groups' performances were inferior to both NGT and brainstorming. Sullivan (1978) questions the conclusion of this study on the basis of the insufficient data produced by a single dependent measure, quality of ideas, which is not the only or primary purpose for which NGT was designed.

Burton, Pathek, and Burton (1977) tested a process they have labeled Nominal/Gordon Technique, a combination of NGT and the Gordon Technique. The authors suggest that the Gordon method was developed to overcome the "blinding" effects of brainstorming: being so close to a problem that the obvious is overlooked. Only the leaders know the real problem, which is disguised and hidden from group participants. This study involved personnel in a management development program who addressed the

problem of areas they would like to see in a company's training program. The "real" question was what company problems limited organizational effectiveness. Thirty-three ideas were generated, but only seven of these were judged to be training problems. The remainder were inhibitors to organizational effectiveness. Burton et al. conclude that the Nominal/Gordon Technique is superior to NGT or brainstorming.

Several problems exist with this study: first, Nominal/Gordon Technique, as developed by the authors, is a modification of a modification, in that the NGT format requires a serial discussion phase for clarification prior to initial voting. Burton et al. followed the initial voting with serial discussion, rather than permitting clarification before the vote. This was done apparently to allow participants to discover that items they judged most important were often not training problems at all. By "discovering" the organizational problems themselves, the subjects might be more supportive of organizational changes arising from these (Burton et al., 1978). Secondly, while the authors' interventions appear to be successful at evoking responses that companies were unable to obtain through other methods (Burton et al., 1978), the omission of a control group in this experiment makes the authors' conclusions questionable.

Cooley (1977) designed an elaborate study to test a modification to NGT, to determine optimal size for NGT groups, and to determine the best criteria for judging quality of group decisions. Five hundred and forty-two officers in the United States Air Force, assigned to 72 groups, participated in Resource Management Exercise. The task was problem

identification. The control group followed a modified NGT format in which participants were required to read their ideas in Phase II, Round-robin, in the order in which they nominally recorded them. When the idea was recorded on the flip chart, the group leader asked whether anyone else who had the item on his/her list to signify by raising his/her hand. A check was placed next to the item, and it was not read again in turn.

The serial discussion phase was omitted before the voting phase. The experimental group also followed a modified NGT in which open discussion was permitted during the round-robin recording phase. Following the round-robin, participants returned to silent idea generation and listing for a three minute period. A second round-robin listing began, also permitting open discussion. Voting followed this phase.

Cooley found no significant difference between the performance of the two groups. He concluded that the optimal size for NGT groups is 10, and that the best criteria for judging quality of ideas is the priority of items. The author also measured the withholding of ideas by comparing items on individuals' sheets to the items listed on the group's flip chart. He found that individuals in all 72 groups withheld their ideas and that no significant difference existed between experimental and control groups withholdings.

This study was obtainable only in an abstract and through citation by Sullivan (1978). It was impossible to determine the rationale for the particular modifications to the control group, especially in light of the Delbecq et al. (1975) emphasis on round-robin-flip-chart listing to

provide anonymity for participants. Delbecq et al. specify that participants be instructed that the idea-generator need not clarify or defend the idea.

Sullivan (1978) tested a modification of NGT designed to further improve the process by totally eliminating the "linking" of ideas to the contributing individuals. During the round-robin phase, each participant, in turn, reads one item from his/her list to be recorded on the flip chart. The intent of round-robin design is that other participants will forget, after several rounds, who suggested each item, thereby reducing inhibitors to participation. Sullivan's modification replaces the verbalization of ideas with an anonymous written system in which participants place each idea on a separate 3 x 5 card. During the round-robin phase each participant places one card in "the hat" being passed around. Cards are then read aloud by the group leader and recorded on the flip chart.

Sullivan also studied effects on the performance of subjects of sensitive and non-sensitive problem questions. The subjects were 144 Army ROTC cadets, randomly assigned to 24 ad hoc groups of 6 members each.

The problem question involved ways of improving the ROTC program. The dependent measures were (1) perceived group satisfaction level, (2) number of ideas withheld from the group, (3) quantity of ideas produced, and (4) a rating by consensual judgment of the "top-seven" ideas generated.

Sullivan (1978) concluded that the modified NGT outperformed the NGT groups on all measures, regardless of whether or not the question

was sensitive or nonsensitive. NGT groups also tended to perform better on a nonsensitive, rather than a sensitive question. NGT groups also withheld three times more ideas than did the modified NGT.

Sullivan suggests that more meaningful results might occur from more "realistic" experiments which used existing groups rather than ad hoc decision groups.

Salasin, Bregman, Entingh, and Thackston (1981) compared NGT and Delphi processes on a problem of determining needed mental health services of children and determining major obstacles to development of these services. Subjects were experts in the mental health field. Forty-six grantees were assigned to NGT groups; the remaining 96 experts were assigned to Delphi groups.

Qualitative measures of the number of suggestions generated and the priority order of the suggestions revealed that although all Delphi suggestions were made by NGT subjects also, Delphi produced more unique suggestions which were not generated by NGT.

Quantative measures of output and cost revealed that Delphi produced more information on more topics, but the overall cost of NGT, \$9,300, was considerably less than the cost of Delphi at \$88,000.

Participant evaluations of satisfaction with the groups' outcomes indicate both groups produced satisfactory suggestions, but Delphi participants felt their results were more useful because of the greater detail of their suggestions. Measures of participant satisfaction with the process produced several significant differences (1981:101-104):

1. effectiveness of the process was rated by both groups as good

to excellent.

2. efficiency of the process was rated between acceptable and good by Delphi participants, but below acceptable by the NGT groups;

3. freedom to express ideas was found to be significantly higher for delphi subjects;

4. freedom from conflict of personalities revealed NGT to be acceptable and Delphi at 4.3 to be better than good; (Delphi subjects do not meet face to face)

5. reaching closure rated NGT as poor, but Delphi at 3.4, better than acceptable;

6. quality of result was acceptable for both groups.

The participants and researchers found problems with the aggregation of suggestions, as well as with the voting procedures of NGT. Both formats experienced withholding of items that participants felt to be someone else's domain of expertise.

The researchers concluded that both processes had certain advantages, and that choice of format should be based on program needs. They also suggest modifying NGT to narrow the scope of a meeting and to provide time for unstructured discussion of the topic to obtain more specificity; this should increase participant satisfaction.

Salasin et al. concluded that Delphi is an extremely useful technique when large numbers of participants must be involved, when experts with differing views must be involved, and when detailed information is needed about a topic. They also concluded that the cost of the meetings is directly related to the amount of information obtained. They suggest



that narrowing the number of topics for NGT, through initial priority setting, would allow more resources to be directed toward collecting information about a few priority topics. The suitability of the NGT approach would depend upon the extent to which priorities could be identified without simultaneous collection and synthesis of information. Several NGT meetings might be held with interventions in-between, for far less cost than one Delphi process.

Stephenson and Franklin (1981) conducted a field study comparing NGT and interacting processes, in the development of a state-wide solar energy plan. The forty-three subjects were representatives of groups who would affect or be affected by this development. Subjects were asked to compare the solar energy experience, which utilized the NGT format, with their previous experiences with traditional, interacting problem solving groups. Questionnaire results were analyzed; participants evaluated NGT superior to traditional, interacting groups in (1) quantity of ideas, (2) quality of ideas, (3) efficiency of group process, (4) equality of participation, and (5) overall sense of accomplishment.

One problem with describing or utilizing the study and its conclusions is that the study is poorly described by the authors. They indicate, for example, that the experiment encountered some problems; the most serious of which involved the training of NGT group leaders. Apparently leaders were not sufficiently trained and comfortable with the process, but this is not specifically stated, only implied. They also suggest a need in complex problem situations to provide technical

training in the subject matter for participants who lack technical competency; they suggest this might increase the effectiveness of the process.

The authors also recommend that NGT should be applied in "iterations" when multiple levels of idea specificity are involved; no rationale is offered from the study. Similar recommendations had been previously made by Delbecq et al. (1975) in their guidelines for using the NGT format.

Erffmeyer (1981) compared interacting, consensus, NGT and Delphi groups on two dimensions of effective decisionmaking, quality and acceptance.

This study utilized a ranking task, the NASA "Lost on the Moon" exercise developed by Hall and Watson (1970), for which a best ranking has been developed by experts from NASA at Houston, Texas. Acceptance was measured by a perceived satisfaction and perceived influence questionnaire and a behavioral acceptance score.

Erffmeyer concluded that Delphi groups produced significantly higher quality decisions than interacting groups. The consensus groups fostered the greatest self-reported acceptance, with interacting and NGT groups second. Erffmeyer proposed this study, in part, to examine the four formats, unencumbered by idiosyncratic modifications of each process which occur in a large percentage of other comparative studies. Unfortunately, the NGT format used was a modification developed by Nemiroff et al. (1976) and not the format of the originators, Delbecq et al. (1975).

This study supports the findings of Nemiroff et al. (1976) that no difference exists between nominal and interacting groups on measures of decision quality. These results are contrary to the findings of Gustafson et al. (1973), Herbert and Yost (1979).

Erffmeyer suggests that remaining process losses in NGT such as conformance due to the extensive structuring and frustration from limited interaction, may work to deter the effectiveness of NGT. He also suggests NGT reveals group members who have limited knowledge of the task, which may ultimately reduce participation or discredit contributions of less competent members by others in the group (1981:81). He further contends that NGT may be more appropriate in idea generation situations.

Hazard (1983) compared NGT and traditional, interacting processes to determine greater decision effectiveness, as measured by the "degree to which a group's accomplishment of assigned tasks conformed to the standards inferred from a given policy statement and exhibited consistency with the research findings appropriate to the assigned problem". The study was undertaken to help correct the lack of existing experimentation to determine the appropriateness of NGT for the evaluation phase of the decisionmaking process. The subjects were undergraduate management students randomly assigned to either interacting control teams of five members each or three NGT experimental teams of five members each. All teams were assigned the problem of recommending a teacher evaluation system to a hypothetical school board.

A mean overall score proved the hypothesis that there was a significant increase in effectiveness for groups using NGT over those using

traditional methods. This study supports the findings of Nemiroff et al. (1976) that no difference exists between nominal and interacting groups on measures of decision quality. These results are contrary to the findings of Gustafson et al. (1973), Herbert and Yost (1978).

## CHAPTER III

### RESEARCH DESIGN AND METHODOLOGY

The purpose of this study was to determine the reliability of a modified group problem solving process, MNGT. The study was a field experiment comparing NGT and MNGT groups in terms of (1) the perceived satisfaction of participants with the processes and outcomes and (2) the similarity of ideas generated by both groups. This chapter describes the research design as well as details of the methods and procedures used in collecting and analyzing the data.

#### Population

The subjects of this study were the 42 members of the teaching staff of one elementary school in a large school division in Virginia. All 42 teachers were invited to participate; 36 accepted. To compensate for planning time lost by teachers while participating in the study, administrators offered compensatory time.

#### Design

This study is a post-test only control group design utilizing two group process formats: NGT (control) and MNGT (experiment). The NGT format was expected to last one hour of one day in order to complete the task. The NGT format was modified, MNGT, as described earlier, so that one half of the process would be completed in one half hour on the

first day, and one half hour on the second day. Teachers were randomly assigned to one of the formats and then randomly assigned to one of three subgroups within each format: NGT - I, II, III, and MNGT - I, II, III. Each format, therefore, contained 17 subjects, and each subgroup contained 5 to 7 subjects.

Leaders for the subgroups were active participants within their groups and were selected by the principal of the school after the randomized formation of the groups. Leader selection was based upon qualities recommended by Delbecq, Van de Ven and Gustafson (1975): ability to understand the process, possession of self confidence to lead the group through the necessary steps, and acceptance by others as having legitimacy in the position.

The leaders of both groups were given one hour of training on how to conduct their meetings and were given written instructions to review over a two day period. (See Appendix A). On the fourth day the leaders were given the opportunity to ask questions about, and review their understandings of their roles and the process. Leaders of MNGT were reminded again of the specific changes in their formats by written instructions on the covers of their MNGT leader folders.

#### The NGT and MNGT Problem Question

Teachers in both groups were asked to individually respond to the following question: "What are the job-related conditions which, as an elementary school teacher, you find to be distressing?" They were then asked to arrive at a group decision through NGT and MNGT processes which would provide the five most stressful conditions for their subgroups.

The question selected is one which appears to be of great concern to teachers, and which was presented to the faculty as an opportunity for generating changes in stressful conditions which might exist within the school. Secondly, the administration supported the use of the question because of a recent school evaluation in which this faculty was judged to be lacking in enthusiasm. The principal had received instructions to do something about the problem. The teacher-stressor question approaches the problem of enthusiasm by the "backdoor", utilizing an established method known as the Gordon Technique, in which a topic similar or related to the actual problem is selected so that generated ideas can be applied to the real problem (Burton, Pathek, and Burton, 1978). It was felt that use of this technique might minimize possible resentment which teachers might feel if asked why they seemed unenthusiastic.

Another reason for the selection of this specific question was that it had been utilized earlier by researchers in an informal modification of NGT (Johnson and Richards, 1983) and had been found to take approximately one hour to complete the process.

Finally, the exact wording of the question utilized in the Johnson and Richards (1983) study of teacher stress was retained in this study for future exploratory comparisons of the resultant stressors.

#### Methods and Procedures

The procedure for this study began with permission being obtained from officials of the school division to conduct the experiment. Permission was then obtained from the principal of the elementary school

staff that was to be studied.

Teachers' names on a faculty list were randomly assigned to NGT and MNGT groups and then randomly assigned to subgroups. The principal selected leaders from within each group on the basis of pre-established criteria mentioned earlier. Leaders were given training in how to conduct the NGT and MNGT sessions and were presented with written instructions to review over the next two days. The leaders were also given the opportunity to ask questions and review procedures prior to the sessions. They had the opportunity to locate previously prepared meeting places in the cafetorium or classrooms.

Prior to beginning the sessions, leaders were also given necessary materials in folders. Materials included a duplicate of instruction sheets for conducting the sessions, sheets on which the teacher stress question was typed, a marking pen, masking tape, and 35 blank, 3 x 5 cards for individual voting, a model for rank order voting and (Appendix C), and a model talley sheet (Appendix D). Earlier, a flip chart had been set up for each leader at the group's site.

Shortly before the experiment was to begin, the principal called the faculty to a central meeting place and introduced the researcher and the purpose of the study. The researcher followed with statements concerning the importance of the study and the staff contributions, and with thanks for their willingness to participate.

Teachers were asked to report to their pre-assigned locations, and leaders checked off group members' names as they reported in. Leaders began the sessions according to instructions. (See Appendix B).



### The NGT Session

The NGT groups proceeded with the format prescribed in the Delbecq, Van de Ven, and Gustafson guidelines (1975) by welcoming the teachers and by describing the objectives and procedures. (See Appendix B). Each teacher was given a copy of the problem question sheet. After reading the stress question aloud, the leader instructed teachers to begin ten minutes of silent idea generation and to record ideas (stressors) on the sheet.

Following this phase, leaders proceeded through the next three phases: ideas being placed round-robin on the flip chart; serial discussion of items; and individual nominal voting.

### Nominal Voting

Teachers were asked to privately select the five most important stressors from the chart, write each item and its number on an index card and rank each item from 1 to 5, five being the most important. Leaders collected the cards, shuffled them, and recorded rankings next to each item on the flip chart. Generally, teachers could immediately see which items represented the group's thinking.

The leaders then explained to the group that the top five items from each group would be combined with those of the other groups on a list which they would receive the following day for evaluation; they would also be receiving a questionnaire on which they could voice their opinions concerning the process and its outcomes.

Finally, the leaders thanked the teacher participants for their cooperation and concluded the sessions. They recorded the time for the session, which was limited to approximately one hour.

After placing all materials in the group's folder, leaders turned the folders in to the researcher and spent a few minutes clarifying items which were not specific enough for clear understanding by a non-participant.

### The MNGT Session

Procedures for the MNCT groups were similar to NGT groups, except that the sessions spanned two days of one-half hour each. MNGT participants were told in advance of the sessions the amount of time required of them. Other specific differences included:

1. Upon completion of the second phase (round-robin listing), leaders dismissed the groups with thanks and reminded them to return on the following day at the appointed time. Teachers were also asked not to discuss the sessions or the ideas generated within their groups until the entire process was completed.

2. On the second day, the last two phases, serial discussion and voting, were also concluded within a half hour.

All other procedures were identical to those followed by the NGT groups.

### Procedural Problems

The experiment incurred several procedural problems, half of which were not incompatible with any typical school environment.

First, one NGT subgroup was pressed to complete its task in the originally allotted time because of an unexpectedly long introduction by the principal. Because the NGT experiment was scheduled for one hour before the students were due at the school, the lengthy introduction took several minutes from the experiment. The other two NGT subgroups

finished in less time than allotted.

Second, several teachers in the NGT groups became distracted by sounds of students in the hall outside of the cafetorium one half hour after the experiment began. They were concerned not only because of the distracting noise, but also because teachers assigned to this duty were in the meeting, and no provisions had been made by the administration to cover the supervision of students. On three occasions teachers slipped out of the groups to check on students.

Another problem encountered in this experiment is not unknown to group meetings of any format; despite training and cautions to group leaders, one leader of an NGT group was unable to completely control the enthusiasm of a teacher participant who continuously attempted to discuss items during the round-robin phase.

Finally, one item (low pay) which appeared in the "top 5" lists of two MNGT subgroups was inadvertently left off the final combined check list given to the teachers for evaluation.

#### Measurement Of Variables And Collection of Data

The effectiveness of MNGT was measured by a comparison between NGT and MNGT determined by:

1. the similarity of responses of the two groups as judged by (a) five independent judges and by (b) the frequency of checked items on the combined master list, judged to be valid stressors by the teachers utilizing each format.

2. the level of perceived satisfaction of groups for the results

of the process and with the process itself indicated by results on a questionnaire.

### Similarity of Responses

As a measurable determinant of loss or gain to a modification of an established group process, similarity of responses was selected as a dependent variable. Two measures of the variable were designed as "checks and balances" for evaluation of the "fuzzy concept" similarity: (1) a check list evaluation of the responses by the participants themselves, and (2) an evaluation performed independently by five impartial judges.

The six subgroups reported their group decisions of the five major stressors. NGT subgroups produced 15 major stressors; MNGT subgroups produced 16 major stressors (with two items tied for a 5th place).

All 31 items from the subgroups were combined by the researcher into one master check list of stressors. Duplicates were omitted, and as far as possible, items were categorized into natural classifications. (See Appendix E). These were (1) Lack of Administrative Communication or Organization, (2) Lack of Administrative Support, (3) Student Discipline, (4) Time Constraints, (5) Miscellaneous.

The remaining 22 items were printed on paper which was color coded by group format: yellow for NGT, white for MNGT participants. The list was distributed to all participants on the day following the group meetings, with instructions directing the teachers to put a check mark next to every item with which they agreed to be a major stressor to elementary teachers.

Similarity between the participants' responses of both group formats

was measured by applying chi-square to response frequencies for both NGT and MNGT groups.

Second, the 31 stressors were recorded individually on index cards, coded as NGT and MNGT format. Five judges were asked to sort from the two groups of cards those responses which appeared to be more similar than dissimilar. Unique responses were isolated and the items recorded. The percentages of unique items were then compared between groups.

### Perceived Group Satisfaction

Van de Ven (1974:26) supports the selection of perceived satisfaction as a criterion to measure the effectiveness of a decision making or problem solving method. Based upon his own studies, as well as the research of others, he states:

The greater the perceived level of satisfaction by participants with a decision making process and outcome, the greater the probability of solution adoption by the decision makers. (Van de Ven, 1974:26; citing also Bass, 1970; Clark, 1968; Utterback, 1971).

As discussed earlier in Chapter II, in most NGT studies, participants perceived a high degree of satisfaction with NGT process and outcomes. Satisfaction was therefore selected as a dependent measure to determine a change in this quality from the proposed modification of the technique (MNGT).

Participant satisfaction was measured in this study by having all participants complete a questionnaire. (See Appendix F). The five questionnaire items were adapted from Van de Ven (1974) and were rated by participants on a five-point scale, from 5-Excellent to 1-Unsatisfactory. Two of the items dealt with perceived satisfaction with the process or method; two of the items dealt with perceived satisfaction

with the outcomes of the task. The final items spans both measures of satisfaction, requiring participants to evaluate how satisfied they felt that their time was well spent in accomplishing the task. Van de Ven (1974) indicates that this item reflects attitudes toward two issues: whether the task was worthy of the time spent, and whether the process was an efficient way of accomplishing the task.

The following variables were treated both separately and in a total satisfaction measure:

1. Process Satisfaction

- a. Felt freedom to participate and express your ideas in writing
- b. Feeling that this process is an effective way to obtain teacher input in a group decision

2. Outcome Satisfaction

- a. Satisfaction with quality of stressors identified
- b. Satisfaction with quantity of stressors identified

3. Process/Outcome Satisfaction

Time was well spent to accomplish this task.

Individual responses to each item were averaged for NGT groups and MNGT groups to obtain a measure of the percent of members identifying each item. Likert type questions were asked of each individual concerning his/her satisfaction with the identification of a given item. Responses to these questions were averaged as a measure of group satisfaction. Comparisons were then made between the NGT satisfaction scores and the MNGT scores by applying a t-test with the level of significance set at .05.

### Other Data Collected

For further comparisons between NGT and MNGT groups, additional data were collected. Included on the perceived satisfaction questionnaire was space for subjective evaluation of the process and/or its results.

Data were also obtained from the school principal which included the age, the number of years of teaching experience, and the grade level or subject taught for each participant. The consideration that there might be significant differences in the responses of NGT and MNGT groups suggested a possible need to define the make up of these groups through this data.

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to determine the usefulness to school administrators of a modified NGT. This study compared a Modified Nominal Group Technique (MNGT) to the standard Nominal Group Technique as to (1) the similarity of ideas generated by both groups, and (2) the perceived satisfaction of both groups with the processes and their results. The assumption was made that both the NGT and the MNGT would yield comparable results on measures of similarity of responses and perceived satisfaction. This chapter presents and analyzes the data gathered to test this assumption. Also presented are the statistical data, summarizing the results of tests of significant differences between the two group formats. This experiment was a randomized post-test only control group design.

#### Similarity Of Responses

Each participant received a Teacher Stressor Combined List, (Appendix E), or check list containing the top five stressors from each of the six subgroups. Thirty-four completed check lists were returned by the teachers. Of the 31 stressors identified, 23 remained after exact duplicates were omitted. Twenty-two items were placed into five categories: A. Lack of Administrative Communication or Organization, B. Lack of Administrative Support, C. Student Discipline, D. Time Constraints,



E. Miscellaneous. A twenty-third item, "low pay", was inadvertently left off the list. Participants placed a check mark next to items they agreed were major stressors for teachers. Frequencies were obtained for each item for both NGT and MNGT groups (Table 1). Comparisons of both groups were made using a chi-square test for each category. As none of the five categories attained significance at the .05 level, the assumption that both NGT and MNGT would obtain similar responses was confirmed.

Supporting the assumption of similarity of responses were the assessments of five judges (Table 2), independently examining the groups' responses for unique items. The judges who were professional educators, were each given two stacks of 3 x 5 index cards, each card containing a stressor from the top-five list of each subgroup. Coded as NGT or MNGT in origin, the cards contained the 15 NGT stressors and the 16 MNGT stressors. Judges were asked to compare the items in the two stacks of stressors and remove those from each stack that were more similar than dissimilar. Items agreed upon by two or more of the five judges in this experiment were considered to be unique.

Of the 15 NGT stressors, one item was judged to be unique. Of the 16 MNGT stressors, three items were judged to be unique. NGT was judged to have produced 93% similar responses to MNGT. MNGT groups produced 81% similar responses to NGT.

#### Perceived Satisfaction

Each participant received a Group Process Evaluation questionnaire to evaluate his/her satisfaction or dissatisfaction with the group process and its results. (See Appendix F). Teachers were asked to rank their

Table 1

TEACHER STRESSOR COMBINED LIST  
CHI-SQUARE COMPARISON OF GROUPS

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Category A. Lack of Administrative Communication/Organization

Item	#1	#2	#3	#4	#5	Marg.
NGT 1	5	6	6	13	9	39
MNGT 2	11	10	14	15	11	61
Marginals	16	16	20	28	20	100

$$\chi^2 = 2.04$$

$$df = 4$$

No significance at the .05 level

---

Percentages for Category A

Item	#1	#2	#3	#4	#5
NGT	.29	.35	.35	.76	.53
MNGT	.65	.59	.82	.88	.65

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TABLE 1-Continued

Category B. Lack of Administrative Support			
Item	#6	#7	Marg.
NGT	10	8	18
MNGT	7	14	21
Marginals	17	22	39

$\chi^2 = 1.99$   
 df = 1  
 Significant only at the .20 level

Percentages for Category B

Item	#6	#7
NGT	.59	.48
MNGT	.41	.82

TABLE 1-Continued

Category C. Student Discipline				
Item	#8	#9	#10	Marg.
NGT	8	8	9	25
MNGT	15	16	10	41
Marginals	23	24	19	66

$\chi^2 = 1.03$   
 df = 2  
 No significance at the .05 level

Percentages for Category C

Item	#8	#9	#10
NGT	.47	.47	.53
MNGT	.88	.94	.59

TABLE 1-Continued

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Category D. Time Constraints

Item	#11	#12	#13	#14	#15	Marg.
NGT 1	14	14	12	15	10	65
MNGT 2	13	14	14	13	14	68
Marginals	27	28	26	28	24	133

$$\chi^2 = .91$$

$$df = 4$$

No significance at the .05 level

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Percentages for Category D

Item	#11	#12	#13	#14	#15
NGT	.82	.82	.71	.88	.59
MNGT	.76	.82	.82	.76	.82

TABLE 1-Continued

Category E. Miscellaneous								
Item	#16	#17	#18	#19	#20	#21	#22	Marg.
NGT 1	7	7	5	9	10	16	14	68
MNGT 2	8	12	9	11	8	14	14	76
Marginals	15	19	14	20	18	30	28	144

$\chi^2 = 2.25$   
 df = 6  
 No significance at the .05 level

Percentages of Category E

Item	#16	#17	#18	#19	#20	#21	#22
NGT	.41	.41	.29	.53	.59	.94	.82
MNGT	.47	.71	.53	.65	.47	.82	.82

TABLE 2  
UNIQUE ITEMS  
DETERMINED BY FIVE INDEPENDENT JUDGES

<u>JUDGE #1</u>	NGT	MNGT
1. ability grouping all day		1. not enough pay *2. red tape in special ed. 3. inflexible fellow teachers
<hr/>		
<u>JUDGE #2</u>		
1. ability grouping all day		1. not enough pay 2. inflexible fellow teachers *3. lack or lateness of materials
<hr/>		
<u>JUDGE #3</u>		
*1. insufficient planning time 2. time taken from first week		1. inflexible fellow teachers
<hr/>		
<u>JUDGE #4</u>		
1. time taken from first week		1. not enough pay 2. inflexible fellow teachers *3. parents have priority w/adm
<hr/>		
<u>JUDGE #5</u>		
		1. not enough pay 2. inflexible fellow teachers
<hr/>		
<u>*unique items</u>		
N = 15		N = 16
Unique = 1		Unique = 3
Similar Items = .93		Similar Items = .81

responses according to the following scale:

- 5 - Excellent
- 4 - Good
- 3 - Acceptable
- 2 - Poor
- 1 - Unsatisfactory

Mean scores and standard deviations (Table 3) were obtained for each item for NGT and MNGT. A t-test was applied to the means for statistical comparison (Table 4). No significant differences were found between groups on four items: items 1, 2, 3, and 5. Item 4, Satisfaction with Quality of Stressors Identified, was significant at the .05 level. The mean score for NGT ranked 3.73, or between acceptable and good; the mean score for MNGT ranked 4.44, or between good and excellent. Increased satisfaction with stressor quality was evidenced for the modified process. All other items scored between acceptable and excellent.

#### Additional Questionnaire Data

##### NGT Participant Comments

Six NGT participants chose to make additional comments on the process and its results. Two teachers indicated that the problem topic, stressors, put them in a "foul" mood for the remainder of the day. Three NGT participants noted approval of the stressors identified, but registered concern that the problems identified might not be addressed or solutions attempted. One participant voiced interest in repeating the process at another time during the school year to determine whether or not teachers were affected by different stressors at different times. One noted that



TABLE 3

GROUP PROCESS EVALUATION  
SATISFACTION QUESTIONNAIRE *t*-STATISTICS

	NGT (N=15)	MNGT (N=16)	<i>t</i>
Item #1. Felt Freedom	4.27	4.56	.79
Item #2. Time Well Spent	3.33	3.88	1.46
Item #3. Quantity of Stressors	3.73	4.00	.80
Item #4. Quality of Stressors	3.73	4.44	2.43 *
Item #5. Effective Process	4.00	4.50	1.67

\*Significant at the .05 level

Scale

5 = Excellent

4 = Good

3 = Acceptable

2 = Poor

1 = Unsatisfactory

the experience "made the end of the year bearable, with a chance to gripe". One experienced feelings of being pressed for time in the NGT format.

#### MNGT Participant Comments

Five MNGT participants elected to write comments on the questionnaire. One participant indicated that the process took too much time, which was needed for other things. Another MNGT subject registered the following concern: "I just wonder if all this work will be read by anyone who can change things. Will any stressors be eliminated?" Another teacher noted that he/she did not agree with the many comments concerning lack of administrative support and organization. One participant commented that he/she was an uninterested group member in the beginning of the experiment, but changed attitudes upon the discovery of so many items he/she shared in common with everyone else. Finally, one teacher noted that more time was needed during the process for "fine points".

#### Other Data Collected

Additional data was obtained from the records of the principal, including the teachers' ages, the number of years of teaching experience of each participant, and the grade level or specialty taught. Means were obtained for age and experience for each subgroup and for the total NGT and MNGT groups (Table 5). A t-test applied to the group means revealed no significant differences at the .05 level for either age or years of experience. The grade levels taught were evenly distributed in both groups (Table 6).

TABLE 5  
 DEMOGRAPHIC DATA  
 AGE AND EXPERIENCE

By Total Group	AGE	EXPERIENCE
NGT	38.1	13.1
MNGT	36.2	11.1
t	.34	.62
No significant differences at the .05 level for age or experience		
By Subgroups	AGE	EXPERIENCE
NGT Subgroups		
I	35.43	10.86
II	41.86	15.71
III	37.29	12.57
MNGT Subgroups		
I	37.43	12.14
II	38.71	12.29
III	32.43	8.71

TABLE 6  
GRADE LEVEL OR SPECIALIZATION

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Grade Level	NGT	MNGT
K	3	3
1	3	2
2	2	3
3	3	2
4	2	3
5	3	2
Reading	1	
Speech		1
Music		1
Learning Disabilities	1	1

Summary

Presented in this chapter were the results of statistical tests performed to evaluate the reliability of a modification to NGT. Only one satisfaction item out of five, Quality of Stressors, attained significance at the .05 level. The ranking of this item for NGT groups, however, was 3.75 or between acceptable and good; the MNGT mean was 4.44, between good and excellent.

No significant differences were shown on measures of similarity. These analyses confirmed the assumption of MNGT reliability compared to NGT on similarity of responses and perceived satisfaction.

## CHAPTER V

### CONCLUSIONS, DISCUSSION, RECOMMENDATIONS AND SUMMARY

Chapter V summarizes the intent of the study, the conclusions drawn from the study, and recommendations for MNGT application as well as for further study of the process.

#### Conclusions

This study was intended to identify a useful group process for school administrators who desire to make use of participatory decision making and organizational processes. The Nominal Group Technique was selected for this purpose because of its verified qualities of "maximum feasible participation" and non-threatening process. The NGT format is designed to overcome process losses, such as those resultant from participant inhibitions. Its structure and guidelines also permit those familiar with or trained in the format to frequently repeat its use with reliability.

The major problem confronting the school administrator who intends to make use of NGT, is the time limitations of many faculties. As noted earlier, NGT in its original design may take from one to four hours to complete. This study was undertaken to determine whether or not NGT could be made more useful to school administrators by being modified into two sessions on two successive days and still retain the reliability

of its original design. Measurement of the reliability of the MNGT was a comparison of NGT and MNGT in terms of the similarity of the responses generated by both groups and by the perceived satisfaction of the participants. The findings of this experiment led to the following conclusions:

1. MNGT was confirmed to be as reliable as NGT for information gathering and problem identification.

2. There were no statistically significant differences between NGT and MNGT groups in the similarity of responses each group produced.

3. Overall perceived satisfaction measures for both the processes and their outcomes yielded no statistically significant differences for NGT or MNGT participants.

4. Measures of perceived satisfaction with the NGT and MNGT processes yielded no statistically significant differences.

5. Measures of perceived satisfaction for the outcomes of the processes yielded a statistically significant higher mean score for the MNGT groups on one item, Quality of Stressors.

6. All five satisfaction measures produced mean scores between acceptable and excellent for both groups, MNGT ranking slightly higher than NGT for each item.

### Discussion

The findings of this study indicate that the NGT format can be divided into two brief sessions, one each on successive days, without violating the reliability of the original design. Consequently, the MNGT format can be considered useful to school administrators who

have limited time for faculty meetings.

The Nominal Group Technique was originally designed to overcome process losses of traditional, interacting groups; its structured, one-day format, based on prior research findings, had been experimentally tested and found to be superior to the most often used interacting format. Because many school administrators have access to teachers which is limited by contractual time, the usefulness of NGT to school administrators was limited to those who had access to their total faculties for one hour or more on any given day. For other school administrators an alternative form needed to be identified or designed. This was the intent of the modification designed for this study.

The designers of NGT, Delbecq et al. (1975), themselves, suggest the need for further study of NGT modifications to improve on their process and its utility. Unfortunately, as discussed in Chapter II, many of the earlier research designs are fraught with idiosyncratic modifications which claim to be NGT formats. Many of these studies are also poorly described. Several difficulties result from this sort of experimental research and its reporting. The researcher who attempts to study or to replicate the previous experiments has difficulty, and the conclusions, inappropriately applied to NGT from a modification, must be considered suspect. The present study compared one intentional modification to the original design.

Second, many of the previous experimental research studies were laboratory experiments utilizing ad hoc groups. Several researchers have recommended studies which utilized existing groups for results relevant to organizational use of the NGT process (Erffmeyer, 1981;



Sullivan, 1978; Van de Ven, 1974). Perceptions of satisfaction, acceptance of decisions, etc., might be questioned when the decision making body does not have to "live with" the results of the process. The participants in this study were an intact faculty who not only have to live with their own recommendations, but also with each other.

Third, several studies have recommended utilizing problem questions that were important to the participants, rather than a "Lost on the Moon" type of exercise (Nemiroff et al., 1976). The artificiality of these types of problems might have affected conclusions generated. The NGT problem question for this study, teacher stressors, produced deep emotional involvement in some participants, and, at the least, a high degree of interest and concern in most teachers for the outcomes of the processes.

In the above respects, the present study not only retained the integrity of the original NGT design as a control, but also tested a useful modification with existing, intact groups, using a question of importance to the participants. This study has "unmired" some of the problems or filled some of the voids of past research. This modification, MNGT, produced results relevant and useful to administrators seeking a group process for their organizations.

Although the assumption was made that NGT and MNGT groups would produce similar results, an obvious concern with modifying such a tightly designed process was that any intervention into, or modification of such a design might alter the results and therefore the reliability of the process. This might be especially true of an interruption in the continuity, such as an extended break of 24 hours between

two process phases. Such an interruption might obviously result in the participants' dissatisfaction with either the process or its results, or might prove so disruptive that participants' thought processes would produce altogether different responses. The present study produced no evidence that this was the case.

Only one measure of satisfaction, Quality of Stressors, reached statistical significance at the .05 level; it was in the direction of the MNGT, however, which would not have been predicted. The higher MNGT mean score may represent the increased time, overnight, for participants to evaluate the stressors generated on the first day. In this period of time, personal reflection might provide either more specific and accurate evaluations of the ideas generated, and/or greater acceptance of the vote outcomes. Either might therefore produce increased satisfaction. In light of the non-significant other satisfaction measures, it is also possible that this significance was due to chance.

It is also possible that participants' attitudes toward a modification which was intended to benefit them and which was confined to contract time, produced the increased satisfaction for the quality of the product. In fact, although not statistically significant, it must be noted that every other satisfaction item was ranked slightly higher by MNGT groups. While item 3, Quality of Stressors, was ranked between acceptable and good by NGT groups, MNGT groups ranked the item as good. Item 5, Effectiveness of the Process, was ranked good by NGT participants, but between good and excellent by MNGT participants. As noted above, these slight increases may represent a kind of Hawthorne

effect, pleasure expressed for concern exhibited.

As noted in Chapter IV, several participants wrote comments on the questionnaire, relative to satisfaction with the process and outcomes, which were generally positive. Concerns offered by a few were two-fold: (1) that the meetings took place in the mornings before the teaching of students began. Because teachers became involved in a sensitive, relevant question of importance to teachers, some reacted emotionally to what became a review of elements that produced symptoms of stress in them daily. They consequently began the teaching day with feelings of irritability or resentment, which concerned them greatly; (2) that their time and efforts in the meetings might not result in reduced numbers of stressors in reality. This was despite the principal's assurances that the information generated in the meetings would be acted upon by the administration. This confirms the importance of managerial support for group participation in problem solving found in so many group process studies and management texts. In light of the generally poor results of the widely-used interacting meetings; lack of productivity, lack of a sense of closure, etc., teachers' concerns in this study may reflect fears from past failures with group processes or with administrations.

Several additional comments were voiced to the principal, the subgroup leaders, and the researcher; two voiced repeatedly. One opinion was that participants were pleasantly surprised that both NGT and MNGT meetings turned out to be so enjoyable. The other was surprise that in both group sessions, some teachers participated who had never

spoken out before in a meeting. Both of these findings confirm claims made by the NGT format designers, and verified through past studies, of increased participation and satisfaction not found in interacting meetings.

Fortunately, this experiment incurred no major problems. One minor problem, mentioned earlier, re-emphasizes a recommendation by Delbecq et al. (1975), as well as a number of other researchers, that special care be taken to properly select and train group leaders for NGT. Although five group leaders in this study followed the process guidelines easily and well, the sixth experienced some difficulty with a participant who attempted to discuss items in the round-robin recording step, rather than waiting for step three, discussion. This leader expressed concern, indicating that she understood the process, but was unable to completely control the other teacher. The problem seems to be one of strength of personalities, rather than a training problem.

Another minor problem in this study may also have been one of leadership. The researcher had selected an NGT problem question which had taken approximately one hour to complete in a previous study (Johnson and Richards, 1983). One NGT subgroup reported being pressed to complete the process in that time, although the other two NGT sub-groups finished with time to spare. It is possible, although not probable, that this might have affected the process results or the perceived satisfaction. The subgroup leader may have allowed the group to bog down somewhat during the discussion step or failed to get the group started on time, but there were no apparent detrimental results.

Because NGT designers recommended that group leaders be active participants, groups were first randomly assigned, and then leaders from each group were selected by the school administrator. He had been given the Delbecq et al. (1975) criteria for leader selection and indicated that these were the bases for his selections. His leader selections each possessed the maximum number of leadership qualities within the group. Under these circumstances, it is possible that a leader may be over powered by another strong personality, and provisions must be made to minimize or compensate for the problem.

Overall, this experiment proceeded smoothly and the results appear useful to administrators. If group processes are to be selected for use, however, the types of input a principal might require must be considered. These might include: the status of faculty morale, the impact of procedures or programs on students and teachers, possible improvements to the curriculum, PTA concerns, student concerns, possibilities for parent involvement within the building.

Difficulties that arise in obtaining these kinds of information include the inhibitions which such a variety of participants might feel and the resultant unequal participation of group members, as well as other process characteristics such as too little structure, which allow early closure of a meeting without closure on the problem. Another concern is lack of satisfaction with the results of group meetings, which may lead to participants not supporting decisions based on those results.

The school administrator concerned with participatory decision-making within his/her school and aware of the difficulties inherent in

most group meetings has a powerful tool in NGT. As a result of this study, the principal who is further constrained by time and limited access to teachers, has available another powerful tool, MNGT. Although this study is limited to one elementary school, other school administrators, including secondary principals, should consider utilizing either the NGT or MNGT processes. Further, principals can use the processes when community and teacher groups must come together for consensus because the original intent of the design was to serve diverse groups in problem solving and information gathering (Delbecq et al., 1975). Just as NGT has been proven to be superior to interacting groups in previous research, MNGT has been confirmed to be as reliable as NGT in the present study.

#### Recommendations

As a result of the findings of this study, the following recommendations are made for utilizing NGT or MNGT:

1. That group leaders be selected from the faculty before the groups are randomly assigned, and that the leaders then be randomly assigned to the groups. This would allow a larger population from which to select the leaders, thus providing the most capable leadership.
2. That the use of NGT or MNGT with a sensitive or disturbing question for teachers be undertaken after the teaching day, if possible, so as not to disturb the emotional rapport between teachers and students.
3. That school administrators utilize NGT and MNGT to include teachers in goal setting, problem solving, decision making and infor-

mation gathering.

4. That school administrators utilize these processes for problem solving among themselves, other schools, and central administrators.

The following recommendations are made for future research:

1. That future studies of NGT and MNGT incorporate the modification by Sullivan<sup>\*</sup> (1978), in order to guarantee anonymity of participants and to decrease the possibility of withholding of ideas.

2. That the Gordon Technique<sup>\*\*</sup> be used with NGT and MNGT in situations in which the participants might be too sensitive to the "real" question, or in which other attempts at gathering the same information had failed.

3. That further efforts be made to modify NGT to maximize its usefulness; this should include further dividing the process steps and phases for use when even a full half hour is not possible for total participation.

4. That this study be repeated with secondary school teachers who may have even greater diversity among their ranks.

#### Summary

An assumption was tested that both NGT and MNGT would yield similar results with regard to participant satisfaction and similarity of responses to the question of identification of teacher stressors. The

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\* A modification "in which the verbalization of ideas is replaced by an anonymous written system utilizing 3 x 5 cards in an attempt to avoid the 'linking' of ideas with individuals" (Sullivan, 1978:vi).

\*\* A method for disguising the real purpose or problem for the group meeting, by substituting a similar or related problem, in an effort to overcome group inhibitors and encourage honesty and creativity.

results of this study confirm that the NGT format can be divided into two sessions of one half hour each, on two successive days, without violating the reliability of the original design or its effectiveness.

The value of both NGT and MNGT as group processes is that they provide a non-threatening means of obtaining maximum participation by all participants in the process. The MNGT format should be considered a useful and effective tool for school administrators who are interested in utilizing teacher input for problem solving and decision making, but who have limited access to teachers and limited time for group meetings during the contractual school day.



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## APPENDIX A

LEADERS' TRAINING GUIDE FOR CONDUCTING  
NGT AND MNGT MEETINGS

(Adapted from Delbecq et al., 1975)

LEADERS' RESPONSIBILITIES - PREPARATION FOR MEETINGS

On the day of the meeting you should check the following arrangements:

1. Locate your groups' station, identifiable by the group number on the table.
2. Check the table set-up for correct number of chairs in "U" shape around table.
3. Be sure the flip chart is on the wall at the open end of the "U".
4. Check your leader's folder for the following:
  - masking tape
  - nominal worksheets containing the problem question
  - felt pens
  - 3 x 5 cards for ranking
  - model ranking card
  - model talley sheet
  - dialogue and instructions for the meeting day

MEETING ORGANIZER'S RESPONSIBILITIES - INITIAL MEETING

The meeting organizer will perform the following tasks:

1. Welcoming statement
2. Statement of importance of NGT task
3. Clarification of importance of individuals contributions to

group

4. Statement of use of meeting's output

CONDUCTING THE NOMINAL GROUP PROCESS (Delbecq et al. 1975)

STEP 1. SILENT GENERATION OF IDEAS IN WRITING

Process:

Present the nominal question to the group in writing  
Verbally read the question  
Illustrate level of abstraction and scope desired with example  
which does not distort (lead) group responses  
Avoid other requests for clarification  
Charge the group to write ideas in brief phases or statements  
Ask group members to work silently and independently  
Model good group behavior  
Sanction disruption of the silent, independent activity by  
comments addressed to group as a whole.

Benefits:

Provides adequate time for thinking  
Facilitates hard work by the model of other group members  
reflecting and writing  
Avoids interrupting each other's thinking  
Avoids premature focusing on single ideas  
Eliminates dominance by high-status or aggressive members  
in idea generation  
Keeps the group problem-centered

STEP 2. ROUND-ROBIN RECORDING OF IDEAS ON A FLIP PAD

Process:

Provide clear instructions concerning the step:

Indicate objective of the step is to map the group's thinking  
Explain need to present ideas in brief words or phases  
Explain process of taking one idea serially from each member  
Explain group members must decide if items are duplicates  
Explain that an individual may "pass" when he has no further  
items, but may "reenter" later  
Express the desirability of hitchhiking and adding new  
ideas even if they are not on individual nominal worksheets  
Explain inappropriateness of discussion prior to completion  
of listing

Quick effective mechanical recording:

Record ideas as rapidly as possible  
Record ideas in the words used by group members  
Provide assistance in abbreviating only in special situations  
Make the entire list visible by tearing off completed sheets  
and taping them on an area visible to all group members

Sanction group as a whole if individuals engage in side conversations  
or attempt to discuss items prior to completing the listing

**Benefits:**

- Equalizes opportunity to present ideas
- Assists in separating ideas from personalities
- Provides a written record and guide:
  - Increases group's ability to deal with a larger number of ideas
  - Avoids loss of ideas
  - Confronts the group with an array of clues
  - Encourages hitchhiking
- Places conflicting ideas comfortably in front of group
- Forces the group to fully explore the problem.

**STEP 3. SERIAL DISCUSSION FOR CLARIFICATION****Process:**

- Verbally define the meaning of items
  - To clarify the meaning of items
  - To explain reasons for agreement or disagreement
- Indicate the final judgments will be expressed by voting so arguments are unnecessary
- Pace the group so that all ideas receive sufficient time for clarification
- Avoid forcing the member who originally lists the idea to be solely responsible for clarifying the item

**Benefits:**

- Avoids having discussion focus unduly on any particular idea or subset of ideas
- Helps eliminate misunderstanding
- Provides opportunity to express the logic behind items
- Allows members to disagree without undue argumentation

**STEP 4. VOTE ON ITEM IMPORTANCE****Process:**

- Ask the group to select from the entire list a specific number (5) of priority (important) items:
  - Place each priority item on a 3 x 5 card or rating form
  - Rank-order or rate the selected priority items
- Collect the cards or rating forms and shuffle them to retain anonymity
- Tally the vote and record the results on the flip chart in front of the group

**Benefits:**

- Obtaining independent judgments in writing helps eliminate social pressures
- Expressing judgments mathematically by ranking-ordering or rating increases accuracy of judgments
- Displaying the array of individual votes clearly highlights areas needing further clarification or discussion

## APPENDIX B

INSTRUCTIONS TO GROUP LEADERS FOR CONDUCTING  
NGT AND MNGT MEETINGS

(Adapted from Delbecq et al., 1975)

MEETING DAY REMINDERS

Please review all instructions carefully!

Your role as a group leader is to ensure strict adherence to NGT procedures.

## Reminders:

Don't:

- criticize ideas
- permit arguments
- ask the initiator of an idea to explain it
- change wording of participant's idea
- encourage compromises

Do:

- keep the process moving
- write legibly on flip chart
- stop side conversations between members
- stop discussion during round-robin listing

First: Welcome the individuals to the groupSecond: Describe briefly the 4 steps in the process:

1. silent writing of ideas by each individual
2. round-robin listing of ideas on flip chart
3. brief discussion
4. secret, ranked vote

State further explanation will be provided as needed

Third: Proceed with the leader's Guide, Step One of Conducting The NGT and MNGT Meetings.

## CONDUCTING THE NGT AND MNGT MEETINGS

## STEP 1. SILENT GENERATION OF IDEAS IN WRITING

"Would each of you look carefully at the question at the top of the worksheet which I am going to hand out?

## PASS OUT WORKSHEETS

"You will notice that the question which is the focus of our meeting is the following: What are the job-related conditions which, as an elementary school teacher, you find to be distressing?"

"I would like each of you to take ten minutes to list your ideas in response to this question, in a brief phrase or a few words, on the worksheet in front of you. Please work independently of the other members in identifying job-related conditions which you find distressing. During this period of independent thinking, I ask that you not talk to other members, interrupt their thinking, or look at their worksheets. Since this is an opportunity for each of us to prepare his or her contributions to the meeting, I would appreciate intense effort during the next ten minutes. At the end of ten minutes, I will call time and suggest how we can proceed to share our ideas. Are there any questions? ...Let's proceed then with our individual effort for the next ten minutes."

## LEADERS BEGINS TO WORK ON OWN LIST

## Guidelines for Serving as Leader in Step 1:

1. Resist non-process clarifications
2. Model good group behavior by writing in silence
3. Sanction individuals who disrupt the silent, independent activity

## CALL TIME AFTER EXACTLY TEN MINUTES

## STEP 2. ROUND-ROBIN RECORDING OF IDEAS ON A FLIP CHART

"During the last ten minutes, each of us has used his/her worksheets to list job-related conditions which we find to be distressful. Now I would like to have each of you share your ideas with the group."

"This is an important step because our list of ideas will constitute a guide for further discussion, help us understand the richness of ideas we have to work with, and stimulate additional ideas."

"In order to accomplish this goal as quickly and efficiently as possible, I am going to go around the table and ask individuals one at a time to give me one idea from their worksheets, summarized in a brief phrase or a few words. After the entire list is on the chart, we will have the opportunity to discuss, clarify and dispute the ideas. If someone else in the group lists an idea which you also had on your worksheet, you need not repeat the idea. If, however, in your judgment the idea on your worksheet contains a different emphasis or variation, we would welcome the idea. Variations on a theme are important and will help us be creative."

LEADER TURNS TO FIRST PERSON: "Mrs. Smith, would you give me one idea from your list?.... LEADER LISTS EACH IDEA ON A FLIP CHART

## Guidelines for Step 2:

1. Ideas are to be taken serially
2. Each idea is to be numbered
3. Record ideas in the words used by the group member
4. Keep entire list visible to group by tearing completed sheets from the flip chart and taping them on the wall
5. Omit duplicate items
6. Variations on ideas are desirable
7. Sanction inappropriate group behavior; do not permit discussion of ideas or side conversations

CALL TIME AFTER EVERY INDIVIDUAL HAS EXHAUSTED HIS/HER LIST OR A  
 MAXIMUM OF TWENTY MINUTES HAS PASSED.

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NOTE: At the conclusion of Step 2., MNGT leaders will conclude their meeting by thanking participants and reminding them to return at the appointed time on the following day.  
 NGT leaders will continue with Step 3 immediately.

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### STEP 3. SERIAL DISCUSSION FOR CLARIFICATION

"Now that we have listed our ideas on the flip chart, I want to take time to go back and briefly discuss each idea."

"The purpose of this discussion is to clarify the meaning of each item on our flip chart. It is also our opportunity to express our understanding of the logic behind the idea, and the relative importance of the item. We should feel free to express varying points of view or to disagree."

"We will, however, want to pace ourselves so that each of the items on the chart receives the opportunity for some attention, so I may sometimes ask the group to move on to further items."

"Finally, let me point out that the author of the item need not feel obliged to clarify or explain an item. Any member of the group can play that role."

LEADER GOES TO FLIP CHART AND POINTS TO ITEM ONE

"Are there any questions or comments group members would like to make about item one?"

Guidelines for Step 3:

1. Define the role of this step as clarification
2. Pace the group in order to avoid undue arguments or neglect of some items at the expense of others
3. Individuals should not be asked to clarify their own items. Although

most of the time individuals will volunteer to clarify their own items, the precedent should be established that clarification is a group task.

#### STEP 4. VOTE ON ITEM IMPORTANCE

"We have completed our discussion of the entire list of ideas, have clarified the meaning of each idea, and have discussed the areas of agreement and disagreement. At this time, I would like to have the judgment of each group member concerning the most important ideas on the list."

"To accomplish this step, will each of you take five 3 x 5 index cards?"

LEADER HANDS SET OF INDEX CARDS TO PARTICIPANTS AT TABLE

"I would like you to select the five most important items from our entire list of items. This will require careful thought and effort on your part."

"As you look at the flip chart and find an item which you feel is important, please record the item on the index card."

LEADER GOES TO FLIP CHART AND DRAWS AN INDEX CARD, USING THE MODEL GIVEN IN THE FOLDER

"Please place the number of the item in the upper left-hand corner of the card. For example, if you feel item 13 is important, you would write 13 in the upper left-hand corner.

LEADER WRITES 13 IN UPPER LEFT-HAND CORNER OF THE CARD HE/SHE HAS DRAWN ON THE FLIP CHART

"Now write the identifying words or phrases on the card."

LEADER WRITES THE PHRASE FROM ITEM 13 ON THE CARD



"Do this for each of the five most important items from our master list. When you have completed this task, you should have five cards, each with a separate phrase written on the card, and with identifying numbers using the numbering system from our list of ideas on the flip chart."

"Do not rank order the cards yet. Spend the next few minutes carefully selecting the five cards. We will all rank order the cards together. Are there any question?"

LEADER PROCEEDS TO SELECT FIVE PRIORITY CARDS. WHEN EACH OF THE GROUP HAS SELECTED FIVE ITEMS AND WRITTEN THEM ON SEPARATE CARDS, THE LEADER PROCEEDS AS FOLLOWS:

"Please spread out your cards in front of you so you can see all five at once. Looking at your set of five cards, decide which one card is the most important. Which card is more important than the other four cards?"

LEADER GIVES GROUP AN OPPORTUNITY TO STUDY THEIR CARDS

"Please write a number 5 in the lower right-hand corner of the card and underline the number three times."

"Turn that card over and look at the remaining four cards. Of the remaining four cards, which is the least important? Write the number 1 in the lower right-hand corner and underline that number three times."

"From the remaining three cards, choose the most important item and number it with a 4. Write the number in the lower right-hand corner of the card and underline it three times."

"Of the remaining two cards, choose the card that is least important and write the number 2 in the lower right-hand corner. Underline

it three times. Write the number 3 on the last card and underline it <sup>7</sup> three times."

AFTER GIVING THE GROUP TIME TO RE-EXAMINE THE CARDS, THE LEADER REQUESTS THAT THE CARDS BE TURNED IN TO HIM/HER. LEADER SHUFFLES THE CARDS TO PRESERVE ANONYMITY SO THAT NO INDIVIDUAL MEMBER'S VOTING PATTERN CAN BE IDENTIFIED. LEADER THEN MAKES A BALLOT SHEET ON A FLIP CHART, NUMBERING THE LEFT-HAND SIDE OF THE SHEET IN ACCORDANCE WITH THE NUMBER OF ITEMS FROM THE ROUND-ROBIN LISTING. A MODEL IS INCLUDED IN THE FOLDER. A MEMBER OF THE GROUP IS ASKED TO READ THE ITEM NUMBER AND THE RANK NUMBER FROM THE STACK OF VOTING CARDS. THE ITEM IS GIVEN FIRST AND THEN THE RANK. THE LEADER MAY THEN INDICATE TO THE GROUP THOSE ITEMS ON THE LEFT WHICH HAVE THE HIGHEST RANKING FOR THAT GROUP. THE LEADER REMINDS THE PARTICIPANTS THAT THE TOP FIVE STRESSORS FROM EACH GROUP WILL BE COMBINED INTO ONE CHECK LIST FOR THEM TO REVIEW AND APPROVE ON THE FOLLOWING DAY, ASKING PARTICIPANTS TO RETURN BOTH THE CHECK LIST AND THE ACCOMPANYING EVALUATION PROMPTLY.

**Final Steps:**

1. Collect all remaining materials and return them to the researcher
2. Clarify any items in question to researcher

APPENDIX C

MODEL CARD FOR RANK ORDER VOTING

5      Number from original group  
         flip chart list

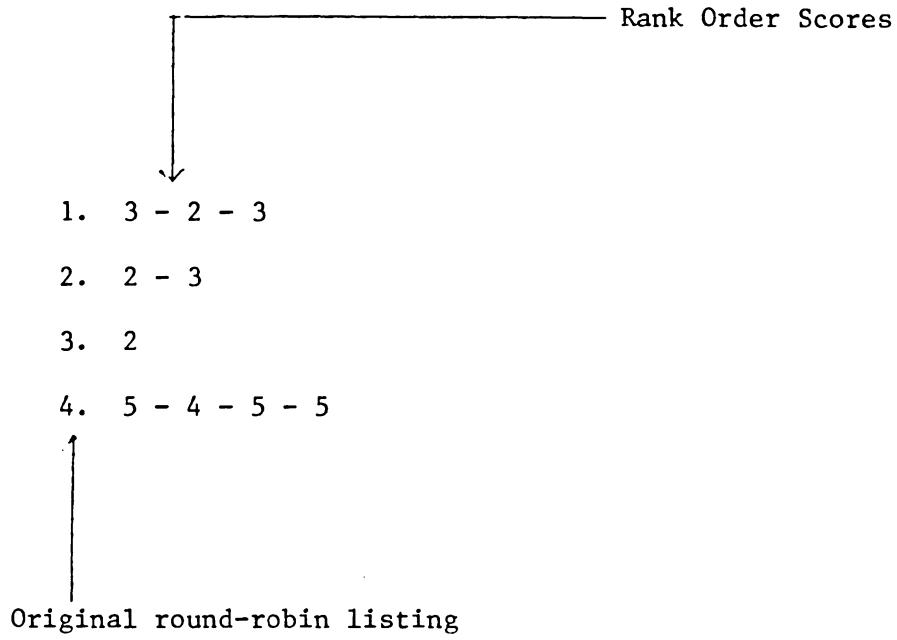
Lack of specialization

2      number indicating  
\_\_\_\_\_ rank-order  
\_\_\_\_\_  
\_\_\_\_\_

APPENDIX D

MODEL TALLEY SHEET

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## APPENDIX E

## TEACHER STRESSOR COMBINED LIST

Please check every item on this aggregated list which you agree is a major stressor for teachers in your school, regardless of whether or not the item appeared on your original group list.

Lack of Administrative Communication or Organization

- \_\_\_ 1. Lack of direction from administration
- \_\_\_ 2. Lack of communication with various grade levels
- \_\_\_ 3. Lack of communication with teachers when overturning teachers' decisions
- \_\_\_ 4. Lack of administrative organization and planning: schedule changes, unexpected deadlines, changing homerooms
- \_\_\_ 5. Administrative decisions without approval of teachers concerned

Lack of Administrative Support

- \_\_\_ 6. Lack of support (back-up) with student discipline
- \_\_\_ 7. Parents have priority with administration over teachers

Student Discipline

- \_\_\_ 8. Disruptive students
- \_\_\_ 9. Lack of respect from students for teachers
- \_\_\_ 10. Administration not available to discipline students

Time Constraints

- \_\_\_ 11. Insufficient planning time during school day
- \_\_\_ 12. Excessive clerical work
- \_\_\_ 13. Excessive time spent at home on paper work
- \_\_\_ 14. Excessive time taken from teaching to meet deadlines, filling out forms, etc.
- \_\_\_ 15. Time taken from first week of school for in-service programs

Miscellaneous

- \_\_\_ 16. Inflexible fellow teachers
- \_\_\_ 17. Red tape necessary for special education students
- \_\_\_ 18. Lack of communication between grade levels
- \_\_\_ 19. Lack of or lateness of instructional materials
- \_\_\_ 20. Students ability grouped all day (unrealistic)
- \_\_\_ 21. Lunch duty
- \_\_\_ 22. Bus duty

## APPENDIX F

## GROUP PROCESS EVALUATION

Please evaluate the degree of your satisfaction or dissatisfaction with the group process and its results by ranking your responses on the following 5 point scale:

- 5 Excellent
- 4 Good
- 3 Acceptable
- 2 Poor
- 1 Unsatisfactory

- \_\_\_ 1. Felt freedom to participate and express your ideas in the meeting
- \_\_\_ 2. Time was well spent to accomplish this task
- \_\_\_ 3. Satisfaction with quantity of stressors identified
- \_\_\_ 4. Satisfaction with quality of stressors identified
- \_\_\_ 5. Feeling that this process is an effective way to obtain teacher input in a group decision

Please feel free to comment on the effectiveness of this process or the quality of the results obtained by the groups \_\_\_\_\_

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When you have completed this questionnaire, please seal it in the attached envelope and give it to \_\_\_\_\_. Do not put your name on any of the forms or the envelope.

Again, my thanks for all your assistance. Hopefully we will contribute to a body of knowledge that will assist both teachers and administrators in a very taxing role. I truly appreciate the time and effort you gave.

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