THE EFFECTS OF COOPERATION AND COMPETITION UPON GROUP PROCESS

by

MORTON DEUTSCH

B.S., The City College of New York
(1939)

M.A., University of Pennsylvania
(1940)

SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
(1948)

Signature of Author.....

Certified by.....
Thesis Supervisor

.....
Chairman, Departmental Committee on Graduate Students

Room 20B-238
M.I.T.
Cambridge, Mass.

September 7, 1948

Professor Joseph S. Newell
Secretary of the Faculty
Massachusetts Institute of Technology
Cambridge 39, Massachusetts

Dear Sir:

In accordance with the requirements for the Degree of Doctor of Philosophy, I herewith submit a thesis entitled, "The Effects of Cooperation and Competition upon Group Process."

I should like to take this occasion to acknowledge my gratitude to the staff of the Research Center for Group Dynamics.

Respectfully submitted,

Morton Deutsch

ACKNOWLEDGEMENTS

This study could not have been possible without the financial support of the Research Center for Group Dynamics nor without the excellent cooperation of the Industrial Relations Section.

Professor Lippitt, my thesis advisor, has been of inestimable help; I have profited much from our many stimulating discussions. Professor Festinger has provided invaluable assistance in planning the experiment and in the analysis of the results. For permission to use Introductory Psychology students as subjects and for obtaining many students to volunteer to be subjects, I am very much indebted to Professor Haire. To my co-experimenter, Gordon Hearn, I am grateful for many productive joint efforts. The students at the Research Center have all been helpful at various times, many of the ideas to be presented here reflect informal discussions held during lunches.

I am particularly indebted to the observers, who attended to their jobs so faithfully despite many personal inconveniences. The observers included: Mimi Guerreiro, Dorothy Rapapport, Anita Kassen, Barbara Meyers, Gil Krulee, and Arthur Bryant.

Perhaps, most of all, I owe deep gratitude to the M.I.T. students who participated in the experiment. Unwittingly they let themselves in for more than they bargained and yet, almost to a man, persevered till the end of the experiment.

THE EFFECTS OF COOPERATION AND COMPETITION UPON GROUP PROCESS

An abstract by Morton Deutsch

In order to study the effects of cooperation and competition upon group process, ten experimental groups were established. Each group was composed of five Introductory Psychology students who were participating in the experiment as a substitute for their regular class sections. All groups met for one period of 3 hours, at different times of the week, for six consecutive weeks. During the first week the 10 groups were observed and rated as they discussed a human relations problem, the ratings of the discussion productivity were used to pair-off equated groups. Five pairs were thus formed. One group of each pair was then assigned by flipping a coin to the cooperative treatment, the other to the competitive treatment.

The cooperative situation was produced by a set of instructions which stated essentially that the group, as a whole, would be rated in comparison with the efforts of four other similarly constituted groups; the grade or reward that each member received would be the same and would be determined by the relative position of this group in contrast with the other four similar groups. The competitive situation was produced by another set of instructions which stated essentially that each member would be rated in comparison with the efforts of the other four members composing his group, the grade or reward that each would receive would be different and would be determined by the relative contributions of each to the solution of the problem with which they were confronted.

Apart from the differences in instructions, all groups were exposed to similar routines during their 3 hour meetings. The first part of the meeting was spent solving a Sunday supplement type puzzle, the second part of the meeting was spent discussing and writing some recommendations for a problem of human relations, in the third part of the meeting the instructor-experimenter informally lectured on psychology.

The results indicated that the cooperative groups showed more of the following characteristics than did the competitive groups: (a) Coordination of Efforts; (b) Diversity in amount of contributions per member; (c) Subdivision of activity; (d) Pressure toward achievement with respect to the tasks; (e) Attentiveness to fellow members; (f) Mutual comprehension of communication; (g) Agreements with each other; (h) Orientation and orderliness; (i) Productivity per unit time; (j) Quality of product and of discussions; (k) Friendliness during discussions; (l) Favorable evaluation of the group and its products; (m) Group functions such as encouraging and rewarding; (n) Perception of favorable effects upon fellow members.

The competitive groups showed more of the following: (a) Production of signs in the human relations problem; (b) Individual functions such as blocking, aggressing, and self-defending.

No significant differences were found in the following: (a) Amount of interest or involvement in the situation; (b) Amount of specialization with respect to function; (c) Amount of learning (though the trend is in favor of the cooperative members. Nor were there any striking developmental differences with time.

The above results give support to the theory of cooperation and competition developed in the present study. At the core of the theory is a conceptualization of the cooperative situation as a situation in which the goals of the individuals composing it are "promotively" (positively) interdependent and of the competitive situation as a situation in which the goals of the individuals composing it are "contriently" (negatively) interdependent. From these conceptualizations it was derived that the cooperative and competitive groups would differ with respect to perceived interdependence, substitutability of one member's actions for another's, inducibility, cathexis or valence, and helpfulness versus obstructiveness. From these psychological implications of the cooperative and competitive situations, it was possible to make further derivations (which have been supported by the results previously cited) about how the cooperative and competitive groups would differ with respect to various aspects of group functioning.

The data also reveal that the puzzles and the human relations problems differ in the following respects: (a) The solutions of the puzzles are more objectively demonstrable and, as a consequence, it is possible for the individual to work more independently of his fellow members; (b) The puzzle problems offer more obstacles to communication than do the human relations problems; (c) The content of the human relations problem is more "value-laden" than is the content of the puzzle. These differences in task structure result in: more individualized effort, (less coordination of efforts, fewer attempts at communication) in puzzle solution; more conflict (blocking, self-defending, and aggression) in the human relations problems;

and more communication difficulties in the puzzles. The results, however, clearly indicate an interacting effect between nature of task and nature of the group. The structure of the puzzles is such as to minimize the differences between cooperative and competitive groups in some respects, while the structure of the human relations problems, on the other hand, tends to bring out the differences between the two types of groups.

Group process and group productivity is, thus, a function of the properties of the group and the properties of its medium or environment. One cannot predict precisely from the knowledge of the properties of either the group or its environment alone.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

THE PROBLEM AND ITS RATIONALE

To agree that the understanding of the nature of cooperation is of vital importance to human welfare one does not have to accept fully Elton Mayo's statement (23), "It is not the atomic bomb that will destroy civilization. But civilized society can destroy itself -- finally, no doubt, with bombs -- if it fails to understand intelligently and to control the aids and deterrents to cooperation." The concept of "cooperation" and the interrelated concept of "competition" are rarely missing in discussions of inter-personal or inter-group relations; together they play a key role in the systems of many social theorists. Yet despite the obvious significance of these concepts for the understanding and control of social process, virtually no experimental work has been done with respect to the effects of cooperation and competition upon social process. The experimentation that has been done has largely been concerned with the effects of cooperation and competition upon the individual's strength of motivation to achieve under the two different conditions. None of these studies have investigated the interactions between individuals, the group process that emerges as a consequence of a cooperative or competitive social situation.

It probably is not without accident that no such studies have taken place. Greenwood (8) has pointed out the commonness of belief among sociologists that "only a minute portion of sociology is experimental, because the sociologist has not as yet been successful in producing at will the exact group behavior which he desires to study, but must begin with groups already in existence." Clearly, such a belief current among many sociologists, would be a deterrent to experimental research on the

effects of cooperation and competition upon group process. Fortunately, such beliefs, widely held among both sociologists and psychologists, are beginning to disappear as a consequence of the successful pioneering studies (18,6,5) conducted by members of the staff of the Research Center for Group Dynamics.

A not insignificant purpose of the present study is to again demonstrate that it is possible to do experimental research that is meaningful and rewarding on group problems that have theoretical as well as practical importance. The major purpose of this study, however, is to contribute to the understanding of the nature of cooperation-competition and, through it, to the understanding of group process. It is believed that the concepts "cooperation" and "group" are very closely interrelated and that intimate study of cooperation and group process jointly will be particularly fruitful.

We propose to start out boldly in the next chapter by sketching out a theory of cooperation and competition and by applying the hypothesis developed to different aspects of group functioning. There are ambiguities, inadequacies, and gaps in the theory to be presented, yet even so it is hoped that the theory will justify itself in terms of its present usefulness. The third chapter will examine the concept "group" and show its intimate relationship to the concept of the "cooperative situation". The two chapters following will reveal the nature of the present experiment and the measures that will be used as a basis for testing the hypothesis developed in Chapter II. Chapter VI will present the evidence for and against the various hypotheses. The final chapter will summarize the results and point to the conclusions to be drawn from them.

CHAPTER II

A THEORY OF COOPERATION AND COMPETITION

The purpose of this chapter is to develop a theory of the effect of cooperation and competition upon small (face-to-face) group functioning. Before attempting this development, it may be well to see how other writers have formulated "cooperation" and "competition".

A. Some Existing Formulations -- A Glance at the Literature

No attempt will be made to summarize the extensive writings on cooperation and competition. May and Doob (22) have done this for the literature up until 1937. Very few studies of significance have been reported since then. In addition to indicating the prominence of the concepts of competition and cooperation in social and economic theory, they have developed an elaborate theory. They distinguish between cooperation and competition in the following manner:

> Competition or cooperation is directed toward the same social end by at least two individuals. In competition, moreover, the end sought can be achieved in equal amounts by some and not by all of the individuals thus behaving; whereas in cooperation it can be achieved by all or almost all of the individuals concerned.

Their theory primarily has to do with the conditions for, and the forms of, cooperation and competition. Their basic postulates with respect to cooperation and competition are as follows:

> Postulate 5. On a social level individuals compete with one another when: (1) they are striving to achieve the same goal which is scarce; (2) they are prevented by the rules of the situation from achieving this goal in equal amounts; (3) they perform better when the goal can be achieved in

unequal amounts; and (4) they have relatively few psychologically affiliative contacts with one another.

Postulate 6. On a social level individuals cooperate with one another when: (1) they are striving to achieve the same or complimentary goals that can be shared; (2) they are required by the rule of the situation to achieve this goal in nearly equal amounts; (3) they perform better when the goal can be achieved in equal amounts; and (4) they have relatively many psychological affiliative contacts with one another.

Mead's survey of cooperation and competition among primitive peoples (25) accepted the following definitions:

Competition: the act of seeking or endeavoring to gain what another is endeavoring to gain at the same time.

Cooperation: the act of working together to one end.

She asserts that a distinction must be made between "competition" and "rivalry". A similar distinction is made between "cooperation" and "helpfulness".

Competition is behavior oriented toward a goal in which the other competitors for the goal are secondary; rivalry is behavior oriented toward another human being, whose worsting was the primary goal.

In cooperation, the goal is shared and it is the relationship to the goal which hold the cooperating individuals together; in helpfulness, the goal is shared only through the relationship of the helpers to the individuals whose goal it actually is.

Maller in his classic study of cooperation and competition among school children (21) defines a cooperative situation as one which stimulates an individual to strive with the other members of his group for a goal object which is to be shared equally among all of them. On the other hand, a competitive situation is one which stimulates the individual to strive against other individuals in his group for a goal object of which he hopes to be the sole or principal possessor.

Barnard (1) has done extensive theorizing on the nature of cooperative systems. His work is so extremely fruitful that an attempt to summarize it in limited space would be foolhardy. He discusses the origin of cooperative action:

Among the most important limiting factors in the situation of each individual are his own biological limitations. The most effective method of overcoming these limitations has been that of cooperation. This requires the adoption of group, or non-personal purpose.

He also discusses factors that emerge from cooperation.

Cooperation is a social aspect of the total situation and social factors arise from it. These factors may be in turn the limiting factors of any situation. This arises from two considerations: (a) the processes of interaction must be discovered or invented; (b) the interaction changes the motives and interest of those participating in the cooperation.

Also considered are the persistence and survival of cooperation:

The persistence of cooperation depends upon two conditions: (a) its effectiveness; and (b) its efficiency. Effectiveness relates to the accomplishments of the social purpose. Efficiency relates to the satisfaction of individual motives. The test of effectiveness is the accomplishment of a common purpose. The test of efficiency is the eliciting of sufficient individual wills to cooperate.

The survival of cooperation, therefore, depends upon two interrelated and interdependent classes of processes: (a) those which relate to the system of cooperation as a whole in relation to the environment; and (b) those which relate to the creation or distribution of satisfactions among individuals.

Helen Block Lewis in two recent articles (16,17) has presented a very stimulating viewpoint. She writes:

A minimum requirement for cooperative behavior is not physical togetherness nor joint action, nor even synchronous, complimentary behavior, but a diminution of ego-demands so that the requirements of the objective situation and of the other person may function freely. In truly cooperative work, personal needs can function only if they are relevant to the objective situation; the common objective, in other words, is more important than any personal objective....Since the self is not focal, another person's activities -- the cooperating persons -- may be as satisfactory as your own.

Competing for individual rewards, i.e., individualistic competition, on the other hand, involves a heightening of ego-demands, so that the ego-objective is more important than any common objective; i.e., the person is at the focus of consciousness, selfconsciousness is at a maximum -- the individual is "on the spot" -- so that similar behavior may be expected from the member of the competing group and the person driven by inordinate (neurotic) ambition. Competing behavior involves seeing the objective situation as relevant to the personal need to win, or for prestige. Only personal activities, therefore, can be satisfactory.

This rather brief survey and a cursory glance through the works of various sociologists (10,19,20,30,35) has indicated a core of common conceptualizations running through the treatment of the cooperative and

competitive social situation. Inherent in most of these conceptualizations has been the notion that the crux of the difference between cooperation and competition lies in the difference in the nature of the goal-regions in the two social situations. The conceptualization to be offered below also follows this distinction.

B. A Conceptualization of the Cooperative and Competitive Situations

1. In a cooperative social situation the goals for the individuals or sub-units in the situation under consideration have the following characteristic: the goal regions for each of the individuals or sub-units in the situation are defined so that a goal-region can be entered (to some degree) by any given individual only if all the individuals or sub-units under consideration can also enter their respective goal-regions (to some degree). For convenience sake, the phrase "promotively interdependent goals" will be used to identify any situation in which the individuals or sub-units composing it have their goals interrelated by the characteristic defined above.

2. In a competitive social situation the goals for the individuals or sub-units in the situation under consideration have the following characteristic: the goal-regions for each of the individuals or sub-units in the situation are defined so that if a goal-region is entered by any individual, or sub-unit, (or by any given portion of the individuals or sub-units under consideration) the other individuals or sub-units will, to some degree, be unable to reach their respective goals in the social situation under consideration. For convenience sake, the phrase"contriently interdependent goals" will be used to identify any situation in which the individuals or sub-units composing it have their goals interrelated by the characteristic defined immediately above.

The foregoing conceptualizations of cooperation and competition, if they are adequate, combined with the definition of the group concept, "membership motive" (see the next chapter) provides an opportunity for the derivation and empirical testing of hypotheses about the effect of variations in strength of membership motive on various aspects of group functioning. This possibility is created primarily by the linkage of "cooperation" and "membership motive" through the concept "promotively interdependent goals". The empirical linkage is provided by the operational definitions of cooperation and competition that compose the experimental manipulation (see Chapter IV).

Specifically, the hypotheses relevant to group functioning must be derived from the consequences inherent in the concepts "promotively interdependent goals" and "contriently interdependent goals". In some respects the word "derivation" is being used rather loosely in this study. The "derivations" insofar as they result in hypotheses that can be empirically tested require additional psychological assumptions. These assumptions will be stated when recognized and when feasible.

As a first step in the attempt to derive hypotheses, an attempt will be made to state the implications logically inherent in the aforementioned concepts. The second step will be to attempt to deduce psychological implications, making various psychological assumptions, from the logical implications of the concepts. The third step will be to attempt to apply these psychological implications to problems of group functioning.

Step I The Logical Implications of the Conceptualization of the Cooperative and Competitive Social Situations:

Promotively Interdependent Goals	Contriently Interdependent Goals
If A,B,C,etc. does not obtain his goal (enter his goal region) X does not obtain his goal.	If A, B, or C, obtains his goal, Y does not obtain his goal.
X obtains his goal only if A,B,C, etc., obtain theirs.	Y obtains his goal only if A,B,C, etc. do not obtain theirs.
A,B,C,etc., obtain their goals only if X obtains his.	A,B,C, etc., do not obtain their goals if Y obtains his.

From the definitions of promotively and contriently interdependent goals, it appears to follow that: 1. Any person X who has promotively interdependent goals with persons A,B,C,etc., will come to have promotively interdependent locomotions in the direction of his goal* with persons A,B,C,etc.

1a. Any person Y who has contriently interdependent goals with persons A,B,C, etc. will come to have contriently interdependent locomotions in the direction of his goal*, with persons A,B,C,etc.

The above statements are based on the following considerations:

Locomotion in the direction of the goal, from any point not in the goal region, may be thought of as a condition for entry into the goal region. Entry into the goal region may be thought of as a part of locomotion in the direction of the goal; entry being the final step in locomotion. It follows that a locomotion by X or Y in the direction of goal* can be considered to be

*It should be emphasized that, at this point in the development, "locomotion in the direction of the goal" refers to locomotion in an objective social space, not to locomotion in the individual's life space. That is, as yet, no inferece should be drawn as to whether the individual is aware of, or even affected by, his locomotion in objective social space. An example, in another context, of locomotion in objective social space without immediate corresponding locomotion in the individual's life space, is the following: A student takes an exam, thinks he fails, and is afraid he will not graduate. The instructor corrects the exam, passes the student, the student is approved for graduation, etc. within a day after the student takes the exam. The student worries, and is only notified two weeks after the exam that he has passed.

promotively or contriently interdependent with the locomotions of A,B,C, etc., in the direction of their goals; the nature of the interdependence with respect to locomotions depending upon the nature of the interdependence with respect to goal regions.

Promotively Interdependent Locomotions in the Direction of the Goal	Contriently Interdependent Locomotions in the Direction of the Goal
If A, B, or C, etc., does not locomote in the direction of his goal, X does not locomote in the direction of his goal.	If A, B, or C, etc., locomotes in the direction of his goal when Y is not locomoting in the direction of his goal (or locomotes at a more rapid rate than Y locomotes towards his goal), the rivalry ratio $\frac{\text{Locomoting Person's Distance to his Goal}}{\text{Person Y's Distance to his Goal}}$ will decrease.
If X locomotes in the direction of his goal, A, B, C, etc., will locomote in the direction of their goals.	If Y locomotes in the direction of his goal, when A,B, or C,etc., is not locomoting in the direction of his goal, (or locomotes at a more rapid rate than A,B or C, etc., is locomoting toward his goal) the rivalry ratio described above will increase.
If A, B, or C, etc., locomotes in the direction of his goal, X will locomote in the direction of his goal.	If A,B, or C, etc., does not locomote in the direction of his goal and Y does not locomote, the rivalry ratio will either remain constant or increase.

In addition to the above implications of statements 1. and 1a., it seems to be possible to draw implications concerning locomotion which is in a direction opposite* to that of locomotion in the direction of the goal.

*For the definition of oppositeness of direction see Lewin's monograph (14) "The Conceptual Representation and Measurement of Psychological Forces".

Promotively Interdependent Locomotions in a Direction Opposite to the Direction of the Goal	Contriently Interdependent Locomotions in a Direction Opposite to the Direction of the Goal
If A, B, or C, etc., does not locomote in a direction opposite to that of his goal, X does not locomote in a direction opposite to his goal.	If A,B, or C, etc., locomotes in a direction opposite to his goal when Y is not locomoting in a direction opposite to his goal (or locomotes at a more rapid rate than Y does in such a direction), the rivalry ratio: $\frac{\text{Locomoting Person's Distance to His Goal}}{\text{Person Y's distance to His Goal}}$ will increase.
If X locomotes in a direction opposite to that of his goal, A,B,C,etc., will locomote in a direction opposite to their goals.	If Y locomotes in a direction opposite to his goal, when A,B, C, etc., is not locomoting in a direction opposite to his goal (or locomotes at a more rapid rate than A,B, or C, etc., in such a direction), the rivalry ratio will decrease.
If A, B, or C, etc., locomotes in a direction opposite to the direction of his goal, X will locomote in a direction opposite to his goal.	If A,B, or C, etc., does not locomote in a direction opposite to his goal and Y does not locomote, the rivalry ratio will either remain constant or decrease.

From the statements about promotively and contriently interdependent locomotions it seems to be possible to draw further implications, if we accept the following additional statements:

1. Facilitating locomotion (i.e.--decreasing resistances to locomotion) in the direction of the goal makes it more likely that the goal will be obtained.
2. Hindering locomotion (i.e.--increasing resistances to locomotion) in the direction of the goal makes it less likely that the goal will be obtained.

Promotively Interdependent	Contriently Interdependent
If X facilitates the locomotion of A,B, or C, etc., in the direction of their goals, he facilitates his own locomotion in the direction of his goal.	If Y facilitates the locomotion of A, B, or C, etc., in the direction of their goals, the rivalry ratio is likely to decrease.
If A,B, or C, etc., facilitate the locomotion of X toward his goal, their locomotion will be facilitated.	If A,B, or C, etc., facilitates the locomotion of Y towards his goal, Y's rivalry ratio is likely to increase.
If X hinders the locomotion of A,B, or C, etc., toward their goals, he will hinder his own locomotion.	If Y hinders the locomotion of A,B, or C, etc., toward their goals, he will be likely to increase his own rivalry ratio.
If A,B, or C, etc., hinder the locomotion of X, the locomotion of A,B, or C, etc., will be hindered.	If A,B, or C, etc., hinder the locomotion of Y towards his goal, Y's rivalry ratio is likely to decrease.

Several major differences reveal themselves as inherent in the distinctions between the cooperative and competitive social situations. The analysis of the cooperative situation reveals that all the individuals in such a setting occupy the same position with respect to their goals; if any one individual locomotes the others must also locomote in the same direction. In the competitive situation, the various individuals may occupy the same or differing positions with respect to their goals; locomotion by any individual has no necessary effect on the locomotions of others, though it may effect the relative positions of the various individuals.

Step II The Deduction of Psychological Implications from the Conceptualizations of the Cooperative and Competitive Situations

Up to this point we have been stating some of the consequences logically inherent in the conceptualizations of simple*cooperative and competitive

*There are undoubtedly many different species of cooperative and competitive situations. The present conceptualization is aimed at simple, and it is hoped "basic", cooperative and competitive situations. They are, namely, situations in which each individual concerned stands in a cooperative or competitive relation, equally, with every other individual in the situation.

social situations. No statements have been made which have a direct psychological reference (i.e.--a reference in terms of individual life spaces). The statements have had reference only to an objectively defined social space.

The next step called for appears to be an attempt to derive psychological implications from these statements by introducing additional psychological assumptions which will somehow relate these statements about events in objective social space to events in individual life spaces. In the attempt to take this next step, many of the theoretical issues that are involved in the relationship of "objective facts" to "psychological facts" will be ignored. It is felt that it would be overly ambitious to try to deal with these issues in the scope of this thesis.

The problem to be solved in taking this next step is quite a difficult one. Essentially the question is "What psychological assumptions are necessary in order to derive psychological or perceived interdependence from objective social interdependence?" Under what circumstances will the conditions of objective interdependence lead to the social perception of interrelationship? Another approach to the problem of the interrelationship between objective social interdependence and perceived social interdependence would be to postulate that psychological or perceived interdependence is a necessary condition for objective social interdependence. It seems apparent that such an approach would by-pass the problem and in by-passing the problem would ignore facts that indicate that an individual can locomote through an objective social space without, in any sense of the word, being immediately aware that locomotion is taking place. Further, such an approach, by definition, would not be able to analyze why under varying social conditions there would be little or much psychological unity in groups that have the same objective social interdependence.

It is evident that the problem being raised here is in certain respects similar to the question Koffka raises of "Why Do Things Look As They Do?" Koffka clearly points out the inadequacies of any answers solely in terms of the real properties of the objects or in terms of the proximal stimulus properties of the object. Yet even so, for effective behavioral adjustment to its environment, an organism's perceptions and expectancies must be veridical to the entities and the relationships among those entities that compose its functional environment. To explain the behavioral adequacy of our perceptions, expectations, or cognitions one might say that the same kinds of laws govern both the organization of real entities and field organization initiated by the proximal stimuli affecting the sense organs. Such an explanation could perhaps be accepted for the simpler perceptions and cognitions in which object-Ego relations do not influence the field organization (though even in the simpler cases there appear to be many exceptions to such an explanation). It seems apparent that perceptions that are intimately connected to actions which are related to need reduction or intensification will be influenced by object-Ego relations. It is likely that most social perceptions and expectations involve Ego-forces in their organization. Thus, the explanation of the behavioral adequacy or inadequacies of our perceptions and expectations requires an insight into the nature of object-Ego relationships and an understanding of how these relationships are acquired.*

*The theoretical section of the paper presented by Deutsch and Pepitone at the 1947 "Topological Meetings" was a preliminary attempt to formulate an approach to the understanding of the nature of these relationships.

Without in any way attempting to detail an explanation of reasons for the behavioral adequacy or inadequacy of our perceptions and expectations it becomes apparent that learning principles, as well as principles of perceptual and cognitive organization are basic to the explanation. Learning principles are necessary to bridge the gap between objects and relations and percepts and expectations. (They are necessary but not sufficient. It is clear that principles of cognitive organization, such as revealed by the work of Heider, as well as the more obvious factors of perceptual organizations are involved.) "Objective social facts", as well as "things" come to have "psychological" significance (i.e., significance in terms of the life space) by becoming related to need reduction or intensification through learning. By assuming that all action is a process which is directed toward reduction or removal of need tension, and that some such principle as the "Principle of Least Action" (39) guides action and that object significance is established in the course of action it is possible to derive that the perceptions and expectations of an individual are likely to be veridical to his objective environment in direct proportion to the individual's capacities, to his amount of experience in the environment, and to the simplicity of the environment being perceived.

The preceding several pages have been an excursus. It is hoped that it has served two purposes. One purpose has been to demonstrate the very complex and shaky assumptions that exist at the base of any predictions about behavior in an objective social situation. The second purpose has been to provide the rationale for such predictions by offering an empirical coordination for hypotheses to be derived from the conceptualizations of the

two objective social situations. In brief, the preceding sections were meant to provide the rationale for the following kind of statement: "If five reasonably well-adjusted college students, of fairly homogeneous abilities, are placed in an objective social situation in which they have, objectively, promotively interdependent goals (or contriently interdependent goals) and the clues to the situation are reasonably obvious, the five students will perceive themselves as having promotively interdependent goals (or contriently interdependent goals)". The rationale for the statement being the previously stated assumption that the perceptions and expectations of an individual are likely to be veridical to his environment if he has had enough experience with the situation, if he has intelligence, and/or if the situation is simple enough. The subjects in the present experiment were all relatively intelligent. All of them had had experience with cooperative and competitive social situations. The experimental manipulations defining the two situations were simple and explicit.

The same psychologic can be applied to promotively (and contriently) interdependent locomotions and to promotively (and contriently) interdependent facilitations and hinderings so as to derive psychological or "perceived" interdependence from the objective social interdependence. However, it should be pointed out that in the experimental situation the tasks that the individuals were exposed to were of such a nature that the clues provided by objective locomotion were neither simple nor clear-cut. Thus, it can be assumed that the correspondence between objective and psychological locomotion was far from perfect. This lack of correspondence has, of course, its empirical consequences which one should be able to predict from

theoretical considerations.* Fortunately, for the present purposes, the lack of perfect correspondence between "objective" and "perceived" interdependence can be disregarded since the hypotheses to be offered in the next pages are relative, rather than quantitatively refined.

Basic Hypotheses

Hypothesis 1

A. Individuals who are exposed to the cooperative social situation (Indiv coop) will perceive themselves to be more promotively interdependent (in relation to the other individuals composing their group)with respect to goal, locomotions, facilitation, etc., than will individuals who are exposed to the competitive social situation (Indiv comp).

B. Indiv comp will perceive themselves to be more contriently interdependent (in relation to the other individuals composing their group) with respect to goal, locomotions, facilitations, etc., than will Indiv coop.

*In large measure, one should be able to explain the differences of behavior (individual or group) that occur in objective social situations as being due to lack of correspondence between the "perceived" and "objective" situation. Moreover, knowledge of the explicitness of cues provided by a given cooperative (or competitive) social situation should enable us"to predict" differences in kind and amount of cooperative (or competitive) behavior.

An individual is not "cooperative" even though objectively he stands in a cooperative relation to others, when he does not perceive this relationship. From this lack of correspondence, without too many additional psychological assumptions, one should be able to predict the following: how an individual will diverge from "cooperative" behavior, what happens when the "divergent" individual bumps up against the objective situation, and the effect of his divergence on others who are in a "cooperative" situation with him. The kind of prediction that would be made is the same order of prediction that one would make about a rat's behavior, knowing how much the rat's percept and expectations with respect to the maze he has to run diverge from the objective structure of the maze.

Using the same rationale that was involved in developing Hypothesis I, it is possible to establish that one can coordinate perceived interdependence to the objective interdependence for each of the implications logically inherent in the conceptualization of the cooperative and competitive situation. Thus, for example, with reference to the cooperative situation, the statement, "If A, B, or C, etc. locomotes in the direction of his goal, X will also locomote in the direction of his goal" can be read "X perceives that if A, B, or C, etc., locomotes in the direction of his goal, he will also locomote in the direction of his goal".

For convenience sake, let us direct our attention to the psychological implications of locomotion in the cooperative or competitive situation. Let us analyze the following hypothetical instance with respect to locomotion in the direction of the goal: "A" locomotes in the direction of his goal and the other individuals in the social situation perceive that "A" is locomoting:

(1) In the cooperative situation "X" would (be likely to) perceive that he has locomoted towards his goal as a consequence of "A's" actions. Several implications seem to directly follow, if we accept certain additional psychological assumptions:

(a) Substitutability -- Since "X" has locomoted towards his goal as a consequence of "A's" actions, there is no longer any necessity for "X" to perform any action which is similar (functionally identical) to "A's".* We can derive that "A's" action will be substitutable for "X's", if we assume any one of the following: a principle of "Least Action", a principle of "Efficiency", or that the force in a direction of a region is zero when the person is in that region.

(b) Positive Cathexis If we make an assumption, which is rather widely accepted, that an entity will acquire positive cathexis (become attractive)

*Here we are presenting the "ideal" cooperative situation...A situation in which the only goals of the individuals are promotively interdependent.

if that entity is seen to be promotively related to need satisfaction -- it is possible to derive that "A's" action (which results in locomotion in the direction of the goal) will be positively cathected by "X". It is likely that the cathexis will generalize to "A". That is, "X" is likely to accept, like, or reward "A's" action.

(c) Inducibility --The assumption here is a little more complex: Let us assume that the relationship of inducibility derives from the fact that the inducible person perceives the inducing entity to be such that it stands in a causative relationship to the intensification, continued persistence, or lowering of need tension within himself. Positive inducibility* occurs when the inducing entity as seen as promotive rather than contrient with respect to tension-reduction (or when the inducing entity is seen as more powerful -- i.e., capable of producing even more tension than the tension existing to be reduced.)

Making the above assumption one can derive that "X" will stand in the relationship of positive inducibility to "A" insofar as "A's" action contributes toward "X's" locomotion in the direction of his goal.

(2) In the competitive situation "Y" would (be likely to) perceive that his rivalry ratio with respect to "A" has decreased. The situation here is somewhat more complex than in cooperation. The amount of change in the rivalry ratio would depend upon the distances of both "A" and "Y" from their goals and also upon the distance locomoted by "A". Nevertheless several implications seem to directly follow, if we accept certain additional psychological assumptions (though, it may be that if the rivalry ratio is greater than a certain maximum, or lower than a certain minimum, a rivalry situation will no longer exist psychologically.)

*Positive inducibility is meant to include two related phenomena: (a) The production of additional "own" forces in the direction induced by the inducing entity. (b) the channelizing existing "own" forces in the direction induced by the inducing entity.

(a) Substitutability - It is evident that there will be no substitutability.

(b) Negative Cathexis - The assumption here is parallel to that made in deriving positive cathexis, an entity will acquire negative cathexis if that entity is seen to be contriently related to need satisfaction (therefore, is seen to decrease the probability of need satisfaction). The additional assumption here is that decreasing the rivalry ratio will be seen as decreasing the probability of success. (This additional assumption may only hold within minimum and maximum limits.) From these assumptions it is possible to derive that "A's" locomotions in the direction of his goal will be negatively cathected by "Y". It is likely that the cathexis will generalize to "A".

(c) Negative Inducibility* - Assuming that negative inducibility occurs when the inducing entity is seen as contrient with respect to tension reduction, one can derive that "Y" will stand in the relationship of negative inducibility to "A" insofar as "A's" actions lead to locomotions by "A" which decrease "Y's" probability of reaching his goal. However, another factor, cognitive in nature, may come into play making "Y's" relation to B one of ambivalence or non-inducibility. The cognition that "going in a direction opposite to "A's" would be going in an opposite direction to his own goal.

We can, with the same kinds of assumption, analyze a hypothetical instance in which "B" locomotes in a direction opposite to that of his goal. Without detailing the analysis it is evident that in the cooperative situation, substitutability is not expected but one would expect negative cathexis and negative inducibility. The competitive situation, again, is not so unequivocal as the cooperative situation. Here one would expect positive cathexis and ambivalent or non-inducibility.

"Facilitations" (of locomotions in the direction of the goal) in most respects can be considered analogous to locomotions in a direction opposite to the direction of the goal. One can make the same derivations that were

*Negative inducibility is meant to include two related phenomena: (a) the production of additional "own" forces;(b) channelizing of existing"own" forces... in the direction opposite to that desired by the inducer.

made with respect to substitutability, cathexis, and inducibility for facilitations and hinderings, respectively, as those that were made for locomotions in the direction towards or opposite to that of the goal. In addition, it is possible to make statements about "helpfulness" and "obstructivness" -- defining "helpfulness" as the act of facilitating locomotion and defining "obstructiveness" as the act of hindering locomotion.

In the cooperative situation, if "X" facilitates the locomotion of "A" in the direction of his goal, he also facilitates his own locomotion in the direction of this goal. Assuming that facilitation of locomotion makes locomotion more probable it is evident that "X's" facilitations of others are likely to result in his own locomotion, and therefore, is also likely to result in tension-reduction with respect to that locomotion. His own actions of facilitations (helpfulness) will become positively cathected and will be likely to be manifested in appropriate situations (according to learning theory previously assumed). Using the same kind of analysis one can demonstrate that acts hindering locomotion in the direction of the goal (obstructiveness) will be negatively cathected and will be avoided. For "facilitations" and "hinderings" in a direction opposite to the goal, of course, the converse of the above statements would be true.

In the competitive situation, with respect to locomotions of others in the direction of the goal, "helpfulness" would become negatively cathected, "obstructiveness" positively cathected. The converse would be true for locomotion in a direction opposite to that of the goal.

Up to this point, we have made some statements about substitutability, cathexis, inducibility, and helpfulness in each of the two social situations, cooperation and competition, under each of two different circumstances -- locomotions, etc., in the direction of the goal and in the direction opposite

to the goal. In each of the situations, under different conditions, there is positive and negative cathexis, helpfulness and obstructiveness. To test the theory it is necessary to know which of the conditions are operating. The assumption will be made that under the experimental conditions there will be more locomotions in the direction of the goal than in a direction opposite to that of the goal in both instances. From this assumption and the foregoing analysis it is possible to assert the following hypotheses:

Hypothesis 2: There will be greater substitutability for similarly intended actions among Indiv coop as contrasted with Indiv comp.

Hypothesis 3: There will be a larger percentage of actions by fellow members positively cathected by Indiv coop than by Indiv comp.

Hypotheses 3A: There will be a larger percentage of actions by fellow members negatively cathected by Indiv comp than by Indiv coop.

Hypothesis 4: There will be greater positive inducibility with respect to fellow members among Indiv coop than among Indiv comp.

Hypothesis 4A: There will be greater internal (self) conflict among Indiv comp than among Indiv coop.

Hypothesis 5: There will be more helpfulness towards each other among Indiv coop than among Indiv comp.

Hypothesis 5A: There will be more obstructiveness towards each other among Indiv comp than among Indiv coop.

Step III The Applications of the Psychological Implications of Cooperative and Competitive Situations to (Small, Face-to-Face Group Functioning)

In this step an attempt will be made to apply some of the psychological implications of the hypotheses derived in the preceding section to the

functioning of small face-to-face groups. To draw out these implicitions for group functioning, additional assumptions will be necessary; these assumptions will be stated when recognized and when feasible. The aspects of group functioning to be considered will for convenience sake be arbitrarily grouped under the following headings: (a) Organiziation, (b) Motivation, (c) Communication, (d) Orientation, (e) Productivity, (f) Interpersonal Relations, (g) Individual Behavior. No attempt will be made to exhaust the implications to be drawn with respect to these aspects of group functioning; it should also be understood that an empirical test of all of these implications will not be possible in this study.

(a) Organization

Several different aspects of "organization" appear to be relevant to the differences between cooperation and competition: (1) Interdependence (2) Homogeneity of Sub-Units (3) Specialization of Function (4) Stability of Organization (5) Situational Flexibility of Organization.

(1) Interdependence -- From Hypothesis 4 (re positive inducibility), it seems evident that one would expect greater coordination of effort, as well as more frequent interrelationship of activity.

Hypothesis 6: At any given time there will be more coordination of efforts (working together, interrelation of activities) among Indiv coop than among Indiv comp.

Hypothesis 6A: Over a period of time, there will be more frequent coordination of efforts among Indiv coop than among Indiv comp.

(2) Homogeneity: If we assume that the individuals composing the various groups, in both the cooperative and competitive situation, differ from one another with respect to ability or personal inclinations to

contribute, etc., it is possible from the substitutability hypothesis (Hyp. 2) to derive

Hypothesis 7: There will be more homogeneity with respect to amount of contributions or participations among Indiv comp than among Indiv coop.

The above hypothesis follows from the consideration that the contribution of an Indiv coop can be a substitute for another Indiv coop; this does not hold for Indiv comp. In the cooperative situation if any individual has ability and contributes, there is less of a need for another individual to contribute -- this factor produces heterogeneity in amount of contributions.

(3) Specialization of Function: Making the same kinds of assumptions as above plus the additional ones that the individuals compromising the various groups differ in respect to ability and/or interest in performing the various functions (e.g.--"orienting", "elaborating", "coordinating", etc.) necessary for successful task completion, and are aware of these differences in aptitude or interest, it is possible to derive, from the substitutability hypothesis, the following:

Hypothesis 8: There will be greater specialization of function (i.e.--different individuals fulfilling different functions) among Indiv coop than among Indiv comp.

If we assume some time or achievement pressure, from the substitutability hypothesis, it is also possible to derive

Hypothesis 9: There will be greater specialization with respect to content or activity (i.e.--different individuals taking different aspects of the task and working on them simultaneously) among Indiv coop than among Indiv comp.

The structure of certain kinds of tasks make it extremely difficult for this type of specialization to take place. So that one would expect fewer

differences between Indiv coop and Indiv comp on some tasks and more on others.

(4) and (5) Stability and Situational Flexibility of Organization: No attempt will be made to test the following hypotheses on this study, but it seems interesting to point them out. If specialization of function occurs and we assume that expectations are established as a result of this specialization and that these expectations act as a force on behavior we would expect:

Hypothesis 10: There would be greater structural stability (from like situation to like situation) with respect to functions assumed among Indiv coop than among Indiv comp. This difference should increase with time.

From the lack of substitutability among Indiv comp one can derive a rigidity, each individual always trying to fulfill all the functions. Stability of structure among Indiv coop may result in some perseverance but there does not seem to be any reason to equate rigidity and stability.

Hypothesis 11: In the face of changing circumstance, more organizational flexibility (change of roles to adapt to circumstance) will be manifested among Indiv coop than among Indiv comp.

(b) Motivation

There are three things to consider when making a force analysis: (1) direction of the force, (2) strength of the force, and (3) point of application of the force.

(1) Direction of the Force -- From the hypothesis about positive inducibility it can be expected that

Hypothesis 12: The direction of the forces operating on Indiv coop would be more similar than the direction of the forces operating on Indiv comp.

This being the case, other things being equal, one would expect more

rapid locomotions -- i.e., more rapid decisions and reaching of agreements by cooperative groups. Another point to be considered here is that of the frame of reference with respect to locomotion in the cooperative and competitive situations. In the competitive situation the individual is oriented to locomotions relative to the locomotions of the other individuals with whom he is competing (the rivalry ratio); in the cooperative situation meaningful locomotion units is in relation to task completion. If this is the case it can be expected that

Hypothesis 13: The directions of the forces operating on Indiv coop would be more toward task closure than would be the directions of the forces operating on Indiv comp -- i.e., there is more achievement pressure on the Indiv coop.

(2) Point of Application of the Force -- From the hypothesis of positive inducibility we can assert that a force on any Indiv coop is likely to induce a force on other Indiv coop. Thus, any force operating on an Indiv coop in the direction of the goal is also simultaneously operating on the Group in the direction of the goal. We can define group motivation as some complex function of the strength of forces that operate simultaneously on all individuals as a function of their interrelationship with respect to positive inducibility.

Hypothesis 14: The group force in the direction of the goal in a cooperative group will be stronger than such a group force in a competitive group. This hypothesis has somewhat the same operational significance as hypothesis 12 and 13.

(3) Strength of Force -- From positive inducibility we would expect more additional own forces to be induced in the Indiv coop once he is exposed to induction by other members; in the competitive situation due to combined

negative and positive induction one would also expect the production of more own forces. If to the concept of strength of force we coordinate "interest" or "involvement", there does not seem to be any clear-cut rationale for predicting differences between the situations:

Hypothesis 15: There will not be a significant difference in the strength of the forces (interest, involvement) operating on the Indiv coop and Indiv comp in their respective situations* (making the assumptions that situationally irrelevant ego-systems do not become involved).

(c) Communication

The term, "communication", in its widest sense, is used to cover any instance of the establishment of a commonage, that is, the making common of some property to a number of things. For the present purpose, we will follow Morris (26) and limit the word "communication" to mean "the arousing of common significata through the production of signs"; the establishment of a commonage other than that of signification, whether it be by signs or other means, again following Morris' usage, will be called "communization". From the communicator's point of view, communication may be considered a special case of exerted positive induction -- i.e., the use of signs to induce in the communicatee sign-behavior similar to that of the communicator. Normally, for the communicator, the process of communication stands in a means relationship to some such purpose as informing, persuading, or being expressive of one's self.

*It may be argued that in our culture a competitive situation evokes more basic motives and would thus result in more ego involvement. This may well be true. However, in the present experimental situation, the cooperative groups were in a position of inter-group competition, thus possibly eliminating differential ego-involvement.

There are three principal elements to the definition of communication: (1) "The production of signs", (2) "the arousing of", (3) "common significata". Let us see what implications our basic hypotheses have for these different aspects of the communication process.

(1) The Production of Signs -- If we assume that in certain kinds of tasks (notably, tasks in which there are no clearly discernible "objective" criteria of locomotion -- i.e., tasks in which the group itself provides the criteria for judging locomotion) the production of signs can be perceived as a means of locomotion, it is possible to make certain derivations (with additional assumptions) about the quantity of such production in the cooperative and competitive situations. First, it should be made clear that the production of signs by an individual within a group can be made with or without the intent to communicate to the other individuals in the group. Thus, an individual can produce signs under the assumption that "talking" is a means of locomoting, or an individual may produce signs with the intent of communicating with some one outside the group (for example, a "judge" or "observer").

From the substitutability hypothesis and the additional assumptions (1) That it is perceived that locomotion takes place either through the utterance of many good ideas (i.e. the production of many signs that will be evaluated highly) or through the frequent persuasion or informing of others via communication; (2) that quantitative efforts do not seriously interefere with qualitative efforts or that if they do quantity is seen to be as or more important than quality; and (3) that the time space available per unit of time allows for more production of signs than are necessary for optimal, solution of any problem -- it is possible to derive

Hypothesis 16: When the task-structure is such that production in quantity of observable signs is perceived to be a means for locomotion, there will be a greater total of signs produced per unit of time by the Indiv comp than by the Indiv coop.

From the hypothesis about the coordination of effort (Hyp. 6 and 6A) in tasks one would expect that

Hypothesis 17: When the task structure is such that locomotion is possible without the production of observable signs, there will be a greater total production of such signs per unit time by the Indiv coop than by the Indiv comp.

(2) "The arousing of" -- If from the communicator's point of view, communication can be considered a locomotion or a means of locomotion, the state of receptivity (i.e. the readiness to be aroused) in the communicatee stands in a potential relation of facilitating or hindering the locomotions of the communicator. From the hypotheses re helpfulness and obstructiveness (Hyp 5 and 5A), it can be derived that

Hypothesis 18: There will be less attentiveness (readiness to be aroused) to each other's production of signs among Indiv comp than among Indiv coop.

(3) "Common Significata" If one assumes that attentiveness is a condition for the arousing of common significata, it follows:

Hypothesis 19: The production of signs by Indiv comp will less frequently result in common significata among other Indiv comp than will be the case for the production of signs by Indiv coop.

Even when attentiveness is present there seems to be reason to believe that there is greater likelihood of distortion by communicatees in the com-

petitive situation. This is a consequence of the fact that in the competitive situation, locomotion is likely to be perceived in terms of its effect on relative position (the rivalry ratio); in the cooperative situation the locomotion of any individual is likely to be perceived as resulting in the locomotion of the others. The consequence of this difference is that the expressive characteristics of the production of signs are likely to be more significant to Indiv comp. A sign is expressive if the fact of its production is itself a sign to its interpreter of something about the producer of a sign. Tolman's concept of sign-magic (doing to the sign what the organism is predisposed to do to the significata of that sign) combined with his concept of sign-gestalt (37) helps to explain why it is likely that:

Hypothesis 20: There will be more lack of common signification, even when attentiveness is optimal, among Indiv comp than among Indiv coop.

From the hypothesis with respect to positive inducibility it follows directly that:

Hypothesis 21: There will be more common appraisals (agreements, acceptances by communicatee) of communications by communicators and communicatees among Indiv coop than among Indiv comp.

(d) Orientation'

There are several aspects of orientation: (1) Orientation of members to each other (2) Commonality of Perceptions of Goal, Position, Direction to Goal, and Steps in the Path to the Goal.

(1) Orientation of Members to Each Other -- The question here is how well do the members know each other's opinions, values, aptitudes, etc. From the hypothesis with respect to communication, one can assert (a quali-

fication must be added with respect to the Indiv coop who communicate little, as per heterogeneity hypothesis) that:

Hypothesis 22: The Indiv coop will have more knowledge about its active members than will the Indiv comp.

(2) Commonality of Perception -- We will define group orientation to exist to the extent that there is commonality of perception among the members. Group orientation can be assessed in relation to goals, position at a given time, direction to goal, or steps in path to the goal. From the communication hypothesis and from the hypothesis of positive inducibility one can derive that:

Hypothesis 23: There will be more group orientation among the Indiv coop than among the Indiv comp.

(e) Group Productivity

There are various possibilities of defining "group productivity". One could define it in terms of motivation reduction of the members, in terms of the entity produced, in terms of a group's realization of its potential, etc. For present purposes we shall consider group productivity in terms of the entity produced by the group, and, in terms of the learning of the individuals composing the groups. We shall examine productivity in terms of quantity per unit time, time/quantity, and quality.

From the hypothesis with respect to strength of group motivation (Hyp 14), assuming that, other things being equal, locomotion will proceed more rapidly the stronger the motivation, one can derive that:

Hypothesis 24: The Indiv coop will produce more per unit of time than will the Indiv comp.

Hypothesis 24A: It will take less time for the Indiv Coop to produce what the Indiv comp produces.

If we assume that any or all of the following are negatively related to group productivity (in respect to quality of product) lack of coordination, communication difficulties, persisting internal conflict, lack of group orientation, we can derive that:

Hypothesis 25: The productivity of the Indiv coop with respect to quality will be higher than that of Indiv comp.

From the hypotheses about communication and the hypotheses with respect to positive inducibility, with the additional assumption that the individuals composing the various groups had information and a background of experience that could benefit the other individuals, it is possible to derive that:

Hypothesis 26: The Indiv coop would learn more from each other than would the Indiv comp. (The more knowledgeable and experienced of the Indiv coop would, of course, learn less than the not so well-informed Indiv coop.)

(f) Interpersonal Relations

There are various things to be considered here: (1) Valence of the actions of fellow members, of the group, of the situation, and the extent of the generalization of this property. (2) The occurrence of group or individual functions. (3) The perception of effect on others (4) The incorporation of the attitude of the generalized other.

(1) Valence or Cathexis of the actions of fellow members, etc. From the hypothesis with respect to cathexis (Hyp 3 and 3A) we expect the actions of fellow members to be more positively cathected among Indiv coop than among Indiv comp. We would also expect the perceived source of these actions to

acquire, to some extent, a cathexis similar to that held with respect to the actions.

Hypothesis 27: There will be more friendliness among Indiv coop than among Indiv comp.

The extent of generalization of this cathexis of the person will be a function of the centrality for the person of the goals he has involved in the situation of cooperation or competition. Thus, if the situation is important to the person, we would expect his perceptions of the personalities of other members to be effected by the cathexis,* we would also expect the friendship or lack of it to generalize to other situations, etc.

Just as Hyp. 27 follows from the original cathexis hypothesis, it seems likely that the cathexis will be generalized to the products of the joint actions of fellow members and oneself -- i.e., the group products.

Hypothesis 28: The group products will be evaluated more highly by Indiv coop than by Indiv comp.

(2) The Occurrence of Group or Individual Functions -- If we define as "group functions" any actions which are intended to increase the solidarity of the group, or to maintain and regulate the group so that it functions "smoothly" (these functions are analogous to the ego-syntonic functions in the individual) and assert that "group functions" are seen to be "helpful" (i.e. -- facilitate locomotion) it can be demonstrated that:

Hypothesis 29: There will be a greater percentage of group functions among Indiv coop than among Indiv comp.

*See F. Heider (9)

If we define "individual functions" to include any actions of the individual which are not immediately directed toward task solution and which are not "group functions" (i.e. actions which are obstructive, blocking, aggressive, or self-defensive, etc., are "individual functions") it can be demonstrated that:

Hypothesis 30: There will be a greater percentage of individual functions among Indiv comp than among Indiv coop.

(3) The Perception of Effect on Others -- There seem to be two questions here: (a) How realistic are the individual's perceptions of his impressions on others? and (b) What kinds of impressions are the individuals likely to have in the social situations?

From the communication hypotheses, it was developed (Hyp 22) that over a period of time Indiv coop should know more about the attitudes of (active) fellow members than is the case for Indiv Comp. Using the same reasoning, and making the assumption that the communication difficulty with respect to this content is also greater for Indiv comp, it follows that:

Hypothesis 31: The perception of the attitudes of the others towards aspects of one's own functioning in the group, etc., by Indiv coop should be more realistic than such perceptions by Indiv comp.

From the inducibility hypothesis, it also follows that:

Hypothesis 32: The attitudes of any individual with respect to his own functioning should be more similar to the attitudes of the others with respect to his functioning among Indiv coop than among Indiv comp.

From Hyp. 31 and the cathexis hypothesis we can derive that Indiv coop will tend to perceive they have a favorable effect on the others in the group. If we make the assumption of "autistic hostility" (28) -- that is, that

hostile impulses under conditions of reduced communication tend to create the expectation of counter-hostility, we can demonstrate that:

Hypothesis 33: Indiv coop will perceive themselves as having more favorable effects on fellow-members than will Indiv comp.

(4) The incorporation of the Attitude of the "Generalized Other"*

The term "attitude of the generalized other" refers to some internalized structure which is developed as a result of introjecting the mutually interacting attitudes of those who are commonly engaged in a social process. From our preceding development it is clear that the development of the "attitude of the generalized other" requires communication and positive inducibility. It follows then, that:

Hypothesis 34: Incorporation of the attitude of the generalized other will occur to a greater extent in Indiv coop than in Indiv comp.

The operational implications of the preceding hypothesis are similar to those of the coordination and orientation hypotheses. It has further implications in terms of group development which will not be drawn here. For present purposes, the "feeling of responsibility" to other members will be taken as an operational definition of the degree of internalized attitude of the generalized other.

(g) Individual Behavior

No attempt will be made in this study to derive how individuals with certain personality characteristics will behave nor what the reactions of other individuals to such behavior will be in the two different types of situation - cooperation and competition. Suffice it to say, that it is

*The concept of "generalized other" plays a crucial role in the social psychology of G. H. Mead (24).

evident that one would expect more behavioral homogeneity in competitive situations than cooperative situations. It is also apparent that the reactions of others to a "stupid" individual (one who hinders locomotion or locomotes in the wrong direction) or to a "bright" individual will vary significantly from one situation to another.

(h) The Course of Development With Time

From our theory one would predict quite different developments in successful and unsuccessful cooperative groups. Similarly, important developmental differences would occur in competitive situations in which reward over a period of time was all accumulated by one individual or segment as compared with competitive situations in which over a period of time different individuals were rewarded. The derivation of these predictions will not be attempted in this thesis.

CHAPTER III

THE CONCEPT OF "GROUP"

In the preceding chapter it was suggested that a linkage existed between the conceptualization of the cooperative situation and the concept of group and that this linkage provided the possibility for the derivation and empirical testing of group hypotheses. The task of this chapter will be to clarify the nature of the linkage and to define some group concepts. As a brief introduction, we would like to raise and answer the questions (1) "In what sense, if any, do groups exist?" (2) "What are some of the existing formulations with respect to groups?"

A. In What Sense, if Any, Do Groups Exist?

Kurt Lewin (15) has emphasized the importance of the belief in "existence" of something as a psychological prerequisite for the scientist's interest in that something as an object for scientific investigation. He suggests that "the taboo against believing in the existence of a social entity is probably most effectively broken by handling this entity experimentally". The pioneering works of Lippitt (18) and French (6) have done much to shatter the scientific belief that groups do not exist - the belief, therefore, that the concept of "group" has no empirical reference.

The resistance to the acceptance of the belief in the "reality" of groups stems largely from what Whitehead (40) has called "The Fallacy of Misplaced Concreteness". The very words used in phrasing the question "In what Sense..." implies the acceptance of the fallacy that for anything to be real it must have "simple location" in physical space-time. It is clear that many groups do not have the property of simple location; that is,

one cannot answer the question "Where?" in terms of physical space. This lack of physical locus for a group has confused many people and has led them to reject the concept of group as having no empirical coordinates. Yet it should be clear that many of these same people have unwittingly accepted concepts such as "the person" which have no simple-location, fallaciously concretizing something which is quite "abstract".

Another related source of resistance to the acceptance of the "reality" of groups, has been the argument that we cannot scientifically speak of a group as deciding and acting, since it is the individuals that compose the group that decide and act. Child (2) has, in answer to such argument, pointed out that the same kind of objection could be raised with respect to considering the individual as a unit, it too is composed of sub-units, which in turn are composed of sub-units, etc. It is clear that this argument has to do with the size of unit that is most fruitful in the investigation of any scientific problem. This is a problem in the pragmatics of science. It is believed that the concept of "group" will have the same value for the study of social phenomena that the concept of the "individual" has had for the study of psychological phenomena. It is further believed that the concepts "individual" and "group" have two crucial similar attributes - the idea of organization or patterning of its sub-parts and the idea of motivation; organization being established in the course of purposeful striving in relation to the environment (31).

To sum up, the answer to the question "In what sense, if any, do groups exist?" is simply that groups exist as concepts that have empirical references. Their usefulness as concepts depend in part on the nature of the relationship of the concept "group" to other concepts and in part on the nature of the empirical coordinations.

B. What Are Some of the Existing Formulations with Respect to Groups?

No attempt will be made here to make a thorough census of formulations with respect to groups. Wilson (41) has recently attempted such a summary of sociological formulations. From his summary it is apparent that the group concept is pivotal in the thinking of many sociologists. The works of such sociologists as Durkheim("The Division of Labor"), Simmel (the effect of size upon group organization, interaction processes, etc.), Von Wiese (a classificatory approach to groups), Cooley ("Social Process" and "Social Organization"), Brown ("Social Groups"), and Coyle ("Social Process in Organized Groups") have much to offer in the way of fruitful hypotheses for experimental research. Wilson summarizes his survey by asserting that there exists "a prevailing ambiguity of conceptualization and classification with reference to the group in the whole field of sociology".

Yet, if we look carefully at the definitions used by sociologists we find a common core, based on the idea of "interaction". (Some sociologists use the word "group" to also include "categories" based on similarities, "aggregates" based on proximity, as well as "groups" based upon "psychic" interaction.) In most usages it is not made explicit whether interaction is defined in terms of an objective, social interdependence or a psychological interdependence. In addition to the criterion of interaction some sociologists e.g. Znaniecki (42) and Newstetter (29), have stated that the concept of group includes "a feeling of identification", or "realization of a selective bond". Sociologists have, in considering the relationship of the individual and the group, tended to emphasize the incompleteness of the individual without the group (Durkheim's concept of "anomie").

Koffka (12) makes a distinction between "sociological" (geographical) groups and "psychological" (behavioral) groups. He asserts that sociological groups are "gestalts" and they have characteristics as gestalts which are somewhat distinctive. In the first place the "strength" of the gestalt (the degree of interdependence) may differ over an enormously wide range; secondly, the individuals composing the group are not completely determined by the group. The reality of the psychological group is expressed in the pronoun "we", "we" implying here the feeling of unity in joint action. As used by Koffka the phrase "psychological group" refers to an individual life space, the phrase "sociological group" refers to a group space. He asserts that a sociological group of n members presupposes n psychological groups. Koffka has many stimulating suggestions to offer with respect to the condition of group formation, group structure, and with respect to the relation of the individual to the group.

French (6) states two criteria for the existence of a group: interdependence and identification. He defines "identification conceptually in terms of two dynamic factors: (a) belonging to the group has, for its members, a positive valence, (b) compared to the non-members, the members accept to a greater degree the forces induced by the group". Interdependence is the basic criterion, not all psychological groups presuppose identification.

One of the most stimulating contributions to the theory of groups and organization is presented in Barnard's "The Functions of the Executive" (1). This work, which must be considered a "basic Work"in this field, is too pregnant with ideas to permit any concise summary. He suggests that the word "group" is most appropriately applied to the relationship of cooperation, which is a system of interactions. He also points out, as Koffka has done, (but in rather different terminology) that: (1) the group or organization as

a system has properties independently of the persons composing the group (2) the persons composing a group possess some characteristics which may not be pertinent to the group and the group, of course, does not completely determine the person. In effect, Barnard uses the term "member" to apply to the group relevant aspects of the person. Any person may have many different memberships.

He asserts "an organization comes into being when (1) there are persons able to communicate with each other, (2) who are willing to contribute action (3) to accomplish a common purpose. These elements are necessary and sufficient conditions initially.... For the continued existence either effectiveness or efficiency is necessary". That is, an organization cannot persist unless the individuals obtain more satisfaction than discomfort in the course of directly obtaining the specific objectives of the organization or unless they do it indirectly.

The conceptualization to be offered below, though not directly influenced by Barnard, is in many respects similar to his. The primary critique of Barnard's conception is that though his theory is "effective", it is "inefficient" in that it introduces some unnecessary elements such as "consciously coordinated activities" and "willingness" to contribute which could very much complicate the problem.

C. A Proposed Formulation:

Basic definitions:

1. A sociological group* exists (has unity) to the extent that the individuals or sub-units composing it are pursuing "promotively inter-

*It should be noted that these terms are not being used as Koffka has used them.

dependent goals.

2. A psychological group* exists (has unity) to the extent that the individuals composing it perceive themselves as pursuing promotively interdependent goals.

3. The total potential energy of a psychological group is some cumulative direct function of the strength of goals that are perceived to be promotively interdependent by the various individuals or sub-units composing the group.

4. A psychological group has cohesiveness as a direct function of the strength of goals perceived to be interdependent and of the degree of perceived interdependence.

The following definitions are reformulations of the above definitions from the point of view of membership.

1a. Individual or sub-units belong in a sociological group to the extent that they are pursuing promotively interdependent goals.

2a. Individuals or sub-units possess membership in a psychological group to the extent that they perceive themselves as pursuing promotively interdependent goals.

3a. Individuals or sub-units possess membership motive in a psychological group as a direct function of the strength of goals perceived to be interdependent and of the degree of perceived interdependence.

The conceptualization of the cooperative situation (see the previous chapter) is, of course, identical with the definition of the sociological group. It follows that if Indiv coop and Indiv comp are equated in other respects that Indiv coop will possess more unity as a sociological group

*It should be noted that these terms are not being used as Koffka has used them.

than will the Indiv comp. From the logical and psychological consideration advanced in the preceding chapter it would also follow that the Indiv coop will possess more unity as a psychological group than will the Indiv comp. Since all the hypotheses in the preceding chapter were relative statements based on the assumption that the Indiv coop and Indiv comp were equated in other respects it is possible to substitute for "Indiv coop" the phrase, "a psychological group with greater unity," and to substitute for "Indiv comp" the phrase, "a psychological group with lesser unity."

Thus, in effect, through creation of a cooperative and a competitive situation it becomes possible to test empirically the effect of variation in degree of unity or strength of membership motive of a psychological group upon the functioning of groups.

CHAPTER IV

THE EXPERIMENTAL DESIGN

A. Background Considerations

In setting up the experiment to test the hypotheses developed in the preceding chapters, it was necessary to consider many factors - only a few of which were directly related to the hypotheses to be tested. First of all it was necessary to have the following: (1) intelligent and reasonably well-adjusted subjects who would regularly attend experimental sessions over a period of time; (2) some degree of control over the goals the subjects strove for (so as to be able, through manipulation of these goals, to place the subjects in cooperative or competitive situations); (3) a readily observable situation.

After much preliminary investigation it became obvious that the somewhat unorthodox Introductory Psychology course offered at M.I.T. might provide the means by which all the conditions above might be satisfied. By making the experimental sessions an integral part of the course regular attendance would be assured; the instructor's control over grades and assignments would provide some degree of control over the goals of the subjects. Fortunately, the very excellent and helpful cooperation of the Industrial Relations Section made this possible.

Questions of economy and of responsibility to the students (participating in the experiment as a substitute for the regular sections of Introductory Psychology) required additional limitations: (1) that the number of groups be limited, (2) that the number of students in a group be relatively small, (3) that the content of group meetings be relevant to "Introductory Psychology", (4) that "experimentation", questionnaire

administration, etc. be limited to the amount that could be tolerated by the subjects and to an amount which would permit achievement of the course objectives.

B. Subjects and Matching of Groups

At the first meeting of the various Introductory Psychology sections, it was announced that the department was interested in doing research on its Introductory Psychology course and that, as part of this research, it was planning to form some small sections to be composed of 5 students and one instructor. It was asserted that the experimental sections would meet once weekly as a substitute for the regularly scheduled 3 one hour meetings. Nothing specific was stated about the research except that it was research which had the purpose of improving the Introductory Psychology course. Volunteers were requested and providently more subjects volunteered than were needed.

However, the department had decided that we would be able to take only the 50 subjects needed for the 10 experimental groups plus a few alternates. The 50 odd subjects and alternates were then formed into groups on the basis of their available meeting times. Though this very much limited the possibility of matching personalities as well as groups, some flexibility still remained because of the large overlappings that existed among the time schedules of the various subjects.

At this point all the subjects were administered the following tests: "The A-S Reaction Study", "Wide Range Vocabulary Test" and the Sanford, Frankel-Brunswick ideology questionnaires. On the basis of these tests and other face-sheet data about the individuals, the most deviant students were eliminated as subjects. After this elimination no freedom existed, in terms of the time schedules for group meetings, for shifting of subjects from group to group.

The next step was to match* pairs of groups. The following procedure was used: Each group, at its first meeting together, were told: "You are to be constituted as a board of human relations experts. As experts, each week you will be presented a human relations problem. Your job is to analyze and discuss the problem and to formulate, in letter form, some written recommendations." Sheets of paper to be used in writing the letter was presented to them (a standard form was used only after this first meeting) and the problem to be handled was read to them (though each member was provided with a copy of the problem). The problem presented to each of the groups was entitled "The Treecutters" (see Appendix A), they were allowed a total of 50 minutes for the discussion and writing of recommendations. Each of the groups were rated by the experimenter on a 9 point scale in terms of the productivity of their discussion of the problem presented to them. (See Scale 1 of the "over-all Rating Scales" in Appendix B.) Groups were then paired-off in terms of these ratings; in the one instance when 3 groups had the same rating, the pairing was based, in addition, on similarity between meeting times (i.e. -- both groups met in the evenings). One group of each pair was labeled "H", the other "T". A coin was the flipped, the side whose face turned up determined whether a group would be cooperative or not. Thus if a "heads" turned up, the "H" group in the pair would be cooperative and the "T" group competitive; if a "tails" turned up the "T" group would be cooperative and the "H" group would be competitive.

The rationale of the matching of groups rather than individuals follows from our discussion in the preceding chapter. If we accept the notion that

*I am indebted to Prof. Leon Festinger for suggesting that the groups be matched in terms of their performance on a group task.

a group is not merely the sum of its part, it follows that matching of individuals (parts) is not a sufficient basis for matching groups - groups have to be matched as functioning entities. The rationale for using the experimenter's judgment as the sole criterion for matching was one of expediency. He was the only experienced observer available for such ratings; during these first meetings the other observers were still in the process of being trained.

C. The Experimental Manipulation

After the first week, during which time the groups were paired, one of each pair was exposed to a cooperative situation, the other was exposed to a competitive situation. The cooperative and competitive instructions which created the experimental variables are presented below.

1. Instructions Read to the Cooperative Groups

A. Puzzle Problems

Every week you will be given a puzzle to solve as a group. These puzzles are, in effect, tests of your ability to do clear, logical thinking as a group. Your effectiveness in handling the problem will be evaluated by ranking you as a group in comparison with 4 other groups who will also tackle the same problems. Each of the 5 groups will be ranked... the group that works together most effectively will receive a rank of 1, the next most effective group will receive a rank of 2, the least effective group will receive a rank of 5. The ranks that each group receives on the weekly problems will be averaged - at the end of it all we should be able to have a pretty good picture of each group's ability to do clear, logical thinking.

To motivate you to contribute your best efforts, we will have a reward. The group that comes out with the best average will be excused from one term paper and will receive an automatic "H" for that paper. That is, if your group receives the highest rank all of you will get excused from one term paper and will receive an automatic "H".

You are to come out with one solution as a group. When you have decided as a group that you have reached a solution, let me know by handing me your answer written on this answer sheet.

B. Human Relations Problem

There are 2 principal factors determining your grade for this course:

1. The discussions in class of the human relations problems
2. The papers you hand in periodically

Your grade for the discussion in class will be determined in the following manner:

Each week the plans or recommendations that the group comes out with as a result of discussion will be judged and evaluated by ranking them in comparison with the efforts of 4 other similar groups. The group whose discussions and recommendations are judged to be best (in terms of both quality and quantity of ideas) will receive a rank of 1, the next best group a rank of 2, and so on, the worst group will receive a rank of 5.

Every member of the group will be given the rank that his group receives. That is, all members of a group will receive the same rank... the rank being determined by how good their group discussion and recommendations are.

The ranks that are received weekly shall be averaged and used in making up that part of the grade which is based on class discussion.

Thus, in effect, you are to consider the discussions of these human relations problems presented to you weekly as a test, in which your group rank or grade is determined by your ability to effectively apply insight to these problems. Remember, the group whose discussions and recommendations are best in quality and quantity will get the highest grade, the group whose discussion and recommendations are worst will get the lowest grade.

This meeting, as in all the other meetings, you will consider yourself to be a board of human relations experts. As such, you have been presented with the following problem which I will read to you, you may glance at your copies of the problem as I read, if you wish to do so: (The problem was then read by the experimenter.)

You will be allowed a total of 50 minutes for both the discussion and the writing of recommendations. You are to write your recommendations in letter style, on this form which I have provided.

You will be notified when you have only 20 minutes, 10 minutes, and 5 minutes left.

2. Instructions Read to the Competitive Groups

A. Puzzle Problems

Every week you will be given a puzzle to solve as a group. These puzzles are, in effect, tests of your individual abilities to do clear, logical thinking. The contributions that each of you make to solving the weekly puzzle will be ranked...so that the person who contributes most to the solution will receive a rank of 1, the one who contributes next will receive a rank of 2, etc., the one who contributes least will receive a rank of 5. The ranks that each of you receive on the weekly problems will be averaged...at the end of it all we should have a pretty good picture of each individual's ability to do logical thinking.

To motivate you to contribute your best individual efforts we will have a reward for the individual who comes out with the best average. He will be excused from one term paper and will receive an automatic "H" for that paper.

You are to come out with one solution as a group. When you have decided that as a group you have reached a solution, let me know by handing me your answer written on this answer sheet.

B. Human Relations Problem

There are 2 principal factors determining your grade for this course.

1. The discussions in class of the Human Relations Problem
2. The papers you hand in periodically.

Your grades for the discussion in class will be determined in the following manner:

Each week the contributions that each of you makes to the plan or recommendations that the group comes out with as a result of discussion will be ranked so that the individual contributing the most, (in terms of both quality and quantity of ideas) to the group plan will receive a rank of 1, the individual contributing next most will get a 2, and so on, the individual who contributes least will get a 5.

The ranks that each individual receives from week to week will be averaged and will be used in making up that part of his grade which is based on discussion.

Thus, in effect, you are to consider the discussion of these human relation problems presented to you weekly as a test, in which each of you are being ranked and graded on your individual ability to effectively apply insight to these problems. Remember, the individual who contributes most in quality and quantity to the recommendations will get the highest grades, the individual who contributes least will get the lowest grades.

This meeting, as in all the other meetings, you will consider yourself to be a board of human relations experts. As such, you have been presented with the following problem which I will read to you, you may glance at your copies of the problem as I read, if you wish to do so. (The problem was then read by the experimenter)

You will be allowed a total of 50 minutes for both the discussion and the writing of recommendations. You are to write your recommendations in letter style, on this form which I have provided.

You will be notified when you have only 20 minutes, 10 minutes, and 5 minutes left.

At the beinning of the experiment, after reading the instructions, the experimenter asked if there were any questions. If any, the instructions were repeated and clarified until there was evidence of clear understanding. To all questions pertaining to the nature of the experiment or observations, the experimenter responded with a promise of full, detailed explanation at the end of the experiment. The cooperation of the subjects in not discussing problems, etc. outside of the group meetings was solicited. The same instructions were repeated at each group meeting.

During the five weeks of experimentation, each of the groups met once

weekly for a period of approximately 3 hours. The schedule of a meeting was as follows: (1) The experimenter read the appropriate (that is, cooperative or competitive) instructions for the puzzles. (2) The group undertook the solution of the puzzle and worked at it until they handed in a group solution to the experimenter. Amount of time taken varied from 4½ minutes to 56 minutes. (3) The students then filled out a brief questionnaire, while the observers made various ratings. (4) The experimenter read the appropriate instructions for the human relations problem. (5) The group was allowed a total of 50 minutes for the discussion and writing of recommendations. (6) The students then filled out a lengthy questionnaire (see Appendix B). (7) There was a 10-15 minute break. (8) The rest of the three hours the experimenter informally lectured (encouraging active discussion) on psychological principles such as are involved in "need theory", "level of aspiration", "conflict", etc. Each of the 10 groups received the same informal lectures in any given week; this similarity of content despite the latin square arrangement of problems (see next section of this chapter), required that the instructor avoid discussing the human relations problem tackled by the group in the preceding hour.

It should be clear that the discussion and solution of both the puzzles and human relations problems were undertaken by the various groups without the participation of the experimenter (instructor). During these discussions he sat at a table with the other observers and functioned solely as an observer.

It should be emphasized that the only differences introduced into the three hours meetings by the experimenter-instructor were the difference in

instructions read to cooperative and competitive groups. The experimenter-instructor tried to create a friendly, informal, but impersonal relationship with all groups.

D. The Problems

The function of the problems was to provide a medium for the occurrence of group process. Not all mediums are alike. The process that occurs is a function of both the properties of the group and the properties of the group's medium or environment.* The communication hypotheses, thus, make different predictions for different kinds of environments.

The background considerations, previously outlined, dictated that human relations problems be used as group tasks. In addition for comparative purposes it was thought that it would be interesting to have the groups confronted with problems of a rather different type. The human relations problems (see Appendix A) are tasks in which there are no clearly discernible "objective" criteria of locomotion; they are tasks in which the group itself, through consensus, provides the criteria for judging locomotion. In addition, the content of these problems are likely to evoke strongly - held personal value systems among the discussants. The puzzle problems were, for convenience, chosen for contrast. Due to their "objective" (i.e. -- logically demonstrable) solutions, locomotion could take place without group consensus. This, of course, provided the possibility for relatively more individual work in the puzzles than in the human relations problems. The relative lack in ideological relevance of the content of the puzzle problems, made

*This is but another version of the formula B=F (P,E)

"conflict" more likely in the human relations problems.

1. A Human Relations Problem* ("The World War II Vet)

I have noticed that a fellow I've been working with lately has been seriously worried about something. I want to help him. This is the story he told me the other day when we stopped in for a drink after work.

"I am a World War II veteran. I have been home for 3 months after having served 2½ years overseas. I had been married a year and a half and my son was five months old when I left. My wife and I have always been very much in love with one another. My wife is a very intelligent sensitive person who carries with her the imprint of her father's unfaithfulness to her mother and of the shame and humiliation which she and her mother suffered as a result. Consequently, she regards faithfulness as the one indispensible condition of a successful marriage. I share my wife's conviction but feel that above all a husband and wife must always be completely frank with one another if their relationship is to be a happy one.

While I was overseas in England and France we wrote regularly to each other but as time went on, home seemed to become less and less real to me. During the first year or so, despite the urgings of my buddies in the squadron, I didn't have any dates. My passes were spent at Red Cross centers or around the base. I was pretty lonely, homesick, and just plain miserable. I guess I was kind of a pain to my hut-mates, for one night they more or less insisted that I go along with them to a dance in town. It was fun dancing with one girl in particular who seemed to be able to follow American steps. We got pretty well acquainted and to make a long story short, one thing led to another, and for the next year I spent all my passes with her. She knew that I was married and that our relationship was only for the duration, but she seemed to enjoy my company as much as I did hers. I never spoke of her in my letters to my wife because at first it was harmless but later as it became more involved, I felt I would have to explain it to her in person for her to really understand.

When I got home 3 months ago I tried. I started to broach the subject in a general way by talking of life overseas. My wife said how horrified she had been by stories she had heard of how married men had behaved over there. She was so relieved, she said, that it hadn't happened to them. Naturally, after that, I have felt that I couldn't say what I had started to say."

I suggested that he forget all about it and not tell his wife, but he said, "I feel terribly guilty and feel that if I don't tell her there will always be a barrier between us which would make our marriage deceitful and yet I am afraid that if I do tell her that it will be a blow to my wife which might break up our marriage.

My problem is further complicated by a letter I received the other day from the girl overseas in which she described the terrible conditions over there and asked if I could help her out by sending food parcels."

I still think that my suggestion to him is a good one, but since

*The human relations problems were constructed in collaboration with Gordon Hearn.

he doesn't seem to like it, I don't see why he just doesn't go ahead and tell his wife all about this affair.

1. Can you give me any idea why he can't make up his mind?
2. What do you think is the wisest thing for him to do assuming that for his own peace of mind he can't just forget the matter?

2. A Puzzle Problem* (The Vicar's Daughters)

The vicar gave each of his daughters eight shillings to spend at the bazaar.

"I want each of you," he said, "to buy a present for Mrs. Brown, Mrs. Jones, Mrs. Robinson, and Mrs. Smith.

"Each present bought must cost exactly one shilling or some multiple of one shilling.

"Each of you must choose a different method of dividing her eight shillings into four separate sums.

"Each old lady's presents must have cost the same aggregate sum."

The girls carried out these instructions.

Flora spent more on Mrs. Brown than on the other three ladies together.

Clara spent as much on Mrs. Smith and Mrs. Robinson as Flora spent on the other two ladies.

Marie spent more on Mrs. Jones than on any of the others, and Eva similarly spent more on Mrs. Robinson.

The fifth daughter's name is Sally.

HOW DID EACH GIRL ALLOCATE HER MONEY?

E. The Latin Square Design

Several factors combined to make the latin square a particularly advantageous experimental design**: (1) The limited number of subjects available, combined with considerations of observer economy, etc., made it impractical to consider forming more than 10 experimental groups. (2) The interest in developmental differences. (3) The extreme difficulty of equating beforehand the various human relations problems and the various puzzles. It was, of course, necessary to be able to equate or eliminate the effect of differences due to the problems in order to be able to study development. (4) The necessity, particularly in light of the small number

*The puzzle problems were taken from H. Phillips' "Brush Up Your Wits"
**I am indebted to Stanley Schacter for suggesting that the latin square design would be particularly appropriate for my purpose.

of groups, of eliminating from the error variance the effect of the non-random differences introduced by differences among groups and among pairs, differences due to the effect of "time", and differences due to the varying problems.

The latin square design achieves its precision by arranging it so that each problem occurs only once in each column (time) and in each row (group). By subtracting from the total variance of scores the variances due to differences among groups or pairs, among time (plus psychology instruction), and among problems we have remaining an error variance which is not enlargened by systematic variables.

In effect, in the course of this experiment 4 latin squares were created: (1) A cooperative Human Relations, (2) A cooperative Puzzles, (3) A competitive Human Relations, (4) A competitive Puzzles.

COOPERATIVE HUMAN RELATIONS

Groups		Meeting Number 1	2	3	4	5
I	M2-5	A	B	C	D	E
II	W2-5	B	C	D	E	A
III	W7-10	C	D	E	A	B
IV	Subs coop*	D	E	A	B	C
V	M7-10	E	A	B	C	D

COMPETITIVE HUMAN RELATIONS

Groups		Meeting Number 1	2	3	4	5
I'	Tu2-5	A	B	C	D	E
II'	Th2-5	B	C	D	E	A
III'	Th7-10	C	D	E	A	B
IV'	Subs comp*	D	E	A	B	C
V'	M9-12	E	A	B	C	D

COOPERATIVE PUZZLE

		1	2	3	4	5
I	M2-5	A'	B'	C'	D'	E'
II	W2-5	B'	C'	D'	E'	A'
III	W7-10	C'	D'	E'	A'	B'
IV	Subs coop*	D'	E'	A'	B'	C'
V	M7-10	E'	A'	B'	C'	D'

COMPETITIVE PUZZLE

		1	2	3	4	5
I'	Tu2-5	A'	B'	C'	D'	E'
II'	Th2-5	B'	C'	D'	E'	A'
III'	Th7-10	C'	D'	E'	A'	B'
IV'	Subs comp*	D'	E'	A'	B'	C'
V'	M9-12	E'	A'	B'	C'	D'

A - Barber Shop
B - The cheaters
C- World War II Vet
D - Tool and Die
E - Supervisors

A' - The Liars
B' - The Vicar's Daughters
C' - A Case of Kinship
D' - A Square in Bloomsbury
E' - The Five Pedagogues

*Due to the dropping out of one student, it became necessary to substitute two new groups to form a new pair. The substituted pair differed from the other groups in the following respect: the substituted students were all members of a regular "Introductory Psychology" section and received their psychology instruction in the meetings of their regular section.

In addition to the above 4 latin squares, 4 more were formed by subtracting Competitive from Cooperative lating squares and by subtracting Human Relations from the Puzzle latin squares. Thus: (a) Cooperative-Competitive Human Relations; (b) Cooperative-Competitive Puzzles; (c) Cooperative Puzzles-Cooperative Human Relations; (d) Competitive Puzzles-Competitive Human Relations.

The focus of this study will be primarily upon the Cooperative-Competitive latin squares; the other data will be reported more fully at a later time. At the beginning of Chapter VI there will be a section on the statistical methods used in analyzing the data.

While the latin square design is efficient in many respects, it should be noted that for certain purposes the design is uneconomical. Thus, it becomes difficult to study the interrelationship among variables with such a small number of groups. A case study approach is handicapped by the different sequence of problems experienced by each group. Consequently in this study no attempt will be made to educe the interrelationships among variables nor will the case study approach be used in an attempt to explain differences among groups.

F. The Physical Setting

The experimental group meetings occurred during the months of February and March. The meetings took place in a rather bare, quickly constructed experimental room. The make-shift and incomplete construction tended to give the room a somewhat informal atmosphere. The 5 subjects* sat around a square, composed of two rectangular tables; there were 2 chairs on every side but the side facing the observers. Just beyond the head of the table was situated a removable blackboard.

*The subjects were allowed to seat themselves as they pleased. In almost all groups, the seating remained constant from week to week.

The 4 observers sat behind a rectangular table which was approximately 5 feet away from the subject's table. No partitions separated the observers from the subjects; in effect the observers were looking directly at the subjects and the subjects were aware that this was being done. Despite this and despite the fact that several of the observers were attractive looking girls, it was apparent that the subjects soon became acclimated to the presence of observers and figuratively "forgot" that they were present. In Chapter VI some data will be presented to show how the subjects were affected by the observers.

CHAPTER V

MEASUREMENT METHODOLOGY

The history of science repeatedly demonstrates the important role that instrument development plays in furthering the advancement of science. The creation of new tools to unearth facts frequently provides the prodding necessary for the creation of more adequate concepts. The discussions of Lewin and of Lippitt have emphasized the need for a more adequate methodology in studying group life. It is becoming increasingly clear that the furthering of our knowledge about group life will to a large extent depend upon our ability to develop measurement techniques which are reliable, valid, economical, and non-disruptive of the social process being studied.

Lippitt, in his thesis, has admirably summarized the issues involved in the various approaches to observational technique. He has indicated that the determination of the size of unit is a critical problem in the development of observational methods. The disappointing results obtained by Thomas in her observational studies are attributed to her usage of categories that had little psychological meaning. Using units which were psychologically meaningful and which required considerable interpretative sensitivity on the part of the people being used as observation and recording instruments Lippitt and White had remarkably high reliability with respect to both recording and categorization of data.

In the course of the present study several observational instruments have been developed: all of them have relied very much on the sensitivity of the psychologically-oriented human observer.

Unfortunately, however, the present study can not claim to have any

particular methodological significance. Thus in constructing the various instruments, the press of circumstances made it difficult to deal adequately with the methodological problems involved in the creation of new instruments. Lack of time and funds made it impossible to have more than one observer competently trained in the use of any given instrument. The consequence is that the customary measures of reliability are lacking; fortunately, however, the experimental results themselves are prima facie evidence of sufficient reliability for most of the present purposes.

The instruments were designed with several purposes in mind: (1) primarily, to provide the possibility of testing hypotheses developed in Chapter II, (2) to provide data for a phase analysis of group problem solving, (3) to obtain sufficient data to permit the recapturing of the "raw feel" of what occurred in the group meetings, and (4) to permit quick tabulation and statistical analysis. An inspection of the instruments (see Appendix B) reveals much overlapping. Part of this overlap was caused by the differing purposes, part caused by a desire to have cross-checking data to serve as evidences of reliability and validity.

Arbitrarily, one can classify the instruments into two categories: (A) Instruments used by Observers (B) Instruments used by Subjects.

(A) Instruments Used by Observers

For most of the experiment there were four observers. The following tasks were assigned respectively to the different observers: (1) "Functions Observation Sheet", (2) "Phase Observation Sheet", (3) "Communications Observation Sheet", (4) "The Style Observation Sheet" and a clinical, descriptive recording of group process. All four observers

filled out the over-all rating scales after each problem was discussed. The data collected from "phase", "communication" and "style" observations will not be used in the present study.* "Style" observations were made for exploratory purposes in the hope of collecting material which would be useful in establishing relationships between personality and behavioral style in specific social situations. The "phase" observations were primarily collected for a purpose that is mostly irrelevant to the focus of this study. This is also partly true of the "communication" observations which were meant to serve primarily as a basis for cross-analysis with the "phases"; in addition, it was felt that the over-all communication ratings would more easily supply essentially the same results with respect to the purposes of this study.

*At this point, it may seem to have been rather uneconomical to have collected so much data that will not be used here. The only explanation is that the study was overly-ambitious for the time and financial resources available; a considerable amount of work has yet to be done. Much too much data was collected to permit all of it to be tabulated and analyzed by one person in any reasonable period of time. As a consequence it was necessary to make the decision, early in the analysis, that only those data which were immediately relevant to the major "cooperation-competition" focus of this study would be analyzed for the thesis.

In a study of this magnitude, where so much time and energy must be expended in creating experimental groups for studying under relatively favorable conditions, the temptation is very great indeed to collect as much data as you can. In fact, "experimental economy" provides itself as a rationale for collection of additional data -- "When will the opportunity again present itself to obtain so many possibilities of cross-analysis for such a small amount of extra effort and expense?" is the question you ask yourself. The "rationale" may, however, be a rationalization springing from the experimenter's insecurity - for clearly, the extra data is of little avail unless it is analyzed. Plans for the analysis and tabulation of the data not reported in this study have been made. It is hoped that future work will justify the labors expended in collecting data which is not being presented now.

The Functions Observations Sheet and the accompanying definitions appear in Appendix B. The job of the observer was to categorize each participation of the members in terms of the following: (1) Who spoke (or gestured), (2) To whom the remark was addressed, (3) The intent of the participant, and (4) Length of the participation. Arbitrarily it was decided to use the "utterance" to define a unit of participation, with the exception that if more than one function distinctly occurred in any "utterance" two or more categorizations would be made. To provide the possibility of cross-analysis with other instruments, a new "functions sheet" was used for each 5 minute period; to facilitate tabulation no attempt was made to retain sequence of utterances or the linkage who-to-whom.

The observer, using this instrument, was "trained" for approximately 30 hours before observing the experimental group meetings. Several steps were involved in the training process: (1) Familiarization with the categories and their definitions; (2) Familiarization with the observation sheet and the location of categories, etc. on the sheet; (3) Learning to perceive the intent or purpose of the participant; (4) Acquiring skill in the rapid perception and recording of intent in the discussion group situation; (5) Familiarization with the kind of content likely to occur in the experimental discussion groups.

The first two steps in training largely involved a rote memorization. The learning of the categories was very much facilitated by the fact that the observer also began to use the categories to code written material from the Bethel data. Preliminary coding of the Bethel data brought out some of the overlappings and ambiguities among the categories; this resulted in a revision of the categories so as to make them more distinctive.

Several techniques were used to help the observer acquire skill in perceiving "intent". The observer was encouraged to apply the categories to her own conversations and to the conversations of others. After the observer had done this casually for several days, a series of training group meetings were instituted. At each meeting, two or more of the Bethel coders were asked to discuss one of the human relations problems. As they discussed, the observer acquired practice in categorizing. From time to time, the discussions would be interrupted and a discussor would be asked to state what she was trying to do in her participation. The observer and the participant would then talk over their respective perceptions.

Frequently, recordings were made as the coders discussed the problems. The observer and the participants would then each categorize a short stretch of recording and discuss their respective categorizations. In addition, the observer and experimenter spent a portion of each training group meeting jointly coding and discussing the coding of the discussions.

During the experiment unanticipated problems arose from time to time. At the end of every group meeting a time was alloted for discussion to handle any such problems that might arise.

The "functions" observing is a complex, skilled job requiring a considerable amount of training for optimal performance. By the time the experimental variables were introduced, that is, after one week of observing "equating sessions", it was felt that the observer had a moderate degree of competence in the use of this instrument. After two weeks of observing, a reliability test was attempted. The experienced functions observer and a relatively untrained observer observed the same meeting -- the experienced observer recorded more than double the number of participations recorded by the novice. In such circumstances, the reliability coefficient would have no

value and thus none was computed. However, the results themselves point to sufficient reliability for most of the present purposes.

The Over-All Rating Scales were rated by each observer at the end of each problem. All of the rating scales apply to the meeting as a whole. Due to the fact that the subjects filled out rather lengthy questionnaires at the end of the discussion of the human relations problems, it became possible to use the following procedure in rating of such discussions: (1) First each observer independently made ratings, (2) Then the observers compared and discussed their various ratings, making explicit their reasons for making each rating, (3) Finally the observers each made re-ratings independently -- sometimes changing their original ratings, sometimes leaving them alone. In statistical computations the average of these second ratings have been used. There were several reasons behind the use of this procedure -- it was thought that (1) the discussions of the ratings would provide an excellent method for mutual sharpening of perceptions, (2) this method would facilitate the formation of common standards for judgment and thus make cross-analysis more feasible, and (3) ratings obtained by this method would probably be the most reliable and most valid.*

Lack of time at the end of the puzzle problems prevented inter-observer discussion of ratings, consequently the ratings used in the statistical computations are averages of the independent ratings of the observers.

In considering the various ratings, we should keep in mind that it was impossible to maintain any absolute standards. The ratings more or less

*The studies of group discussion and judgment reported in Murphy, Murphy, and Newcomb's "Experimental Social Psychology" support this belief.

presumed a standard of judgment based on experience with groups of Introductory Psychology students. Thus, the emphasis throughout will be primarily on the direction of the obtained differences rather than on size of the differences.

It has been stated that the observing instruments have considerable prima facie reliability. The evidence for this statement lies in the significant results which will be presented in the next chapter. For, unless the instruments have sufficient reliability, it is impossible to obtain significant results. The validity of the observations and ratings, however, cannot be directly determined from the results. One of the primary questions that may arise with respect to the validity of the observations would probably be concerned with a possible bias among the observers. Thus, if the observers were disposed to see the cooperative groups as being better than the competitive groups any significant results might be a reflection of this predisposition rather than of real differences.

There is no simple way to insure that the observers had no such predisposition. However, they were never told what the hypotheses were and, were instructed to make their observations and ratings independently of their knowledge that a group was exposed to the "cooperative" or "competitive" instructions. I believe these instructions were carried out faithfully and that the observers did not bias their observations in terms of any preconceptions about cooperation and competition. Two kinds of evidence support this belief: (1) Impromptu statements from the observers to the effect (a) that if they were allowed to keep the instructions in mind they would have a better interpretative frame of reference for their observations, and (b) that, after a while, they never listened to the instructions. In addition, in rather candid bull sessions at the end of the experiment the

the observers attested that their observations were not influenced by knowledge that a group was "coo" or "com" (the terms used by the experimenter in referring to the two types of groups during the course of the experiment) (2) The second kind of evidence is indirect but, in some ways, quite supportive of the belief in lack of bias. Data collected from the subjects strongly agree with the results from data collected by the observers. Since there is no reason to suspect the subjects of bias (they didn't know what the experiment was about), this is good indication of lack of bias in the observers.

(B) Instruments Used by the Subjects

It will be noted that the questionnaires filled out by the subjects, in many respects, closely parallels data obtained by the observers. The problem arises: What happens if the two kinds of data give conflicting results? Theoretically, if we assume no particular bias on the part of the observers, one should have to give preference to the data obtained from them because of (1) the superior training of the observers (2) the restricted frame of reference for judgment that is available to the subjects (only having their own meetings as a basis for establishing standards). Yet there would be much resistance engendered to the acceptance of tests of hypotheses based on observer data, if this data were not in agreement with data collected from the subjects. One would question the assumption of lack of bias in the observers. Fortunately, in this study, the data collected from observers and subjects supported each other.

Several instruments were used by the subjects: (1) A fairly long (15 to 25 minutes) questionnaire which was filled out every meeting after discussion of the Human Relations problems. (2) Personality Rating Scales - Each member had to rate every other member, himself, and his expectations with

respect to how the others would rate him in various "personality" characteristics. These ratings were made during the first and last experimental meetings only. This data will not be reported in this study. (3) One week after the end of the experiment the subjects filled out a questionnaire which had as its purpose the collection of miscellaneous information.

All of these instruments appear in Appendix B, appropriately labelled.

In addition to the foregoing, other data collected in the course of this study include:

1. Tests of Subject
   a. The A-S Reaction Study
   b. The Wide Range Vocabulary Test
   c. The Fraenkel-Brunswick, Sanford, et al Ideology Scales
   d. The Runner-Seaver Personality Test
2. Background Data About Each Subject
3. The Grades of the Subjects on Various Introductory Psychology Papers.

(c) The Hypotheses and the Measures Relevant to Their Testing

Hypotheses		Relevant Measures		
		BASIC HYPOTHESES		
1A	Indiv coop will perceive themselves to be more promotively interdependent than Indiv comp	A* - 4c;	C-10	D-12(b)-f
B	Indiv comp will perceive themselves to be more contriently interdependent than Indiv coop	A - 4c;	C-16a	D-12(b)-c
2	Greater substitutability for similarly intended actions among Indiv coop than among Indiv comp	See homogeneity and specialization of function hypothesis		
3	Higher percentage of actions of others positively cathected by Indiv comp	See Interpersonal relations hypothesis		

*From the point on the letter "A" will be used to refer to the over-all Rating scales, "B" to Functions Observations, "C" to the Weekly Questionnaires, and "D" to the post-Experiment Questionnaire.

3A	Higher percentage of actions of others negatively cathected by Indiv comp than by Indiv coop	
4	Greater positive inducability among Indiv coop	See Motivation, Orientation, Communication and Interpersonal Relation Hypotheses
A	Greater internal (self) conflict among Indiv comp	
5	Greater helpfulness among Indiv coop	See Interpersonal relations and Communication Hypotheses
A	Greater obstructiveness among Indiv comp	

ORGANIZATIONAL HYPOTHESES

6	At any given time, more coordination of efforts among Indiv coop	A - 4/
A	Over a period of time, more frequent coordination of efforts	A - 3, C11
7	Greater homogeneity in amount of contributions among Indiv comp	B
8	Greater specialization of function among Indiv coop	B
9	Greater specialization with respect to content or activity among Indiv coop	From bottom of "communications" sheet
10	Greater structural stability among Indiv coop	Not considered in this study, but is obtainable from B and C-17
11	Greater organizational flexibility among Indiv coop	

MOTIVATIONAL HYPOTHESES

12	The directions of the forces operating on Indiv coop would be more similar than the directions of forces operating on Indiv comp	See productivity hypothesis C-76
13	The directions of the forces operating on Indiv coop would be more	A - 4h, D12a

14	The group force in the direction of the goal in a cooperative group will be stronger than such a group force in a competitive group	See productivity hypothesis
15	There will not be a significant difference in strength of force operating on Indiv coop and Indiv comp	A - 4d, C-9

COMMUNICATION HYPOTHESES

16	When the task structure is such that production in quantity of signs observable to the group is perceived to be a means of locomotion, there will be greater sign production among Indiv comp	$B_{(HR)}$, C3
17	When the task structure is such that locomotion is possible without the production of observable signs, there will be a greater total production of such signs by Indiv coop	$B_{(puzzle)}$
18	Less attentiveness among Indiv comp	A - 4g, C5
19	Less common significata among Indiv comp	A - 4c, C6, C4
20	Less common significata among Indiv comp even when attentiveness is optimal	
21	More common appraisals of communications among Indiv coop	A - 4j, $B_{Follower}$, $B_{Eval-critic}$, C-7a, C-8a

ORIENTATION HYPOTHESES

22	Indiv coop will have more knowledge about its active members than will the Indiv comp	See Interpersonal Hypothesis
23	More group orientation among Indiv coop	A - 4e, A2

PRODUCTIVITY HYPOTHESES

24	Indiv coop will produce more per unit time than will Indiv comp	Words in written products
A	Less time will be taken by Indiv coop to produce a given product than will be taken by Indiv comp	Time taken to solve puzzles
25	Higher qualitative productivity by Indiv coop	A - 1, A1a, rankings of written products
26	Indiv coop will learn more from each other than will Indiv comp	C15, D6, Grades on 1st paper

INTER-PERSONAL RELATIONS HYPOTHESES

27	More friendliness among Indiv coop	A - 4a, D-1, D-2, D-3, C14
28	Group and group products will be evaluated more highly by Indiv coop	C - 12, C-1
29	Greater percentage of group functions among Indiv coop	B
30	Greater percentage of indiv functions among Indiv comp	B
31	More realistic perception of attitudes of others among Indiv coop	C (Will not be tested in this study)
32	Greater similarity in perception of self functioning and in others' perceptions of functioning	C
33	Indiv coop will perceive themselves as having more favorable effects	C - 8a, C8b, C13b
34	Greater incoporation of the attitude of the generalized others by Indiv coop	D - 12b (e,i)

CHAPTER VI

THE EXPERIMENTAL RESULTS

A. A Note on the Statistical Analysis

The latin square design of the experiment dictates the statistical techniques to be used in analyzing the data regularly collected at each experimental session. In brief, the following procedure was used for this kind of data: (1) Each score, obtainable from the data, was placed into its appropriate cell. For the data collected from the observing instruments, this resulted in four latin squares for each variable -- a Coop H.R., a Coop Puzzle, a Comp H.R., and a Comp Puzzle. For the weekly questionnaire, there were no puzzle latin squares. (2) Latin squares composed of difference scores were then obtained by making the appropriate subtraction: Coop H.R.- Comp H.R., Coop Puzzle - Comp Puzzle, Coop Puzzle - Coop H.R., and Comp Puzzle - Comp H.R. (3) Then using standard procedures (33), the variance was analyzed into four components -- variance due to pairs, problems, past amount of experience, and to error. When the error variance would have been unnecessarily enlarged by decreasing its degrees of freedom without decreasing its sum of squares (in the attempt to eliminate the effect of a variable which had no discernible effect), it was customary to remove from the total variance only those variables having discernible effect. (4) The error variance was then taken to be an estimate of the variance of the population from which the pairs were drawn. From the variance of the population, the standard error of the mean is computed, according to the equation $\sigma_M = \sqrt{\frac{\sigma_{pop}}{n}}$ (5) A "t" test is then done by dividing the mean difference between paired groups by the σ_m. The probability of obtaining a difference of such size is

then looked up in the "t" tables, using the same degrees of freedom that were used in computing the error variance. (6) The probabilities obtained for the five pairs (if the direction of the differences were the same) were then combined according to the formula (11): $M=2\sum \log_e p$, M being distributed in the form of Chi-square with degrees of freedom equal to twice the number of probabilities being combined. When the differences in four of the pairs went in one direction, and one of the pairs in the opposite direction, probabilities were combined after assigning a probability of 1.00 to the divergent pair.

The foregoing procedure is, in some respects, a cautious test of the hypothesis under investigation since the hypotheses predict not only that there will be a difference but that the difference will be in a given direction.

Results

B. The Instructions

It is perhaps important to start out by inquiring about the reactions of the subjects to the two different sets of instruction. Clearly, if the instructions never "got over", one could reasonably question the efficacy of the instructions in producing differences.

All subjects* when requested (see D-13) to "describe the method by which they were being graded on the human relations problems" responded

*Not all subjects took the post-experiment questionnaire. The substituted groups were unable to take them and one "cooperative" subject was absent. Thus, four competitive groups totaling twenty filled out this questionnaire, and four cooperative groups totaling nineteen ... all in all, making it a total of 39 subjects who took the questionnaire.

with an appropriate description. That is, everyone of the thirty-nine subjects filling out the questionnaires understood and could recall the essentials of the instructions to which they were exposed at every meeting.

In answer to question, D-14c, "If you would have had completely free choice as to the method of grading discussion in class, which would you have preferred?" the following results were obtained:

Grading method preferred:	Cooperative	Competitive	No preference
By Indiv coop	11	6	2
By Indiv comp	6	11	3

Since there is no reason to suspect that these differences existed at the beginning of the experiment, one can conclude that roughly the same percentage of individuals were satisfied with the method of grading to which they were exposed. However, from D-14a: "How much did you like the method by which you were graded?" the following results were obtained:

The difference (cooperative-competitive) between paired groups*:

Pair 1	Pair 2	Pair 3	Pair 5	M	σ_m	t	p
/.9	/.6	/.2	/1.6	/.83	.229	3.71	.05-.02

These results indicate that the intensity of satisfaction with the grading system tended to be higher among Indiv coop than among Indiv comp.

Clearly, then, the instructions "got over" to the subjects in both kinds of groups and further they "got over" in such a way as to seem satisfactory to approximately the same percentage in both groups. The

*For the data from the post-experimental questionnaire the following procedure was generally used: (1) the ratings made by the members of a group were averaged, (2) the difference between the average ratings were then computed for the paired cooperative and competitive groups. (3) A routine "t" test was then performed to test the null hypothesis that the mean of the distribution of differences did not deviate significantly from zero.

The above procedure through relatively crude (in that no advantage is taken of the "within cell" variance) was deemed adequate for demonstration of the more obvious differences.

importance of this latter point lies in the possibility that if disapproval of the grading system occured in sufficient strength, the nature of the social situations might be changed markedly enough to make the experimental variables impotent.

C. Perceived Interdependence

One of the basic hypotheses of this study, Hypothesis I, asserts that Indiv comp will perceive themselves to be more contriently interdependent than will Indiv coop. Table I presents some relevant data.

The data reveals that group-centeredness ("we -feeling") was rated by the observers to be considerably higher in the cooperative groups for both the puzzles and the human relations problems. The ratings of the subjects, in the questionnaire pertaining to the human relations problem, are in the same vein. The Indiv coop give themselves credit for more "group-feeling" than do the Indiv comp. These differences with respect to "group-centeredness" and "group-feeling" are significant at the .1% level for both the puzzles and human relation problems. Thus, if we accept these measures as appropriate empirical coordinations, the evidence gives support to the first part of Hypothesis I (perceived promotive interdependence).

The second part of the hypothesis (perceived contrient interdependence) is partly supported by the same evidence that supports the first part of the hypothesis. Thus, the competitive group members were rated to be more self-centered (A-4c) by the observers; in addition, the Indiv comp rated themselves as being more self-oriented (c-10) than did Indiv coop. This is, of course, but a restatement of the data previously cited; it supports the second part of the hypothesis only insofar as the second part is the mirror-image of the

TABLE 1: Data Relevant to Hypothesis 1

Variable	High end of scale	Comparison	Pair 1 Mdiff	Pair 1 p	Pair 2 Mdiff	Pair 2 p	Pair 3 Mdiff	Pair 3 p	Pair 4 Mdiff	Pair 4 p	Pair 5 Mdiff	Pair 5 p	Total * Mdiff	Total * p	* σ_M	* d.f
Group-centeredness A-4c	1	Coop-Comp H.R.	-3.44	(001)	-2.50	(005)	-2.24	(01)	-4.44	(001)	-2.28	(005)	-2.98	(001)	.629	12
"	1	" P.	-3.41	(005)	-3.86	(001)	-2.46	(01)	- .80	(35)	-2.18	(02)	-2.54	(001)	.825	24
"	1	P-H.R. Coop	/1.30		- .18		/ .9		/3.34		- .18		/ .93	not sig		
"	1	P-H.R. Comp	/1.06		/1.18		/ .52		- .30		- .24		/ .45	not sig		
Group-feeling C-10*	9	Coop-Comp H.R.	/1.88	(01)	/2.12	(005)	/ .20	(73)	/1.0	(25)	/ .70	(22)	/1.20	(01)	.539	13
Competitiveness C-16a*	1	Coop-Comp H.R.	- .52	** (23)	/ .66	(13)	- .64	** (14)	/2.0	(01)	/1.34	(01)	/ .37	** (02)	.392	13
			diff		diff		diff				diff		diff			d.f.
Desire to excel others(D-12b)	1	Coop-Comp H.R.	/2.8		/3.6		/1.2				/1.6		/2.30	(03)	.548	3
" "	1	Coop-Comp P	/3.0		/2.2		/1.2				/2.4		/2.20	(01)	.370	3

Footnotes to TABLE 1

Mdiff = Av of the differences between a paired cooperative and competitive group for the 5 sessions.

Total Mdiff = Av of the differences among the 5 paired cooperative and competitive groups for the 5 sessions.

p = probability of obtaining a difference of this size by chance

H.R. = Human Relations

P = Puzzles

** = A pair going in the opposite direction.

*The members of Pair 4, the substituted pair, only filled out "C" questionnaires the first and last meetings. The necessary corrections were made in computing the σ_M and the p for this pair. The presented σ_M does not apply to Pair 4 for the C-instrument.

**This "p" was computed, using 100 as the "p" for the pairs going in the opposite direction.

first part. "Self-centeredness" (which is defined to be the opposite of "group-centeredness") seems to include in it the emphasis on the "I" as being distinct, in purpose and activity, from "the others"; one would expect "self-centeredness" to be higher when there is "perceived contrient interdependence". However, "perceived contrient interdependence" seems to include, in addition, the notion of "I" versus "the others". To measure this component, the subjects were asked (C-16a): "How competitive with the other members in your group did you feel you were during the discussion (of the human relations problem)?"

The results obtained here are not so conclusive, though they tend to support the hypothesis (see Table 1, "competitiveness"). Two groups support the hypothesis at the 1% level; one group supports it at the 13% level; two groups reject the hypothesis at the 14% and 23% level respectively. Combining probabilities* (assigning a "p" of 100 to the two rejecting groups) total "p" comes out to be significant at the 2% level. Somewhat surprised by the lack of clean-cut results with respect to this question the author queried a sampling of the Indiv coop as to what they meant by "competitiveness" when they made their rating. Several responded that when they indicated that they felt competitive they meant that they felt an obligation to do their equal share in helping the group to move along. Thus, it seems probable that the lack of clean-cut results is a reflection of the differing interpretations placed on the word "competitiveness" by Indiv coop. This interpretation is supported by the fact that when the phrase "desire to excel others" was used on the post-experimental questionnaire significant differences were obtained in the direction predicted by the hypothesis.

*Combining probabilities this way is a somewhat dubious procedure. Its rationale is that the hypothesis asserts direction of difference, and using the full scope of the hypothesis makes it less easy for the reader to fall into the trap of equating lack of rejection of the null hypothesis to disproof of the hypothesis under scrutiny.

To sum up, the data strongly supports the first part of Hypothesis 1 and supports, but not so strongly, the second part. Also, it is interesting to note that there is a tendency for both the cooperative and competitive subjects to be less grou-centered in the puzzle discussions than in the discussions of the human relations problems.

D. Organization

1. Coordination of Efforts

From the basic hypothesis with respect to inducibility it was derived that there would be a greater degree of coordination of efforts and that coordination would occur more frequently among Indiv coop than among Indiv comp (Hypothesis 6). Table 2 presents the relevant evidence.

The observers rated that the cooperative groups worked together more frequently (A-3) and were more highly coordinated (A-4f) than were the competitive groups. These differences are significant at the .1% level for both kinds of problems. In answer to the question (c-11): "How cooperatively did the group work together on this problem?", the ratings of the Indiv coop indicated more working together than did the ratings of the Indiv comp. This difference is also significant at the .1% level.

Thus, clearly, the data gives rather definite support to Hypothesis 6. The structure of the problems, also clearly, has definite effects on coordination of activities. Both the cooperative and competitive groups exhibit less coordination of efforts in their approach to the puzzles than in their discussion of the human relations problems.

2. Homogeneity of Participation (Hypothesis 7)

From the basic substitutability hypothesis it was derived that

TABLE 2': Data Relevant to Hypothesis 6

Variable	High end of scale	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f.
Frequency Work together (A-3)	1	Coop-Comp H.R.	-2.78	(001)	-1.94	(01)	-1.88	(01)	-3.66	(001)	-1.82	(02)	-2.42	(001)	.580	12
" "	1	" P	-2.32	(01)	-3.96	(001)	-1.12	(06)	-1.94	(03)	-2.64 **	(01)	-2.68	(001) **	.795	24
" "	1	P-H.R. Coop	/2.16	(001)	/ .22	(15)	/1.24	(03)	/1.20 **	(04)	- .46	(38)	/ .85	(001) **	.512	20
" "	1	" Comp	3.42	(005)	/2.08	(01)	/ .98	(17)	- .32	(67)	/ .36	(57)	/1.10	(01)	.659	16
Degree of coordination (A-4f)	1	Coop-Comp HR	-3.66	(001)	-2.00	(05)	-2.14	(005)	-3.36	(001)	-1.94	(01)	-2.62	(001)	.516	12
" "	1	" P	-3.32	(005)	-3.44	(001)	-1.72	(04)	-2.26	(01)	-2.10 **	(02)	-2.57	(001) **	.780	24
" "	1	P-HR Comp	-1.54	(02)	0	(100)	/1.04	(11)	/1.08 **	(09)	- .06	(93)	/ .72	(07) **	.680	20
" "	1	" Coop	/1.2	(05)	/1.44	(02)	/ .62	(25)	- .02	(98)	/ .1	(85)	/ .67	(08)	.546	12
Group cooperation * (C-11)	1	Coop-Comp HR	-1.66	(005)	-1.36	(01)	- .16	(73)	-2.35	(01)	-1.7	(005)	-1.18	(001)	.420	13

'In this, and all the subsequent tables, the symbols and asterisks have the same meaning as indicated in the footnotes to Table 1.

there would be less homogeneity with respect to amount of contribution among Indiv coop than among Indiv comp. On the face of it, this hypothesis would appear to run counter to commonsense impression. Let us examine a little more closely the considerations lying at the base of the common-sense impression to see how they apply to the present experiment conditions.

There appear to be two basic notions involved in the common-sense impression: (1) That the more threatening atmosphere of the competitive situation will make it more difficult for timid individuals to participate. (2) That cooperation implies equality of participation. There is some validity to each of these notions.

From the present theory one should be able to predict that the competitive situation would be more stressful for certain kinds of personalities than would the cooperative situation. The consequence of the stress might be a restructuring of goals and a withdrawal, with the result that the withdrawn individual would no longer be in a competitive situation. Presumably, the withdrawn individual would no longer "compete" with the effect that the homogeneity of participation would be low in competitive groups (though, under certain circumstances, the effect of partial withdrawal might be to lessen ego-vulnerability and thus permit the "timid" individual to participate more freely). However, the present experimental conditions operating on reasonably well-adjusted individuals with a modicum of ego-strength made "withdrawal" rather unlikely.

The second notion also has some validity, in the sense that there are certain kinds of group situations in which the actions or words of another cannot readily function as a substitute for one's own actions or words. For example, various kinds of "self-expression", "get acquainted", and "therapy"

TABLE #3: Data Relevant to Hypothesis 7

Variable	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 Mdiff	p	Pair 5 Mdiff	p	Total Mdiff	p	σ_M	d.f
Homogeneity of Participation (B)	Coop-Comp H.R.	ƒ826	(67)	ƒ3777	(07)	ƒ3104	(135)	ƒ7563	(005)	-2305**	(16)	ƒ2593	(03)**	1913	12
" "	Coop-Comp P	ƒ184	(70)	ƒ722	(12)	ƒ871	(11)'	ƒ792	(96)	ƒ31	(96)	ƒ518	(18)	469	23'

' One score is missing from this row due to a student's absence during the puzzle discussion

situations might induce forces on each individual to participate without allowing much in the way of substitutability. It seems evident that the task-oriented nature of the present experimental sessions were situations which permitted substitutability.

The data presented in Table 3 provides the evidence relevant to Hypothesis 7. The variance in amount of contributions among members has been used as the measure of homogeneity of contribution. The differences between variances of paired groups were then entered as scores in the latin square and the customary statistical treatment was made. This procedure violated the mathematical assumptions at the base of the analysis of variance technique but, even so, it seemed the most feasible technique to use in lieu of "F" tables for all levels of confidence.

The data gives support for the hypothesis, although the results are not conclusive. In both the puzzles and human relations problem there is greater homogeneity of participation within competitive groups. Four out of the five pairs in the human relations problem and all of the five pairs in the puzzles go in the direction predicted by the hypothesis. If direction of difference were to be considered in the statistical test of the hypothesis, the differences between cooperative and competitive groups for both the puzzles and human relations problems would be significant at the 1% level.

3. Specialization (Hypotheses 8 and 9)

A cursory inspection of the data collected by the functions observations sheet revealed that to test Hypothesis 8 (Specialization with respect to function) it would be necessary to treat the data via the latin square. Individuals varied too much in functions from meeting to meeting to permit any combination of the data for treatment in terms of the five sessions. This placed the experimenter in a dilemma, since he had the impression that the

TABLE 4: Data Relevant to Hypothesis 8

Variable	Comparison		Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 Mdiff	p	Pair 5 Mdiff	p	Total Mdiff	p
Specialization of function with respect to	Coop-Comp	H.R.												
" Orienting (B)	"	"	ƒ387.4		-27.6		-7.6		-326		ƒ432.2		ƒ150.4	
Energizing (B)	"	"	ƒ32.0		-4.2		ƒ20.8		ƒ23.0		-41.6		ƒ7.6	
Coordinating (B)	"	"	ƒ100.6		-17.8		ƒ59.8		ƒ789.8		-4.0		ƒ292.9	
Information asking (B)	"	"	ƒ55.0		ƒ56.4		ƒ78.8		ƒ50.4		-22.8		ƒ73.6	
Information giving (B)	"	"	ƒ86.6		ƒ388.4		ƒ38.4		ƒ498.0		ƒ98.6		ƒ222.0	
Elaboration(B)	"	"	ƒ330.0		ƒ228.2		ƒ2.0		-193.0		ƒ178.2		ƒ109.1	
Initiation (B)	"	"	ƒ31.6		-19.8		ƒ91.6		ƒ34.4		ƒ220.8		ƒ71.7	

functions data were not sufficiently reliable to make it worthwhile to engage in the refined analysis necessary for the test of this hypothesis. The lack of reliability is of significance primarily due to the small number of participations that any individual would have in a given category per meeting. Observer error in combination with the small frequencies would make it most difficult to demonstrate significant differences. Despite these considerations, compulsiveness made the experimenter go through the detailed analysis. The data are presented in Table 4.

The data were obtained by the following procedure: The frequencies with respect to each function, per member, were converted into percentages of the member's total number of task contributions. The variance in member percentages were then computed and the customary latin square of the differences between paired groups was then constructed.

As was expected the data reveals no clear-cut significance. The actual "p's" were not computed because on inspection it was clear that the error variance would be too large to permit of any significance.

The evidence relevant to specialization with respect to content or activity (Hypothesis 9) is much more clear-cut. Table 5 presents the data. The results definitely indicate that with respect to the job of writing the letter of recommendations, asked for in the human problems, there were significantly more instances of division of labor in the cooperative groups than in the competitive groups. Faced with the problem of achievement in a limited amount of time, cooperative members were able to organize themselves so as not to duplicate each other's efforts. Substitutability of one for the other permitted the members to divide up the job into its different aspects and allowed the various members to work on these components simultaneously.

TABLE 5

The Maximum Number of Persons Who were Simultaneously Engaged in Writing Recommendations For the Human Relations Problem

Meeting Number

	1		2		3		4		5	
Coop 1		1		3		2		3		4
Comp 1	A	1	B	1	C	1	D	1	E	1
Coop 2		3		1		3		3		3
Comp 2	B	1	C	1	D	1	E	1	A	1
Coop 3		1		3		2		1		1
Comp 3	C	1	D	3	E	1	A	1	B	1
Coop 4		3		4		3		3		3
Comp 4	D	3	E	2	A	2	B	1	C	2
Coop 5		1		1		2		3		2
Comp 5	E	1	A	1	B	1	C	1	D	1

In the competitive situation writing was usually done in either of the two following extremes: (a) one man was assigned the job, usually on the basis of a rotation scheme, and the other members took an active part in supervising the writing. The getting of ideas into written form was seen as a path, thus everyone was actively concerned with what was being written. Since the number of pages, always less than five, prevented the possibility of any compromise -- "we each do one" -- (due to lack of substitutability) it was necessary for all to focus on the same activity. As a consequence, it was rare that two members were writing simultaneously. When two or more recorders are shown in the competitive groups, their time of writing did not overlap much. This is not at all the case for the cooperative groups. (b) Some conscientious member took the form and wrote up recommendations while the others discussed. The discussants showed no interest in the write-up, never examining it, their whole attention being directed to the discussion. The written product was more or less considered an irrelevant side issue for some conscientious soul to handle. It was not seen as a necessary path, thus it was perfectly permissible for anyone who wished to do so to take over the function of writing.

Similar data was not, unfortunately, collected for the puzzle problem. The experimenter, however, had the definite impression that a "formal" decision to take different approaches to the group problem occurred not infrequently in the cooperative groups but did not occur at all in the competitive groups.

E. Motivation

Hypothesis 12 asserts that the directions of the forces operating on Indiv coop should be more similar than the directions of the forces

operating on Indiv comp. If this hypothesis is correct one should expect greater speed in group locomotion for the cooperative groups. The data with respect to locomotion is presented under "Productivity" (Section H); the data gives strong support to the hypothesis.

The validity of the hypothesis presupposes the validity of the basic hypothesis with respect to posivie inducibility. The following questions (c-7a)and 7b): "How did you react to the ideas or suggestions of others?" and "How frequently was your own thinking or reaction affected by what the others were saying?" Table 6 indicates that the Indiv coop were affected by the ideas of others, significantly more often than were Indiv comp. Table 2 indicates, further, that the Indiv coop were markedly more agreeable and acceptant towards the ideas initiated by others. These two sets of facts provide direct support for the basic hypothesis with respect to positive inducibility and indirect evidence for Hypothesis 12.

From Hypothesis 13 one would predict that there would be more achievement drive in the cooperative groups than in the competitive groups. The ratings of the observers and of the subjects both produce significant differences in the predicted direction for the human relations problem. The direction of the differences obtained for the puzzles is in line with the hypothesis, but the size of the differences are not significant. Several reasons may be at the base of this latter lack of significant difference: (1) The strength of forces acting on the individual in the puzzle situation are high (significantly higher than the forces acting in the human relations situation -- see Table 7), so that it becomes difficult to demonstrate relatively small differences with such a few cases. (2) The structure of the puzzle problem, in contrast to the human relations problem, permits the individual to locomote without consensus. This, the results have indicated,

TABLE 6: Data Relevant to Hypotheses 12 and 13

Variable	High end of scale	Comparison		Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4' * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f.
Effect of others ideas' (C-7b*)	1	Coop-Comp	H.R.	/.50	(15)	/.42	(22)	/1.26	(005)	/1.1	(05)	/.80	(03)	/.78	(001)	.321	13
Achievement Pressure (A-4h)	1	Coop-Comp	H.R.	-2.18	(001)	-.36	(45)	-1.12	(04)	-1.24	(03)	-.08	(85)	-1.00	(01)	.467	12
"	1	"	P	-.2	(68)	-.6	(24)	-.8	(13)	-1.1	(04)	/.24	(66)**	-.49	(15)	.497	24
"	1	P-HR	Coop	-.20		-.26		-.60		-.18		/.16		-.22	not sig		
"	1	"	Comp	-1.66	(01)	-.02	(98)	-.96	(13)	-.32	(58)	-.16	(78)	-.62	(15)	.58	16
				diff		diff		diff				diff					
Strength of motivation to achieve (D-12a)	9	Coop-Comp	H.R.	/1.2		/.60		/.80				/.70		/.83	(01)	.126	3
"	9	"	P	/.70		/1.1		-1.8				/.80		/.20	not sig		

'Individuals in Pair 4 did not fill out the post-experimental questionnaire

TABLE 7: Data Relevant to Hypothesis 15

Variable		Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Midff	* p	Pair 5 Midiff	p	Total * Mdiff	* p	* σ_M	* d.f.
Involvement (A-4d)	1	Coop-Comp H.R.	-.84		∤.88		∤.28		-.78		∤1.22		∤.15	not sig		
"	1	" P	-.18		∤.10		∤.86		-.60		∤.96		∤.23	not sig		
"	1	P HR Coop	-1.36	(04)	-1.68	(015)	-1.16	(08)	-.50	(35)	-.13	(68)	-1.08	(02)	.623	20
"	1	" Comp	-2.02	(001)	-1.1	(08)	-1.1	(08)	-.38	(53)	-.22	(75)	-.96	(05)	.597	20
Interest (C-9)*	1	Coop-Comp H.R.	-1.06		∤.52		∤.24		-.60		∤.62		-.10	not sig		

facilitates individual working. In individual work the person is oriented more toward achievement (reaching the task solution) than he is in a competitive group discussion. As a consequence, the direction of the force acting on the competitive individual in the solution of the puzzles is more task oriented than during the discussion of the human relations problems and not much less task oriented than is the cooperative individual.

Hypothesis 15 states that there is nothing inherent in the cooperative or competitive situations (in isolation from other systems) which should produce differences in the strength of force operating on the individuals in either situation. "Interest" or "involvement" is considered to be an operational measure of total situationally relevant forces. The hypothesis, as stated, is the null hypothesis and, therefore, not amenable to the customary statistical devices in establishing a level of confidence for its acceptance. The data of table 7 clearly provides no basis for rejecting the hypotheses; the differences between cooperative and competitive groups with respect to involvement or interest in the problem at hand are negligible.

However, both the cooperative and competitive groups were rated to be significantly more involved in the puzzle problems than in the human relations problems. A reasonable explanation for this result perhaps lies in the characteristics of the subjects. All of the subjects were engineering students; perhaps liberal arts students might have had just the opposite interests.

F. Communication

In Chapter II, hypotheses were developed with respect to four aspects of the communication process: (1) The Production of Signs, (2)

The Attentiveness of the Communicatee to the Signs Produced and (3) The Creation of Common Signification, (4) Appraisal of Signs.

(1) The Production of Signs

Hypotheses 16 and 17, in effect, assert that the volume of participation of the competitive as contrasted to the cooperative groups will be (Hypothesis 16) greater for the human relations problem, and (Hypothesis 17) fewer for the puzzles. The relevant data are presented in Table 8.

The evidence for Hypothesis 17 is clearly confirming, the difference being significant at the .1% level. The data for Hypothesis 16 is not so clear-cut. Three of the groups support, two of the groups do not; the combined probabilities are significant at the 5% level. The hypothesis was derived from the basic substitutability hypothesis and some additional assumptions which included the following: the task demands are such "that quantitative efforts do not seriously interfere with qualitative efforts, or that if they do, quantity is seen to be as, or more important than, quality" (Chapter II). The instructions which emphasized both quality and quantity may have resulted in some ambiguity of interpretation, so that the preceding assumption did not hold true for all the Indiv comp. This, of course, would make it more difficult to demonstrate the validity of the hypothesis under scrutiny.

It is interesting to note that, according to expectation, there is significantly less participation volume in the puzzles than in the human relations problems. However, this difference is not nearly so marked for the cooperative as for the competitive groups. The difference in differences would clearly be significant at the .1% level and is in line with what one

TABLE 8: Data Relevant to Hypotheses 16 and 17

Variable	Comparison	Pair 1		Pair 2		Pair 3		Pair 4		Pair 5		Total Mdiff	p	σ_M	d.f.
Participation' Volume (B)	Coop-Comp H.R.	-82	(007)	≠8.4	(73)	-32.2	(20.5)	≠41.6	(12)**	-50	(063)	-22.8	(05)**	24	12
"	" P	≠114	(03)	≠178	(001)	≠153	(01)	≠93	(06)	≠52	(27)	≠118	(001)	46	24
"	P-HR Coop	-33	(19)	≠2.1	(93)	≠7.0	(77)**	-78.7	(007)	-53.5	(045)	-31.3	(04)**	24.3	16
"	" Comp	-245	(001)	-156	(001)	-144	(001)	-131	(001)	-155	(001)	-166	(001)	33.5	24

'Participation Volume has the meaning of Total Number of Participation per 45 minutes. Thus all the participation volumes are equaled in terms of a constant time unit.

should expect from Hypotheses 16 and 17.

(2) Attentiveness to Signs

From the basic hypothesis with respect to helpfulness it was derived that there would be less attentiveness to each other's production of signs among Indiv comp than among Indiv coop (Hypothesis 18). Table 9 supplies the information necessary to test this hypothesis.

The observers rate (A-4g) Indiv coop to be significantly more attentive to each other than the Indiv comp for both kinds of tasks. The ratings by the subjects of their own attentiveness (c-5) also tend to support the hypothesis.

The structure of the task apparently influences attentiveness. The puzzle problems which permit of more individual action results in markedly less attentiveness when individual activity does occur, as, for example, in the competitive groups. In the cooperative groups there is also a tendency for less attentiveness in the puzzles; the tendency, however, is not so marked.

(3) Common Signification of Signs

Hypothesis 19 and 20 assert that there will be less common signification between communicators and communicatees among Indiv comp than among Indiv coop, or in other words, that there would be a greater amount of communication difficulties in competitive groups than in cooperative groups. The relevant data is presented in Table 10.

The data reveals that the observers rated that there were significantly greater communication difficulties among Indiv comp than among Indiv coop. Further support for Hypothesis 19 (no independent test of Hypothesis 20 is possible in this study) is obtained from the subjects. In answer to the question (c-4): "Did you find that you had difficulty in getting your ideas

TABLE 9: Data Relevant to Hypothesis 18

Variable	High end of scale	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f.
Attentiveness (A-4g)	1	Coop-Comp H.R.	-.88	(09)	-.60	(24)	-.48	(35)	-2.46	(001)	-.80	(13)	-1.04	(01)	.496	16
"	1	" P	-1.78	(01)	-2.48	(001)	-1.40	(03)	-.36	(53)	-1.90	(01)	-1.50	(001)	.569	24
"	1	P HR Coop	/.34	(41)	/.04	(93)	-.40	(33)**	/1.4	(01)	/.26	(53)	/.33	(30)	.404	20
"	1	" Comp	/1.32	(04)	/1.92	(005)	/.52	(35)	-.30**	(59)	/1.34	(04)	/.96	(01)	.557	16
Attentiveness (C-5*	9	Coop-Comp H.R.	/.88	(04)	/.96	(03)	/.08	(74)	-.40**	(83)	-.40**	(83)	/.42	(11)	.390	13

across to others?", the ratings of the Indiv comp expressed significantly more difficulty than did the ratings of the Indiv coop. The same results were obtained in answers to the following question (c-6): "Did you find that you had difficulty in trying to follow or get the point of what the others were saying?" Thus, the competitive subject experienced more difficulty with respect to the spread of common signification, both in the roles of communicators and communicatees.

Thus, the data provides striking support for the hypothesis being examined.

The structure of the problem appears to have differential effects on cooperative and competitive groups. Relatively more communication difficulty is experienced by the cooperative groups in their discussion of the puzzles than in their discussion of the human relations problems. For the competitive groups, task structure produces no difference in communication difficulty. This latter result probably reflects the fact that difficulties in communication are sufficiently high in the discussion of the human relations problem so that increased obstacles (due to task structure) will not be able to have much of an effect.

(4) The Appraisal of Signs

Hypothesis 20 asserts that there will be more common appraisals of communications in the cooperative groups than in the competitive groups. Table 11 presents the evidence for the hypothesis.

The observers rate that there is more acceptance of each other's ideas in the cooperative groups than the competitive groups in both kinds of tasks. Differences are significant at the 1% level or better. The ratings by the subjects also strongly support the hypothesis. In answer to the question:

TABLE 10: Data Relevant to Hypothesis 19

Variable	High end of scale	Comparison		Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f
Communication Difficulties (A-4c	1	Coop-Comp	H.R.	ƒ2.18	(005)	ƒ1.9	(01)	ƒ1.62	(01)	ƒ2.48	(005)	ƒ1.32	(03)	ƒ1.94	(001)	.537	12
"	1	"	P	ƒ1.52	(07)	ƒ2.44	(01)	ƒ.68	(38)	ƒ.62	(35)	ƒ1.70	(04)	ƒ1.39	(01)	.781	24
"	1	P-HR	Coop	-1.32	(015)	-.46	(35)	-.42	(39)	-.60	(23)	-.44	(37)	-.65	(07) not sig	.494	20
"	"	"	Comp	-.66		-1.1		ƒ.52		ƒ1.22		-3.1		-.13			
Difficulty in communicating to others (C-4)*	1	Coop-Comp	H.R.	ƒ.44	(22)	ƒ1.28	(005)	ƒ.12	(73)	ƒ2.2	(001)	ƒ.84	(03)	ƒ.81	(001)	.335	13
Difficulty in understanding others (C-6)*	1	Coop-Comp	H.R.	ƒ.76	(005)	0	(100)	ƒ.40	(07)	ƒ1.7	(001)	ƒ1.1	(001)	ƒ.67	(001)	.205	13

"How did you react to the suggestions of the others?" and "How did the others tend to react to your ideas or suggestions?", the ratings made by the Indiv coop indicate significantly more agreement with the ideas and suggestions of others, as well as perception of more agreement by others.

Two categories on the functions observation sheet, "evaluator-critic" and "follower", also provide some relevant data. However, it should be kept in mind that both of the categories may contain a few items which are not specifically related to the notion of "common appraisal". Thus, "evaluator-critic" probably contains some items which are positive evaluations, and "follower" includes some items which connote understanding but not necessarily agreement. Nevertheless, for both categories there are significant differences in the direction of the hypothesis between the cooperative and competitive groups on the human relations problems. The differences, with respect to the puzzles, are in the predicted direction but are not significant.

Task structure does not seem to produce any significant differences in amount of common appraisal for the cooperative groups. The competitive groups, however, seem more inclined to accept each other's ideas in the puzzles than in the human relations problems. This latter result is significant for the over-all ratings and the same tendency, though not statistically significant, can be noted in the two categories "follower" and "evaluator-critic".

The above result can perhaps be explained by assuming that the human relations problems present more potentiality for inter-personal conflict due to their value-laden content than do the puzzles, and by assuming that

TABLE 11: Data Relevant to Hypothesis 20

Variable	High end of scale	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f
Acceptance of each other's ideas (A-4j)	1	Coop-Comp H.R.	-2.62	(001)	-2.12	(005)	-1.02	(12)	-3.22	(001)	≠.02	(99)	-1.80	(001)	.588	12
"	1	" P	-.48	(35)	-1.38	(015)	-1.08	(045)	-.90	(09)	-.92	(09)	-.95	(01)	.502	24
"	1	P-HR Coop	≠.98		-.32		-.34		≠.40		-.84		-.02	not sig		
"	1	" Comp	-.88	(06)	-1.02	(03)	-.48	(26)	-1.6	(005)	≠.10**	(84)	-.78	(01)	.424	16
Aggreement with others (C-7a)*	1	Coop-Comp H.R.	-.98	(001)	-1.46	(001)	-.26	(18)	-.80	(02)	-.56	(005)	-.81	(001)	.187	13
Agreement by others (C-8a)*	1	" "	-.58	(02)	-1.12	(01)	≠.04**	(92)	-.50	(38)	-.84	(04)	-.61	(02)	.355	13
Follower (B)'		Coop Comp H.R.	≠8.62	(005)	≠4.62	(05)	≠1.26	(58)	≠3.64	(12)	≠3.50	(15)	≠4.34	(01)	2.31	16
"		" P	≠8.82	(01)	≠1.40	(64)	≠1.78	(52)	-2.94	(31)	≠1.54	(61)	≠2.05	(25)	2.96	16
"		P-HR Coop	-2.40		-.64		≠.10		-1.46		≠5.76		≠.26	not sig		
"		" Comp	-2.60		≠2.94		-1.22		≠5.52		≠7.68		≠2.46	not sig		

TABLE 11 (Cont'd)

Evaluator-Critic (B)'	Coop-Comp	H.R.	-11.5	(001)	-2.58**	(27)	-1.4	(55)	-1.5**	(52)	-.06	(79)	-3.36	(04)	2.26	16
	"	P	-7.08		≠2.1		-1.98		≠2.42		-.18		-.95	not sig		
	P-HR	Coop	≠1.98		≠.40		-1.92		≠1.48		-4.24		-.46	not sig		
	"	Comp	-2.2	(48)	-4.48	(17)	-1.34	(67)	-2.44	(45)	-4.12	(20)	-2.91	Not sig	3.10	20

'The scores entered into the cells of the latin square represented a percentage computed by the following procedure: Total frequency of this category for the group was divided by the totals of all categories in the group.

competition is able to make use of this"potentiality" due to the greater amount of inter-personal rivalry caused by competition.

G. Orientation

From the basic hypothesis with respect to positive inducibility it was derived that there would be more commonality of perception with respect to position and direction to the goal among Indiv coop than among Indiv comp (Hypothesis 23). The relevant data is presented in Table 12.

The observers rated the cooperative groups to be significantly more oriented ("aware of where they are and where they are going") than the competitive groups, for both kinds of tasks. The hypothesis is also given indirect support by the observer's ratings that the cooperative groups were also significantly more orderly and systematic in their approach to the various problems. The assumption here is that orientation and systematic approach are closely related.

At first thought it may be somewhat surprising to find that task structure does not have any marked influence on orientation or systematicness. On further analysis, it becomes clear that there are at least two factors which might help explain the obtained results. The greater communication difficulties experienced in the puzzles (see Table 10) should make for less commonality of perception. However, the structure of puzzles, are sufficiently simple and similar (especially to students with a mathematical background) to make it easier to outline an approach and thus orient yourself to the problem than is the case (for the relatively untrained) with respect to the human relations problems. The greater communication difficulties should result in less orientation in the puzzles; the simpler structure of the puzzles should result in more orientation in the puzzles. These two

TABLE 12: Data Relevant to Hypothesis 23

Variable	High end of scale	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 Mdiff	p	Pair 5 Mdiff	p	Total Mdiff	p	* σ_M	* d.f.
Orientation (A-4e)	1	Coop-Comp H.R.	-3.10	(001)	-.82	(02)	-.96	(01)	-2.44	(001)	-1.20	(005)	-1.70	(001)	.300	12
"	1	" P	-1.62	(13)	-3.02	(01)	-1.98	(05)	-.28	(79)	-2.68	(015)	-1.92	(01)	.989	24
"	1	P-HR Coop	∕.82		-.60		∕.06		∕.90		∕.02		∕.23	not sig		
"	1	P-HR Comp	-.46		∕1.4		∕1.08		-1.30		∕1.30		∕.41	not sig		
Orderliness (A-2)	9	Coop-Comp H.R.	∕3.96	(001)	∕1.44	(02)	∕1.08	(05)	∕2.34	(001)	∕1.04	(07)	∕1.99	(001)	.500	12
"	9	" P	∕2.5	(01)	∕2.46	(01)	∕1.04	(23)	∕.66	(45)	∕3.14	(005)	∕1.96	(001)	.825	24
"	9	P-H.R. Coop	-1.76		∕.40		-.74		-.68		∕.54		-.45	not sig		
"		" Comp	-.42		-.82		-.28		∕1.2		∕1.56		-.38	not sig		

factors, working in opposed directions, might very well be the reason for the lack of differences.

G. Productivity

In the present experiment many different measures can be considered to be relevant to "group productivity". The results obtained by these measures are summarized in Tables 13 and 14.

Hypothesis 24 asserts that, since speed of locomotion will be greater in cooperative groups, quantitative productivity per unit of time will be less in the competitive groups. The evidence in Table 13 provides striking support. Cooperative groups solve the puzzle problems more rapidly than do the competitive groups and they also produce more quantitatively on the human relations problems (words in the written letters of recommendations are taken as a crude quantitative measure of productivity).

Hypothesis 25 asserts that qualitative productivity will be higher in the cooperative groups. Clear support is given to this hypothesis by the observers' ratings of discussion productivity (Table 13) and by the judges' rankings and ratings of the written recommendations for the human relations problems (Table 14). The observers rated that the discussions of the cooperative groups not only came out with more fruitful ideas for handling the problem presented to them, but also that their group discussions showed more insight and understanding of the nature of the problem being posed to them. These differences with respect to group productivity and group insight are significant for both kinds of tasks.

Average individual productivity must not be confused with group productivity. Group productivity ratings referred to the ideas that were agreed upon and accepted as a basis for action by the group. Thus, if two members of a group each had good ideas which were in conflict and no agreement or

TABLE 13: Data Relevant to Hypotheses 24, 25, and 26

Variable	High end of scale	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f
Discussion Productivity (A-1a)	9	Coop-Comp H.R.	/2.90	(001)	/.98	(08)	/.92	(08)	/2.58	(001)	/1.84	(005)	/1.86	(001)	.524	16
" (A-1a)	9	" P	/1.70	(16)	/3.08	(01)	/1.62	(17)	/.62	(56)	/2.48	(035)	/1.90	(01)	1.08	24
Discussion Insight(A-1b)"		" H.R.	/1.78	(01)	/.14	(77)	/.90	(11)	/2.0	(005)	/1.44	(02)	/1.25	(001)	.522	12
" (A-1b)"		" P	/.22	(85)	/3.26	(01)	/2.10	(07)	/.48	(67)	/2.32	(05)	/1.72	(02)	1.12	24
Time per solution		Coop-Comp P	-9.76	(05)	-8.66	(06)	-19.2	(001)	-1.66	(72)	-3.46	(46)	-7.35	(01)	4.53	16
Number of words in written product		Coop-Comp H.R.	/337	(001)	/288	(001)	/238	(01)	/400	(001)	/232	(01)	/299	(001)	70.2	24
Av. Indiv. Productivity (A-7)	1	Coop-Comp H.R.	-.45		/.46		-.26		-.46		-.08		-.15	not sig		
"	1	" P	-.60	(20)	-.28	(52)	-1.16	(015)	-.22	(62)	-.64	(17)	-.58	(07)	.434	24

TABLE 13 (Cont'd)

Learn from Discussion (C-15)*	1	Coop-Comp	H.R.	-1.08	(07)	-.46	(39)	/.56**	(30)	-1.7	(07)	/.40**	(45)	-.25	(22)**	.519	13
				diff		diff		diff		diff							
Grades on Term Paper		Coop-Comp		/7.8		-.6		/1.6		/		/2.6		/2.85	(18)	1.77	3

action were taken by the group, the meeting bogged down in conflict, group productivity was rated as being low. The same kind of distinction held for group insight in contrast with average individual insight. The ratings of average individual productivity show no significant difference for the cooperative and competitive groups on the human relations problems; for the puzzles, there is a difference approaching significance favoring the Indiv coop. The latter result is probably explained by the fact that the greater communication within cooperative groups meant that individuals were less likely to stay in blind alleys for long periods of time.

Table 14A presents the rank order of each group for each of the five different problems, as ranked by three different judges. Although it is evident that there is a considerable unreliability in the rankings, it is also clear that despite the unreliability there are significant differences in rankings between the paired cooperative and competitive groups. Table 14B reveals similar results for the ratings. The difference between ratings of the cooperative and competitive products is significant at the .1% level. The instructions given to the judges are presented below.

no help at all		not very helpful		somewhat helpful		a good deal of help		very helpful
1	2	3	4	5	6	7	8	9

You are to imagine yourself to be a psychology instructor who has given to his ten students a series of five practical problems as test. You are to grade the ten papers for each of the five problems separately in the following manner:

(1) Take the ten papers, for any given problem, and read through all. Rate each of the papers in terms of how "helpful" (see the scale on top of the page) the insights and suggestions for actions are: Try to keep from being influenced by such considerations as grammatical niceties, etc. Do not try to guess which of the groups are cooperative and which are competitive.

TABLE 14 A

Rank Order of Each Group on Each Problem by 3 Different Judges

	Barber Shop			Cheaters			WW II Vet			Tool & Die			Supervisors		
	T(hibaut)	B(ach)	P(spitone)	T	B	P	T	B	P	T	B	P	T	B	P
M2-5 (coop)	7	5	6	6	8	3	1	2	1	6	4	8	1	7	2
Tu2-5 (comp)	9	10	10	4	4	2	8	7	8	2	7	4	8	8	8
W2-5 (coop)	1	1	2	5	1	4	2	1	3	9	3	6	7	2	4
Th2-5 (comp)	10	4	5	10	6	9	10	8	9	10	8	10	10	10	10
W7-10 (coop)	2	8	3	1	9	10	3	4	5	1	2	7	5	3	3
Th7-10 (comp)	4	3	1	2	7	5	9	10	7	7	1	1	2	5	6
Subs Coop	3	2	4	3	5	1	4	5	4	5	10	3	3	6	1
Subs Comp	5	9	8	9	3	7	6	6	6	8	9	9	9	9	9
M7-10 (coop)	6	7	7	7	2	8	5	3	2	3	5	2	4	4	5
M9-12 (comp)	8	6	9	8	10	6	7	9	10	4	6	5	6	1	7

TABLE 14 B

Ratings of Group Products by Three Different Judges

	Barber Shop			Cheaters			WW II VET			Tool & Die			Supervisors		
	T	B	P	T	B	P	T	B	P	T	B	P	T	B	P
M2-5 (coop)	4	5	4	5	4	4	9	7	7	5	5	3	8	5	8
Tu 2-5 (comp)	2	1	1	6	6	4	5	3	2	7	2	7	4	2	2
W2-5 (coop)	6	8	7	6	8	3	8	7	6	4	5	4	4	7	7
Th 2-5 (comp)	1	6	4	1	6	1	1	3	2	3	2	1	1	4	1
W7-10 (coop)	6	3	6	9	2	1	7	6	4	8	6	4	5	7	7
Th7-10 (comp)	5	6	8	7	5	3	1	1	3	5	6	8	7	5	3
Subs coop	5	8	5	7	6	4	7	4	5	5	2	7	6	5	8
Subs comp	5	1	2	2	7	2	6	4	3	4	2	3	3	2	2
M7-10 (coop)	5	4	3	4	8	2	6	7	7	6	4	8	5	6	3
M9-12 (comp)	3	5	2	3	2	3	5	2	1	6	4	5	5	8	2

Results of Latin Square of Differences Between Averaged Ratings

Pair 1		Pair 2		Pair 3		Pair 4		Pair 5		Total	
Mdiff	p	Mdiff	p	Mdiff	p	Mdiff	p	Mdiff	p	Mdiff	p
/2.12	(02)	/3.52	(001)	/.54	(50)	/2.40	(01)	/1.62	(05)	/2.04	(001)

σ_M	d.f.
.763	1.6

(2) After rating the papers, rank them from 1 to 10. Let "1" represent the best paper, "10" the worst paper. (Do not have any"tie" ranks.)

Hypothesis 26 states that the Indiv coop will learn more from each other than will the Indiv comp. Table 13 indicates that the cooperative group members in three of the five pairs rated themselves as learning more from the discussion of the human relations problem than did the competitive members rate themselves. The combined probabilities, however, are not significant.

The same kind of results are obtained when one examines the grades obtained by the individuals exposed to each of the experimental conditions. The grades being considered were those obtained on the first term paper handed in by all the subjects; the paper was due on the last week of the experiment. Statistical analysis reveals the differences, (while they are in the direction predicted by the hypothesis,) cannot be considered as significant.

Thus, Hypotheses 24 and 25 have gotten strong support from the data but the evidence with respect to Hypothesis 26 is far from conclusive. Several possible explanations for this latter lack of significance are the following: (1) The discussions took place at the very beginning of an Introductory Psychology course. Perhaps, at such an early stage the subjects did not have much to offer to each other since none had enough training to have crystallized his own experiences into useful approaches to such problems as were discussed. (2) Even if (1) is not valid, many students believed it to be so and felt that what they would learn, they would learn from the instructor. Thus, they were not particularly ready to have cognitive changes induced by fellow members under either of the two conditions. (3) The

relative differences in learning during group discussion were so small that they were insignificant in comparison with the learnings during the regular instructional period. The assumption here being that the Indiv coop and Indiv comp learned as much as each other during the regular instructional period. Some relevant data will be presented in the "Odds and Ends" section.

I. Inter-personal Relations

From the basic hypothesis with respect to cathexis, it was derived that the Indiv coop would be more friendly towards each other in the group meetings than would the Indiv comp. (Hypothesis 27) Table 15 presents the relevant data.

The observers rate that the Indiv coop were significantly more friendly during discussions of both types of problems than were the Indiv comp, giving strong support to the hypothesis under scrutiny. It also receives partial support from the functions observation: a significantly greater percentage of encouraging or rewarding remarks were made in cooperative groups during the discussions of the human relations problems; a significantly greater percentage of aggressive remarks were made during the competitive discussions. These differences in functions were not obtained for the puzzle problems. This latter result is probably explainable by assuming that the lack of emotionally laden content in the puzzles led to a smaller percentage of emotional functions such as "rewarding" and "aggressing", thus making it difficult to establish significant differences for the puzzles. Despite the lack of emotional content to the inter-actions of the members during the discussions of the puzzles, it is clear from the observers' ratings that the style of inter-actions among Indiv coop reflected more friendliness than did the style of the Indiv comp.

TABLE 15: Data Relevant to Hypothesis 27

Variable	High end of scale	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f.
Friendliness (A-4a	1	Coop-Comp H.R.	-.92	(04)	-.50	(25)	-1.60	(01)	-2.86	(001)	-.44	(29)	-1.26	(001)	.402	12
"	"	" P	-.50	(34)	-1.02	(07)	-1.42	(015)	-1.52	(01)	-.04	(93)	-.89	(01)	.520	24
"	"	P HR Coop	ƒ.80		-.44		ƒ.08		ƒ.20		-.88		-.05	not sig		
"	"	" Comp	ƒ.38		-.08		-.10		-1.14		-1.46		-.48	not sig		
			diff		diff		diff				diff					
Friendly Feeling D-1	9	Coop-Comp	ƒ.6		-.04		ƒ.87				-.50		ƒ.25	not sig		
Time taken to learn last names D-2	1	Coop-Comp	-.40		-.50		-.18				-.98		-.52	(06)	.169	3
Time taken to learn first names D-2	1	Coop Comp	ƒ1.3		-6.1		ƒ3.9				ƒ.3		-.20	not sig		
Spelling of last names	0	Coop Comp	0		-50		-4.5				-11.7		-5.3	(11)	2.41	3
Desirability as a friend (C-1)	100	Coop Comp	ƒ6.3		ƒ5.4		ƒ5.7				-4.6		ƒ3.2	not sig		

TABLE 15: Cont'd

How good were contributions of others C-14*	1	Coop-Comp	H.R.	-1.0	(005)	-.92	(01)	**/.04	(87)	-1.5	(01)	-.60	(07)	-.70	(001)	.290	13
Encourager (B)		Coop-Comp	H.R.	/.40	(57)	/3.56	(001)	**-.40	(57)	/.9	(18)	/.34	(62)	/.96	(01)	.668	16
"		"	P	/.70		/.32		-1.74		-.88		/.62		-.20	not sig		
Aggressor (B)		"	H.R.	-1.36	(05)	-.78	(23)	-.90	(19)	-1.82	(015)	-.92	(19)	-1.16	(01)	.646	12
"		"	P	-1.76		/.22		-1.56		/.10		-.20		-.64	not sig		

The cooperative subjects in answer to the following question (c-14): "How good were the contributions of the others?" rate each other's contributions to be significantly better than do the competitive subjects. This result can also be taken to be supportive of Hypothesis 27.

The next question that is of interest has to do with the extent of the generalization of the friendliness shown during the experimental meetings. In Chapter II, it was hypothesized that the extent of generalization would be a function of the strength of the goals perceived to be interdependent. Unfortunately, no really adequate measure of the strength of goals involved in the situation was taken. Question D-4, "How much did the weekly small group meetings stand out for you in contrast with the other classes you attend during the week?" is the only relevant measure. The average responses for the cooperative and the competitive members were not significantly different. On the average, the subjects rated that the weekly meetings were "Thought about some -- more prominent in my thinking than some of my other courses" but not "more prominent than most of my other courses". It is difficult to give unequivocal meaning to these ratings. The experimenter, on the basis of his own observations, has the opinion that for most subjects the weekly sessions had more than negligible significance, but that, in the total pressure of "life at Tech", the meetings had but minor significance for the subjects.

A variety of different measures were taken to test the extent of generalization: ratings of fellow members with respect to desirability as a friend (E-1), rating amount of friendly feeling toward others (D-1), time taken to learn first and last names, correctness of spelling of last names, amount of time spent together in outside activities, and kinds of activities

jointly engaged in outside of class. Table 15 presents most of the evidence.

Even at the end of the experiment, the Indiv coop rate themselves (E-1, D-1) as being more friendly towards each other than do the Indiv comp. These differences, however, are clearly not statistically significant. The Indiv coop report that they learned each other's last names sooner than do the Indiv comp; this difference is significant at the 6% level. They also spell each other's names more correctly than do the Indiv comp; the size of this difference, however, could occur 11 times out of 100 times by chance. (It was the experimenter's impression that the names of the Indiv coop were probably more difficult to spell than the names of the Indiv comp.) No differences were obtained with regard to learning first names, nor were any differences obtained with respect to frequency or kinds of outside activities jointly engaged in. (Very few joint outside activities were reported.) Thus, the data indicate that little generalization of cathexis occurred. The lack of generalization is probably due to the following factors: (1) The relative lack of importance of the goals involved in the experimental manipulations; (2) The strong restraining forces operating in the life of the Tech student which would have prevented realization of any inclinations toward increased sociability which might have resulted from the experimental situation.

Hypothesis 28 states that the group and its products will be evaluated more highly by the Indiv coop than by the Indiv comp. Table 16 presents the relevant data. In answer to the question (c-1): "Did the group help your thinking?" the ratings of the cooperative members revealed significantly more help than did the ratings of the competitive members.

TABLE 16: Data Relevant to Hypothesis 28, 29, and 30

Variable	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4* Mdiff	p	Pair 5 Mdiff	p	Total * Mdiff	* p	* σ_M	* d.f
Group Help Thinking (C-1)1	Coop-Comp H.R.	-1.44	(001)	-.68	(05)	-.64	(06)	-2.8	(001)	-.84	(003)	-1.03	(001)	.316	13
How good was group product (C-12)*1	Coop Comp H.R.	-1.58	(02)	-1.74	(01)	-.20	(73)	-2.25	(03)	-.88	(17)	-1.22	(01)	.356	13
Total Group Functions (B)	" H.R.	ƒ12.2	(001)	ƒ7.48	(001)	ƒ2.40	(01)	ƒ4.62	(01)	-3.42**	(05)	ƒ4.64	(001)**	.751	12
"	" P	ƒ4.42		-1.86		-4.70		-3.16		ƒ4.9		-.08	not sig		
"	P HR Coop	-.24	--	-1.28		ƒ.08		ƒ3.26		ƒ11.7		ƒ2.72	not sig		
"	" Comp	ƒ5.24	(06)	ƒ6.86	(06)	ƒ6.98	(06)	ƒ11.0	(06)	ƒ3.46	(06)	ƒ6.72	(01)		
Total Individual Functions (B)	Coop-Comp H.R.	-8.1	(01)	-2.02	(47)	-2.94	(30)	-2.20	(42)	-4.10	(15)	-3.87	(05)		
"	" P	-5.7		ƒ4.52		-9.46		ƒ2.66		-2.52		-2.10	not sig		
"	P-HR Coop	ƒ5.6		ƒ3.78		-1.44		ƒ3.26		-4.27		ƒ.44	not sig		
"	" Comp	-2.24		-2.36		ƒ5.08		ƒ.06		-6.17		-1.13	not sig		

TABLE 16 Cont'd

Blocker (B)	Coop-Comp	H.R.	-4.2	(001)	-.10	(95)	-1.72	(015)	-.68	(28)	-.30	(62)	-1.40	(001)	.605	12
"	"	P	-.18		/1.8		-1.6		-1.26		-.02		-.25	not sig		
Self-defender (B)	"	H.R.	-1.56	(05)	-1.08	(16)	-.84	(29)	-1.38	(08)	-.28	(70)	-1.03	(05)	.732	16
"	"	P	-.30		/1.36		-.36		/.10		-.32		/.10	not sig		

Similar results were obtained in answer to (c-12): "How good do you think the group's product was?" Thus, the data gives strong support to this hypothesis.

From the basic hypothesis with respect to facilitations and hinderings, it was derived that there would be (Hypothesis 29) a greater percentage of group functions among Indiv coop, and (Hypothesis 30) a greater percentage of individual functions among Indiv comp. The data in Table 16 clearly supports the above hypotheses with respect to the human relations problems; the data for the puzzles reveal no clear-cut significances. Several explanations for the lack of differences on the puzzles seem possible: (1) Unreliability of the observations would very much affect the percentages which are based on rather small frequencies. The frequencies for the human relations problems are considerably higher and would not, therefore, be so much influenced by lack of reliability. (2) The structure of the puzzles are such to make obstructiveness more difficult and helpfulness easier. This latter possibility is not unlikely. The objectively demonstrable solution of the puzzle problems makes it more difficult for individuals to produce the rationalizations necessary for "civilized" blocking or aggressive behavior; further, a demonstrable solution compels a certain degree of agreement and acceptance, thus, in a sense, making group functions more likely. The data of Table 16 tend to support this second explanation. Thus, the competitive groups have a significantly greater percentage of group functions in the puzzle problems than in the human relations problems, and there is a tendency for them to have a smaller percentage of individual functions on the puzzles. The same kinds of differences obtain for the cooperative groups on the two kinds of problems, but as one would expect, they are less marked and are clearly not significant.

Hypothesis 33 states that the Indiv coop will perceive themselves as having more favorable affects on fellow members than will the Indiv comp. Three items (c-8a, 8b, 13 b) on the weekly questionnaire provide relevant data. Table 17 indicates that: the cooperative subjects saw their fellow members as reacting more positively to their ideas; the competitive members perceived that their ideas were being ignored more frequently; the cooperative members felt that their contributions would be evaluated more highly. For each of the items, four out of the five pairs differ in the directions predicted by the hypothesis;when probabilities are combined the differences are clearly significant. Thus, the data seem to give definite support to the hypothesis.

Hypothesis 34 asserts that there will be greater internalization of the attitude of the generalized other by Indiv coop than by Indiv comp. In its broadest meaning, most of the experimental data already discussed are relevant to this hypothesis. In the more restricted sense of identification with the attitudes of others, two complementary measures -- the feeling of obligation to others, and the desire to win the respect of the others -- are relevant.

Table 17 presents data which indicate that the Indiv coop felt more obligated as a member of a group to participate in a joint effort (D-12 b-e) than did the Indiv comp. The differences are significant at the 1% level for the human relations problem and at the 10% level for the puzzles. It is also evident that the desire to win the respect of other members (D-12 b-i) plays more of a role in the motivation of Indiv coop than in the motivation of Indiv comp. The differences for the puzzles are significant at the .1% level and at the 9% level for the human relations problems. Thus, the evidence gives strong support for the hypothesis being examined.

TABLE 17: Data Relevant to Hypotheses 33 and 34

Variable	High end of scale	Comparison	Pair 1 Mdiff	p	Pair 2 Mdiff	p	Pair 3 Mdiff	p	Pair 4 * Mdiff	* p	Pair 5 Mdiff	p	Total * Mdiff	* p	σ_M	d.f.
How did others react to your ideas (C-8a)*	1	Coop-Comp H.R.	-.58	(12)	-1.12	(01)	**/.04	(92)	-.50	(38)	-.84	(04)	-.61	**(02)	.355	13
How frequently did others react (C-8b)*	9	" "	-.32	(18)	**/.68	(02)	/.86	(01)	/1.0	(03)	/.54	(04)	/.49	**(001)	.241	13
How will others rate your contributions * (C-13b)	1	" "	-.98	(01)	-.64	(06)	-.34	(28)	-1.3	(02)	**/.32	(33)	-.49	**(001)	.313	13
			diff		diff		diff				diff					
Strength of feeling of obligation to others (D-12b)	1	Coop-Comp H.R.	-2.0		-3.0		-3.2				-3.0		-2.80	(01)	.270	3
"	"	" P	-3.0		-2.0		/.2				-1.4		-1.55	(10)	.671	3
Strength of desire to win respect of others (D-12b)	1	" HR	-2.5		-.2		-.6				-2.80		-1.53	(09)	.656	3
"	1	" P	-3.5		-2.4		-1.4				-2.2		-2.38	(001)	.130	3

J. The Effect of Task Structure

Much of the data with respect to the effect of the two different task structures upon group process and upon cooperation-competition have been presented in the preceding sections. The different effects of the two different types of problems having been explained by the following differences between the puzzles and human relations problems:

(1) The easier demonstrability of correctness of task solution of the puzzles. This difference has two primary consequences: (a) psychological locomotion could take place independently of the others in the puzzles, this being less true for human relations problems; (b) the readily demonstrable correctness of a puzzle solution made it less easy to provide rationalizations for criticism or aggression.

(2) The greater communication difficulties inherent in puzzle discussion. One of the reasons a puzzle is a puzzle is due to the confusion in signification produced by signs which are very much alike - thus "Eucled" denoting geometry and "Mr. Eucled" denoting a person can lead to personal befuddelment. To clear away confusion the individual is likely to develop a private system to clarify the confusing signs. Inter-personal communication in a puzzle situation is likely to be difficult either because the individuals are confused or because they have developed differing private schemata which, though the basis for their attempted communications, are not themselves expressed. Another cause for the greater communication difficulties in discussing the puzzles is that the signs developed for communications in mathematical-type problems tend to be written rather than verbal in nature relying on the eye rather than the ear. The consequence of the greater communication difficulties inherent in puzzle-solution is to further facilitate individual work.

(3) The more value-laden content of the human relations problems. The possibility of ideological differences increases the potentiality of conflict.

Table 18 presents some additional data relevant to the effect of task structure upon group process. The data seems clearly explainable by the differences in task structure outlined above. Thus, the smaller percentage of coordinating and elaborating functions in the puzzle discussions probably reflects the more individualized work on this type of problem. The larger percentage of information-oriented remarks in the puzzles reflects a more "factual" orientation; the larger percentage of blockings, self-defensive, aggressive and harmonizing remarks reflects the greater conflict of values experienced during the discussions of the human relations problems. The higher percentage of self-observing remarks is evidence that more personal frustration was experienced in the puzzle problems than in the human relations problems. In part these remarks are indications of the greater personal bewilderment caused by the intra- and inter-personal communication difficulties inherent in the puzzles. Possibly the greater percentage of soliciting remarks in the puzzles also is a consequence of communication difficulties.

The evidence and discussions of the preceding sections demonstrate the interacting effect between task structure and cooperation-competition. The validity of the basic maxim, "Group process is a function of both the nature of the group and the nature of its enviornment", is again indicated. Thus, the structure of the puzzles is such as to minimize the differences between cooperative and competitive groups with respect to amount of individual functions displayed; the nature of the human relations problem, on the contrary, provides considerable more opportunity for the display of conflict

TABLE 18

Data Relevant to The Effects of Task Structure (P - H.R.)

	Cooperative Groups			Competitive Groups		
Variable	Mdiff	No of groups in same direction as Mdiff	p	Mdiff	No of groups in same direction	p
Orienter	/.39	3	not sig.	-1.06	4	not sig
Energizer	-.44	4	not sig.	-.13	3	" "
Eval-critic	-.46	3	not sig	-2.91	5	" "
Coordinator	-2.66	5	001	-2.24	5	001
Pos Stater	-1.27	4	not sig	-.87	2	not sig
Info-giver	/2.92	5	001	/7.65	5	001
Info-ask	/3.84	5	001	/7.42	5	001
Elaborator	-9.10	5	001	-11.98	5	001
Initiator	/3.80	5	02	-1.49	4	not sig
Task Tot	-3.83	4	not sig	-5.98	4	01
Grp Commentator	-.10	2	" "	/.23	3	not sig
St Setter	/.07	2	" "	/.16	3	" "
Solicitor	/2.62	5	05	/1.52	4	05
Gd member	/.64	4	not sig	/1.80	5	not sig
Harmonizer	-.36	5	001	-.80	5	01
Follower	/.26	2	not sig	/2.46	3	not sig
Rewarder	-.19	2	" "	/1.00	5	" "
Grp Tot	/2.80	3	" "	/6.80	5	01
Play-boy	-1.00	4	" "	/.92	4	not sig
Self-observer	/3.58	5	01	/2.34	5	001
Help	/.99	4	not sig	/1.02	5	not sig
Dominator	-.48	5	not sig	-.46	5	" "
Blocker	-.72	3	" "	-1.91	5	01
Aggressor	-.70	4	05	-1.28	3	not sig
Self-Defender	-1.01	4	001	-2.15	5	001
Indiv Tot	/.44	2	not sig	-1.13	3	not sig

and thus allows for greater differences between cooperative and competitive groups.

K. Odds and Ends

Table 19 reveals that at the beginning of the experiment the subjects were definitely aware of the observers as they discussed the problems (D-15). The consciousness of the presence of the observers, however, decreased with time so that by the third week most of the subjects were only occasionally aware of them. By the end of the experiment the subjects were for the most part not conscious of the observers while they discussed the problems. It is interesting to note that the competitive subjects tended to be more aware of the observers than did the cooperative subjects. The greater consciousness of the "I", the awareness by the competitive subject that he is being judged (by the observers) in comparison with others would make him more conscious of them. Support is given this interpretation by the fact that the Indiv comp rated themselves to be significantly higher in trying to please the experimenter than did the Indiv coop (see Table 19 D 12-b).

The reactions the subjects assert they had to being observed are as follows:

	A. Disturbed Self-Conscious	B. More formal	C. Tried to win observer's approval	D. More Group-Conscious	No Effect
Coop	2	6	3	4	3
Comp	4	8	4	3	6

The efficacy of the instructions in producing cooperation and competition have already been attested to by the results cited in previous sections. However, it should be remembered that intra-group cooperation

TABLE 19: Some Odds and Ends

Variable	High end of scale	Comparison		Pair 1 diff	Pair 2 diff	Pair 3 diff	Pair 4	Pair 5 diff	Total Mdiff	p	σ_M	Total d.f.	Mcoop	Mcomp	t
1st week (D-15) Observer Conscious	1	Coop-Comp		/.46	/.8	0		/4.2	/1.37	(25)	.956	3	3.91	2.55	1.43
" 3rd week	1	"		/.6	/.8	/.2		/1.4	/.75	(06)	.250	3	6.6	5.85	3.00
" last week	1	"		/.8	/.70	-1.0		-.4	/.02	not sig			7.15	7.13	
Strength of (D-12b motivation to please experimenter	1	"	H.R.	/1.6	/1.0	/1.6		/.2	/1.1	(05)	.332	3			3.31
"	1	"	P	/.2	/1.2	/.2		-.4	/.30	(42)	.332	3			.904
Strength of motivation to excel other groups	1	"	H.R.	-5.2	-5.6	-3.4		-4.0	-4.55	(01)	.513				8.87
"		"	P	-5.4	-7.0	-2.0		-5.0	-4.85	(02)	1.04				4.66
Value of Ec70 Compared to (D-8) other courses	100	"		-10	/13	/8		/8	/4.75	not sig					

TABLE 19 (Cont'd)

Enjoyment of group meetings (D-5)	9	"		≠1.7	≠1.4	-1.2	≠.3	≠.55			
Change in group effectiveness (D-9b)	9	"	H.R.	≠.1	≠3.4	≠.8	≠2.9	≠1.80	(12)	.799	2.25
" (D-10b)	9	"	P	≠.3	≠.8	≠.8	≠1.5	≠.85	(06)	.248	2.94

was produced partly by inter-group competition. Table 19 indicates that the instructions did produce significantly more motivation to excel other groups among Indiv coop than among Indiv comp. It is well, at this point, to warn of possible misinterpretations of the experimental results. That is, some may point to the above result and say that this study is really not concerned with cooperation and competition but with two different types of competition. Such a statement has partial truth and is thus confusing. To say inter-group competition is not cooperation is only true in the trite sense that it is not inter-group cooperation but is, untrue, if one means that inter-group competition does not produce a social situation in which the group members are inter-related in such a manner so as to have their goals promotively interdependent with one another's...That is, it is untrue to say that inter-group competition does not produce a cooperative situation for the individuals composing the group. It is "untrue" by definition.

Table 19 also indicates that the Indiv coop gave their groups credit for more improvement in effectiveness of functioning from the beginning to the end of the experiment than did the Indiv comp. It is probable that this data should be interpreted as additional support for Hypothesis 28 which asserts that the Indiv coop will evaluate their group and its products more highly than will the Indiv comp.

At the end of the experiment the students also rated (D-8) how much they were getting out of their psychology course in comparison with their other courses at M.I.T. Table 19 indicates that the Indiv coop subjects evaluated the psychology course more highly than did the Indiv comp. The difference, however, is not significant. It is very much the same kind of result that has been obtained with all the measures of individual learning.

CHAPTER VII

SUMMARY AND CONCLUSIONS

A. Summary of the Experiment and Its Results

In order to study the effect of cooperation and competition upon group process, ten experimental groups were established. Each group was composed of five Introductory Psychology students who were participating in the experiment as a substitute for their regular class sections. All groups met for one period of 3 hours, at different times of the week, for six consecutive weeks. During the first week the 10 groups were observed and rated as they discussed a human relations problem, the ratings of the discussion productivity were used to pair-off equated groups. Five pairs were thus formed. One group of each pair was then assigned by flipping a coin to the cooperative treatment, the other to the competitive treatment.

The cooperative situation was produced by a set of instructions which stated essentially that the group, as a whole, would be rated in comparison with the efforts of four other similarly constituted groups; the grade or reward that each member received would be the same and would be determined by the relative position of this group in contrast with the other four similar groups. The competitive situation was produced by another set of instructions which stated essentially that each member would be rated in comparison with the efforts of the other four members composing his group, the grade or reward that each would receive would be different and would be determined by the relative contributions of each to the solution of the problem with which they were confronted.

Apart from the differences in instructions, all groups were exposed to similar routines during their 3 hour meetings. The first part of the meeting was spent solving a Sunday supplement type puzzle, the second part of the meeting was spent discussing and writing some recommendations for a human relations problem (see Appendix A for both kinds of problems), in the third part of the meeting the instructor-experimenter informally lectured on psychology.

Three or four observers were present during the first two parts of any meeting - each of the observers, in addition to filling out an over-all rating sheet, had a specific task. Much of the results presented in this study derives from the data collected by the observers. However, much information was collected from the subjects who filled out a lengthy questionnaire every meeting after the discussion of the human relations problem and supplied additional data at the end of the experiment.

The results of the experiment are briefly summarized below.

1. The Basic Hypothesis

The evidence for the basic hypothesis is, for the most part, indirect. The data collected to provide tests for the hypotheses about group functioning, hypotheses which were dervied from the basic hypotheses are, in effect, also tests of the latter.

(a) Hypothesis 1, which asserts that Indiv coop will perceive themselves to be more promotively interdependent and that Indiv comp will perceive themselves to be more contriently interdependent, has received rather good support from the data presented in Section C of the preceding chapter.

(b) Hypothesis 2, which states there will be greater substitutability

for similarly intended actions among Indiv coop than among Indiv comp, receives support from the data relevant to Hypotheses 7 and 9. The results for the other related Hypotheses, 8 and 16, are not so clear-cut due to questionable observer reliability and the somewhat tenuous additional assumptions necessary to these hypotheses.

(c) The data with respect to friendliness, evaluation of the group, and perception of the effect on others give definite support for Hypothesis 3, which asserts that a larger percentage of actions of others will be positively cathected among Indiv coop, a larger percentage of actions of others will be negatively cathected among Indiv comp.

(d) Much of the data in the experiment is relevant to Hypothesis 4, which asserts that there will be greater positive inducability among Indiv coop than among Indiv comp. All of the data gives strong support to this hypothesis.

(e) Hypothesis 5, states that Indiv coop will exhibit more helpfulness and Indiv comp will exhibit more obstructiveness. The relevant data, Hypotheses 18, 29, and 30, give definite support.

2. Group Functioning

The results indicated that the Indiv coop showed more of the following characteristics than did the Indiv comp: (a) Coordination of Efforts; (b) Diversity in amount of contributions per member; (c) Subdivision of activity; (d) Achievement Pressure; (e) Production of signs in the puzzle problem; (f) Attentiveness to fellow members; (g) Mutual comprehension of communication; (h) Common appraisals of communication; (i) Orientation and orderliness; (j) Productivity per unit time; (k) Quality

of product and of discussions; (l) Friendliness during discussions; (m) Favorable evaluation of the group and its products; (n) Group Functions; (o) Perception of favorable effects upon fellow members; (p) Incorporation of the attitude of the generalized other.

The Indiv comp showed more of the following:

(a) Production of signs in the human relations problem; (b) Individual Functions.

No significant differences were found in the following:

(a) Amount of interest or involvement in the situation; (b) Amount of specialization with respect to function; (c) Amount of learning (though the trend is in favor of the Indiv coop). Nor did the data reveal any striking developmental differences with time.

(3) Task Structure

The data reveal that the puzzles and the human relations differ in the following respects: (a) The solutions of the puzzles are more objectively demonstrable and, as a consequence, it is possible for the individual to work more independently of his fellow members; (b) The puzzle problems offer more obstacles to communication than do the human relations problems; (c) The content of the human relations problem is more "value-laden" than is the content of the puzzle. These differences in task structure result in: more individualized effort, (less coordination of efforts, fewer attempts at communication) in puzzle solution; more conflict (blocking, self-defending, and aggression) in the human relations problems; and more communication difficulties in the puzzles. The results, however, clearly indicate an interacting effect between nature of task and nature of the group. The structure of the puzzles is such as to minimize the differences between

cooperative and competitive groups in some respects, while the structure of the human relations problems, on the other hand, tends to bring out the differences between the two types of groups.

Group process and group productivity is, thus, a function of the properties of the group and the properties of its medium or environment. One cannot predict precisely from the knowledge of the properties of either the group or its environment alone.

B. Some Related Results From Other Studies

As indicated in Chapter I, most of the studies of cooperation and competition (7,13,21) have been concerned with the individual's strength of motivation under the two different motivating conditions. The results of the various studies have tended to indicate that in Western culture, school children tend to be more highly motivated by competition than cooperation. However, most of the studies suffer from not having attempted to create situations in which the objective probability of reward was equal under both conditions, thus, making it somewhat uncertain whether equal "strengths" of cooperation and competition were being compared.

Animal studies (3) have been somewhat meagre and contradictory with respect to whether cooperative behavior exists in various primate species. Yet, an interesting little study by Daniel (4) reveals that two rats can engage in cooperative activity, providing that they have acquired the behavioral skills necessary to the cooperation. This result, taken in conjunction with the rather inconclusive results with higher species, suggests the important point that cooperative behavior will ensue, under appropriate motivating circumstances, providing that the skills necessary for the cooperative behavior exist. Without the necessary skills, such behavior is not to be expected.

A few of the empirical studies have direct relevance to the theory of cooperation and competition presented in this study. Maller's experiment (his Experiment III) in which competition was contrasted with five differing cooperative conditions (teamwork, partnership, boys versus girls, arbitrary groups, class) seems relevant to the basic hypothesis with respect to positive inducability. Theoretically, one would expect (see Chapter III) that the greater the membership motive, other things being constant, the greater the positive inducability, the more will the child do for the group. It seems evident that "boys versus girls" would arouse the greatest membership motive in school-children and one would, therefore, expect the individual to do most for the group under this condition. Maller's results indicate that this cooperative condition resulted in much more giving to the group than did any of the other cooperative conditions.

The excellent studies of Lewis provide considerable support for the basic hypothesis with respect to substitutability. Using the Zeigarnik method, she obtained the following results:

> When the person works alone, and half the tasks he is doing are interrupted, then recall favors interrupted rather than completed tasks in the ratio of nearly 1.75 to 1 (Experiment 1). When the person works in cooperation with someone else, and half the tasks are interrupted, interrupted tasks are again recalled better than completed, in the ratio of 1.5 to 1 (Experiment II). When the person works alone and half the tasks are interrupted and completed by someone else, interrupted tasks are recalled in the ratio of only 1.20 to 1 - still favored slightly in recall, but not nearly to the extent found without external completion (Experiment III). When the person works in cooperation with someone else, and half the tasks are interrupted by the partner and completed by the partner, then interrupted (partner-completed) and completed (self-completed) tasks are equally recalled (Experiment CW)
>
> All of these results depend upon the existence of task-orientation in work. That is, these results are obtainable only if the S's main concern seems to be to complete his work, rather than enhance his ego.

Clearly, the work of another person with whom one is cooperating can be a substitute (i.e. - result in tension release) for similarly intended actions of one's own. Further, comparing Experiments CW and III, there is evidence that the degree of substitutability is a function of strength of membership motive.

The survey of "Cooperation and Competition Among Primitive Peoples" edited by Mead presents a host of interesting and related data. As a partial summary of the major findings, she writes:

> In the cooperative cultures, there are real closed groups within which the individual's status is defined, and within which he is given security in relation to his fellows; the society depends upon the structure for its perpetuation, not upon the initiative and ambition of individuals. In the competitive cultures, there is no closed society; fighting exists within the group of loosely inegrated lineages; no individual is secure in relation to his fellows because success is defined as the maintenance of a status which can be lost or as the attainment of higher relative status; and the culture is organized around the initiative of individuals.
>
> The degree of diversification of individual goods is relevant to the problems of cooperation and competition in societies of all types. In the most purely competitive societies, all achievement is measured upon a common scale...In the cooperative societies where there is one common goal, the diversified achievements of the individual participants are related to each other through this shared end relationship, and the craftsman and fisherman in Samoa both contribute to the honor of the village.

These results seem consistent with the theory presented in this study. Thus, the greater diversification of individual goals in cooperative societies appears to be explainable in terms of the substitutability hypothesis combined with several other fairly well-accepted additional assumptions. Similarly, the greater insecurity of individuals in competative societies appears explainable in terms of the cathexis, obstructiveness, and inducibility hypotheses.

Thus, the data from three empirical studies of cooperation reported above, studies which occurred in widely differing settings, seem to be con-

sistent with the theory and results presented in this study.

The few experiments (32, 34, 36, 38) that have investigated group problem-solving are not directly relevant to the present thesis. They have mostly concerned themselves with comparing the productivity of individuals versus groups. Murphy, Murphy, and Newcomb (27) cogently summarize the findings:

> From such studies the superior value of group thinking over individual thinking, when demonstrated, is clearly due in part to (1) the larger number of ways of looking at a problem; (2) the larger number of suggestions for a solution; (3) the larger number of effective criticisms of each proposed plan; (4) the patent need to accept social criticism and not be "bullheaded" (as subjects working alone frequently are).

Yet, nevertheless, the above summary in some respects is an admirable statement of some of the differences between cooperative and competitive group problem-solving, giving support for the notion that competition results in less group-centered activity than does cooperation.

C. Next Steps

There is little need to point ou the many possibilities for future theorizing and research that exist in the area investigated in this present study. Clearly, one of the next steps should be a more rigorous formulation of the theory developed in Chapter II. The many ambiguities and gaps in it can perhaps be eliminated by a more explicit formalization. Another step called for is a further analysis of the data from the experiment to explore the effect of cooperation and competition upon different kinds of personalities, to analyze further the development of group structure under the varying conditions. A host of further experimental studies suggest themselves as being relevant. Probably studies of the effect of success and failure of goal

attainment upon group process and structure should have high priority. Studies of the interdependence of various skill factors, such as communication, with cooperation would be particularly valuable from a practical point of view. Etc.

There is much to be done before we fully understand and can control the aids and deterrents to cooperation. It is hoped that the present research has contributed to that understanding and has once more demonstrated that significant experimental research can be done on problems that have social, as well as theoretical significance.

D. Practical Implications of the Results

The practical implications of this study will not be specified in detail here. It seems evident (to the extent that the results have any generality) that greater group or organizational productivity will result when the members or sub-units are cooperative rather than competitive in their interrelationships. The inter-communication of ideas, the coordination of efforts, the friendliness and pride in one's group which is basic to group harmony and effectiveness appears to be disrupted when members see themselves to be competing for mutually exclusive goals. Further, there is some indication that competitiveness produces greater personal insecurity (expectations of hostility from others) than does cooperation. The implications for committee, conference, and small group functioning in general appear fairly obvious.

Also, in light of the results of this study, it seems that educators might well reexamine the assumptions underlying their common usage of a competitive grading system. One may well question whether a competitive

grading system produces the kinds of interrelationships among students, the task-directedness, and personal security that are in keeping with sound educational objectives.

BIBLIOGRAPHY

1. Barnard, C.I.: "The Functions of The Executive." Harvard, 1938

2. Child, C.M.: "Physiological Foundations of Behavior". Holt, 1924

3. Crawford, M.P.: "The Social Psychology of the Vertebrates". Psychol. Bull., 1939, 36, 407-441

4. Daniel, W.J.: "Cooperative Problem-Solving in Rats". J. Comp. Psychol. 1942, 34, 361-368

5. Festinger, L.: "The Role of Group Belongingness in a Voting Situation". Human Relations, 1947, 154-181

6. French, J.R.P.: "Organized and Unorganized Groups Under Fear and Frustration". Studies on Topological and Vector Psychology III, Univ. Ia. Stud. Child Welf., 20

7. Greenberg, P.J.: "Competition in Children: An Experimental Study". Am. J. Psychol., 1932, 44, 221-248

8. Greenwood, E.: "Experimental Sociology". Kings Crown Press, 1945

9. Heider, F.: "Attitudes and Cognitive Organization". J. Psychol, 1946, 21, 107-112

10. Hiller, E.T.: "Principles of Sociology". Harpers, 1933.

11. Kendall, M.G.: "Advanced Theory of Statistics". Vol II C. Griffin & Co., 1946

12. Koffka, K.: "Principles of Gestalt Psychology". Harcourt-Brace, 1935

13. Leuba, C.J.: "An Experimental Study of Rivalry in Young Children". J. Comp. Psychol., 16, 1933, 367-378

14. Lewin, K.: "The Conceptual Representation and The Measurement of Psychological Forces". Contr. Psychol. Theor., 1, No.4, 1-207

15. Lewin, K.: "Frontiers in Group Dynamics". Human Relations, 1, 1947

16. Lewis, H.B.: "An Experimental Study of the Role of Ego in Work. I. The Role of the Ego in Cooperative Work". J. Exp. Psychol., 34,1944, 113-127

17. Lewis, H.B. and Franklin, M.: "An Experimental Study of the Role of Ego in Work: II. The Significance of Task-Orientation in Work". J. Exp. Psychol., 34, 1944, 195-216

18. Lippitt, R.: "An Experimental Study of the Effect of Democratic and Authoritarian Group Atmospheres". Studies on Topological and Vector Psychology I., Univ. Ia., Stud. Child Welf., 16, No. 3

19. Lundberg, G.A.: "Foundations of Sociology". Macmillan, 1939

20. MacIver, R.M.: "Society: A Textbook of Sociology". Farrar & Rinehart, 1937

21. Maller, J.B.: "Cooperation and Competition: An Experimental Study in Motivation". Teach. Coll., Contrib to Educ. No 384, 1929

22. May, M.A. and Doob, L.W.: "Cooperation and Competition". Soc. Sci. Res. Council Bull #25, 1937

23. Mayo, E.: "Social Problems of an Industrial Civilization". Harvard,1945

24. Mead, G.H.: "Mind, Self and Society". Univ of Chicago, 1934

25. Mead, M.: "Cooperation and Competition Among Primitive Peoples". McGraw-Hill, 1937

26. Morris, C.: "Signs, Language, and Behavior". Prentice-Hall, 1946

27. Murphy, Murphy, and Newcomb: "Experimental Social Psychology". Harpers, 1937

28. Newcomb, T.M.: "Autistic Hostility and Social Reality". Human Relations, 1, 1947

29. Newstetter, et al: "Group Adjustment"

30. Parsons, T.: "The Structure of Social Action". McGraw-Hill, 1937

31. Russell, E.S.: "The Directiveness of Organic Activities". Cambridge Univ., 1945

32. Shaw, M.E.: "A Comparison of Individuals and Small Groups in the Rational Solution of Complex Problems". Am. J. Psychol., 44, 1932, 491-504

33. Snedecor, G.W.: "Statistical Methods". Collegiate Press, 1946

34. South, E.B.: "Some Psychological Aspects of Committee Work". J. Ap. Psychol., 11, 1927, 348-368, 437-464

35. Spykman, N.A.: "The Social Theory of George Simmel". Univ of Chicago,1925

36. Thorndike, R.L.: "On What Type of Task Will a Group Do Well". J. Abn. & Soc. Psychol., 1938

37. Tolman, E.C.: "Purposive Behavior in Animals and Men". The Century Co, 1932

38. Watson, G.B.: "Do Groups Think More Efficiently Than Individuals?" J. Abnorm. Psychol., 23, 1928, 328-336

39. Wheeler, R.H.: "The Science of Psychology". Crowell, 1940

40. Whitehead, A.N.: "Science and the Modern World". Macmillan, 1925

41. Wilson, L.: "Sociology of Groups". in "Twentieth Century Sociology" edited by Gurvitch, G. and Moore, W.E.

42. Znaniecki, F.: "Social Groups as Products of Participating Individuals" Am. J. Sociol., XLIV, 1939, 799-812

Appendix A: The Problems

A. The Human Relations Problems

I The Tree-cutters

II The Barber Shop (A)

III The Cheaters (B)

IV The World War II Veteran (C)

V The Tool and Die Factory (D)

VI The Supervisors (E)

B. The Puzzle Problems

I. The Liars (A')

II The Vicar's Daughters (B')

III A Case of Kinship (C')

IV A Square in Bloomsbury (D')

V The Five Pedagogues (E')

The Tree-cutters

A group of nine boys, 14 and 15 years of age, from an underprivileged section of a large city, made up the membership of Cabin 10. Throughout the summer much was done to introduce campers to Indian lore. Many cabins had undertaken the construction of Indian stockades, tepees, and totem poles. Campers had been warned about cutting trees to use in these projects. It had been explained where and what kind of trees might be cut, and that no trees should be cut until campers were sure it was needed.

One afternoon, during rest period, Cabin 10 went out in the woods near the council ring and chopped down twenty-three beautiful tall aspens. They had no plan in mind for using the timber.

The camp director called a few counselors from that section of the camp together to discuss what should be done. One suggested that the boys be denied all swimming and athletic privileges for three or four days. Another proposed that the boys be required to clean up the area in which the trees had been cut and to transplant small trees into the area to replace those cut down. A third suggested that the boys be thoroughly "bawled out" privately and again before the entire compound then made to apologize to the camp. A final suggestion was that the boys be sent home as an object lesson. It was left with the "chief" to decide after a conference with the boys and their counselor.

Questions that should be considered:

1. What hypotheses can you offer as to why the boys did such a stunt?
2. What ends or objectives should be kept in mind in any plan for dealing with this situation?
3. In light of the hypotheses, would any of the offered suggestions have helped? If so, why?
4. Would any of them have been harmful? If so, why?
5. What would you have advised the "chief" to do?

The Barber Shop

I was sitting in a barber shop the other day when the following incident occurred:

This is a fairly large 6-chair shop but only 4 of the barbers were on the job. The shop was crowded and people had been coming in from the front and back entrances. I got into a conversation with the fellow sitting next to me and who I had seen there a couple of times before. He was worried as to whether he could get his hair cut and get home in time for a dinner engagement. He figured he could probably make it because he was next in turn.

When a chair was vacant the barber asked who was next. A fellow at the other end of the shop spoke up and the barber said, "O.K., Sam. I guess you are next." The fellow next to me was on his feet and over to the chair saying, "I'm sure I was next and I am in a hell of a hurry." Sam, who by this time was in the chair said, "That's all right mister, I'm in a hurry too and I am sure that I cam in before you did. I came in right after the fellow in the chair over there." The barber tried to settle the matter by saying, "Well, Sam's already in the chair and there will be another one in a minute."

"Oh the hell with that. I'll be damned if I am going to wait any longer. There's another damned Jew for you, always pushing ahead and the trouble is you guys always let "em get away with it."

I am Jewish and ever since then I have been thinking about that incident, and several questions have kept coming up in my mind.

1. Why did this fellow sitting next to me act the way he did?
2. What should Sam have done when he was called a damned Jew and why?
3. What could I have done? and why?

The Cheaters

I am the president of a college of 1200 students where a serious problem has arisen recently. The college is sponsored by a religious organization and has always been very proud of the high moral character of its students. Like other colleges its enrollment has been greatly increased during the past two years, but nevertheless the college has maintained its high standards in selecting its students. The problem that has arisen is this. Examination papers were stolen before one of the examinations last spring. There was evidence of cheating during some of the examinations and some of the faculty suspect that some of the students have copied one anothers term papers. The faculty are very much concerned about the problem but so are the students for, as one of them expressed it, "A person has to cheat if he is going to keep up with the standard bein set as a result of this increase of cheating. I don't like to cheat. It's degrading and it contradicts everything that this college stands for. But it is getting so that you have to cheat in order to keep up."

These are the questions I would like to put to you:

1. Under what conditions do students cheat?

2. What factors do you think are causing our students to cheat, even though they feel it is "degrading"?

3. What can be done at our college so that cheating is no longer an important problem on the campus?

The World War II Veteran

I have noticed that a fellow I've been working with lately has been seriously worried about something. I want to help him. This is the story he told me the other day when we stepped in for a drink after work.

"I am a World War II veteran. I have been home for 3 months after having served 2½ years overseas. I had been married a year and a half and my son was five months old when I left. My wife and I have always been very much in love with one another. My wife is a very intelligent sensitive person who carries with her the imprint of her father's unfaithfulness to her mother and of the shame and humiliation which she and her mother suffered as a result. Consequently, she regards faithfulness as the one indispensible condition of a successful marriage. I share my wife's conviction but feel that above all a husband and wife must always be completely frank with one another if their relationship is to be a happy one.

While I was overseas in England and France we wrote regularly to each other but as time went on, home seemed to become less and less real to me. During the first year or so, despite the urgings of my buddies in the squadron, I didn't have any dates. My passes were spent at Red Cross centers or around the base. I was pretty lonely, homesick, and just plain miserable. I guess I was kind of a pain to my hut-mates, for one night they more or less insisted that I go along with them to a dance in town. It was fun dancing with one girl in particular who seemed to be able to follow American steps. We got pretty well acquainted and to make a long story short, one thing led to another, and for the next year I spent all my passes with her. She knew that I was married and that our relationship was only for the duration, but she seemed to enjoy my company as much as I did hers. I nver spoke of her in my letters to my wife because at first it was harmless but later as it became more involved, I felt I would have to explain it to her in person for her to really understand.

When I got home 3 months ago I tried. I started to broach the subject in a general way by talking of life overseas. My wife said how horrified she had been by stories she had heard of how married men had behaved over there. She was so relieved, she said, that it hadn't happened to them. Naturally, after that, I have felt that I couldn't say what I had started to say."

I suggested that he forget all about it and not tell his wife, but he said, "I feel terribly guilty and feel that if I don't tell her there will always be a barrier between us which would make our marriage deceitful and yet I am afraid that if I do tell her that it will be a blow to my wife which might break up our marriage.

My problem is further complicated by a letter I received the other day from the girl overseas in which she described the terrible conditions over there and asked if I could help her out by sending food parcels."

I still think that my suggestion to him is a good one, but since he doesn't seem to like it, I don't see why he just doesn't go ahead and tell his wife all about this affair.

1. Can you give me any idea why he can't make up his mind?
2. What do you think is the wisest thing for him to do assuming that for his own peace of mind he can't just forget the matter?

The Tool and Die Factory

I am the owner of a small tool and die factory employing a little more than 500 men. The factory is located in the outskirts of a fairly large city in Connecticut. As you know Connecticut has recently passed a law which prohibits discrimination of any sort in employment. I am very much in sympathy with the purpose of this new law but it has presented a serious problem to me.

This conversation that I overheard in the factory and which I have every reason to believe reflects the sentiment of the men, will give you some idea of the difficulties that I may soon have to face.

"I sure as hell won't stand any niggers working beside me or stinking up our toilets. Soon the niggers will be swarming all over this place. If we once let them in, like that new law says, there won't be any place left for a white man."

I know that there a re a number of skilled Negro veterans in our city and there is no doubt that in a short time they will be applying for jobs, which under the law, I cannot refuse them. Yet, it is clear that unless I do something I am going to have trouble with my present workers. I certainly can't afford a major upheaval, such as a strike, at this time.

It would be helpful for me to know:

1. Why are the men reacting this way to the prospect of Negroes coming to the plant?

2. Is there anything I can do now to prepare for the situation when the Negroes come to apply for work?

The Supervisors

We are considering hiring one of four men for a job as a supervisor at our factory. Each of the four men have had about the same amount of experience working as a supervisor. We, unfortunately, have no direct comparable evaluations from their previous employers which would enable us to make our selection without further consideration. However, the letters of recommendations from their previous employers and our own interviews with them give us a pretty good picture of the characteristics of each of these men as supervisors.

Mr. Jones is a hardboiled supervisor who constantly checks up on everyone to keep up production. He gives the orders and employees carry them out. He believes that the only way to get conscientious performance is to expect and secure discipline and immediate acceptance of all orders. He is careful not to spoil the employees with too much praise, believing that because the employee is paid to work he should work without "pampering" with praise. It is the employee's place to carry out directives, not to question or understand them. Mr. Jones is usually very conscious of his position and authority and believes that the workers should be always very much aware that he is the boss. He believes that employees cannot be trusted very long on their own initiative.

Mr. Brown, in contrast to Mr. Jones, is interested in his employees, wants to see them happy, praises them as much as he criticizes them, is seldom harsh or severe, and likes to think that he is developing a happy family group. He urges employees to bring their problems to him and is rather hurt if they don't confide in him and ask for help when they're having trouble in or outside of work. He believes that as a supervisor he, more or less, has to be a "father" to his workers. He calls his men by their first names, pats them on the back and to get things done the way he likes it he is likely to say, "That's the way I like it, Jim...That isn't the way I told you to do it, Bob". His men all call him Mr. Brown. In his interview he said, "Most of my men are very loyal to me, they wouldn't think of doing anything that I wouldn't want them to do...they know how much it would hurt my feelings."

Mr. Garner believes that a supervisor must be a "good fellow". He acts very much like any of the other workers. He believes that his employees ought to be left pretty much on their own responsibility. In his interview he said: "You can get the best results if you let the employees alone. They'll come to you if they need help. Most supervisors bother workers too much. Workers know their jobs and if you let them alone, they'll do their work without somebody telling them what they're supposed to be doing all the time. Nosey supervisors just irritate their workers.

Mr. Norris endeavors whenever possible to share with his group the decision-making about work planning, assignment and scheduling. Where a decision musut be made by him, he helps the group to understand clearly the basis for his decision. He is careful to develop as much participation, opinion-giving, and decision-making as possible, and a feeling of responsibility for the success of the work on the part of everyone. In his interview he said, "Each employee should clearly understand his work and its importance. The more a worker can feel that what he's doing is important, the more likely he is to develop a feeling of responsibility for his job and the more likely he is to come out with good ideas for improvement."

We'd like to know:

1. What kinds of reactions a group of average semi-skilled workers are likely to have to each of the above supervisors? Why do you think the group would have such reactions to each of the supervisors?

We are especially interested in such things as productivity of the workers, morale (turnover, absenteeism, accidents, grievances, etc.) suggestions for improved techniques from employees, etc.

The Liars

Five schoolgirls sat for an examination. Their parents - so they thought - showed an undue degree of interest in the result. They therefore agreed that, in writing home about the examination, each girl should make one true statement and one untrue one.

The following are the relevant passages from their letters:

Betty: "Kitty was second in the examination. I was only third."

Ethel: "You'll be glad to hear that I was top. Joan was second."

Joan: "I was third, and poor Ethel was bottom.:

Kitty: "I came out second. Mary was only fourth."

Mary: "I was fourth. Top place was taken by Betty."

WHAT IN FACT WAS THE ORDER IN WHICH THE FIVE GIRLS WERE PLACED?

The Vicar's Daughters

The vicar gave each of his daughters eight shillings to spend at the bazaar.

"I want each of you," he said, "to buy a present for Mrs. Brown, Mrs. Jones, Mrs. Robinson, and Mrs. Smith.

"Each present bout must cost exactly one shilling or some multiple of one shilling.

"Each of you must choose a different method of dividing her eight shillings into four separate sums.

"Each old lady's presents must have cost the same aggregate sum."

The girls carried out these instructions.

Flora spent more on Mrs. Brown than on the other three ladies together.

Clara spent as much on Mrs. Smith and Mrs. Robinson as Flora spent on the other two ladies.

Maria spent more on Mrs. Jones than on any of the others, and Eva similarly spent more on Mrs. Robinson.

The fifth daughter's name was Sally.

HOW DID EACH GIRL ALLOCATE HER MONEY?

A Case of Kinship

There must have been a dearth of eligible young ladies in Kinsleydale, for each of five men there has married the widowed mother of one of the others. Jenkins's stepson, Tomkins, is the stepfather of **Perkins.** Jenkins's mother is a friend of Mrs. Watkins, whose husband's mother is a cousin of Mrs. Perkins.

WHAT IS THE NAME OF THE STEPSON OF SIMKINS?

A Square in Bloomsbury

Blotto Square is a tiny square in Bloomsbury. There is only one house on each of its four sides. These sides may be called the north side, east side, south side and west side respectively.

The residents in the square are Mr. East, Mrs. West, Mr. North, and Mr. South. They are (not necessarily respectively) a barrister, a doctor, a sculptor, and an actor.

Here are some more facts about them:

The resident on the north side of the square knows nothing about the law.

The doctor lives opposite to Mr. South; and the actor, opposite to Mr. North.

The resident on the west side of the square has never passed an examination.

Mr. South, who has never been inside a theatre, has briefed the barrister in an action now pending in the courts.

Mr. West is the actor's right-hand neighbour.

DRAW A PLAN OF BLOTTO SQUARE SHOWING EACH RESIDENT'S HOUSE AND OCCUPATION.

The Five Pedagogues

Mr. Mortarboard engages five masters for his school: Mr. Botany, Mr. Euclid, Mr. French, Mr. History, and Mr. Syntax. Each is required to teach two of the subjects which correspond to their five names. No master, however, teaches the subject corresponding to his own name.

Mr. History plays cut-throat bridge with the two botany masters. Mr. Syntax is married to the sister of one Euclid master, while his own sister is married to the other. Mr. Botany knows no French and Mr. French has no interest in syntax. Mr. Euclid spends his holidays with the two history masters. Mr. History and Mr. Syntax share in the teaching of one subject. French is not taught by the namesake of a subject taught by Mr. French. All lessons in French and Euclid take place at the same time.

WHAT ARE THE TWO SUBJECTS WHICH THE FIVE PEDAGOGUES RESPECTIVELY TEACH?

APPENDIX B: The Instruments

A. Observer Instruments

I. Observer Ratings of Group Process at End of Meeting ("A")

II. Functions Observation Sheet ("B")

III. Functions of Participations - Definitions ("B")

IV. Communications Observation Sheet

V. Phases Observation Sheet

VI. Style Observation Sheet

B. Instruments Used by Subjects

I. Weekly Questionnaire ("C")

II. Post-Experimental Questionnaire ("D")

III. Personality Ratings -1st week

IV. Personality Ratings - 5th week ("E")

APPENDIX B:

Poor text quality - next 27 pages

I. (A)

[illegible]

[illegible] somewhat [illegible] [illegible]

2 3 4 5 6 7 8

[illegible] How [illegible] the [illegible] insight [illegible]

[illegible]	a little insight	some insight	[illegible] insight	[illegible]

1 2 3 4 5 6 7 8 9

How abstract or generalizable (theoretical or mathematical) were the ideas?

[illegible] generalizability	mostly were not generalizable	half the time were, half the time were not generalizable	mostly were generalizable	[illegible]

1 2 3 4 5 6 7 8 9

How orderly and systematic was the discussion [illegible] problem?

[illegible]	a little coherence	somewhat systematic but not constantly	[illegible]	[illegible]

1 2 3 4 5 6 7 8 9

How often did the group work together [illegible]

[illegible]	quite a bit	some	[illegible]	[illegible]

1 2 3 4 5 6 7 8 9

[illegible] the atmosphere of the group?

[illegible]

[illegible]

[illegible]ing [illegible]gged [illegible]wn	serious communication differences hampering discussion	[illegible]	[illegible] misunderstandings	[illegible] completely understand each other

2 3 4 5 6 7 8 9

[illegible]	a good deal of involvement	some involvement	not very involved	[illegible]

2 3 4 5 6 7 8 9

[illegible] where they are [illegible] going	fairly clear on what they're doing	somewhat hazy some idea of what they are doing	rather hazy don't know what they are doing	[illegible]

2 3 4 5 6 7 8

[illegible] highly [illegible]	definite coordination	[illegible]	[illegible]	[illegible]

2 4 6 8

[illegible]	usually attentive	sometimes attentive	[illegible]	[illegible]

2 3 4 5

[illegible] achievement [illegible]	considerable achievement pressure	some acheivement pressure	a little achievement pressure	[illegible]

3 4 5 6

[illegible]

	usually acceptant		sometimes acceptant sometimes rejectant		usually rejectant		rejectant
1	2	3	4	5	6	7	8	9

	usually not interesting		sometimes interesting sometimes not interesting		usually interesting		always very interesting
1	2	3	4	5	6	7	8	9

slow ing	usually slow moving		sometimes slow moving sometimes fast moving		usually fast moving		always fast moving
1	2	3	4	5	6	7	8	9

What specialization of functions occurred?

Formal decision Informal

a. Content Sub-division
b. Activity Sub-division
c. "Functions" Sub-division

How productive was each member of the group?

rior	good		average		poor		very poor
1	2	3	4	5	6	7	8	9

Problem Group DATE Page

II. Functions Observation (B)

Proc-Tech.	B	C	Proc-Tech	D	E	Proc-Tech Gr	A	Proc-Tech. B	C	Proc-Tech. D	E	Proc-Tech. Gr.
ORIENTER	B	C	ORIENTER	D	E	ORIENTER Gr	A	ORIENTER B	C	ORIENTER D	E	ORIENTER G
ENERGIZER	B	C	ENERGIZER	D	E	ENERGIZER Gr	A	ENERGIZER B	C	ENERGIZER D	E	ENERGIZER G
Eval-Critic	B	C	Eval-Critic	D	E	Eval-Critic Gr	A	Eval-Critic B	C	Eval-Critic D	E	Eval-Critic G
COORD.	B	C	COORD.	D	E	COORD. Gr	A	COORD. B	C	COORD. D	E	COORD. Gr
Post-STAT.	B	C	Post-STAT	D	E	Post-STAT Gr	A	Post-STAT. B	C	Post-STAT D	E	Post-STAT. Gr
INFO-GIVER	B	C	INFO-GIVER	D	E	INFO-GIVER Gr	A	INFO-GIVER B	C	INFO-GIVER D	E	INFO-GIVER Gr
INFO-ASK.	B	C	INFO-ASK.	D	E	INFO-ASK. Gr	A	INFO-ASK B	C	INFO-ASK D	E	INFO-ASK. Gr
ELABOR.	B	C	ELABOR.	D	E	ELABOR Gr	A	ELABOR B	C	ELABOR D	E	ELABOR Gr
INITIATOR	B	C	INITIATOR	D	E	INITIATOR Gr	A	INITIATOR B	C	INITIATOR D	E	INITIATOR Gr
Gr. Comm	B	C	Gr. Comm	D	E	Gr. Comm Gr	A	Gr. Comm B	C	Gr. Comm D	E	Gr. Comm. Gr
ST-SETTER	B	C	ST-SETTER	D	E	ST-SETTER Gr	A	ST-SETTER B	C	ST-SETTER D	E	ST-SETTER G
SOLIC.	B	C	SOLIC.	D	E	SOLIC Gr	A	SOLIC B	C	SOLIC D	E	SOLIC. G
Ed-mem	B	C	Ed-mem	D	E	Ed-mem Gr	A	Ed-mem B	C	Ed-mem D	E	Ed-mem. G
HARMON	B	C	HARMON	D	E	HARMON Gr	A	HARMON B	C	HARMON D	E	HARMON Gr
FOLLOWER	B	C	FOLLOWER	D	E	FOLLOWER Gr	A	FOLLOWER B	C	FOLLOWER D	E	FOLLOWER Gr
REWARD	B	C	REWARD	D	E	REWARD Gr	A	REWARD B	C	REWARD D	E	REWARD. Gr.
PLAYBOY	B	C	PLAYBOY	D	E	PLAYBOY Gr	A	PLAYBOY B	C	PLAYBOY D	E	PLAYBOY Gr
SELF-OBS.	B	C	SELF-OBS.	D	E	SELF-OBS. Gr	A	SELF-OBS. B	C	SELF-OBS D	E	SELF-OBS Gr
HELP-SEEK	B	C	HELP-SEEK	D	E	HELP-SEEK Gr	A	HELP-SEEK B	C	HELP-SEEK D	E	HELP-SEEK G
REC-SEEK	B	C	REC-SEEK	D	E	REC-SEEK Gr	A	REC-SEEK B	C	REC-SEEK D	E	REC-SEEK Gr
DOMIN	B	C	DOMIN.	D	E	DOMIN. Gr	A	DOMIN B	C	DOMIN D	E	DOMIN. G
DISCLOSER	B	C	DISCLOSER	D	E	DISCLOSER Gr	A	DISCLOSER B	C	DISCLOSER D	E	DISCLOSER Gr
RECREASON	B	C	RECREASON	D	E	RECREASON Gr	A	RECREASON B	C	RECREASON D	E	RECREASON Gr
SELF-DEF	B	C	SELF-DEF	D	E	SELF-DEF Gr	A	SELF-DEF B	C	SELF-DEF D	E	SELF-DEF G

III Functions of Participation (B)

By "function of participation" is meant the immediate intent or purpose of the participant. Though logically, of course, this is an inference, psychologically the "perception" of immediate intent or purpose is fairly direct.

The perception of intent is partially based on context (the conditions for the effects of the contribution) however one must be careful not to confuse intent with effect. Thus the intent of an individual may be to harmonize or mediate a difference between two members but the effect of his clumsy efforts may be to accentuate the existing split.

It is also important to clearly distinguish between the intent of the contribution and style or manner of participation. The style or manner of a participation usually reflects more pervasive and enduring characteristics of the participant (perhaps needs which are intentions or predispositions to respond which are not immediately specific). One, for example, must distinguish between the purpose of aggression (the immediate intent to injure) and a remark that is made in an aggressive manner. In the latter case the aggressive characteristic is not the immediate, more or less conscious, intent of the participant. It is something which intrudes on his immediate purpose (perhaps even against the participant's wish). One can classify immediate intent or "function" into three broad groupings which are more or less distinct;

A. Task Functions: participations which are directed toward the task that the group is confronted with, they have for their immediate purpose the facilitation of problem solution.

B. Group Functions: participations which are directed toward the functioning of the group as a group, they have for their immediate purpose the maintenance, or strengthening, regulation, or perpetuation of the group.

C. Individual Functions: participations which are directed toward the satisfaction of the participant's individual needs; they have for their immediate purpose the reaching of an individual goal which is neither task nor group relevant. The goal is individual, in the sense, that the satisfaction aimed at by the participant cannot be participated in by the others (at all or in the same way).

Task Functions

1. Contributes, suggests, or proposes new idea or change [illegible]
   a. Suggests new goals (new definition of problem) or new [illegible] to the goal.
   b. Suggests new solution, suggests way of handling difficulty.
   c. Suggests new procedure for the group, suggests way of [illegible]

*A "new" idea is any idea which has not been offered to the group [illegible] going meeting. An idea is not to be considered as being "new" if it represents [illegible] elaboration, specification, or clarification of a suggestion which has been [illegible] made. A suggestion, however, which has been previously made and is now being used in a different context to handle a different "problem" should [illegible]

2. Gives information, reports own experience, quotes facts all of which are "authoritative" (information given)
   a. gives information which is unquestioned.
   b. quotes facts or authority.
   c. relates own experience.

2A. Gives opinions, beliefs, states position (position-states)
   a. States what his position is on an issue
   b. Gives opinion in answer to a question

3. Elaborates, specifies, explains ideas (Elaborator)
   a. gives examples (don't have factual reference)
   b. elaborates details of suggestion, develops suggestion in more detail.
   c. gives rationale for suggestion
   d. explains how it would work.

4. Coordinate, integrates, relates together (coordinator)
   a. shows or clarifies relationship between or among ideas, suggestions.
   b. integrates ideas and suggestions, pulls them together
   c. coordinates activity or action relating what one person is doing to what others are doing.

5. Orients, defines position or direction (orienter)
   a. raises problem of direction or goals
   b. defines position, summarizes what has occurred
   c. indicates group is off the beam or on the beam(departing from or sticking to a decided upon direction)

6. Evaluates,is realistic, raises difficulties, critiques (evaluator-critic)
   a. evaluates or questions "practicality" of idea, suggestion
   b. evaluates or questions "logic"
   c. evaluates or questions "facts"
   d. evaluates or questions "procedure"

7. Prods to action or decision, activates, stimulates or arouses (energizer)
   a. expresses need for group to move along
   b. raises a problem for the group to act upon
   c. asks for, urges group to make a decision or come to a consensus

8. Asks for or seeks information, opinions, meaning (information seeker)
   a. Seeks or asks for clarification
   b. Seeks or asks for opinions of others.
   c. Seeks or asks for information, facts from others

9. Executes routine tasks, expedites by doing (procedural technician)
   a. manipulates objects for group
   b. executes routine tasks
   c. makes routine suggestion

10. Records ideas, decisions, etc. (recorder)
   a. writes down suggestions
   b. writes down group product

II. Group Functions.

11. Encourages, praises, agrees, accepts, indicates solidarity (encourager)
   a. encourages others
   b. indicates warmth, solidarity
   c. praises, rewards, commends, agrees
   [redacted]

12. Harmonizes, mediates, reconciles, specifies, relieves tension (harmonizer)
   a. tries to reconcile differences between individuals through mediation
   b. pours oil over troubled waters.
   c. jests to relieve tension.

13. Compromises, yield status, disciplines self, admits error (Good member [redacted])
   a. compromises
   b. yields status to maintain group harmony
   c. disciplines self to facilitate group progress
   d. admits error, changes position to go along with group.
   e. volunteers for procedural tasks, accepts responsibility as a group member

14. Keeps communication channels open, regulates and facilitates comm. (solicitor ~~gate keeper~~)
   a. facilitates participation of others by drawing them in
   b. keeps communication channels openby defining a word or rewardinga suggestion
   c. regulates flow of communicationby preventing interruptions, giving permission to talk.

15. Sets standard for performance (standard setter, ego ideal)
    a. sets standard for group to meet
    ~~b. expresses evaluation of group functioning~~

16. Makes observations on group functioning, on group "feeling" (group commentator)
    a. makes comments on group functioning
    b. expresses "feelings" of group
    c. evaluates group functioning

18. Follows suggestion of others, passively accepts ideas of others/**agrees, accepts** (follower)
    a. follows suggestions of others.
    b. passively accepts ideas of others, **agrees**
    c. acts as audience
    d. indicates understanding
    ("Encourager" has a more active and giving connotation than "follower")

III. Individual functions

19. Aggresses, attacks, deflates, is derogatory, disapproves
    a. attacks or deflates status of others; disapproves values, actions or desires of others.
    b. attacks is derogatory about, shows dissatisfaction with group, situation, or problem
    c. displays anger or antagonism
    d. jokes aggressively, **teases**
    e. displays envy, tries to take something away from other

20. Disagrees, opposes, resists (blocker)
    a. is negativistic, stubborn, or resistant
    b. disagrees or opposes without "reason"
    c. attempts to maintain or bring back issue after group has rejected or by-passed it.

21. Calls attention to himself, seeks status, or recognition, is defensive (recognition-seeker)
    a. Gives self status, boasts, cites personal achievement, etc.
    b. Draws attention to self through joke, unusual actions, etc.
    ~~c. Is self defensive, tries to prevent being placed in "error", "wrong" or "inferior" position~~

22. Expresses "feeling", "insight","values" (self-observer)
    a. Expresses "insight"
    b. " "feeling"
    c. " "values" or "ideology"
    d. " "personal goal"

23. "Out of field", playful, cynical, is nonchalant (playboy)
    a. Tries to give impression of nonchalance, unconcern, lack of involvement
    b. Tries to create mirthful, playful atmosphere
    c. Makes irrelevant remarks
    d. Acts as though "out of field"

24. Gives commands, seeks to manipulate, asserts authority or superiority (dominator)
    a. seeks to manipulate others through flattery
    b. asserts a superior status or right
    c. gives commands or directions authoritatively as though of superior status
    d. makes authoritative statements about facts as though of superior status

25. Seeks help, sympathy (help seeker)
    a. expresses insecurity
    b. expresses personal confusion
    c. depreciates self

26. Is self-defensive, attempts to deny error, wards off attack, resists criticism (Self-defender)
    a. Denies "error", "wrong", or "inferior" position - defends self
    b. wards off attack, resists criticism, counter-criticizes
    c. withdraws exposed ego, sulks

	ATTENTION													ACCEPTANCE					
	FULL ATTEN.	PARTIAL ATTENTION			NO ATTENT.		LACK OF UNDERSTAND.	MISUNDERSTAND.	SEMANTIC DISCUSSION	REPETITION	SAYING SAME THINGS	TALKING PAST EACH OTHER	WHO	COMPLETE (+ +)	COND. ACCEPT (+)	NEUTRAL	COND. REJECT (-)	REJECT (- -)	IGNORING

IV Communications Observation Sheet

MEMBERS BORED ... — SERIOUS COMM. WITH HAPPENING DISCUSSION — DISC. SLOWED, MEMBERS GENERALLY UNDERSTOOD EACH OTHER — INFREQUENT MISUNDERSTAND. — MEMBERS COMPLETELY UNDERSTOOD EACH OTHER

1 2 3 4 5 6 7 8 9

GROUP CENTERED — MOSTLY GROUP CENTERED — SOMEWHAT GROUP CENTERED — MOSTLY SELF CENTERED — SELF CENTERED

1 2 3 4 5 6 7 8 9

FRIENDLY — FRIENDLY — MATTER OF FACT — SOMEWHAT UNFRIENDLY — TENSE, UNFRIENDLY

1 2 3 4 5 6 7 8 9

VERY INVOLVED — A GOOD DEAL OF INVOLVEMENT — SOME INVOLVEMENT — NOT VERY INVOLVED — APATHETIC

1 2 3 4 5 6 7 8 9

Roles taken:

A Content subdivision

B Act ivity subdivision

C Task functions: Initiator, Elaborator, Energizer, Critic, Coordinator, Orienter, Info-giver, Info-asker, Proc.

Group functions: Group coordinator, Standard-setter, Soliciter, Good-member, Harmonizer, Rewarder, Follower

Individual functions: Self-obs., Playboy, Help-seeker, Rec.-seeker, Dominator, Blocker, Aggressor.

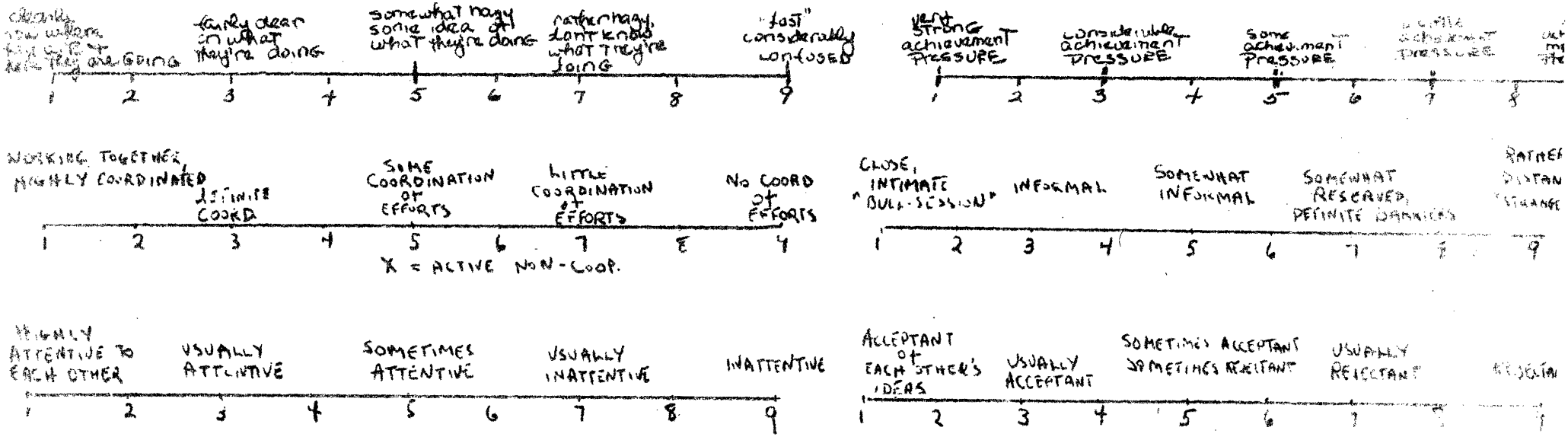
Problem_____ Group_____ Date_____

Phases of Group Problem-Solving

1. Orienting to the Task	2. Providing Group Procedure	3. Suggesting solutions	4. Evaluating Ideas	5. Putting solution into written form
1. Absorbing 2. Defining limits 3. Analyzing Nature 4. Assessment	1. Organization of group for task a. Defining roles b. Procedure for decision c. Providing for write-up 2. Locating group functions 3. Assigning functions	1. Bring out info, facts, etc. 2. Suggesting solutions, plans, etc.	1. Trying out a solution 2. Appraising a suggestion 3. Making a suggestion as a group	1. recording 1 2. recording 2 3. Putting solution into final form

Content

V Phase Observations Sheet



Date_____ Group_____ Problem_____ Page_____

A B C D E

No. of Partic.	Generality & Coherence	Stability	Originality	Psycholog. Insightfulness ( )covert ( )overt Needs	Emotion	Ideology
		VI Style Observation Sheet				
Many Quite a bit Average Few None	W + Wo Wv W-D D + Do Dv D- Dd + Dd Dd-	Rigid Persistent Flexible Fluid	O + O- P Repetition	M FM m	aba dom rec ach harm sent aff nurt sex agg infa suc auto ord und cnt play	+ self - + others -	rigid toler conv liberal unconv prej unprej
Many Quite a bit Average Few None	W + Wo Wv W-DW D + Do Dv D- D + Dd Dd-	Rigid Persistent Flexible Fluid	O + O- P Repetition	M FM m	aba dom rec ach harm sent aff infa sex agg nurt suc auto ord und cnt play	+ self - + others-	rigid conv liberal unconv prej unprej toler
Many Quite a bit Average Few None	W + Wo Wv W-DW D + Do Dv D- Dd + Dd Dd-	Rigid Persistent Flexible Fluid	O + O- P Repetition	M FM m	aba dom rec ach harm sent aff infa sex agg nurt suc auto ord und cnt play	+ self - + others -	rigid toler conv liberal unconv prej unprej
Many Quite a bit Average Few None	W + Wo Wv W-D D + Do Dv D- Dd + Dd Dd-	Rigid Persistent Flexible Fluid	O + O- P Repetition	M FM m	aba dom rec ach harm sent aff infa sex agg nurt suc auto ord und cnt play	+ Self - + others -	rigid toler conv liberal unconv prej unprej
Many Quite a bit Average Few None	W + Wo Wv W-D D + Do Dv D- Dd + Dd Dd-	Rigid Persistent Flexible Fluid	O + O- P repetition	M FM m	aba dom rec ach harm sent agg infa sex aff nurt suc auto ord und cnt play	+ self - + others -	rigid toler conv liberal unconv prej unprej

I Weekly Questionnaire (C)

Name_____ Date_____ Time_____ Problem_____

Did the group help your thinking?

help very much		help somewhat		help some hinder some		hinder somewhat		hinder very much
1	2	3	4	5	6	7	8	9

How many suggestions or ideas did you have (which for any reason) you did not make to the group? Approximate as best you can.

0 1 2 3 4-5 6-7 8to10 11 to 14 15 or more

If answer to no.2 is anything but "0", why didn't you make these suggestions? Check( ) as many reasons as apply, double check( ) those reasons which were most important. Fill in any other reasons you may have had.

(a) Didn't think they were worthwhile.

(b) Somebody else said pretty much the same thing.

(c) Couldn't get a word in edgewise.....others were talking so much.

(d) Not enough time.

(e) I wasn't quite sure how they would be received.

(f) The whole business didn't interest me much.

(g) I usually find it a little difficult to say what I'm thinking in groups.

(h) My idea wasn't relevant to what the group was talking about at the time.

(i)

Did you find that you had difficulty in getting your ideas across to the others?

a great deal of difficulty		quite a bit of difficulty		some difficulty		a little difficulty		no difficulty
1	2	3	4	5	6	7	8	9

Were there times when you were only half-listening or not listening at all to what the others were saying? How frequently did this occur?

almost never was fully attentive to what others were saying		was fully attentive about ½ of the time		about ½ the time was fully attentive		about 3/4 of times fully attentive		always was very attentive to what others were saying
1	2	3	4	5	6	7	8	9

Did you find that you had difficulty in trying to follow or get the point of what the other fellows were saying? Rate the difficulty you had in understanding each of the others by putting each last name with an appropriate number next to it to indicate the ranking in the space on the next page.

a great deal of difficulty in figuring out what they meant	quite a bit of difficulty	some difficulty	a little difficulty	they were clear always understood what they meant
1	2 3	4	5 6	7 8 9

7a When yo did react to the ideas or suggestions of others how did you react? Rate your reactions to the suggestions and ideas of <u>each</u> of the others by putting last name with appropriate number to indicate the rating on the space below.

almost always agreed	usually agreed	half the time agreed, half the time disagreed	usually disagreed	almost always disagreed
1	2 3 4	5	6 7	8 9

7b How frequently was your own thinking or reactions affected by what the others were saying? Rate your reactions to the suggestions and ideas of <u>each</u> of the others by putting last name with appropriate number next to it to indicate the rating in space below.

almost invariably ignored what was said	usually ignored	ignored half the time, reacted half the time	usually reacted	almost always reacted
1	2 3	4 5	6 7	8 9

8a When the others did react, how did they tend to react to your ideas or suggestions? Rate the reactinns of <u>each</u> of the others by putting last name with appropriate number next to it to indicate the rating in the space below

almost always agreed	usually agreed	half the time agreed, half the time disagreed	usually disagreed	almost always disagreed
1	2 3 4	5	6 7	8 9

How frequently was the thinking or reactions of the others affected by your ideas or suggestions? Rate **each** of the others by putting last name with appropriate number to indicate the rating in the scale below:

lmost nvariabley gnored what said		usually ignored		ignored about 1/2 the time		usually reacted to what I said		almost always reacted to what I said
1	2	3	4	5	6	7	8	9

How much interested were you in the problem?

y much nterested		much interested		some interested		little interested		bored, no interest
1	2	3	4	5	6	7	8	9

How much group-feeling did you have while you worked?

roup-feeling, ked as an vidual		a little group-feeling		some group-feeling		much group-feeling		very high degree of group feeling, subordinated myself to the "group" purpose
1	2	3	4	5	6	7	8	9

How cooperatively did the group work together on this problem?

eat deal operation		quite a lot of cooperation		some cooperation		a little cooperation		no cooperation
1	2	3	4	5	6	7	8	9

How good do you think the group's product(plan, recommendations, or solutions) was?

good		good		fair		poor		very poor
1	2	3	4	5	6	7	8	9

How good do you think your **individual** contributions were? Rate yourself.

good		Good		fair		poor		very poor
1	2	3	4	5	6	7	8	9

4

Indicate below what you think the evaluations of the others in the g

4. How good were the contributions of the others?Rate the contributions of the others by putting last names with appropriate numbers to indicate ratings in the space below.

Very good good fair poor very poor

1 2 3 4 5 6 7 8 9

5. How much did you learn from this discussion?

Very much quite a lot some a little nothing

1 2 3 4 5 6 7 8 9

6a. How competitive withit the other members in your group did you feel you were during the discussion?

Very much competitive quite a bit competitive some a little bit of competition not competitive at all

1 2 3 4 5 6 7 8 9

6b. How competitive do you think the others were? Rate each of the others in the space below with appropriate names and numbers.

Very competitive quite a bit some a little bit not at all competitive

1 2 3 4 5 6 7 8 9

7. Characterize the behavior of each member of the group (including yourself) by circling those words below which appropriately describe the role each individual took. Add any other words you feel necessary to give an accurate description. Be sure to read all the words.

Name _____

leader clown cynic creative thinker prodder recorder
disrupter information-giver idea-coordinator realist encourager
mediator idea-elaborator procedural initiator attention-seeker
debunker dominator group conscience non-participant nuisance
good group member on-the-beam keeper critic sympathy-seeker
poor group member

ne___________________________

ader clown cynic creative thinker prodder recorder disrupter

formation-giver idea-coordinator realist encourager mediator

ea-elaborator procedural initiator attention-seeker debunker dominator

oup conscience non-participant good group member nuisance critic

-the-beam keeper sympathy-seeker poor group member

me___________________________

ader clown cynic creative thinker prodder recorder disrupter

formation-giver idea-coordinator realist encourager mediator

ea-elaborator procedural initiator attention-seeker debunker

minator group conscience non-participant good group member critic

isance on-the-beam keeper sympathy-seeker poor group member

me___________________________

ader clown cynic creative thinker prodder recorder disrupter

formation-giver idea-coordinator realist encourager mediator

ea-elaborator procedural initiator attention-seeker debunker

minator group conscience non-participant good group member critic

isance on-the-beam keeper sympathy-seeker poor group member

me___________________________

ader clown cynic creative thinker prodder recorder disrupter

formation-giver idea-coordinator realist encourager mediator

ea-elaborator procedural initiator attention-seeker debunker

minator group conscience non-participant good group member critic

isance on-the-beam keeper sympathy-seeker poor group member

II. Post-Experimental Questionnaire (D)

Name _____ Group _____ Date _____

1. How do you feel about the people in your group? Rate each of the others.

strong dislike	dislike somewhat		neutral		somewhat friendly		very friendly
1	2	3	4	5	6	7	8	9

2. Write the first and last names of each member of your group on the lines below. When did you get to know the names if the others (so that you could remember without being reminded). Indicate by an "F" for first name and an "L" for last name in the appropriate column.

	before group met	1st wk	2nd wk	3d	4th	5th	6th	7th
_____								
_____								
_____								
_____								
_____								

3. (a) How much time do you spend with the people in your group outside of class hours? Rate each of the others by placing their names next to the appropriate letter.

_____ a. Less time than I might with fellows I know casually from other classes at M.I.T.

_____ b. Somewhat more time than I might with fellows I know only from other classes.

_____ c. As much as I might with somebody I know fairly well.

_____ d. As much time as I might with a fairly good friend.

_____ e. As much time as I might with a very close friend.

3. (b) What kinds of activities (if any) did you engage in with the others? Rate each of the others by putting their names next to the activities.

tudying

orts

ull Sessions (about Ec 70, etc.)

obbies

ltural

hers

(con't.)
ommutting

ating

ocial (Dances, Dating, etc.)

isiting

lub Activities

ecreational (Movies, Beer, etc.)

How much did the weekly small group meetings stand out for you in contrast with the other classes you attend during the week?

a. Didn't think about the meetings at all....other classes were much more prominent in my thinking.
b. Thought about it occasionally...but other classes were more prominent in my thinking.
c. Thought about it some- was mor prominent in my thinking than some of my other courses.
d. Thought about it quite a bit - was more prominent in my thinking than most of my other courses.
e. Thought about it frequently - was more prominent in my thinking than my other courses.

How much did you enjoy the weekly small group meetings?

trongly disliked	somewhat disliked	so-so neutral	enjoyed somewhat	enjoyed very much
1 2	3 4	5 6	7 8	9

What did you like (if anything) about the meetings?

Name _____

hat did you dislike (if anything) about these meetings?

. How much do you feel you've learned as a result of your weekly discussions of the human relations problems?

nothing		a little		some		quite-a-bit		very much
1	2	3	4	5	6	7	8	9

. How much do you feel you've learned as a result of discussions of psychological principles with the instructor?

nothing		a little		some		quite a bit		very much
1	2	3	4	5	6	7	8	9

. How would you rate what you're getting out of Ec 70 with what you're getting out of your other courses at M.I.T.?
Ec 70 rates better than _____% of my other courses.

. How well, on the average, did your group work together as a group on the Human Relations
a) Problems?

very well		pretty well		so-so		somewhat poorly		very poorly
1	2	3	4	5	6	7	8	9

B) Was there much change in effectiveness of your group as a group from the beginning to the end of the experiement in handling the human relations problems?

(OVER)

Name _____

9b (con't.)

group got worse as time went on		no real change in group effectiveness		a slight improvement in group effectiveness		some improvement		marked improvement as time went on.
1	2	3	4	5	6	7	8	9

c) In what ways do you think your group could have improved its functioning in tackling the human relations problems?

10 (a) How well on the average did your group work together as a group in solving the puzzles?

very well		pretty well		so-so		somewhat poorly		very poorly
1	2	3	4	5	6	7	8	9

(b) Was there much change in the effectiveness of your group as a group in solving the puzzles from the beginning to the end of the experiment?

group got worse as time went on		no real change in effectiveness		a slight improvement in group effectiveness		some improvement		marked improvement as time went on
1	2	3	4	5	6	7	8	9

(c) In what ways do you think your group could have improved its functioning in solving the puzzles?

Name_____

. Did you and any or all of the other members of your group get together at any time efore meetings, during breaks, after meetings, etc.) to discuss ways of functioning re effectively as a group? Yes_____ No_____

If you checked "Yes", how many times did this occur during the course of the experiment? Circle the correct number below:

nce twice three times four times five times six times seventimes (at least once every week)

more than seven times

(a) How strong on the average was your desire or motivation to come out with a good set of recommendations for the human relations problems? Indicate with an "H".

ot really otivated | a little motivation | some motivation | quite a bit of motivation | very strong motivation

2 3 4 5 6 7 8 9

Indicate above with a "P" the strength of your motivation to solve the puzzles.

b) Rank the following factors (and any other factors you wish to add) as to their relative importance in determining how strongly you were motivated. Place a (1) next to the most important factor, a (2) next to the second most important factor, etc. Put an X next to the factors that had no influence on you atall.

Puzzles

a. the fact that you were being graded.

b. The challenge of the problem.

c. Desire to excel the contributions of the other members in your group.

d. The fact that this was part of an experiment.

e. The obligation you felt as a member of a group to participate in a joint effort.

f. Desire to excel the other groups that were tackling the same problems.

g. Thought you could learn most that way.

h. Thought that was what the instructor wanted.

i. To win the respect of the other members.

j.

k.

13. Describe the method by which you were being graded on the human relations problem.

14. What were your reactions to this method of grading?
(a) How much did you like it?

disliked it intensely		disliked it		didn't care one way or the other		liked it		liked it very much
1	2	3	4	5	6	7	8	9

Why did you feel that way?

(b) How much did the method of grading influence your attitudes and behavior during the discussion of the human relations problems?

not at all		a little bit		somewhat		quite a bit		a great deal
1	2	3	4	5	6	7	8	9

In what ways did it influence your attitudes and behavior? Consider such things as your attitudes toward the other members, your participation, your desire to cooperate, etc.

(c) If you would have had completely free choice as to the method of grading discussion in class, which of the following grading methods would you have prefered? Indicate by a check.

1. Being graded on your individual contributions. The grade being determined by the rank you receive in comparison with the contributions made by the other 4 members of your group.
2. Being graded on the group's discussion. The grade being determind by the rank your group receives in comparison with the discussion of 4 other similiar groups.

How strong is your preference:

actually I have not any preference	a slight preference		moderate preference		strong preference			very strong preference
1	2	3	4	5	6	7	8	9

If you do have a preference, why do you prefer one rather then the other?

15. (a) How conscious were you of the observers while you were discussing the human relations problems? Make ratings for the beginning (1st week), middle (3d wk), and end (the last week).

very much aware of their presence		aware of them		sometimes aware of them		usually not conscious of them		not at all conscious of them
1	2	3	4	5	6	7	8	9

(b) What effect (if any) did your awareness of them have on what you said and did? Check the appropriate items and add any other effects it might have had.

(a) Disturbed me - made me very self-conscious.

(b) Inhibited me from being as informal as I would have been.

(c) I tried to win their approval.

(d) Made me more group-conscious.

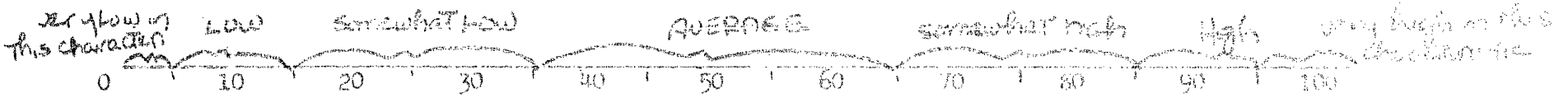
(e)

(f)

1st meeting

Please rate every other member of the group yourself, and how you think the others will rate you on each of the characteristics. Do this by placing a number in the appropriate row and column to indicate how you would rate the other members, yourself, etc. with respect to each characteristic. Use I.T. students for comparison and assume that the average M.I.T. student would receive a rating of 50 on each characteristic.

III Personality Ratings - 1st week



Percentages of M.I.T. students who have less of the characteristic than the individual being rated

Rate each individual on every characteristic even though you may experience difficulty in making the rating. When you experience a great deal of difficulty place three checks in parenthesis (✓✓✓) next to the rating, where some difficulty is experienced, place two checks in the parenthesis (✓✓). When a little difficulty is experienced, place one check, and when no difficulty is experienced, do not make a check.

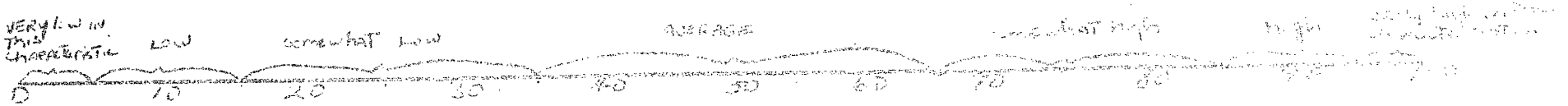
Work rapidly, and give your first judgment. Please be completely honest in making you ratings, they will be kept in strict confidence.

CHARACTERISTICS	How others will rate me								
	A	B	C	D	Self	A	B	C	D
Desirablity as a friend									
Candidness									
Maliciousness									
Cooperativeness									
Creativity									
Maturity									

Last meeting

Please rate every other member of the group yourself, and how you think the others will rate [illegible] of the characteristics. Do this by placing a number in the appropriate box that indicates how [illegible] would rate the other members, yourself, etc. with respect to each characteristic. Use M.I.T. students for comparison and assume that the average M.I.T. student would receive a rating of 50 on each characteristic.

IV Personality Ratings -5th week ("E")



Percentage of M.I.T. students who have less of the characteristic than the individual being rated.

Rate each individual on every characteristic even though you may experience difficulty in making the rating. When you experience a great deal of difficulty place three checks in parenthesis (✓✓✓) next to the rating. Where some difficulty is experienced, place two checks(✓✓) in the parenthesis. When a little difficulty is experienced, place one check, and when no difficulty is experienced do not make a check.

Work rapidly, and give your first judgment. Please be completely honest in making your ratings. They will be kept in strict confidence.

Characteristics	How others will rate me								
	A	B	C	D	Self	A	B	C	D
Desirability as a friend									
Candidness									
Self-Centeredness									
Cooperativeness									
Creativity									
Maturity									
Desirability as a member of a small group like this									
Desirability as a leader of a small group like this									

APPENDIX C: Additional Data

Table 20: Data from the Over-All Rating Scales ("A")

Table 21: Data from the Functions Observation ("B")

Table 22: Data from the Weekly Questionnaire ("C")

Table 23: Data from the Post-Experimental Questionnaire ("D")

TABLE 20: Data From Over-all Rating Scales by Observer ("A")

Variable	#	High end of scale	Human Relations Mcoop	Human Relations Mcomp	Puzzles Mcoop	Puzzles Mcomp	Comparison coop-comp H.R. Mdiff	coop-comp H.R. p	coop-comp P Mdiff	coop-comp P p	P-HR coop Mdiff	P-HR coop p	P-HR comp Mdiff	P-HR comp p
Productivity	1a	9	6.16	4.32	5.98	4.08	/1.84	(001)	/1.90	(01)				
Insight	1b	9	5.70	4.43	5.80	4.08	/1.27	(001)	/1.72	(02)		not		
Orderliness	2	9	6.40	4.38	5.95	3.99	/2.02	(001)	/1.96	(001)	-.45	sig	-.39	not sig
Work-Together	3	1	3.16	5.62	3.98	6.72	-2.46	(001)	-2.74	(001)	/.82	(01)	/1.10	(01)
Friendliness	4a	1	4.05	5.31	4.00	4.91	-1.26	(001)	-.91	(01)	-.05	not sig	-.40	not sig
Group-centeredness	4b	1	3.40	6.39	4.34	6.88	-2.99	(001)	-2.54	(001)	/.94	"	/.49	not sig
Communication Diffic.	4c	1	6.00	4.06	5.33	3.94	/1.94	(001)	/1.39	(01)	-.67	(07)	-.12	not sig
Involvement	4d	1	4.77	4.62	3.71	3.48	/.15	not sig	/.23	not sig	-1.06	(02)	-1.14	(05)
Orientation	4e	1	3.68	5.43	3.88	5.86	-1.75	(001)	-1.98	(01)	/.20	not sig	/.43	not sig
Coordination of Efforts	4f	1	3.36	5.98	4.08	6.65	-2.62	(001)	-2.57	(001)	/.72	(07)	/.67	(08)
Attentiveness	4g	1	3.44	4.49	3.78	5.37	-1.05	(01)	-1.59	(001)	/.34	(30)	/.88	(01)
Achievement Pressure	4h	1	3.70	4.69	3.61	4.10	-.99	(01)	-.49	(15)	-.09	not sig	-.59	(14)
Intimacy	4i	1	5.24	5.47	5.48	6.27	-.23	not sig	-.79	not sig	/.24	not sig	/.80	not sig
Acceptance	4j	1	3.85	5.60	3.87	4.82	-1.75	(001)	-.95	(01)	/.02	not sig	-.78	(01)
Average indiv. productivity	7av	1	4.29	4.44	4.02	4.60	-.15	not sig	-.58	(07)				

TABLE 21: Data From Functions Observer ("B")

	Human Relations		Puzzles		Comparison							
					coop-comp HR		coop-comp P		P-HR coop		P-HR comp	
Variable	Mcoop	Mcomp	Mcoop	Mcomp	Mdiff	p	Mdiff	p	Mdiff	p	Mdiff	p
Orienter	5.43	4.81	5.82	3.75	/.62	not sig	/2.07	not sig	/.39	not sig	-1.06	not sig
Energizer	2.32	2.05	1.88	1.92	/.27	not sig	-.04	not sig	-.44	not sig	-.13	not sig
Evaluator-Critic	10.36	13.76	9.90	10.85	-3.40	(04)	-.95	not sig	-.46	not sig	-2.91	not sig
Coordinator	3.48	3.26	.82	1.02	/.22	not sig	-.20	not sig	-2.66	(001)	-2.24	(001)
Position Stater	4.44	7.02	3.17	6.15	-2.58	(02)	-2.98	(01)	-1.27	not sig	-.87	not sig
Information Giver	3.68	3.42	6.60	11.07	/.26	not sig	-4.47	(01)	/2.92	(001)	/7.65	(001)
Information-Asker	3.08	2.28	6.97	9.70	/.80	(02)	-2.63	not sig	/3.83	(001)	/7.42	(001)
Elaborater	19.44	17.98	10.34	5.96	/1.46	not sig	/4.38	(01)	-9.10	(001)	-11.98	(001)
Initiator	10.42	8.80	14.22	7.31	/1.62	not sig	/6.91	(001)	/3.80	(02)	-1.49	not sig
Group Commentator	1.10	.93	1.0	1.16	/.17	not sig	-.16	not sig	-.10	not sig	/.23	not sig
Standard Setter	1.50	1.45	1.57	1.71	/.05	not sig	-.14	not sig	/.07	not sig	/.16	not sig
Solicitor	5.56	6.34	8.18	7.86	-.78	not sig	/.32	not sig	/2.62	(05)	/1.52	not sig
Good Number	1.86	1.73	2.50	3.53	/.13	not sig	-1.03	not sig	/.64	not sig	/1.80	not sig
Harmonizer	.40	.97	.04	.17	-.57	(01)	-.13	not sig	-.36	(001)	-.80	(01)
Follower	12.70	8.37	12.96	10.83	/4.33	(01)	/2.13	not sig	/.26	not sig	/2.46	not sig
Encourager	2.82	1.82	2.63	2.82	/1.00	(01)	-.19	not sig	-.19	not sig	/1.00	not sig
Play-boy	2.54	2.63	1.54	3.55	-.09	not sig	-2.01	not sig	-1.00	not sig	/.92	not sig
Self Observer	1.97	2.47	5.55	4.81	-.50	not sig	/.74	not sig	/3.58	(01)	/2.34	(001)
Help-seeker	.92	.69	1.91	1.71	/.23	not sig	/.20	not sig	/.99	(11)	/1.02	(15)
Recognition-seeker	.21	.23	.33	.44	-.02	not sig	-.11	not sig	/.12	not sig	/.21	not sig
Dominator	.95	.74	.47	.28	/.21	not sig	/.19	not sig	-.48	not sig	-.46	not sig
Blocker	1.86	3.30	1.14	1.39	-1.44	(001)	-.25	not sig	-.72	not sig	-1.91	(01)
Aggressor	1.03	2.22	.30	.94	-1.19	(01)	-.64	not sig	-.70	(05)	-1.28	not sig
Self-Defender	1.65	2.70	.64	.55	-1.05	(05)	/.09	not sig	-1.01	(001)	-2.15	(001)
Total Task	63.35	63.98	59.52	58.00	-.63	not sig	/1.52	not sig	-3.83	(15)	-5.98	(01)
Total Group	25.88	21.32	28.08	28.12	/4.56	(001)	-.04	not sig	/2.80	not sig	/6.80	(01)
Total Individual	10.77	14.64	11.28	13.51	-3.87	(05)	-2.30	not sig	/.44	not sig	-1.13	not sig

TABLE 22: Data collected from the weekly questionnaire ("C")

Variable	#	High end of scale	Human Relations Mcoop	Mcomp	coop-comp HR Mdiff	p
How much did group help thinking	1	1	2.52	3.55	-1.03	(001)
How many ideas not expressed	2		1.75	1.81	- .06	not sig
Difficulty in getting ideas across	4	1	7.11	6.31	/ .81	(001)
Attentiveness to others	5	9	7.29	6.77	/ .43	(11)
Difficulty in understanding others	6	1	7.78	7.11	/.67	(001)
Agreement with others	7a	1	3.60	4.41	- .81	(001)
Effected by others	7b	9	6.90	6.12	/ .78	(001)
Agreement of others with you	8a	1	3.83	4.44	- .61	(02)
Effect of you on others	8b	9	6.59	6.12	/ .48	(001)
Interest in problem	9	1	3.19	3.26	- .07	not sig
Group-feeling	10	9	6.98	5.82	/1.16	(001)
Group cooperation	11	1	2.95	4.04	-1.09	(001)
How good was group product	12	1	3.24	4.49	-1.25	(01)
How good were your own contributions	13a	1	3.84	4.34	- .50	(12)
How would others rate you	13b	1	3.94	4.43	- .49	(01)
How do you rate others	14	1	3.60	4.30	- .70	(001)
How much did you learn	15	1	4.94	5.19	- .25	(.22)
How competitive were you	16a	1	5.37	5.03	/ .34	(01)
How competitive were others	16b	1	5.21	5.15	/ .06	not sig

TABLE 23: Data From Post-Experimental Questionnaire ("D")

Variable	#	High End of Scale	Mcoop	Mcomp	Mcoop	Mcomp	Mdiff	p	Mdiff	p
Friendliness	1	9	6.80	6.55			≠ .25	not sig		
Last names when remembered	2	1	1.40	1.94			- .54	(06)		
First names when remembered	2		4.50	4.70			- .20	not sig		
How much did meetings stand out	4		2.80	3.05			- .25	not sig		
How much were meetings enjoyed	5		7.80	7.67			≠ .55	not sig		
How much learned from discussions	6		5.83	5.22			≠ .61	(46)		
How much learned from teacher	7		6.69	6.33			≠ .36	not sig		
How does Ec70 compare with other courses	8		46.3	41.5			≠4.75	not sig		
How well did you work together on HR	9a		3.10	3.98			- .88	(39)		
Change in effectiveness on HR	9b		6.98	5.18			≠1.42	(12)		
How well did you work together on P	10a				4.63	5.73	-1.10	(19)		
Change in effectiveness on P	10b				6.23	5.38			≠ .85	(06)
Frequency of get-togethers	11b		3.33	3.20			≠ .13	not sig		
Strength of motivation	12a		7.75	6.92	7.63	7.43	≠ .83	(01)	≠ .20	not sig
Rank order of importance of:										
grade	12b		4.13	3.95	4.15	3.95	≠ .18	not sig	≠ .20	not sig
challenge of problem	"		3.10	2.50	2.35	2.05	≠.60	not sig	≠ .30	not sig
desire to excel others	"		7.15	4.85	6.35	4.15	≠2.30	(03)	≠2.20	(01)
to comply with experiment	"		6.58	7.20	7.55	6.75	- .62	not sig	≠ .80	not sig
obligation to others	"		3.20	6.0	4.60	6.15	-2.80	(01)	-1.55	(10)
desire to excel other groups	"		4.15	8.70	4.35	9.20	-4.55	(01)	-4.85	(02)
to learn	"		5.63	5.70	7.90	8.10	- .07	not sig	- .21	not sig
to please experimenter	"		9.00	7.90	9.10	8.80	≠1.1	(05)	≠ .30	(42)
to win respect	"		5.58	7.10	5.53	7.90	-1.52	(09)	-2.38	(001)
How much did you like method of grading	14a		6.03	5.20			≠ .83	(08)		
How much were you influenced by grading	14b		5.58	5.00			≠.58	(20)		

Observer consenses-1st week	15_1	3.91	2.55	≠1.37	(25)
" " 3rd week	15_2	6.6	5.85	≠ .75	(06)
" " last week	15_3	7.15	7.13	≠ .02	not sig

CONTINUATION OF TABLE 23

APPENDIX D: Examples of Written Products

I.	W2-5 (coop)	The Cheaters
II.	Th2-5 (comp)	The Cheaters
III.	W7-10 (coop)	The World War II Veteran
IV.	Th7-10 (comp)	The World War II Veteran

Group Wed. 2-5

Session No. I (Cheaters)

Dear Sir:

We have discussed the situation which you described from all points of view and it seems to us the reasons for student cheating can best be described as follows:

The opportunity has evidently been such that students have been tempted to cheat. The underlying motives for cheating are a fear of failure magnified by advancing scholastic standards, the ever-present desire to excel, and possibly a general disinterest in the work, the latter being possibly due to poor instruction, side interests of the students individually, and very difficult courses which might require an unreasonable amount of time & effort. Courses which are required and appear of small value to the students are likely to cause them to feel apathetic towards the work, and any chance at getting these courses "out of the way", so to speak, by the use of "bibles", or cheating (in general) might be relied on.

Group W 2-5

Session No. I

In answer to your question as to why the students at your college have been cheating, despite their feeing of being "degraded", we suggest the following possibilities:

The students at your college may cheat for any or all of the reasons listed in answer to question #1. The point of whether the student deems cheating "degrading" is questionable. The quoted testimony was obviously tainted by a desire to impress the president (you). Students in their own minds, when cheating seems to be to their overall advantage, tend to rationalize their reasons for cheating in order to make them seem justifiable. Overcrowding in colleges tends to raise standards so much that students develop a fear of what seems to them unwarrented failure and hence disgrace. A careful regard should be given to scholastic standards in the several school years so that they may be relatively equal; and specifically not too much increased in early years.

Group W-2-5

Session No. 1

We suggest that to overcome the problem of cheating at your college it is necessary to do the following:

Reduce the possibility of cheating by better supervision of exams, more exams of the type that require individual thinking - Have a better faculty presentation of material and more emphasis on what student gets out of the course. Institute a policy of de-emphasis on grades and more on personal learning. Better orientation of what a student expects to get out of his college work and why he is there. Efforts to obtain a better and bigger faculty to suit the growth of the college should be given consideration.

The reasons for our recommendations are:

Placing more emphasis on what a person expects to get out of his work at college will make a better student of him and lessen the desire to cheat. By supervision it will eliminate making it possible to cheat and remove temptation present.

Group 2-5 Thurs.

Session NO. I (Cheaters)

Dear Sir:

We have discussed the situation which you described from all points of view and it seems to us the reasons for student cheating can best be described as follows:

1. The group as a whole must think cheating is acceptable.

2. There must be at least a fair chance of cheating without being caught.

Group Th 2-5

Session No. 1

In answer to your question as to why the students at your college have been cheating, despite their feeling of being "degraded", we suggest the following possibilities:

The average student would cheat if it were the only way to maintain his position in class.

Any strong emphasis on grades as all important would tend to make him cheat.

Group Th 2-5

Session No. 1

We suggest that to overcome the problem of cheating at your college it is necessary to do the following:

1. Tighten the existing system of handling exams before they are given.
2. Install an honor system in which the student body tries offenders.
3. Cheating "purge" at start.

The reasons for our recommendations are:

1. eliminating temptation to a larger extent

2. encourages honesty, improved morale of the student body

Group Th 9-10

Session No. 1 (Vet)

Dear Sir:

We have discussed the situation which you described from all points of view and it seems to us that he can't make up his mind because:

1. He is not sure whether frankness or deceit will bring the greatest happiness to him in the long run.

2. He is not absolutely sure of his wife's reaction.

Group Th 7-10

Session No. 1 (Vet)

We think that it would be wisest for him to do the following:

1. He should not tell his wife.

The reasons we make the above suggestions are:

1. It would make for unpleasant conditions for the wife and child in that the family union would be destroyed.

Group Th 7 - 10

Session No. 1 (Vet)

We suggest that in this situation it would be wisest for you to do:

1. Try to talk it out of him (draw the vet out - and let him make his own decision).

2. In the event he can't make a descision, offer your views -

The reasons for our suggestions are:

1. We feel that he will come to a definite conclusion.

Group Wed 7-10

Session I (Vet)

Dear Sir:

We have discussed the situation which you described from all points of view and it seems to us that he can't make up his mind because:

We consider that he is influenced by several conflicting drives. On an idealistic level his conviction that complete frankness is necessary to a happy relationship between his wife and himself is opposed by his concern for his wife's personal feelings, beyond any effect which her attitude might leave on the permanency of the marriage.

Practically, he is worried about the "barrier" which might be set up due to his own feelings if he doesn't tell his wife of the affair; and he realized that the worst possible thing would be her finding out from another source. On the other hand, he is afraid that if he does tell his wife, her objections and resulting attitude might cause their marriage to break up.

Group Wed. 7-10

Session No. 1

We think that it would be wisest for him to do the following:

He should tell his wife of the entire arrangement. He should try first to change her attitude toward the question by a discussion of the reasons why she thinks as she does; and should explain to her the various small contributing factors, with a view to showing that it took place under unusual circumstances and wouldn't be repeated.

The reasons we make the above suggestions are:

We consider that his own attitude would be so very badly influenced by his feeling of deceit and guilt if he did not tell his wife, that as a result his future relations with his wife would be very strained and unhappy.

We think it much better that he tell her himself than take a chance on her finding out otherwise.

We suggest that in this situation it would be wisest for you to do:

You should, in discussion with your friend, try to find out how strong his stated ideals and convictions are. You should try to determine how strongly his wife feels on her stated tenets.

If your friend's feelings, as stated, are sufficiently strong, you should advise him to follow the course we have outlined previously.

The reasons for our suggestions are:

Your friend may have manufactured issues to conceal the real reason for his perturbation. Maybe he is worried mainly about the letter and fears detection of his secret, if he seeks to keep it. His stated ideals may be not so strong as to overcome certain practical considerations.

APPENDIX E: Biographical Note

MORTON DEUTSCH

Born February 4, 1920, in New York City. Attended the City College of New York, majored in psychology, and graduated with a B.S. degree in 1939. Obtained an M.A. degree from the University of Pennsylvania in 1940. From September 1940 to December 1941, worked as a clinical psychologist in several New York State institutions. The next three and a half years were spent in the U. S. Army Air Forces, variously as a psychologist, combat navigator, and as a clinical psychologist. Taught Abnormal Psychology at the City College of New York the Summer of 1945 and Introductory Psychology at the Massachusetts Institute of Technology during the year 1946-1947 and during the spring term of 1948. Has been a research assistant with the Research Center for Group Dynamics since the Fall of 1946.

Has membership in the American Psychological Association and the Society for the Psychological Study of Social Issues.