CONCEPT PAPER

TITLE:
THE EFFECTS OF DIFFERENT GROUP REWARD SYSTEMS

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PROJECT DURATION:
THREE YEARS
JUNE 1, 1991 - MAY 30, 1994

ESTIMATED COST FOR 3 YEARS:
APPROXIMATELY $300,000
1. ABSTRACT OF PROPOSAL

This proposal envisages a program of theoretical and empirical studies which would focus on identifying the conditions under which individual and group performance are fostered more by a system of distributing rewards to group members based on a "contribution" principle as opposed to an "equality" principle. Although the primary emphasis in the research would be on the effects of the different distributive principles upon performance, we would also be interested in their effects upon a variety of other dependent variables such as: level of aspiration regarding performance, task attitudes, attitudes toward other group members, self-attitudes, and desire to remain a member of the group.

The basic theoretical idea which would guide our initial research is that the "equality" distribution principle is likely to be the most effective in "solidarity-oriented" groups, while the "contribution principle" is apt to be the most effective in "economically-oriented" groups. Any conditions which interfere with the development of group solidarity or which foster impersonal relations among a group's members will make the "equality" as compared to the "contribution" principle relatively less effective. Thus, one could expect that the "equality" principle will become relatively less effective as the size of the group increases, as the anonymity of its members increases, as the heterogeneity of its membership increases, as group cohesion decreases, as opportunities for contact and communication among members decreases, and so on.

In the proposed program of research, in addition to studying the effect upon group performance of the "fit" between the group's orientation and the distribution principle, we would also systematically investigate the effects of several other relevant independent variables: the type of group task, the kind of "good" or "harm" being distributed, the distributive preferences, and abilities and work motivation of the group members. Our objective is to develop a deep theoretical understanding of the conditions which lead one group reward system to be more effective than another in promoting group performance.

Key Words: Group Performance, Distributive Justice, Equality, Contribution, Merit, Reward System, Solidarity-Orientation, Economic-Orientation, Task Structure
II. PROPOSAL

A. Abbreviated Objective and Relevance to Army Needs

The objective of the proposed research is to develop scientific knowledge about the conditions under which different types of group reward systems will foster group productivity. There has been abundant speculation about how various ways of distributing rewards within a group will affect individual and group productivity, but there has been surprisingly little systematic research concerning the conditions which influence the applicability and effectiveness of such widely discussed principles of distribution as: "rewarding group members in proportion to their contribution to the group" (the contribution principle) or "rewarding members so that all get equal shares" (the equality principle).

The small amount of relevant, existing research challenges widely-held assumptions about the universal effectiveness of the contribution principle in enhancing individual and group performance. However, this research has done little to help to identify the conditions under which the contribution principle will be relatively more effective in promoting group productivity, group cohesion, and self-esteem than the equality principle (or vice versa). It seems evident on a priori grounds, as well as on the basis of everyday experience, that each distributive principle is apt to be suitable under some group circumstances but not others.

Like most complex organizations, the army is composed of many small groups. The functioning of these groups is undoubtedly very much influenced by how things which are valued -- money, recognition, status, information, resources, etc. -- are distributed within these groups. Development of scientific knowledge about the conditions which make it appropriate to employ one rather than another principle for distributing rewards within a group will lead to greater understanding of how to enhance the productivity, the cohesion, and well-being of the many groups of which the army consists.

B. Background Information

1. General

Possibly the earliest research in this area was the study I published in 1949 (Deutsch 1949a, b) on the effects of cooperation and competition upon group processes. In this study, groups that operated under the equality principle (the cooperative groups) were compared with groups that operated under a competitive form of the contribution principle (the competitive groups). The groups worked on two different types of tasks, intellectual
puzzles and human relations decision-making problems. The groups that operated under the equality principle were not only more productive, they also developed friendlier interpersonal relations and felt more esteemed and more self-confident as compared to those in the groups that functioned under the competitive contribution principle.

Since my 1949 study of cooperation and competition, many hundreds of related studies have been conducted. Researchers have investigated individualistic as well as cooperative and competitive groups; they have studied cooperative and competitive relations between groups as well as within groups; they have conducted research in classrooms and in work settings as well as in the laboratory; they have studied groups whose compositions were homogeneous and groups that were composed of individuals of diverse ability, or of diverse racial and ethnic background, or of people who were physically disabled and not disabled. David Johnson and his colleagues have been the leading researchers in this area and have presented integrative summaries of the research that has been conducted during the past thirty-five years (see Johnson and Johnson, 1983, for such a summary and for references to their research).

Johnson, Maruyama, Johnson, Nelson, and Skon (1981) report a statistical analysis of all available and relevant studies conducted in North America (122 were found) containing achievement or performance data that compared two or more of the four goal structures: cooperation, cooperation with intergroup competition, interpersonal competition, and individualistic effort. From their analysis of the 122 studies they conclude:

1. Cooperation is superior to competition or individualistic efforts in promoting achievement and productivity. These results hold for all subject areas (language arts, reading, math, science, social studies, psychology, and physical education), for all age groups, and for all such diverse tasks as concept attainment, verbal problem solving, categorizing, spatial problem solving, and retention and memory. For rote-coding and correcting tasks, no differences were obtained for the three types of groups.

2. There is no significant difference between interpersonal competitive and individualistic goal structures on achievement and productivity.

3. The results also suggest but do not consistently support the proposition that cooperation without intergroup competition promotes higher achievement than cooperation with intergroup competition.

Johnson, Johnson, and Maruyama (1983) have also done a statistical analysis of all existing research (98 studies) conducted between 1944 and 1982 on the relative impact of cooperative, competitive, and individualistic learning experiences on interpersonal attraction among homogeneous and heterogeneous samples of students. The results of their statistical analysis provide strong support for the proposition that cooperative experiences, compared with competitive or individualistic ones, promote greater interpersonal attraction with-
in groups of homogenous students, within groups composed of students from
different ethnic groups, and within groups composed of physically disabled and
non-disabled students.

However, in interpreting the results it is important to keep in mind that
my theory of cooperation and competition (Deutsch, 1949) explicitly and most
of the research settings implicitly involve individual accountability in the
context of cooperative incentives. As Slavin (1983) has pointed out, in his
review of research on cooperative learning and student achievement, individual
accountability is a necessary but not sufficient ingredient for effective
individual learning in cooperative contexts employing group rewards. He
states, "The best learning efforts of every member of the group must be
necessary for the group to succeed, and the performance of each group member
must be clearly visible and quantifiable to the other group members" (p. 441).

Without individual accountability, as Latane and his coworkers (Latane,
Williams, and Harkins, 1979, 1980) have demonstrated, "social loafing" and the
"free rider" effect may occur. That is, when cooperation entails a cost or a
pleasure foregone or postponed, less conscientious individuals (when their
efforts cannot be observed) may shirk their cooperative responsibilities.
However, on theoretical grounds as well as on the basis of research evidence,
there is reason to believe that one of the consequences of successful coopera-
tion is the induction of a heightened sense of responsibility toward one's
fellow group members. If this is the case, one might speculate that the
repeated experience of successful cooperation will reduce the need for expli-
cit individual accountability; the induced individual conscientiousness will
inhibit social loafing. Considerable more research is needed to identify the
conditions that foster the sense of responsibility to others and deter free
riding, when social loafing is difficult or impossible to detect.

In addition to the issue of accountability, it seems that most of the
existing research in this area implicitly assumes that the social context, the
group task, the type of reward available for distribution, and other circum-
stances in which the groups find themselves as they are operating under the
equality distribution principle are such as to foster or, at a minimum, not
inhibit the development of positive-emotional, solidarity relations. This
assumption, of course, avoids the critical questions: What are the conditions
which are most suitable for the application of the equality principle and what
are the conditions most suitable for the application of the contribution
principle? So far as I can tell from my survey of the literature (see
Deutsch, 1985) little good research has been done on these questions.

2. Own Contributions in this Area

My students and I have been active investigators in this area. Some of
this work has been summarized in my 1985 book, Distributive Justice: A
Social Psychological Perspective. Much of the theoretical and empirical work
presented in this book is concerned with developing some understanding of the
social and psychological effects of distributive systems that differ in their
basic distributive value. We sought to answer the multifaceted question: How are self-esteem, attitudes toward work and relations with fellow group members, as well as individual and group productivity, affected by the way a group's earnings are distributed within the group? We also sought to throw some light on which social and psychological factors determine preferences for one or another distributive value. Here, we were interested in the question: What are the conditions that lead people to prefer egalitarian rather than meritocratic values?

Although the research and theory presented in my 1985 book provide a substantial initial contribution to the development of the knowledge posed in the immediately foregoing questions, there is obviously a need for much more work to be done before fully, adequate answers to these questions can be given. However, the theoretical and empirical work presented in Distributive Justice provide an excellent foundation for further work.

C. Proposed Research

As indicated earlier, the basic theoretical idea which would guide our initial research is that the equality distribution principle is likely to be the most effective in "solidarity-oriented" groups, while the contribution principle is apt to be the most effective in "economically-oriented" groups.* Elsewhere, I have described some of the basic differences between these two

* I note that here I am referring to the distribution of rewards (i.e., something of intrinsic value) rather than to the distribution of tools or instruments to facilitate task production. I expect that in both types of groups, the "rational" tendency will be to allocate the scarce resources of production to those most able to use them effectively in relation to the group's task. "Scarc resources of production" includes not only tools but also types of role activities and authority. However, I would also expect that each type of group would be vulnerable to different types of irrational deviations from the rational allocation of the scarce resources of production within the group. The "solidarity-oriented" group would be apt to deviate in the direction of "pseudoegalitarianism" (i.e., being unable to make appropriate distinctions among its members: treating people "identically" rather than "equally"), while the "economically-oriented" group would be apt to deviate in the direction of "invidious distinctions" (i.e., making distinctions among members that are overgeneralized and applied beyond their appropriate context). See Deutsch (1985) for a discussion of "pseudoegalitarianism" and "invidious distinctions."
group orientations (Deutsch, 1975, 1982, 1985). In brief, in economically-oriented groups, one expects the attention and activities of the participants to be directed toward something external to their relationship; whereas in solidarity-oriented groups, one expects much of the involvement to be centered on the relationships with other group members. This difference in focus leads one to expect a relationship that is economically-oriented to be impersonal in the sense that who is involved in accomplishing the group's task, and the nature of the personal relationships among those working on the task, are of less importance than the actual accomplishment of the task; the personal identity and the unique individuality of the performers have little significance in such groups. In contrast, in a solidarity-oriented group the personal qualities and identity of the individual group members are of paramount importance: relations are not impersonal and people are not readily substitutable for one another.

The foregoing idea, combined with "Deutsch's Crude Law of Social Relations" (namely, that the typical effects of any given type of social relation tend to induce that social relation) leads to the proliferation of many specific hypotheses (Deutsch's crude law is discussed in Deutsch 1973, 1975, 1980, 1982, and 1985). Thus, for example, one could expect that the equality as compared to the contribution principle would become relatively less effective as the size of the group increases, as the anonymity of its members increases, as the heterogeneity of its membership increases, as group cohesion decreases, as opportunities for contact and communication among members decrease, and so on.

There are also other factors that affect the appropriateness of each of the two distinct distributive principles. For example, one could expect that the contribution compared to the equality principle would be increasingly less appropriate with decreasing ability to assess and measure the individual contributions of group members reliably, validly, and precisely to the accomplishment of the group task. Also, one would expect the amount of reward available for distribution, and whether it is decreasing (as during an "economic crunch") or increasing (as during a period of increasing prosperity), to affect the suitability of the different distributive principles (see Chapter 16 of Appendix A for a more detailed discussion). Additionally, one would expect the characteristics of the group's tasks to make the different distribution principles more or less appropriate — e.g., how much and what types of interdependent activities are required by the group's tasks? What is the distribution among the group members of the costs, pleasures, risks, dangers, responsibilities, etc. resulting from the task activities the members must engage in? Similarly, the nature of the "good" or "harm" to be distributed is apt to play an important role in determining the appropriateness of a distribution principle. As several moral philosophers (Rescher, 1966; Galston, 1980; and Walzer, 1983) have suggested, and as the work of Foa and Foa (1974 and 1980) would imply, there is no reason to believe that the canons of distributive justice are the same for such different types of goods or harms as: love, status, information, money, tangible goods, and services. And,
undoubtedly, the characteristics of the group members would affect the applicability of the different distribution principles: their ideology, degree of alienation, intrinsic motivation to work, attitudes toward their group, gender, educational level, socio-economic background, etc.

In these introductory paragraphs to the description of the Proposed Research, I have briefly sketched out the basic theoretical ideas which would guide our initial research and have also outlined some of the other main variables with which we would be concerned in our program of research. I have not tried to articulate a formal theoretical statement with well-delineated hypotheses; some of this is done in my book and space is limited here. But also this has not been done because I intend to use the proposed research to generate theory as well as to test it. My sense of this area is that there has been a very small amount of research done in it and much more is needed before there will be an adequate empirical base for good theorizing.

Below, a series of experiments are described briefly which will provide a more specific picture of our proposed research. Unless otherwise specified, each of the experiments will have as one of its key independent variables a comparison of the equality distribution principle (all members of the group obtain an equal share of the group's reward) and the contribution principle (each member's share of the group's reward is proportion to his or her contribution to the group's outcome). In addition, in each experiment, we will typically obtain measures of such dependent variables as: individual and group performance, attitudes toward the distribution principles, performance expectations, task attitudes, attitudes toward other group members, self-attitudes, willingness to redistribute earnings, and desire to continue as a member of the group. These are measures we have repeatedly employed in the group experiments described in Deutsch (1985).

1. Experimental series involving non-interdependent group tasks.

In these experiments, the group outcome is the sum of the individual performances of the group members, each of whom is doing the same task in parallel with the other group members. The experimental format will borrow from the interesting work done by Bibb Latané and his colleagues (1979, 1980) on "social loafing." Latané had his subjects do some slightly aversive physical activity — yell as loudly as possible or clap their hands as loudly as possible. We plan to use a task which provides more reliable and precise measurements — e.g., pulling or pushing as hard as possible against a resistance — with measures being obtained of each member's and the group's cumulative pull or push. This task can be performed in a non-face-to-face situation or a face-to-face one.

We plan to do a number of experiments employing this format. The experiments will involve manipulation of the following independent variables: the size of the group (range from 3 to 20 members), the personal versus impersonal character of the relations among the group members, the knowledge (or lack of knowledge) the members have of one another's individual performance (i.e.,
their "accountability" to the group,* the subject's degree of confidence in the accuracy and reliability of the devices measuring individual performance, the level of group performance (i.e., of relative group success or failure), the direction of change in relative group performance over repeated trials, the degree of influence of the reward system, and the type of benefit or harm being distributed. One could, in addition, compose the group score other than through addition of the individual scores: employing, for example, rules for combining individual scores that are analogous to Davis's (1973) Social Decision Schemes.

Using this modified Latané experimental format, we would of course be interested in measuring the amount and distribution of "social loafing" among the group members as a function of our experimental variable. It is impossible in the allowable space to detail our specific, experimental hypotheses concerning social loafing and group productivity. However, let me illustrate a few of our predictions. In keeping with our earlier-stated theoretical notions, we would expect that the most social loafing would occur in the larger, impersonal, unaccountable "equality" groups which experience a relative group failure. Equating for initial task interest, social loafing in such groups would be distributed evenly across the different ability or performance levels of the group members. The introduction of "accountability" would decrease social loafing proportionally more in the "equality" than in the "contribution" groups.** Initially, social loafing would be low in the "contribution" groups under most conditions but with repeated experience of relatively low performances, social loafing would increase among those with consistent low performance.

I have not attempted to characterize in detail the specific experiments or the experimental manipulations. Most of the experiments would involve, in addition to the "distribution principles" variation, no more than two other independent variables. The specific experimental manipulations to create the different experimental variables are not unusual and not difficult for an experienced experimenter to realize.

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* In the typical experiment, the subject would know his or her individual score and the group score; in the "accountable condition," the subject would know that each member knows every other members' scores also.

** In the non-accountable condition, the subjects would obtain only their own performance score and the total group score.
II. Experimental series involving interdependent group tasks.
As I indicated in the background section of this proposal, studies done by my students and myself as well as those by other investigators have consistently found that, in interdependent group tasks, cooperative groups are more productive than non-cooperative groups. It also has been shown that groups rewarded on the equality principle are typically more cooperative than those rewarded on the contribution principle. As I have suggested earlier, these results may only apply when the equality distribution principle "fits" the group -- i.e., when the circumstances and conditions of the group foster solidarity relations among its members. This second series of proposed studies is meant to investigate this thesis.

There are many kinds of group tasks requiring interdependent activities. I do not believe there exists as yet an adequate classification of the types of interdependent activities, interfering as well as facilitative, that can occur in different kinds of tasks. However, McGrath's (1964) recent classification of group tasks provides a useful basis for selecting group tasks in such a way as to have a reasonable cross-section of tasks. I plan to select a task from each of his four "quadrants" (McGrath, 1964, p. 61): "generate," "choose," "negotiate," and "execute," as well as a cooperative learning task. Each of the tasks that will be employed will enable us to obtain individual as well as group scores, vary group size, manipulate the personal-impersonal relatedness of the group members, as well as the other independent variables described in "I" above. The experiments to be employed in this series will parallel those in Series I, except that here the group tasks involve interdependent rather than non-interdependent activities among group members.

A brief description of the tasks that we anticipate using follows:

1. Generate. Here we would employ what Hackman (1968) has characterized as a "production" task. It is a task which we have employed in previous experiments (Deutsch, 1985). It involves having the group members as individuals write a story about an out-of-focus photograph depicting several people sitting around a table, and, after this, they write a single story together about the same photograph. In addition to the usual measures that can be devised about individual and group performance, the content of the stories are often "projective" of the subjects' feelings about what is occurring in the group.

* I hope that one of the by products of this research will be the development of a systematic characterization of different types of interdependent activities.
2. Choose. There are a large variety of potential group tasks that could be employed—e.g., concept identification, concept attainment, jury decisions, personnel selection, procurement decisions, selection of optimal routes, etc. Although I need to do some pilot work, as well as more review of the existing experience with these tasks, my current inclination is to employ a "concept identification" group task (the game of "twenty questions" is one of its many variants) since it is easy to administer, in various ways, with a wide range of subjects; it also provides good measures of individual and group performance.

3. Negotiate. Here we plan to employ a task that has been extensively employed by Hammond, Brehmer, and their colleagues (Hammond et al., 1966, 1975; Brehmer, 1976). In this task, the members of a group are each, individually, given training experiences in a judgment task (e.g., with non-representative samples) that predisposes each member to idiosyncratic biases in their judgments of a representative sample. After their idiosyncratic training, the members of the group are brought together to make a collective judgment and various measures can be obtained of their ability to converge on an agreement and their ability to learn to converge on correct judgmental policies after receiving feedback about the correctness of their group response.

4. Execute. Here, we plan to use a team sport (e.g., volleyball) in which all group members have essentially the same role and in which the number of players on a team could be readily varied. Players would be randomly assigned to one of two basic teams in which the group reward was to be distributed to group members either on a basis of equality or on the basis of contribution to group performance. Ten teams of each basic type would be formed and each of the ten "equality" teams would play each of the ten "contribution" teams. Group and individual scores could readily be derived; the group score would determine the amount of reward that is available to distribute within the group.

5. Student Tense Learning. Partly stimulated by some of my early work on cooperation-competition in classrooms, an extensive research literature has developed on cooperative learning (see Slavin et al., 1985, for representative summaries). Slavin's (1980) revision of Aronson's (1978) Jigsaw method, termed Jigsaw II, seems particularly appropriate. In Jigsaw II, students are assigned to teams (usually of four-to-five members, but size could be varied). They read narrative materials such as social studies chapters, technical material, or biographies, and each team member is given a special topic on which to become an expert. The students typically discuss their topics in "expert groups," then return to teach their teammates what they have learned. Finally, the students take a quiz on the material, and the quiz scores are used to form individual and team scores. The scores that the students contribute to their team's score are usually based on the degree to which the individuals have improved over their prior scores or it could be based on
their absolute scores. In the research being proposed here the group reward (determined by the team score) would be distributed either equally among group members or in accordance with their relative individual contributions to the team score.

There is not space to detail all of the experimental hypotheses. However, let me state that, in general, I expect that we shall obtain results that are similar to the results of prior research on interdependent tasks: namely, the "equality" as compared to the "contribution" groups will perform better, have better social relations, and more self-esteem. This will be particularly true in the small, face-to-face, personal groups but will be increasingly less true as the size of the group increases, as the relations among members are more impersonal and anonymous, and as accountability of individual members decrease. We expect this fall-off to be particularly evident in the desire to leave or defect from the "equality" groups by the better performers.

III. Experimental series involving hierarchical, role-differentiated groups. In Series I and II, the roles of the group members are essentially of equal power and responsibility. In Series III, we plan to compare equality and contribution group reward systems in groups in which the roles of the members differ in their power and responsibility. It is commonly assumed that in such hierarchical-differentiated groups, and work groups in everyday life are frequently of this sort, the equality principle would be disfunctional and would impair group productivity as well as interfere with legitimate authority. My recent review of egalitarianism in work situations (Deutsch, 1985, Ch. 15) found little research support for this widely-held assumption but it also found that very little good, relevant research had been done. We propose to start a series of research studies to remedy this deficiency.

In hierarchical groups, one's position in the hierarchy may not only affect one's relative share of the group's earnings but also one's relative power to determine who occupies what role in the group, one's power to determine one's own activities and to influence the activities of others, one's access to information, one's weight of responsibility, and one's right to deference from other group members. As I suggested in my first footnote in the proposal (see p. 6), "economically-oriented" groups have a disfunctional tendency to overgeneralize distinctions among its members and apply the distinctions beyond their appropriate contexts (i.e., to make "invidious distinctions") while "solidarity-oriented" groups have an irrational tendency toward "pseudoequatorianism" (i.e., being unable to make appropriate distinctions among its members: treating members "identically" rather than "equally").

In this third series of experiments, we plan to create initially two types of groups: "egalitarian, solidarity-oriented" groups and "meritocratic, economic-oriented" groups in which the distribution principles under which the group is operating and the group circumstances are consistent with one another. The groups will be given tasks in which there is a clear hierarchy
of positions — e.g., a three-level hierarchy might involve "managers," "supervisors," and "production workers." The tasks required at the different hierarchical levels will require different abilities or training. The members of a group may initially have the same abilities and training so that each member could, credibly perform any role or they may differ in ability and training so that not all members could perform any role. (There are, of course, a number of interesting variations in the relation between the distribution of task capabilities among the group members and the distribution of task requirements). Each type of group will work on the same task during a set number of work periods; at a predetermined point in the group's history the circumstances confronting the group will change markedly so that the group will have to reorganize itself if it is to function effectively in its new circumstances.

The major independent variables in this series of experiments are: (1) type of group, "egalitarian-solidarity" or "meritocratic-economic"; (2) the initial type of role requirements set by the group task; (3) the distribution of task resources and abilities among group members; and (4) the type of change introduced in the task's requirements. Our major dependent variables, in addition to the ones that are similar to those employed in Experimental Series I and II, will be directed at measuring tendencies to pseudoegalitarianism (expected in the "egalitarian-solidarity" groups) and tendencies to invidious distinctions (expected in the "meritocratic-economic" groups).

In prior research, which compared "egalitarian" and "hierarchical" organized work groups in reaction to an economic crunch, we have created a group task that, with appropriate modifications, could be suitable for much of the research proposed in this series of experiments.
References


FROM: Jim Corder
DATE: 10/12/90
SUBJECT: SUMMARY AND SOME SUGGESTIONS FOR ANALYSIS OF RESEARCH QUESTIONS IN "MATERNAL RESPONSE TO COMPETING DEMANDS" by Mark Lundeen

Questions regarding dyadic situation:

1) What proportion of the time does mother respond to infant vocalization by looking at infant?
   => present "phrase-onset" results only

2) With what latency do mothers respond?
   => first check by presenting histograms for 2-sec. interval across all conditions
   => omit all "prior to look" analyses for now

3) Does maternal response (proportion and latency) differ reliably between the two twins?
   => can't answer statistically, just look at consistency across dyadic overall and triadic overall conditions

4) Does answer to 1) change if data is adjusted to account for "pretarget condition" base-rate?
   => not enough subjects for ANCOVA, so calculate a measure of "differential response rate" by subtracting out prior-to-look response rate from post-look rate, present same tables as for unadjusted response rate

Questions regarding triadic situation:

COMMENT => collapse simultaneous- & sequential-look conditions, call collapsed condition "simultaneous" (do get enough low n)

5) How does maternal response vary across type of infant look (single infant, simultaneous)?

6) Are there differences in response to two twins across these two conditions?
   => check means only, don't bother with histograms

7) In single-infant look condition, is there a difference according to which twin the mother is initially looking at?
   => make single table of means for these two conditions

8) Are there differences in maternal response between dyadic and triadic-single-look conditions?
   => again try to get both into same table

9) (already answered)

10) (omit)

Lois - this is the big problem - the mothers' rate of vocalization is roughly the same before the infant look so after... calling it a question in the entire idea of interpreting her vocalizations as responses (!!!) (We should ask Lois for a judgment of her responses... see "total" window)