

SHARE OR FIGHT : DYNAMICS OF COOPERATIVE
AND COMPETITIVE BEHAVIOUR

by
Udai Pareek

T.R. No.106
April . 1976

Indian Institute of Management
Ahmedabad

CONTENTS

Acknowledgements

1. About the Study	1
2. About Sharing and Fighting	13
3. Who Shares and Who Fights?	30
4. Growing up to Share and Fight	45
5. Do Not Talk if You Want to Fight	56
6. A Punch or Two Paves Way to Cooperation	61
7. Toward a Theory of Cooperative Behaviour	70
8. References	84

ACKNOWLEDGEMENTS

This report discusses the results of several experiments conducted in cooperative and competitive behaviour along with the results of some other recent researches in this field. These studies were made possible by a grant received from the Indian Council of Social Science Research, and I would like to express my thanks to the Council for this support. One Ph.D. assistantship and one master's level assistantship was provided out of the ICSSR grant, resulting in a doctoral dissertation and a master's thesis on the subject. Dr. Debadatta Banerjee and Shri Narendra Dixit were the recipients of these assistantships respectively, and they ably worked on several aspects of this problem. I would like to express my appreciation to both for their help, and admiration for their devotion and high level of professional excellence. Dr. D.W. Carment, Professor of Psychology, McMaster University of Canada stimulated our interest in the subject, and provided the equipment used in these experiments. We owe special gratitude to him.

Various papers growing out of the studies have been published in several journals and these are mentioned in the references. Results are not reproduced here. However, the results are discussed to indicate the general patterns, and finally a tentative theory of cooperative behaviour has been attempted. Comments on this draft will be most welcome.

I would also like to thank the Director of the Indian Institute of Management, Ahmedabad, for all the facilities he provided to me to continue this work after I joined the Institute. In the end, I would like to appreciate the ungrudging and able work done from the messy manuscript by my secretary Shri Padmanabhan.

About the Study

The monograph is based on some experimental studies in cooperative and competitive behaviour. The project was financed by the Indian Council of Social Science Research, and parts of the grant were used to finance one doctoral (Banerjee, 1973) and one master-level research (Dixit, 1973) students employed on the project. Four different studies were conducted. Detailed results of these studies have been reported in professional journals, and these will be referred to in this monograph. The monograph attempts to synthesise all these studies to present an integrated understanding about cooperative and competitive behaviour. Some information about the samples and methodology are given in Tables 1, 2, 3 and 4.

Samples

Information about the samples used in the four studies are given in Table 1. Details are given in Tables 2,3 and 4.

Table 1

Study	Location	Sub-cultural groups	Sample size	Age levels (Grades)	Variables studied
1	Delhi		240		Cooperative-competitive behaviour, achievement motivation, socioeconomic status
2	Udaipur	Hindus Bohras Minas Tribals	214	4,6,8	Above variables plus adjustment, dependency, classroom trust
3	Udaipur	Hindu Jain Bohra Tribals	150	8	Above variables plus cooperative proneness, competitive proneness, cooperative disposition, competitive disposition.
4	Ahmedabad	-	160	Undergraduate students	Cooperative - competitive behaviour in dyad and 3-member groups and under various experimental conditions of communication and partner responses

Table 2
Sample Details of Study 1

<u>School Grade</u>	<u>Boys</u>	<u>Girls</u>	<u>Mixed</u>	<u>Total</u>
4	20	20	40	80
6	20	20	40	80
8	20	20	40	80
Total	60	60	120	240

Table 3
Sample Details of Study 2

<u>School Grade</u>	<u>Groups</u>	<u>Hindu</u>	<u>Bohra</u>	<u>Tribals</u>	<u>Total</u>
4	Boys	10	10	-	20
	Girls	10	10	-	20
	Mixed	20	-	-	20
6	Boys	10	10	-	20
	Girls	10	10	20	40
	Mixed	20	-	-	20
8	Boys	10	10	-	20
	Girls	10	10	14	34
	Mixed	20	-	-	20
	Total	120	60	34	314

Table 4
Sample Details of Study 3

	<u>Hindu</u>	<u>Jain</u>	<u>Bohra</u>	<u>Tribals</u>	<u>Total</u>
Boys	20	20	20	10	70
Girls	20	20	20	20	80
Total	40	40	40	30	150

Instruments Used

The variables studied are mentioned in Table 1. Since cooperative and competitive behaviour was the main variable studied, the instrument used for its study is described in details. The instruments used for measuring other variables are only mentioned with references where details are available.

Cooperative and Competitive behaviour

In these studies Maximizing Difference Game (McClintock and Nuttin, 1969) was used. It is basically a mixed motive game, because cooperative motive and competitive motive are combined in the different alternatives of the game. It is a two-person game where S either wants to maximize the difference in gain between the partner and himself (reveals competitive motive), or wants to facilitate his partner also to get equal points in each trial (shown cooperative motive).

To conduct this game, an electrical apparatus was used, which was developed in McMaster University, Canada*. The apparatus consists of two parts : (1) the game board and (2) the control panel. Two persons can play the game. A card board screen (with the help of stands) was placed on a table. Two glass screens were fixed on both the sides of that cardboard (game board). The payoff matrix of this game was presented on the panel as follows:

Maximizing Difference Game Matrix

		<u>Person Y</u>	
		<u>Black</u>	
		A	B
Person X	C	6	0
Red	D	5	0
		0	5

There are two red switches on one side and two black switches on the other side of the board. The person having two red switches front of him reads red scores on the board as his scores and black scores as his partner's scores, and the person having black switches reads black scores as his points and the red scores as his partner's points. This part of the instrument is operated with the help of controller used by the Experimenter. When both the subjects push

* The apparatus was available through the courtesy of Professor D.W. Carment.

their switches E would get the information automatically on the control panel, and based on this information, he would feed back the players by lighting up the cell where both the Ss gave their choices. This game has been used for such studies in Canada, U.S.A and Belgium (McClintock & Nutin, 1969). Carment (1971) used the same game for Canadian as well as Indian students.

Procedure of Data Collection

As it was not possible to bring Ss in the laboratory, data were collected in different schools. In each school, a separate room was arranged for this purpose and a special care was taken to maintain a laboratory atmosphere in that room, so that Ss did not feel any disturbance. When the apparatus was fixed in the testing room, then two Ss were called at a time (from each group, as it was matched according to the experimental design mentioned earlier) for the Maximizing Difference Game. Two Ss were seated comfortably at both the sides of the apparatus (game board) and E fixed the controller in such a way that Ss could not see that. The Ss were given pencils and record sheets and were instructed as follows:

Instructions

"Now I will show you how this new game is played.

Please listen carefully to whatever I say and do not forget to tell me, whenever you don't follow it. Both of you have two buttons in front of you and a screen on

which some figures are written. First, I will tell you about these buttons. One of you have the red button, while the other one has got the black one. From now onwards the one who has the red buttons will be called 'Red' and the one who has the black button will be called 'Black'.

'You can press the buttons with your fingers, please try it, but remember to release the button right after pressing it (very good), well done. You can use these buttons at your free will, but first look where they are fixed. The red buttons are fixed on the side and the black buttons are at the bottom (let Ss be allowed to see both sides).

Well, now look at the figures written on the screen in front of you. The screen is divided into four parts. Each part (cell) has two figures. Out of these two figures one figure is red and the other one is black. These figures are the scores of this game. To earn these scores one will have to decide which button to press, the Red one will earn the scores written in red and the Black one will earn the scores written in black. You will earn the score in following manner:

Red - pressing of the upper button will mean that you are selecting the upper row and this will earn you the

score of six or zero. Which of the two scores i.e. six or zero you earn will depend upon the button the Black presses. If you choose the lower button you will earn five or zero (irrespective of what Black does).

Black - pressing of the button fixed at your right side will mean that you are selecting the right side row and this will earn you the score of six or zero. But this also depends upon the selection of Red. If you choose to press the button situated on your left (irrespective of what Red does) you will earn the score of five or zero.

After your selection by pressing the button, one of the four cells will be lighted (demonstrate), and you will know how many marks you have scored. Now see how every cell is lighted.

Now let us assume that the Red pressed the upper button and the Black pressed the right-side button. Now if Red draws a hypothetical horizontal line from his button and Black draws a hypothetical vertical line from his button, you will see the line will meet the top right cell from Black and top left cell from the Red. This is the cell which will be lighted and you will earn the number written on that cell. Like this, in whatever cell the hypothetical line will meet, the light will come up.

Now let us try it for few trials, and see whether you followed it or not. 'Red' If Black presses the button and you press the lower button which cell will be lighted?.... and what will be your score?..... Well done. Black.... If Red presses the upper button and you press the right button which cell will be lighted? What will be your score?.... How much will the Red earn?.... Very good (practice, if necessary for few more trials). Now look at the sheet of paper placed before you. You have to use these papers to write down your scores. You have to do this many times and have to write every time you score after earning it, and also the score the other one has earned. After every five trials, I will ask you to total the score and this will give your total score. Please do not talk between yourselves and begin your work when I say 'start'. Every time after the light in the cell goes off, press the button of your choice, without any signal. Press the button fully inside with care and do not keep the button pressed for long, and at a time do not press more than one button.

Do you like toffees? Well, I will tell you a way to earn few toffees. Please listen carefully to whatever I say and do not forget to tell me if you do not follow. Total your score and this will tell you, how you are doing. In

the end you can get toffees according to your score.
I will give you one toffee for every twenty points you
earn.

When Ss understood the instructions properly then actual game was started. In each trial Ss were shown their pay-offs and asked to note it on their record sheets, and at the same time E also noted those pay-offs on a record sheet. After each 5 trials she announced the total scores for both the Ss. In this manner, each pair played this game for 100 trials, and on the basis of total scores of each S, they were given incentives, as they were instructed.

Scoring of Maximizing Difference Game

Those recorded sheets were scored on the basis of two major types of responses-Cooperative (C) and Defecting (competing) (D) responses. The pay-off of (a) 6-6 shows cooperating-C responses for both the Ss (b) 0-0 shows defecting - D responses for both the Ss (c) 5-0 or 0-5 shows one S defecting (getting a score of 5) and other subject cooperating (getting -0). Other than these two variables, six other variables were also qualitatively analysed on the basis of the sequence of interaction between two Ss. Those variables were Trust, Trustworthiness, Repentance, Retaliation, Forgiveness, and Exploitation. These variables were defined by Rapoport and Chamah (Tedeschi et al, 1968) as follows:

1. Trust (T) - 'A' choosing C after both he and 'B' chose D.
 2. Trustworthiness (Tr)- If both players choose cooperatively C on the first interaction and 'A' chooses C on the second interaction, then 'A' demonstrates trustworthiness.
 3. Forgiveness (F) - If 'A' chooses C after he chose C and 'B' chooses D, then A demonstrates forgiveness.
 4. Repentance (9R) - If 'A' chooses C after having chosen D when 'B' chose C, then 'A' shows repentance.
 5. Retaliation (Re)- If 'A' chooses D after having chosen C when 'B' chose D, then 'A' shows retaliation.
 6. Exploitation (E) - If 'A' defects in the second trial after both chose C in the first trial, 'A' demonstrates exploitation.
- Two more variables were added to this list. These are defined as below.
7. Obduracy (O) - If 'A' defects after he chose D and 'B' chose C, he shows obduracy.
 8. Mistrust (M) - If 'A' chooses D after both players had chosen D in the first trial, 'A' demonstrates mistrust.

The scoring system is summarised in Figure 1.

Figure 1

		<u>Scoring System for Game Behaviour</u>			
		<u>Response pattern in the last move</u> (First move by A, second by B)			
		<u>CC</u>	<u>CD</u>	<u>DC</u>	<u>DD</u>
Response by 'A' in the present move.	C	Tr	F	R	T
	D	E	Re	O	M

Other variables

The instruments used for measurement of other variables are mentioned below, along with references.

- | | |
|--|----------------------------|
| 1. Achievement motive | Mehta (1969) |
| 2. Socioeconomic status | Kuppuswamy (1962) |
| 3. Adjustment (PAAS) | Pareek <u>et al</u> (1970) |
| 4. Dependency (PADS) | Pareek <u>et al</u> (1970) |
| 5. Classroom Trust (PACTS) | Pareek <u>et al</u> (1970) |
| 6. Competitive disposition
(D Comp) | Pareek and Dixit (1974a) |
| 7. Cooperative disposition
(D coop) | Pareek and Dixit (1974a) |
| 8. Competitive proneness
(D comp) | Pareek and Dixit (1974a) |
| 9. Cooperative proneness
(D coop) | Pareek and Dixit (1974a) |
| 10. Extension disposition
(D ext) | Pareek and Dixit (1976) |
| 11. Extension proneness (Ext.P)
(P Ext) | Pareek and Dixit (1976) |

About Sharing and Fighting

Social life of human beings is an interplay between cooperation and competition. Social groups are formed when individuals coming together have some common goals. The relationship between two individuals (and amongst several) may depend on how they approach the goal. If the goal is perceived as unsharable, and can be attained only by one of them, they may compete (fight) for the goal. All zero-sum games are situations of this kind. A football match is an example of such a situation. The two teams playing the match are related to each other around the unsharable goal of winning the match; one must win, and the other must lose (of course, unless even after repeated attempts the match is drawn without either one scoring the victory over the other - a rare happening). However, if the goal is seen as sharable, the individuals or teams work together to achieve the goal and share it. Situations of external threats to the groups, or those involving superordinate goals are examples of this category. Individuals or teams cooperate and share in such situations. There may be a third type of situation. Even when the goal is perceived as common to all involved, it may be perceived as achievable with one's effort and without the other(s) coming in the way of its achievement. Others, then, are not relevant for achievement or nonachievement of the goal. Striving to get first division in the examination is an example of such a situation. Several students can get first division and yet they do not work jointly for attainment of this goal.

The dynamics of these strategies of working for the achievement of goals—sharing (cooperating), fighting (competing), or striving individually for the goal have important social implications. On a larger scale, larger international issues like war, tension and new scientific advancements by human beings can be analysed, and strategies can be planned in terms of an optimal use of these tendencies. Much work has been done by economists and sociologists on cooperative effort. But the studies to understand these processes at the micro-level in individuals are in their infancy. The present monograph is an attempt in discussing various aspects of cooperative and competitive behaviour, and the implications of the findings for larger social problems.

The concepts of cooperation and competition

These three types of behaviour can be studied as motives also. "A cooperative motive is a mutual or shared one; a person who possesses a cooperative motive seeks the outcome that is most beneficial to all participants. In contrast, a competitive motive seeks an outcome that is most beneficial to oneself and most detrimental to the other participants. In other words, a competitive motive seeks not only to achieve personal success but also to cause other participants to fail. A person with the third type of motivation, an individualistic motive, seeks an outcome that is the best for himself, regardless of whether others achieve their goals" (Smead, 1972, p. 133).

Often cooperation and competition are regarded dichotomous. However, there is enough evidence to show that these coexist in the same situation (Phillips and DeVault, 1957). There are probably very few life situations in which exclusive cooperation or competition are involved. As Deutsch (1968) proposes most situations in everyday life involve a complex set of goals and subgoals.

Cooperation and competition have been defined by psychologists to emphasise various aspects. According to Anderson and Parker (1964), cooperation is a form of social action in which two or more individuals or groups work together jointly to achieve common goals. Cooperation is the form of interaction which makes unified social achievement possible because it is a form of social action in which all participants benefit by attaining their goals. English and English (1958) define cooperation as "the working together of two or more units, to produce some common or joint effect. The units may be bodily organs (such as muscles), individuals in a social group, or forces operating together" (p. 122). Zajonc's definition (1966) is similar; a cooperative response is defined as one "which enhances the likelihood that the other as well as oneself, will be rewarded." Cooperation usually refers to a style of behaviour characterized by fairness, equality and sharing. According to Deutsch (1953) in a cooperative social situation the goal regions for each of the individuals or subunits in the situation are defined so that a goal region can be entered (to some degree) by any given individual or subunit, only if all the individuals or subunits under consideration can also enter

their respective goal regions, i.e. the goals for the individuals are "promotively interdependent" - in which individuals are also linked together that there is a positive correlation between their goal attainments. The initiation of cooperation requires trust whenever the individual, by his choice to cooperate, places his fate partly in the hands of others (Deutsch, 1960).

On the other hand, competition is that form of social action in which members strive against each other for the possession or use of some limited material or non-material good. It can be defined as "a striving on the part of two or more persons for the same object, especially for the goal of being superior" (English & English, 1958). A competitive choice implies an attempt to block the other person from achieving a positive outcome. Competition refers to action patterns characterised by parties striving towards an unsharable goal.

Competition gets its strength from the ego and social needs of the individual who comes to value his place in a particular group or groups, and who strives to maintain that place or better it (Blair, Jones & Simpson, 1962, pp. 200-202).

Roughly speaking, competition implies a reward that can be obtained only by one social unit (a person, a segment of group, or an entire group) whereas cooperation signifies a reward to be shared among all participants, according to some agreement. In competition the resources of one participant are hoarded and opposed to those of other participants, but in cooperation available resources are pooled and redistributed according to need (Vinacke, Wilson & Meredith, 1969, p. 385)

In a competitive social situation, the goal regions for each of the individuals or subunits in the situation are defined so that, if a goal region is entered by any individual or subunit, the other individuals or subunits will, to some degree, be unable to reach their respective goals in the social situation under consideration. (Deutsch, 1953). In this situation, the goals for the individuals are contritently interdependent - in which individuals are so linked together that there is a negative correlation between their goal attainments (Deutsch, 1949).

Competition appears to be a higher form of human behaviour. While animals fight and compete for the goals - and certainly cooperate to face external threats - cooperation in the form of sharing goals is specifically human phenomenon. Bigelow (1972) postulates human evolution based on cooperation within groups as a natural outgrowth of intelligent self-control in dealing with human competitors and nonhuman predators. He suggests that the effectiveness of aggressive group response to external threats was due to the effectiveness of self-control within the group.

The physiological basis of cooperative or competitive behaviour is not clear. Terada and Masur (1973) have explored the role played by Catecholamines on competitive behaviour, and found the possibility that opomorphine and dextroamphetamine, which increased competition, may have direct effect on central dopamine receptors releasing dopamine from the storage sites. More systematic work needs to be done in this area.

Measuring cooperation as competition

Earlier studies of cooperative-competitive behaviour used observation and simple game behaviour (Wasik, Senn & Epanchin, 1969; Harford, 1966). Some, however, used experimentally designed games to study the behaviour more scientifically and systematically (Loomis, 1959). Pure laboratory testings were done (Hori, 1968; Schmitt & Marwell, 1970; Roberts, 1971; and Marwell, Schmitt & Shotola, 1971) to study the effect of reward and signs in the human relations problem and individual functions. The relationship between cooperation, competition and interpersonal attraction was studied by Sherif, Harvey, White, Hood and Sherif (1961). They conducted an observational study in a summer camp. With the emergence of experimental social psychology more sophisticated experiments were planned, including the use of games. One of the most popular non-zero-sum game and most extensively used is Prisoner's Dilemma Game (PDG). Rapoport and Chammh (1965) have described in some details.

A certain class of non-zero-sum games have been called mixed-motive games, (Schelling, 1960) because the player has to choose between increasing his own immediate gain or increasing the total gain of both players.

It may be necessary here to seek a little more clarity about the concept of games in this context. Rapoport (1970) states that two theoretical frameworks of recent origins have provided additional vantage points for the development of theories of conflict. Both view conflict as a phenomenon sui generis, regardless of its origin or

content. One is system theory, which, applied to the study of large organised social aggregates, views conflict as an interplay of forces, pressures, or stresses inherent in the structure and dynamics of such aggregates. The other is game theory, concerned with strategic aspects of conflict. System theory according to Rapoport abstracts completely from the long term goals of the actors in conflicts, in fact, ignores actors as conscious agents. Game theory, on the contrary, focusses attention on the actor, a participant in a conflict, his interests, and his evaluations of the situations in which he finds himself. Game theory is concerned only with rationally conducted conflicts. Rationality in this context implies, first of all, the existence of well defined interests pursued by the conflicting parties (who are called players) and second, the existence of alternative courses of action among which players can choose. According to Rapoport, the name "game theory" derives from its original preoccupation with games of strategy. These are distinguished from games of pure chance or from games of skill. A strategy involves a player's conditional choices, conditional, that is, on the choice made by other players. Games of strategy so defined are classified in game theory in various ways. The most important distinctions are those between games with only two players (two person game), and those with more than two players (n-person games); also between two-person games in which the interests of the players are diametrically opposed (constant-sum-games) and those

where the interests are partially opposed and partially coincident (non-constant-sum-games). Constant-sum-games are so called because in them the sum of the pay offs to the two players is the same regardless of how the game ends. In particular, if this sum is zero, the game is called zero-sum. In all constant-sum games, the larger the pay off to one player, the smaller the pay off to the other player. In this sense the players have diametrically opposed interests. In the non-constant-sum games, the players have, in general, partially common and partially opposed interests. Such games are sometimes called mixed motive games.

PDG is the most widely used non-zero-sum game. Each of the two players is presented with the task of choosing between two alternatives. It is based on the dilemma of a prisoner who, along with his companion is caught, and is kept in a cell away from his friend. He faces the dilemma whether he should confess the crime or not to confess. If neither he nor his friend confess then they will be locked up on some very minor trumped-up charge and they would both receive minor punishment; if they both confess they will be prosecuted; but if one confesses and the other does not, then the confessor will receive lenient treatment whereas the latter will get heavier punishment.

The main important property of the dilemma is that while neither prisoner is aware of the other's decision it is clear that one prisoner's decision will be very much affected by his prediction of what the other will do. Specifically, it will be very much affected by the extent to which

the trusts the other prisoner not to confess. Prisoner's Dilemma

Game is a non-zero-sum game in which the winnings or losses of one when added to the pay-offs of the other player

player/do not necessarily come to zero. The following matrix values

do show that cooperation is reduced by increases in the temptation (T)

value, and increased by a rise in the value of the reward parameter (R).

Player A

Player B

R,R	S,T
T,S	P,P

Where R represents reward, S = sucker's payoff, T = temptation,

P = punishment.

In the mixed motive games it is possible to manipulate the payoff matrix in such a way that the player has the alternative choices of (a) maximising his gains and that of his partner, or (b) maximising the difference of pay-off with his partner. Games which provide an alternative of maximising the difference in pay-off with other player is referred to as Maximising Difference Game (MDG).

As mentioned in Chapter 1, one of the MDGs is that by McClintack and Nuttin (1969). The details of the game have already been given there. This game was used as the main method for studying cooperative and competitive behaviour, and their several dimensions.

the trusts the other prisoner not to confess. Prisoner's Dilemma

Game is a non-zero-sum game in which the winnings or losses of one when added to the pay-offs of the other player player/do not necessarily come to zero. The following matrix values

do show that cooperation is reduced by increases in the temptation (T) value, and increased by a rise in the value of the reward parameter (R)

Player A

		Player A	
		R,R	S,T
Player B		T,S	P,P

Where R represents reward, S = sucker's payoff, T = temptation, P = punishment.

In the mixed motive games it is possible to manipulate the payoff matrix in such a way that the player has the alternative choices of (a) maximising his gains and that of his partner, or (b) maximising the difference of pay-off with his partner. Games which provide an alternative of maximising the difference in pay-off with other player is referred to as Maximising Difference Game (MDG).

As mentioned in Chapter 1, one of the MDGs is that by McClintack and Mittin (1969). The details of the game have already been given there. This game was used as the main method for studying cooperative and competitive behaviour, and their several dimensions.

Van Kymbeeck (1972) has prepared an inventory for measuring 'sense of cooperation' which includes nonselective acceptance of others on the basis of a belief in their constructiveness, empathy, or ability to understand ideas and actions and readiness to engage in democratic group functioning.

Game behaviour uses cooperation and competition conceived on a continuum. Although the game instructions force a subject to use cooperation and competition as dichotomous, the correlations obtained between the two, even though in the negative direction, are not very significant. The value of coefficient of correlation based on the combined samples of Study 1 and Study 2 ($n=454$) is $-.239$ (Pareek and Banerjee, 1974). Although the value is significant at .01 level (because of large sample size), it is not very high. The value of correlation in Study 4 (Pareek and Dixit, 1974a) was almost zero ($-.018$). Perry (1975) has stressed this point in a philosophical note. It is, therefore, doubtful if the two variables are dichotomous. Perry (1975) has stressed this point in a philosophical note. In order to probe further four other measures were used. Short instruments were prepared (Pareek and Dixit, 1974a) to measure the variables as defined below.

Cooperative disposition (D Coop): A tendency to share the attainment of a goal and its rewards
(self descriptive statement)

Competitive disposition (D Comp): A tendency to achieve the goal without anyone's help (self descriptive statement)

Cooperative proneness (P Coop): An orientation to share the attainment of a goal and its rewards (projective statement)

Competitive proneness (P Comp): An orientation to achieve the goal and deprive the other of its attainment (projective statement)

The values of correlations amongst game behaviour and disposition and proneness are both interesting and baffling.

Competitive disposition was found to have significantly positive correlation with competitive proneness ($r = .269$) but the same was not true of cooperative disposition and proneness ($r = .082$). It seems that competition as revealed in the disposition and proneness items has something common, but this is not so with cooperation. Again, there is a negative and significant correlation between P Comp and P Coop ($- .423$), showing that competitive and cooperative proneness, as revealed in the projective statements, are opposite of each other.

Competitive game behaviour has a significant negative relationship with P Coop ($- .218$). In summary, it appears that while competition and cooperation are not dichotomous, P Coop as measured by the instrument seems to reveal cooperative behaviour, and that both D Comp and P Comp scores show a different kind of competition than that revealed in the game behaviour. Defection in game behaviour shows a tendency to gain at the cost of (or, more appropriately even not gain but cause loss to) the partner in the game. On the other hand, the competition implied in the two tests of disposition and proneness is of a different kind.

The role of cooperation

Cooperation has been reported to influence several aspects of behaviour. There is evidence to show that cooperation reduces prejudice (Fulcher and Perry, 1973; Silverthorne, Chelune and Imada, 1974). Both introduction to the activity and intention to cooperate with the group have been found to be important in forming 'disciplined cooperational behaviour' (Wolf, 1972). Cooperation (collaboration and coordination) was found to interact in influencing group productivity (Hewett; O'Brien and Hornick, 1974). Cooperative students liked, significantly more than competitive students, social studies class, sharing information, working together, receiving group-vs-individual grades (Wheeler and Ryan, 1973). Positive effects of cooperation on student-peer tutoring, normative climate, students' friendship circles and mutual concerns have been reported (DeVries; Edwards and Wells, 1974). Cooperative group was found to have less hostile attitude and paid more attention to socioemotional as contrasted with task aspects, although it felt more positive about their own group when they had a weak bargaining position (Rabbie, et al, 1974). Cooperative group was found to be more productive both in the intragroup and intergroup cooperation condition (Workie, 1974). Dickstein and Brown (1974) found that low-roles (acceptance of sex roles) performed better under competition and high-roles under controlled condition. Under crowded conditions prisoners performed better under competition, and in uncrowded condition better under cooperation (Valins and Baum, 1973).

Cooperative treatment has been found to result in a close personal space (Tedesco and Fromme, 1974). Faroqui (1958) found

cooperative group as more integrated than the competitive group. Compared with the competitive group, the cooperative group had greater emotional expansiveness, showing greater amount of overlap in the life spaces of members.

In a comparative study of cooperators and competitors, Deutsch (1949b, 1953) found that individual cooperators perceived themselves to be more promotively interdependent, and individual competitors perceive themselves to be more contritely interdependent; there was greater substitutability for similarly intended actions among individual cooperation than individual competition: individual cooperation exhibited more helpfulness and individual competition exhibited more obstructiveness. Coordination of efforts, diversity in amount of contribution per member, subdivision of activity, achievement pressure, production of signs in the puzzle problem, attentiveness to fellow members, mutual comprehension of communication, common appraisals of communication, orientation and orderliness, productivity per-unit time, quality of product and discussions, friendliness during discussions, favourable evaluation of the group and its products, perception of favourable efforts upon fellow members, etc were found to be more important characteristics of **individual** cooperation.

Branning, Sommer & Jones (1966) discussed the motivational effects of cooperation and competition. They commented that Raven and Eacus extended Deutsch's formulations, to include those conditions under which competitions might motivate individuals more highly than cooperation. Specifically, those authors suggested that if the solution of the experimental task required the pooling of information or skills (means interdependence) then due to increased task enjoyment and friendliness,

motivation will be higher in the cooperative situation. However, if the nature of the experimental task is such that no interaction or pooling of information was necessary (means independence), motivation will probably be higher in the competitive than in the cooperative situations. As quoted by Bruning et al the means independent situation was previously used by Shaw but his findings were inconclusive, because performance was better under cooperative situation. According to Bruning et al it is important to note that Shaw required his Ss to perform relatively difficult experimental task, hence the competitive Ss might have been highly motivated, but the occurrence of competing responses repaired their performance.

The effect of cooperation and competition will depend on several factors. When competition is used in the sense of striving for excellence, it has been found that it results in more work, whether the competition is with self or others, and that when it is with self there are less errors in classroom work (Rudow and Mantalua a, 1975). The behavioural effects of cooperation and competition conditions depend upon the reinforcement conditions in effect (Scott and Cherrington, 1974). Rabbie (1974) studying the effects of cooperative-competitive orientation provided explanation for the absence of any differences in terms of "mind sets" of members; the group to which one is affiliated becomes more valuable.

Instead of considering dichotomous categories of cooperative and competitive orientation, we may consider a triad paradigm of competitive, cooperative, and individualistic orientations. While cooperative orientation would mean sharing a goal and the rewards of the goal with others,

competitive orientation would mean getting the gains alone at the cost of others. An individualistic orientation would mean attainment of the goal without any reference to others. These three orientations may be produced under different reinforcement conditions. In an evaluation system emphasising maintaining a given curve of distribution so that only a few individuals can attain grade A would stimulate competitive orientation; as a particular student may not be able to get the A unless others are deprived of it, even if many work equally hard. On the other hand, if the system provides that all those who perform well (using some criteria) would get A grade, irrespective of the numbers - a few or many - would stimulate individualistic orientation. The system of evaluating group projects will stimulate cooperative orientation. The three orientations may have different effect on individual behaviour.

Deutsch (1960) has reported the effect of these three motivational orientation - cooperative, individualistic, and competitive, upon trust and suspicion. In all experimental conditions, a cooperative orientation primarily led the individual to make a cooperative choice which resulted in mutual gain, whereas, a competitive orientation primarily led the individual to make a non-cooperative choice which resulted in mutual loss. For the individualistic orientation the choice to cooperate or not, was very much a function of the specific experimental treatments. Theoretically, cooperative orientation would lead to highly predictable trusting and trustworthy behaviour, whereas, a competitive orientation would lead to highly predictable suspicious and untrustworthy behaviour. On the other hand, it was expected that an individualistic orientation would

under certain conditions lead to behaviour similar to that characterising the cooperatively oriented, and under certain conditions as competitively oriented. Deutsch's experiments confirmed these theoretical assumptions. Arnstein & Feigenbaum (1967) studied the relationship of three motives to choice in the PDG. Correlations between response measures indicated that responses allowing maximum joint earnings were strongly influenced by both cooperativeness and trust, but responses allowing maximum individual earnings did not have as strong a relation to competitiveness. The study suggests that such 2-response dichotomy may not always be coincident with a cooperative-competitive or trust-mistrust-dichotomy.

Variables influencing cooperation and competition

It is interesting to find what makes an individual cooperate or compete in a given situation. In an experimental situation it is possible to control and isolate variables. Based on the experiments conducted, and drawing upon results of other researches reported in recent years, explanation of this question will be attempted in this monograph.

The individual responding to a situation is certainly important. The individual variables could either be demographic (age, sex, parity etc) or psychological (personality characteristics). The cultural background is another important variable. The situation, as perceived by the individual plays an important role. This would consist of the person (his behaviour) with whom the individual interacts (his behaviour), reward for cooperation or competition, and the situation being perceived

as demanding cooperative or competitive response for the individual to be effective. Strategy formulation is another significant variable, as also the possibility of his interacting and communicating with one to whom he is responding. In the following chapters these will be discussed in some details. Here we shall discuss only one factor, i.e. sex of the individual.

Who Shares and Who Fights?

There are individual differences in cooperative and competitive behaviour. However, one significant question is whether there is a pattern in such differences. Do persons differ on the basis of their sex, or personality, or motivation? Again, these may also be cultural differences.

Sex Differences

Males have generally been reported to show more cooperative behaviour than females (Bedell and Sistrunk, 1973; Gregsvitch, 1969; Komorita, 1965; Madsen and Shapira, 1970; Owens (1970); Rapoport and Channah, 1965). Females have been reported to behave more cooperatively while playing with male partners (Bedell and Sistrunk, 1973; Gregovich, 1969). Larsen (1972) has further reinforced these findings : men high on attributed power were found to be more cooperative in an invariable cooperative game whereas high scoring women were more competitive in an invariable game. One explanation of higher competitive behaviour of females may be that they are less gain oriented. A study (McNeel, McClintock, and Nuttin, 1972) found that while women were consistently less relative gain oriented than men, the difference was not significant and so the hypothesis that females are more individualistically oriented than competitive was not strongly supported. However, the results showed that for males, but not females, differentiation of sex roles in mixed sex-interaction, redress the likelihood and/or impact of comparison of outcomes, Komorita (1965) found that males reciprocated cooperative choice more than females when such behaviour maximised gain, but reciprocated less when such behaviour was non-optimal.

McNeel et al (1972) predicted that female dyads would be more cooperative than male dyads and that mixed-sex dyads would be more cooperative than like-sex dyads. Carment (1974) replicated the study in Canada and found that the like-sex female dyads were most competitive, followed by the like-sex male dyads. Males and females in the mixed-sex dyads were least competitive and not different from one another. Carment (1974) suggests that the most likely factor accounting for the results was the greater use of "tit-for-tat" responding by the males.

In our first three studies, sex differences in competitive-cooperative behaviour were calculated. Out of the 7 sub-samples, girls showed more competitive behaviour than boys, although the differences were significant only in two cases (Pareek and Dixit, 1974a). In one sub-sample (of Delhi) boys were found to be more competitive, the difference being significant (Banerjee and Pareek, 1974).

When data were analysed for both boys and girls playing with an individual of their own sex and of opposite sex, it was found that in Sample 2 Hindu students boys of different classes were less competitive than those boys who played with girls. Two *t* values were found to be significant at .05 and .01 level for class 4 and 8 respectively. However, classes 6 and 8 pure girls' groups were less competitive than girls played in mixed pairs. But only class 6 girls differed from the other girls of mixed group significantly ($p < .01$). Class 4 girls groups showed a reverse result than other two classes. In this class pure girls' group was found to be more competitive than girls of the mixed group, and mean difference was found to be statistically significant at .05 level. Boys of sample 1

perspective of game. Males have a tendency to view the game over a reasonably long time horizon and therefore tend to use play to communicate to the other party. Females appear to play a series of 1-shot games and thus optimize strictly over the short run.

Cooperation usually refers to a style of behaviour characterised by fairness, equality and sharing, while in the PDG it refers to one of two alternative choices. Hottes & Davis (1971) found males as more likely than females to make the optimal choice, while females were more likely to vary their choices as a function of the sex and attractiveness of their partners. The findings suggested that males and females did not have differential motives to cooperate, but respond to different cues.

Rapoport & Chamah (1965) studied sex differences in factors contributing to the level of cooperation in the PDG. Large differences were observed between male pairs and female pairs, the principal difference being in the considerably greater overall frequency of cooperative choices by men, but in combined pairs these differences were erased. Moreover, no differences in the frequencies of cooperative choice were observed in the first two players of the sequence, which suggested that the overall differences were results of different interaction patterns in men and women rather than of different 'a priori' propensities to cooperate. Sex differences in the PDG was also examined by Gregovich (1969). It was concluded from the result that male-male and female-female pairs tended to cooperate somewhat less than Ss of mixed pairs. Ss who believed their partner to be of the opposite sex cooperated more than did Ss who believed their partner to be of the same sex.

Personality Differences

Cooperative and competitive behaviour, as individual behaviour, could be influenced by personality of the individuals. Not much work has been done on the relationship of personality with competitive-cooperative behaviour.

One relevant personality variable in this regard is the locus of control (Rotter, 1966). It may be hypothesised that individuals high on internal locus of control will cooperate more. Schonpflug (1972) performed 3 experiments to test 8 hypotheses whether persons believing in internal control tend to be readier to cooperate than persons believing in external control, in order to inform themselves about the methods conforming consequences of own behaviour. The tendency to cooperate is assumed to decrease after an orientation phase. Persons left uncertain about the locus of control should show a stronger tendency to cooperate compared to persons who expect a definite locus of control. When cooperation is required, persons believing in internal control as compared to those believing in chance control show more frequent and longer phase of contact, a greater part of which is concerned with task oriented information seeking and antagonistic interactions. The belief in internal control is expected to lead to less steady patterns of role behaviour during cooperation than that expected of chance control. Under cooperation the belief in internal control is also assumed to be weaker than under solitary condition. Results confirmed most of the assumptions. Ryckman and Sherman (1974) found that internals were willing to relinquish much of their personal control over their outcomes by selecting superior partners for cooperative ventures, but only after they had become thoroughl

convinced of their lack of ability on the task. Some externals selected inferior ability partners, thus virtually ensuring defeat.

Another relevant personality variable is machiavellianism (Christie, 1970). Roberts (1971) found that high machiavellians preferred manipulative-competitive games while those with high scores in social desirability preferred non-manipulative-cooperative games. Greater attempts were exerted by high machiavellians for cooperation for personal ends.

Marwell, Schmitt & Shotola (1971) investigated the extent to which the existence of interpersonal risk may disrupt cooperative behaviour in a situation where cooperation is the most effective behaviour for the achievement of the desired goal. Cooperation was disrupted by the introduction of interpersonal risk substantially when the risk was small and almost totally when the risk was large. If the ability to communicate was permitted following disruption of cooperation by risk, it eventually led to the emergence of cooperation for a majority of groups. Very little work has been reported with preadolescents and adolescents. Moore and Mack (1972) selected 72 undergraduates with high or low dominance scores on the A-S reaction study. They were then divided into high-low or mixed dominance pairs of the same sex and played 300 trials of PDG. It was found that high-dominance pairs, but not low-dominance pairs, looked in sooner than mixed pairs. In addition, high dominance pair had a larger proportion of D- response, D-D joint responses and looks in on D-D.

In order to study the relationship of some personality variables with cooperative-competitive game behaviour, the following variables were selected. Detailed findings about these personality variables have been reported elsewhere (Banerjee and Pareek, 1973).

The instruments used to measure these are also mentioned against them.

1. Socioeconomic status (SES), measured by Kuppuswamy (1962)
2. Adjustment : Home (HA)
3. Adjustment : School (SA)
4. Adjustment : Peers (PA)
5. Adjustment : Teacher (TA)
6. Adjustment : General (GA)
7. Adjustment : Overall (OA)

All variables from 3 to 7 were measured by Pre-adolescent Adjustment Scale (PAAS) developed by Pareek and associates (1970).

8. Dependence (D) : "the tendency to seek the help of others in making decisions or in carrying out difficult actions" (English and English, 1958), measured by Pre-adolescent Dependency Scale (PADS), Form B, developed by Pareek and associates (1970).

9. Classroom Trust (CT): Pupil's feeling free to interact with the teacher, e.g. to discuss with him day-to-day classroom problems, and giving voluntary help to the teacher for some classroom problem (Pareek and Rao, 1971), measured by Preadolescent Classroom Trust Scale (PACTS), developed by Pareek and associates (1970).

Intercorrelations between personality variables and all the dimensions of the game behaviour were worked out for sample 2 and sample 3. In both cases the intercorrelations were found to be very low (Pareek and Banerjee, 1974; Pareek and Dixit, 1974). In sample 2 differences were studied according to 3 subcultures: Hindus, Bohras and tribals. For Hindus socioeconomic status was found to have significant correlation (at .05 level) positive with competition and negative with cooperation. This was also

found for tribal group, although the value is not significant due to small n. Although the relationship was in the same direction for sample 3 (Pareek and Dixit, 1974) it was not significant. This may show that in Hindus (and tribals also) higher value is given to competitive behaviour in the higher strata of the society. In the lower socioeconomic status group, cooperation seems to have a higher value. The home would socialise children in the culture of cooperation or competition.

In sample 2, general adjustment was found to have positive correlation (significant at .05 level) with competition for the Hindu group; the same trend is shown for the Bohra and the tribal groups. There are some other differences which will be discussed while discussing cultural differences in a subsequent chapter.

In sample 3 trust was found to have positive significant correlation with home adjustment, indicating the role of home adjustment in trust behaviour. Although most of the correlations were low, when regression analysis was run for sample 3 school adjustment and dependency were found to have contributed significantly to game behaviour.

It has generally been reported that personality as a variable is influential as long as the situation is not very complex. When the threat is too high, or the situation is too complex, personality may not have much influence on behaviour (Terhune, 1970).

Motivation and competition and cooperation

Achievement motivation has been associated with competition, and extension motivation is expected to be related to cooperation. Competition with others has been used as one of the four criteria to determine whether the story written in response to a TAT card can be classified as an achievement-motivation story (Atkinson, 1958). Another of the four criteria is competition with self, i.e. better performance by the individual each time. However, the evidence of the relationship of achievement motivation with performance is conflicting. Some studies have been reported significant relationship between n_{Ach} and better performance (French, 1955; Klauer, 1961, Atkinson and Reitman, 1956), and some others do not find this (Miller and Worchel, 1956; Atkinson & Reitman, 1956, and Reitman, 1960). Failure to find significant positive correlations may be due to a number of factors such as unreliability of the n_{Ach} achievement measure and the nature of the incentives in the task situation, but one finding seems to be consistent amongst the apparently contradictory results to suggest that in general, n_{Ach} appears less likely to be positively related to performance when that performance is routine or almost mechanical. On the other hand, high n_{Ach} appears more likely to be associated with better performance on tasks requiring some imagination or creativity or some personal initiative (McClelland, 1961, p. 216).

Results of the study with n_{Ach} are reported elsewhere (Pareek and Banerjee, 1976). n_{Ach} was found to have positive relationship with competition in almost all groups or communities except in Hindu community in which case the relationship was found to be negative, although

very low. In only one sample (Bohra), relationship between n Achievement and competition was found to be significant at .05 level, but other r values were not statistically significant. However, the general trend of relationship is in the positive direction.

Relationships of n Achievement with repentance, exploitation, and forgiveness were found to be negative in all the groups.

It is significant that in case of Bohra, the relationship between n Ach and competition was significantly positive. Bohra is a business community. This may indicate that increased achievement motivation in a business community may lead to an increase in competitive behaviour. McClelland (1961) showed that economic growth of an individual was positively related with n Achievement. Similar results have been reported by Ryan and Lakie (1965), that individuals who scored high on n Achievement (motive to succeed) performed better in competitive situations. The theory of n Achievement predicts that a person with high n Achievement should be immediately concerned with direct quantitative measure of how well he is doing (McClelland and Winter, 1969, p. 14). According to this, doing well is a sense of competition and in Maximising Difference Game when an individual knew his own, as well as his partner's payoffs, it was very easy to know how well he was doing, and this in turn, would increase the tendency of competition, provided the individual was highly achievement motivated.

Amongst the other variables n Achievement was found to be positively related with trust and retaliation only (r values were not found significant) for the total sample. Trust and retaliation themselves had very high

positive correlation. On the other hand, there were positive inter-correlations amongst repentance, exploitation, forgiveness and trustworthiness (Pareek and Banerjee, 1974). These variables have showed a similar type of relationship with n Achievement. Although this relationship was found, the hypothesis that achievement motivated person will show more competition, seems to be untenable because r values were found to be statistically insignificant for the total sample.

However, Hindus had shown relationship in the negative direction. Though r values obtained in this sample group were not significant yet it was observed that individuals with comparatively high n Achievement cooperated in a game situation rather than competing. It was also observed that r values found between n Achievement and other aspects of game behaviour were lower in comparison to the r values of the other groups.

Terhune's results (1968) are very interesting. He found that achievement-oriented personality types were more cooperative than the other types. They were found to choose cooperatively, while simultaneously expecting cooperation from their partners. The affiliation oriented Ss were most defensive, in that they defected, and the power oriented Ss were more exploitative. Terhune (1970) has summarised these findings and has also reported a significant result that these differences according to motive types were shown as long as the situation was not threatening. The more threatening the game became (with a greater temptation to double cross and having higher pay-off), the smaller were the differences among the motive types. Kelly et al (1973) have also reported similar results. Matched dyads of 18 high n Ach and 18 low n Ach subjects completed a complex motor task under cooperative, competitive or individual conditions.

Results indicated that low n Ach dyads performed better in a competitive situation than in a cooperative situation, while reverse was the case for high n Ach dyads.

Since the basic consideration of a high n Achievement person is his self-interest (Terhune, 1968), his strategy will be determined by his perception of the way his self-interests can be maximally served. Terhune suggested that if trust and cooperation have the highest pay off values, they will show trust and cooperation; but n Achievement people are not especially trusting in absence of evidence to support that trust will help them achieve their goal.

Terhune has suggested that achievement motivated people will cooperate or show trust if it is more paying to their total score. It may be interesting to find out which strategy, cooperation or competition is perceived as more paying. It is simple to understand that cooperation brings the highest payoff provided there is mutual and implicit understanding between the two members of the pairs as in this game situation an individual's behaviour is not only conditioned from his within but also by the behaviour of the other member and his interpretation of the intention of the other member from the feedback he received in the earlier trial. If somehow the mutual understanding is broken, cooperation may not be more paying.

Sinha (1968) studied n Ach and n cooperation under limited/unlimited resource conditions. Findings revealed that high n Ach leads to maximum group output only when resources are unlimited, and when resources are limited, persons with higher n cooperation did better in cube construction test. Conceptually, competition is related to achievement motivation since the basis of achievement motivation is competition. However, while some studies have found correlation between achievement motivation

and competition in the game behaviour, some other studies have found a significant relationship between achievement motivation and cooperation. These results are baffling. Well planned studies to resolve this issue are lacking. Sinha's (1968) is one of the most systematic studies. Sinha has contrasted achievement motivation with cooperation, equating achieving motivation with competition. According to the theory, person with high n Ach will be more interested in maximising his gain, and he would not be interested in competition for its own sake. Where cooperation is more functional, such an individual may resort to cooperation. One of the characteristics of a person with high achievement motivation is creativity. Instead of being bound to available means to solve a problem, such an individual searches alternate ways of approaching the problem. In this sense, a person with high n Ach also creates resources, in addition to using available resources in competing with others. While it is true, as proposed by Sinha (1968), that a person with high n Ach is likely to compete in the use of available limited resources, and in this sense he is likely to cause loss to others in competition with him, he will also tend to generate resources. This is the idea behind achievement motivation training for entrepreneurs. Therefore, the relationship is much more complex than a simple one. As discussed elsewhere (Pareek and Banerjee, 1976; Pareek, Banerjee and Chattopadhyay, 1976; Pareek and Dixit, 1976) cooperation can be developed along with the development of achievement motivation also. These two are not in contradiction. A theory of cooperative behaviour, therefore, should not exclude achievement motivation but may use it for promoting more effective cooperation.

Let us consider the relationship between extension motivation and cooperative behaviour. The concept of extension motivation has been proposed by Pareek (1967, 1968) for concern for others -- indicating the individuals need to extend the self or the ego and relate to a larger group and its goals. Increasing attention is being paid to the study of altruism, a term Sorokin (1954) used first to make a serious attempt to study sociological aspects of a pro-social behaviour. McClelland (1966) has acknowledged the importance of this motive -- what he calls the "concern for the common welfare for all" -- for economic growth: "This theme of concern for the common good was also found more often in the children's textbooks used by those countries that subsequently develop more rapidly. That is, these stories frequently described people being influenced by the wishes and needs of others ... Furthermore, it is probably in this way that one may most easily explain the correlations that have been found between investments in health and education and subsequent rates of economic growth."

Extension motivation is reflected in regard for other persons, cooperation with others for achievement of a common goal, faith and trust in member of a group, and involvement in goals which concern not only oneself, but large groups, with the community or the society (Pareek, 1968). Various dimensions of extension motivation may be : helping, collaborating, sympathy, risking one's comfort, risking safety for others, sacrifice, patriotism, hospitality, peace, etc. A comparative concept of several motives on seven dimensions has been proposed to indicate the possibility of developing a comparative scoring system for stories from TAT (Pareek, 1976). However, in the absence of a good and valid measure of extension motivation, two short instruments were prepared, and used, as mentioned earlier. These are

discussed elsewhere (Pareek and Dixit, 1976), as also the results. The results did not reveal any significant relationship between measures of extension motivation and game behaviour. Not a single correlation was significant. The two measures used had almost zero correlations between them. One was more a measure of verbal behaviour, whereas the other, using a semi-projective technique, probably measured the concern at a deeper level. It has been concluded from the results that variables representing responses at three levels—verbal (surface), projective (deeper), and performance (action) levels — are quite different from one another, and the results obtained should be compared after careful consideration. (Pareek and Dixit, 1976).

Growing Up to Share and Fight

Children learn both to compete and to cooperate. It may be both a developmental phenomenon, as well as the influence of culture. It is difficult to isolate maturation process from socialisation. The influence of age will indicate maturational process, but this may differ from culture to culture. In social behaviour the influence of culture is very important. Here we shall discuss the influence of age as well as culture.

Developmental Trends

In general, literature has reported the development of competitive behaviour with age. Second graders were found to be more competitive than first graders (Richmond and Weiner, 1973). Owens (1970) has reported increase in competition as a function of age from 2 to 8 years. Hirota (1951) found that children did not understand competitive behaviour before the age of 4, children at the age of 5 understood it after repeated instructions, and those of 6 and 7 years understood competitive group work. Kagan and Madsen (1971) found 4-5 years old more cooperative than 7-9 years old. McClintock (1974) has also reported increase in competition with age. McClintock and Nuttin (1969) found a linear increase for all the children in competitive responses from the second to the sixth grade. In the fourth and sixth grade frequency of cooperation was the lowest.

Nelson (1971) reports that when a situation was characterised by the presence of cues for cooperation and the absence of cues for competition, children of all ages were cooperative. However, the older children were more efficient in cooperating when a situation was characterised by competitive cues and the absence of cues for cooperation. Older children were far more competitive than five year olds. When cues for

cooperation and competition were presented, interaction was generally non-cooperative, and equally so for all age levels. However, when the mixed cue situation was designed in one case to make the need for mutual assistance particularly obvious and in another case to make possibility of an equitable outcome particularly obvious, 5-year olds were more cooperative than older children. For older children, the prior experience of cooperation led to greater cooperation than for groups having either no prior game experience or the prior experience of competing. Also, following the prior game experience of cooperating in experiment, older boys were more cooperative than older girls, and younger girls were more cooperative than younger boys.

The various studies showing increase in competition with age may indicate both the influence of maturation and of socialisation in the culture probably more the latter. Since most researches report children and adults from the Western culture to be more competitive, the socialising influence would tend to increase with age, resulting in higher competition behaviour with age. Some good rigorous comparative studies in different cultures, those which emphasise competition (say, USA) and those which emphasise cooperation (e.g. Chinese or Vitanamese societies), may throw more light on this phenomenon.

Developmental trends in cooperative and competitive behaviour have been studied for 3 age groups, and have been reported in great details (Pareek and Banerjee, 1974a). Age was found to have significant correlation (at .01 level) with competition (positive) and cooperation (negative). So, in general competition was found to increase with age. The other values of correlation with age significant at .01 level were those with repentance

and exploitation (both negative). It appears that even though competition increases with age, the tendency to exploit (and repent) decreases. This may show maturational trend.

When t values for variables of cooperative-competitive game behaviour for various age-pairs (4-6, 4-8 and 6-8), it was found that in some sub-cultural groups the trend was significant. Table 4 gives the levels of significance found for the combined groups (boys and girls). In all cases, wherever the values were significant, the same trend was shown : increase in trust and retaliation, and decrease in repentance, exploitation and trustworthiness. It can be concluded that with age there is higher competitive behaviour, with tendency to build trust through retaliation, and the tendency of implicit trust, exploitation and repentance decreases. The dynamics of these patterns of relationship will be discussed later also.

Table 4

Level of significance for t values for various groups according to age

	Sample 1 (Delhi)			Sample 2 (Hindu)			Sample 2 (Bohra)			Sample 2 (Tribal)		
	4-6	4-8	6-8	4-6	4-8	6-8	4-6	4-8	6-8	4-6	4-8	6-8
Trust				.05								.01
Repentance	.05	.05			.05	.05						
Retaliation	.05			.05								.01
Exploitation	.05	.05										
Trustworthiness	.05							.05	.05			.01

Sub-cultural Differences

Culture has a great deal of influence on cooperative-competitive behaviour of an individual, probably much more than is generally recognised. Several aspects of culture may be significant in this regard. A person is a member of a society, and so the social culture has the greatest influence on his behaviour. However, the culture of the group, the general setting in which the experiment is conducted, and the nature of the group also influence game behaviour. We shall consider these factors here.

Group characteristics

It has been reported that smaller groups are more cooperative than larger groups (Hamburger, Guyer and Fox, 1975). Bell (1970) found that singles were significantly less cooperative and more competitive than dyads and triads; and dyads were the most cooperative and least competitive of the three conditions. Dyads appeared to become more cooperative in the second half while triads appeared to become more competitive. Uneven dyads have been found to cooperate faster (Janosek, 1973). Integrated schools showed more cooperation than separate schools (Miller, 1973). Higher level of cooperation is also reported in boys from "own homes" compared with institutionalised boys (Baner and Krinohlang, 1974). Institutionalisation produced more resistance to change to cooperation. Shapira (1970, 1974) has reported Kibbutz boys from Israel to be more cooperative than city boys. Educational background may also have some influence on cooperative behaviour. Noland and Catron (1969) has reported that art group of students was found to be significantly less cooperative than the ordinary students. This was according to expectation, as competition is a characteristic of the perform art culture.

It has been suggested that the situational meaning which subjects attribute to the game could substantially affect their level of cooperation, even when other factors, e.g. communication opportunities, reward magnitudes and partner's strategy, are held constant. Elser and Bhavani (1974) found this in their experimental investigation.

Results of an experiment by Smith (1965) designed to find the effects of varying set, in terms of different degrees of competition and cooperation, upon conformity showed that people in cooperative group setting will conform more than people in a competitive group setting. Nelson (1971) found that when a situation was characterised by the presence of cues for cooperation and the absence of cues for competition, children of all ages were cooperative. Some developmental variations were observed, as discussed in the previous chapter.

Cultural Differences

Most studies report Western cultures to show high competition compared with non-Western cultures. Anglo-Americans have been reported to be more competitive than Mexicans (Kagan and Madsen, 1971, McClintock, 1974), Belgians at the II grade, although this distinction disappeared at VI grade (McClintock and Nuttin, 1969), Cuban-American (Concha, 1975), Indian (Alcock, 1974). However, Mahler and Lal (1964) translated Turner's two scales, Scale A (social acceptance) and Scale C (competition scale), and compared their results with Turner's result on both variables. They reported that Indian college students appeared to be both more competitive and more in need of social acceptance than American college students. Meeker (1970) applied PDG and Maximizing Difference Game (MDG) to adult tribal Africans of varying degrees of westernization. Westernized Ss showed less cooperation

than traditional Ss in the PDG but not in MDG. Traditional and westernized Ss manifested greater similarity to their partners in the MDG than in the PDG.

Richmond and Weiner (1973) found that Black Ss working together were more cooperative and less competitive than pairs of Whites, while blacks and Whites working together were less competitive than pairs of whites but more competitive than pairs of blacks. Madsen (1967) studied three Mexican subcultures to assess cooperative and competitive motivation in Ss, varying in urban-rural and socio-economic status under following conditions:- (a) simple altruism, (b) work outout, (c) solution of a problem in which competition minimized individual reward, and (d) solution of a problem in which competition maximized individual ~~reward~~. Significant differences between groups were obtained with the urban middle class children proving to be much more competitive than their urban poor and rural counterparts. Later on, Madsen & Shapira (1970) conducted a cross-cultural research on cooperation and competition. In first experiment, they found that Mexican-American boys were more competitive than Mexican-American girls, and Afro and Anglo-Americans of both sexes.

Harford (1966) found that Negro boys were significantly less cooperative than Negro girls. White girls and boys were intermediate between the Negro boys and girls, but not significantly different from each other. The development of cooperative behaviour of cult rally deprived Negro and White kindergarten was demonstrated in a game situation by Wasik, Senn & Epanchin (1969).

Bethlehem (1973) did not find any significant difference between Whites and African children, and suggests that the Zambian philosophy

may be revised when these children grow older.

Meeker (1970) conducted his research on Kpelle males of westernized and traditional residents and occupations. He found that westernized Kpelle were competitive in more situations, but not in all situations. Competition was not associated more with education than with participation in the wage earning part of the economy.

Albert (1971) investigated the motivational implications of competition. A preference for competitive vs non-competitive choice was documented and attributed to the activation of a set of cultural values that selectively reinforced certain kinds of choices and not others.

From the data presented in details (Banerjee and Pareek, 1974b; Pareek and Banerjee, 1974a) the differences amongst the sub-cultural groups significant at .05 or .01 level are shown in Table 5. Tribal group was found to be significantly higher on cooperation if one age level (grade 6) compared with the Bohra group. Similarly, tribal children were higher on cooperation as compared with children from Delhi. It is obvious from the results that higher cooperation is shown by tribal children. This is true of 6th grade children. In other cases, the differences are not significant. When we study the differences on other variables of game behaviour, we find that tribal children are low on trust and on retaliation. Both these involve taking initiative. It appears that in interpersonal behaviour, the tribal children respond according to the prevailing norms, and there is a lower tendency in them to take initiative for changing patterns of interpersonal relations.

Children from Bohra community were lower on repentance, exploitation and forgiveness. The differences are significant in some groups, as

revealed in Table 5. Repentance and exploitation go together. However, the interesting finding is that these differences are more evident in 4th and 6th grade children and much less in 8th grade children. Probably, the influence of the culture is much more evident in younger age. Details of such cultural differences are discussed elsewhere (Pareek and Banerjee, 1974; Pareek and Dixit, 1974).

Sex differences found may reflect the cultural differences much more. Table 6 summarises the findings of 3 other studies as well as those from the various samples from the studies reported here. The average proportions of competitive responses are given for 4 groups in the table. As already discussed, Carment (1974) has reported that competition was higher amongst girls when they played the game with members of their own sex followed by boys when they played the game with the members of their own sex. The conclusion Carment arrived at were that the females are more competitive, and subjects were more competitive when they played the game with the members of their own sex. Karabenick (1972) has suggested females' fear of success as the basis for explaining sex behaviour. According to this hypothesis, fear of success in females is higher when competing against males, and, therefore, it is predicted that performance would be lower for females when opponents were males. Results showed improvement in performance following success greater when females competed against males than against females.

The table reveals that the results from these studies are contrary to what have been reported by Carment (1974)^a and by others, but is nearer to the results reported by McNeel et al (1972). The table shows that in all the groups, boys were higher in competitive behaviour compared to girls and only in one case this competitiveness was higher when boys

Table 5

Level of Significance of Difference in Means on Cooperative-Competitive Behaviour according to Sub-cultures

Community Grades	<u>Delhi-Hindu</u>			<u>Delhi-Bohra</u>			<u>Delhi-Tribe</u>			<u>Hindu-Bahra</u>			<u>Hindu-Tribe</u>			<u>Bohra-Tribe</u>		
	4	6	8	4	6	8	6	8	4	6	8	6	8	6	8	6	8	
1. Coop-		05					01								05			
2. Trust							01					01	05	01	05			
3. Repentance		05		01					01									
4. Retaliation												01			05	05		
5. Exploitation				01		05			05									
6. Forgiveness		01		01					01	01								
7. Trustworthi- ness				05	05		01								05			

Table 6

Average Proportion of Competitive Responses

	1 MM	2 FF	3 M	4 F
Rapoport and Chamman(1965) PDG	.41	.66	.50	.52
McNeel <u>et al</u> (1972) MDG	.79	.68	.54	.60
Carment (1974) ^a MDG	.38	.52	.25	.26
Class 4 Sample 1	.55	.44	.55	.46
Hindu	.46	.50	.54	.43
6 Sample 1	.61	.52	.66	.53
Hindu	.53	.41	.58	.58
8 Sample 1	.64	.49	.62	.59
Hindu	.56	.59	.70	.61

played with members of their own sex; otherwise, boys showed greater competitiveness when they played with girls. This difference between the findings from Indian cultural groups and the Western groups can, probably, be explained by the cultural differences of sex role. In the Indian culture, girls accept their sex role without much conflict, and in the culture competitiveness by males is seen as much more appropriate than competitiveness by girls. Such a value may be internalised through the process of socialisation. Such a difference has, however, to be tested further.

Some studies using MDG have made some comments about cultural characteristics in India. Alcock (1974) has reported that Indian subjects of both sexes were very cooperative, although females were more passive. When compared to Indian subjects, Canadian males reacted to imposition of time limit by becoming more competitive and by resisting yielding. Carment and Todkin (1973) have reported that Indian subjects were less conscious of the presence of a coactor, they performed much more rapidly and showed much larger intradivadic differences in performances compared with the Canadians. They also paid less attention to the quality of their performance. Carment has suggested that adaptation or reduced arousal in the presence of a coactor may be due to small personal space available to Indians, and their crowded environment. Lack of concern about the actual performance of the coactor has also been suggested as an explanation. Carment (1974) has reported that Indian subjects were more conservative in risk taking, and showed behaviour which may be characterised with high fear of failure and a belief in the external control of reinforcement.

Do Not Talk if You Want to Fight

The role of communication in building cooperation is crucial. Under some conditions, communication may lead to increase in competition. Deutsch and Krauss (1960, 1962) found that communication in the absence of power to retaliate may lead to competition. However, communication is open way to cooperation. Communication was found to result in the increase in the frequency of choices in PDG (Grezalak and Tyszk, 1974).

McClintock et al. (1963) found isolationists high on competition.

The result were interpreted to mean that isolationists employed strategies to maximize their own gains and their opponents losses, and/or isolationists had a generalized tendency to compete. Wichman (1970) concluded that the high degree of competitiveness typically found in PDG studies may be largely a function of the isolation imposed on the Ss by the E. Wiley (1969) found that both males and females were considerably more cooperative when communication was possible than under non-communication condition.

Communication has been found to be significant in producing cooperation. Greenwood (1974) has reported that agreement was reached significantly when cooperative social orientation and unrestricted communication were combined. However, Marin, Mejia and De Oberle (1975) did not find any influence of communication on cooperation; rural children were found to cooperate more. Wiley (1973) also did not find much difference due to communication.

The standard PDG or MDG does not permit communication between S. When this restriction is removed cooperation level often increases (Gallo and Winchell, 1970). Loomis (1959) studied the effect of communication on frequency of cooperative play. Half of the Ss sent, and the other half received standardized notes expressing expectation, intension, retaliation and (or) absolution. Five levels of communication were used, from expectation alone to all of them in combination. Nonreceivers were somewhat more cooperative than notesenders, but both groups averaged over 50% cooperative play. Deutsch (1960) also reports increased cooperation when communication was allowed. This was true only when the Ss had been given an individualistic motivational set and did hold true when the Ss had been given cooperative or competitive instructions. Other studies (Durkin, 1967, Wichman, 1970) confirm this finding, that communication facilitates cooperation. Enzle and Morris (1974) reported that communication opportunities and availability of power mitigated competition.

In an experiment (using economic) Hoggat (1967) concluded that in the experimental markets in which Ss played with behaviourally stable robots there was a tendency toward stability of behaviour in the human player and there was a tendency for Ss to be more cooperative with cooperative robots than they were with non-cooperative robots.

Very little work has been done to find out how communication increase cooperation. Durkin (1967) believes that very brief eye-to-eye contact facilitates an encountering process, which changes the orientation of the subject. However, verbal Garden *et al* (1973) investigated the effects of 2 proxemic factors (seating arrangements and availability of eye contact)

on the cooperation, interpersonal attitude and approach avoidance tendencies shown by 80 male undergraduates engaged in 2 persons PDG. Significant interactions emerged between these two proxemic factors on all 3 of the above outcomes. Consistent with role play findings, more positive cooperation and attitudinal outcomes tended to be associated with the more proximal, side-by-side seating arrangements when interplayer eye contact was blocked. No trend emerged for approach avoidance data in this condition. When eye contact was available, the opposite pattern emerged. The more positive outcomes for all 3 dependent measures were associated with the less proximal across-table seating arrangements. However, verbal communications (or even non verbal frowns or smiles) can have either a threatening or a conciliatory tone. For example when one participant has the opportunity to threaten the second, and second has got no means to retaliate, the degree of cooperation is less than if no communication were possible at all. (Deutsch and Krauss, 1960, 1962).

To find out the effect of communication on game behaviour, two experimental conditions (no-communication and communication) were used. Under no-communication condition, the subjects were not allowed to see or talk to each other throughout the experiment, and they played under normal instructions. Communication conditions were both used in dyad groups and in 3-member groups. In dyad situation, both the partners were allowed to see and communicate to each other after every 10th trial. But they were not introduced to each other in the beginning of the game. Instructions were modified accordingly. In groups (of 3 members each) the effect of communication was measured in two conditions. In the first condition, both the

nominated one representative each, who met after every 10th trial for discussion, while in the second condition the entire groups were permitted to meet and communicate after every 10th trial

The results of these experiments are reported elsewhere (Pareek and Dixit, submitted). The results showed communication to be quite effective in producing cooperative behaviour. It is much more true in the case of groups than in the case of individuals. While in the case of individuals, a positive trend was found, the results were statistically significant in the case of groups.

Regarding groups there is not much difference how communication is conducted, whether between two groups by all members taking part in it, or through group representatives. However, it appears that when individuals representing the groups discuss together, there are more chances for their understanding the problems which require collaboration and for them to stick to the collaborative arrangement. Such a trend is shown, although the difference was not found significant. The difference was significant at .05 level, indicating that when communication takes place between groups in which all members of both the groups participate, there is a greater tendency to exploit i.e. to take advantage of the trust being generated. This is less so in case of decisions arrived at when representatives meet and negotiate. It appears that the commitment made by individual representatives is much more binding than commitment generated in the total groups meeting together. Interviews with some of group representatives revealed that the group representatives not only felt committed to the decision they

A Punch or Two Paves Way to Cooperation

Cooperative or competitive behaviour of an individual would be influenced by the behaviour of his partner (or the opponent or the coplayer). Gryzlak and Tyszka (1974) found cooperation higher in groups in subjects favourably disposed to each other. Alric and Kahan (1972) found that in an experimental game it is the perception of an actual relationship of an interaction with the other person more than the nature of the game which creates a climate in which cooperative responses can be established. Cooperative sets can be induced through the representation of the partner - a reactive partner promoting cooperation and a rigorous one promoting competition. In order to understand the reaction induced by the partners' behaviour, the behaviour itself is not sufficient. It is interpreted and understood in terms of the initial representations. The analysis of a person's behaviour when in relation with another is based on a joint study of the existing representations and of the actual behaviour observed.

Empathy between the subject and the partner is also an important factor in cooperation. Garner and Deutsch (1974) found decrease in the amount of cooperation when subject believed that their (dissimilarly motivated) partners had the same orientation as they had.

The effect of the partner's strategy also depends on the accuracy of the perception of his strategy. Summers, et al, (1972) experimented with 72 male undergraduates in a PDG involving 9 levels of cooperation by a simulated other. It was found that Ss were quite accurate in detecting the

other's overall level of cooperation as well as the other's reciprocation of Ss noncooperative choices. However, detection of the other's reciprocation of cooperative choices were frequently inaccurate. With regard to the latter, Ss own reciprocation of the others cooperative choices was significantly related to Ss perception of the other strategy.

Generally, cooperative response will elicit cooperation. Mack and Knight (1974) have reported higher cooperation under the condition of the partner's cooperation. Lewicki (1970) found the subject-partner relationship as an important factor. Significantly more cooperative and individualistic choices were made following cooperative relationship. The largest cooperative moves were made when the S had previously been cooperative and the other person was perceived as similar to the S. McNeel et al (1974) found that individualistic orientation (own gain) led to cooperation compared to competitive orientation (relative gain).

In a study of dyadic negotiation Lamm and Rossch (1972) found that subject's cooperative negotiation (negotiating together) was more under competitive than under non-competitive conditions. Another important facilitating factor was full reliable information on the pay off structure.

Quite a few studies have employed a simulated rather than a real other player. That is, each S played against a preprogrammed set of responses sent to him by the experimenter, while believing that he was actually playing against a real opponent. Bixenstine, Potash and Wilsons (1963) used a random strategy of 83% cooperative responses for one group and 83% for competitive responses for another group, followed in all groups by an 83%

matching strategy. McClintock, Strand and Gallo (1963) used random strategies of 85%, 50%, and 15% cooperative responses for their three groups. Neither of the experiments showed any effect of the other's strategy on the choice behaviour of the Ss. Oskamp (1974) used 10%, 90% free play and tit-for-tat strategies. Bixenstine and Wilson (1963) demonstrated that when the strategy of the 'other' reaches as high as 95% cooperative or competitive and is systematically varied over trials the Ss do tend to respond in kind.

A relevant aspect of the partner's strategy is the trust between the subject and the partner, and the partner's credibility with the subject. This may partly depend on the promises made by the partner, honouring those promises, and the demonstration of honesty. Lindskold and Horai (1974) with honest communication subjects sent more messages, were more cooperative, and used more the messages. Bonana *et al* (1974) found that subjects sent more promises to the cooperative than competitive partner and kept promises when these were reciprocated. Schlenker *et al* (1973) found that subjects who scored high on trust would believe the promises of simulated player and cooperate with her more than those who scored low; subjects relied on the promises and cooperated more, the greater the actual probability of promise fulfilment. The situational variable of promise credibility produced much stronger effects on subjects' cooperation with the promisor than did the personality variable of trust, which produced only marginal significant effects. The independent variables also affected the subjects own use of communication and their perception of promisor.

Ayers et al (1973) induced high or low attraction for a simulated player (SP) in 40 female undergraduates in a 2x2 factorial design study. During a mixed motive interaction, the SP sent intermittent promises of cooperation to Ss, the promises were either 10% or 90% credible. Results indicate a main effect of promise credibility on subjects' cooperativeness on message-relevant trials. Liking for and evaluation of the SP were inversely related to perceived potency. Changes in attraction from pre-to post measures support an expectancy theory of attraction. In an experiment by Hogan et al (1973) opponent was programmed as cooperative/competitive and as honest/dishonest. He was, however, perceived as competitive and honest, irrespective of his behaviour. Perception accuracy was correlated with non competitiveness. In a PDG the Monterorde et al (1974) present simulated target as honest-compliant, honest-defiant, dishonest-compliant, and dishonest-defiant. Subjects sent more threats to a compliant than a defiant target. When the target was honest-compliant, he converted the subject into mutual cooperator, but when he was dishonest compliant, subjects exploited him.

To study whether the choice of the other player (or the group) influenced one's degree of cooperation or competition in game behaviour, the strategy of the other player was varied. This was done by pre-programming the choices of the other player. The following strategies were used and the game was played under usual instructions of MDG.

(a) Unilaterally cooperative: The other player (or group) chooses cooperative response on every trial regardless of the subject's choice.

(b) Unilaterally competitive: The other player (or group) chooses competitive trial on every trial regardless of the subject's choice.

(c) Reciprocating (or matching): The other player chooses the response the subject gave on the previous response.

(d) Opposite: The other player chooses the response opposite of the previous response of the subject. Conditions c and d were not tried out on groups.

Results of these experiments are given in some details elsewhere (Pareek and Dixit, submitted). The results did not reveal any difference in the Ss response when the other (partner) reciprocated (i.e. made the same move the subject did) or was opposite (i.e. made a move opposite of the subject). Although a trend is visible to show that reciprocal moves produce more cooperation and more trustworthiness, but the differences were so small that this trend seems to be very weak. Nagoto (1973) found reciprocating tendency significant. Solomon (1960) found that more cooperative responses were made by the Ss when they played against a matching strategy than against either an unconditionally cooperative or an unconditional competitive strategy.

There is a clear indication that cooperative behaviour of the other group leads to cooperative behaviour of the first group also. If both groups are cooperative, cooperative behaviour will increase cooperation and trustworthiness. However, unconditional cooperation may also lead to and increase exploitation.

Unconditional cooperation by the other (partner) produces repentance, but in the case of groups, it is interesting that when the other group is continuously unconditionally cooperative, the level of repentance

is not significantly high. It would mean that the guilt produced because of exploitation making defecting moves even when the other group continues to cooperate gets absolved in the group, since the responsibility of such competitive behaviour cannot be fixed on a single or a few individuals. The guilt seems to persist when the individuals as individuals are involved, and therefore, it may lead to repentance.

Unconditional cooperation by the partner also produces obduracy i.e. continuous defection, but this is not so in the case of a group. It appears that if an individual is able to overcome the guilt of being competitive, when the partner is cooperative, the competitive behaviour seems to increase. After crossing the border of guilt, there seems to be no check on the competitive behaviour.

Although Maruell *et al* (1973) report an experiment with American and Norwegian subjects showing that unconditional cooperation led to cooperation and suggesting that pacifism can produce substantial cooperation our experiment (Pareek and Dixit, submitted) showed that unconditional cooperation leads to exploitation and this was true both for groups as well as individuals. When the other (partner) individual or group unconditionally cooperates, this may be seen as a sign of weakness on the part of the other group or the partner, and this is likely to be exploited. In this sense unconditional cooperation tends to increase exploitation and decrease the chances of a real cooperative relationship. If the partner retaliates with competitive behaviour, the tendency to exploit may decrease. This is contrary to beliefs of some people who advocate unconditional cooperation in the hope that unconditional cooperation would result in the

change of heart of the opposite party. This experimental evidence, however, indicates that unconditional cooperation may lead to exploitation, and this may be more so once the person is able to cope with the guilt

Once this happens, the door to exploitation is fully opened. aroused for some time. / The more effective way, therefore, for producing cooperative behaviour is through a strategy of cooperation interspersed with retaliation to indicate to the partner (or the group) the strength and power one has.

Cooperation is possible only between or amongst persons of more or less equal power. Unless the power of the partner or the opponent is perceived, cooperation cannot emerge. Unconditional cooperation does not allow this to happen. As discussed elsewhere (Pareek, 1976) cooperation is possible under two conditions - trust and mutually perceived power of each other. Figure summarises this concept.

Results also show that continuous and unconditional competition leads both in the individuals and the group forgiveness and retaliation as well as trust and mistrust. Although these are pairs with opposite traits, this seems to be so.

If the other (partner) reciprocates and is not competitive, it will lead to trustworthiness as well as repentance. On the other hand, if the partner is cooperative, and does not reciprocate, it leads to exploitation as well as repentance.

Another important factor influencing cooperative behaviour is the reward attached to the outcome. The reward structure is best reflected in the matrix used for the game. The matrix can be manipulated in such a

way that cooperative behaviour, or competitive behaviour can be rewarded.

The typical PDG creates a conflict between cooperative and competitive behaviour. The reward pattern in what is known as "chicken" matrix punishes double defection severely. Sermat (1967) found the rate of cooperation higher in such a matrix compared with PDG. However, Katz (1974) found competition as the dominant motivation in chicken game. Sleusher et al (1974), using business undergraduates, found that with future orientation, "non-conflict" situation produced a greater propensity to cooperate and in PDG verbal commitment led to more cooperation.

The value of pay off also has significant effect on cooperation or competition. Gallo and McClintock (1965) have reported the dilemma resulting out of miniscule payments per trial. The pay off for cooperation is rather low. However, it is interesting to find that even with a manifold increase in the pay off, there was no significant increase in cooperation (Oskamp and Klineka, 1970). Friedland, Arnold and Thibaut (1974) found the magnitude of reward relative to comparison level (CL); supra-CL outcomes produced cooperation.

Rewards need not be monetary; these could be symbolic also. Radlow, Weidner and Hurst (1968) studied the effect of incentive magnitude and motivational orientation upon choice behaviour, in a two-person non-zero-sum game. They found that Ss who played for real money made a greater number of cooperative choices than did Ss who played for imaginary money. Reward size, method of presentation and number of alternatives in a PDG was studied by Gello, Funk & Lovine (1969). Results indicated that Ss playing for money were more cooperative than Ss playing for points. It was concluded that the number of alternative responses available in a conflict situation may affect the nature of the resolution of that conflict. Gallo & Sheposh (1971) studied effect of incentive magnitude on cooperation. With the help of this

study they tried to reconcile their findings with those of Gumpert, Deutsch & Epstein (1969), who had observed that the Ss played the PDG more cooperatively when imaginary money rather than real money was used, whereas Gallo and Sheposh obtained the opposite result.

Toward a Theory of Cooperative Behaviour

Cooperative behaviour, like any other behaviour, is a complex phenomenon. It is influenced both by the situational factors, as well as personal (and personality) variables, including interpersonal ones. Ware (1970) found that cooperation increased as the payoffs for mutual cooperation increased.

Situation factors are certainly important. The perceived payoff from cooperation may be an overriding factor. Richman's (1971) analysis of the concept of cooperation indicated that the perception of human nature is independent of behaviour in a number of situations involving the making of 'cooperative' or 'non-cooperative' responses. The results of the multiple regression analysis and the cross validation procedure showed that no stable relationships appeared to exist between need structure and behaviour in a number of task situations traditionally believed to elicit cooperative or non-cooperative behaviour, indicating that situational variability may be more important than personal dimensions of need or attitude in determining behaviour in those situations.

The experiment of Sherif et al (1961) have demonstrated the role of superordinate goal in cooperation. Superordinate goal can be defined by two dimensions - degree of attractiveness of the goal to the persons or teams concerned, and their realisation that the goal cannot be achieved by an effort by a single individual or team.

Ware (1970) during the developmental study of cooperation, using PDG, found that preferred game produced twice as many cooperative responses as the non-preferred game, and the Ss playing the preferred game also cooperated sooner than those playing the non-preferred game, indicating

that the attractiveness of the task did affect cooperation.

In addition to attractiveness of goal, the other important, and probably more significant dimension of a superordinate goal, is the realisation on the part of the individuals or teams concerned that the goal cannot be attained by a single individual or group. This would imply two main things. The goal should be seen as sharable, that both (or more) persons or groups involved can share the benefits of the attainment of the goal. If the goal is seen as unsharable, only to be attained by one individual or a group, cooperation cannot emerge. All zero-sum games (like traditions' sports games) have unsharable goals. In the second place, the individuals or groups involved should realise their own and other individuals' or groups' power, capability of attaining, or helping or hindering in the attainment of the goal. Without such a realisation, cooperative behaviour cannot develop. The demonstration of the others' power is through his power to punish the subject when the latter defects.

The effects of threats on PDG was studied by Geiwits (1967). He compared the data from three groups - NT (non threat), TC (threat with costly penalties) and TWC (threat without costly penalties). Results indicated a clear superiority for the threat group over non-threat group. To determine the effects of two variables on cooperative choice: (a) power to punish under unilateral and bilateral conditions, and (b) how the power is used - a modified PD game was designed by Komorita, Sheposh & Brauer (1968). The greatest amount of cooperative behaviour was obtained in the benevolent condition; least in the malevolent condition. Involving bilateral power, the benevolent condition resulted in the greatest amount of cooperative choice, then the other three conditions (passive, matching and a control); the control conditions produced the least cooperation.

Cooperation can, then be produced if the other is perceived as powerful, but he does not use the power much. This raises another important point. If the other is seen as powerful, and there is a minimum level of trust, cooperation can be developed fast. Trust is indicative of the high probability that the power the other has will not be used in a benevolent way. This has been discussed elsewhere (Parcek, 1976). As shown in Figure 1, cooperation results from a combination of perceived power of both and trust in each other.

Figure 1
Cooperation as a function of perceived power and trust

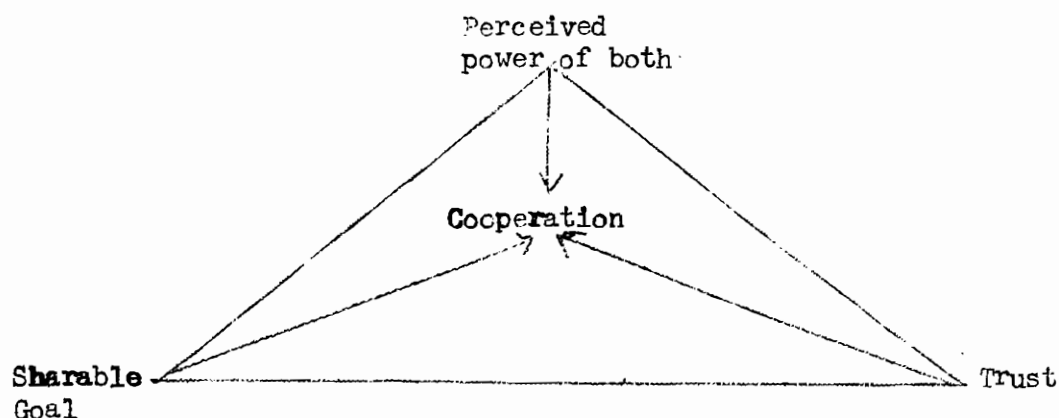
		<u>Perceived Power (Who has power?)</u>			
		Only I	Only He	Neither	Both
Trust	Low	Coercion Exploitation	Submission Compliance	Indifference	Competition Individualistic task
	High	Nurturance	Dependence	Mutual sympathy	Cooperation

In low trust condition, there may be coercion and exploitation if the other person is seen as weak; or submission and compliance, if he is seen as having power. If the perception is that neither have power, there may be indifference to each other. Perception that both have power may lead to either competition or individualistic behaviour. Under condition of high trust, perception of the partner having low power may lead to nurturance-paternalistic attitude; perception that he has power may result in dependency; and the perception that neither have power may generate mutual sympathy. It is only when both perceive and also it is demonstrated that both have power, and there is enough trust in each other, cooperation can emerge.

Figure 2 shows that cooperation results from three main factors - the perception of goal as sharable, the perception that both (or all) involved have power, and a minimum level of trust prevailing amongst those involved in the task. Absence of any one of these may result in low level (or absence) of cooperation.

Figure 2

Cooperation as a function of Sharable Goal, Perceived Power and Trust

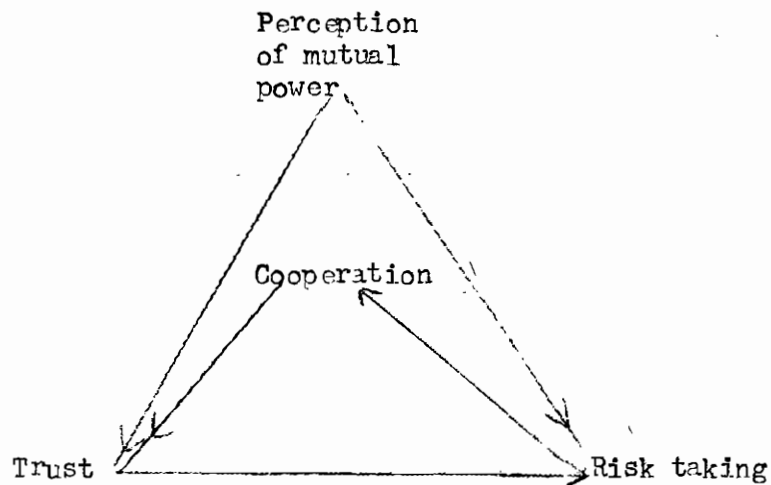


Cooperation results from initiative taken by a person to cooperate. This is a kind of risk the individual takes. In a non-zero sum game, the individual who makes the cooperative move runs the risk of losing a great deal, and the pay off even if both cooperate is not very high. This risk, the initiative, taken by an individual or a group is key to the development of cooperation. In essence, the combination of a relationship of trust, and perception of each other's power is in the willingness to take risk or initiative. Thus cooperation may be seen as resulting from the risk taken by an individual in this context. As shown in Figure 3, both mutual trust and perception of mutual power lead to risk taking tendency, but not

the other way round. And only the risk move leads to cooperation.

Figure 3

Cooperation as a Function of Individual Risk Taking



The results of the researches with games has many interesting implications for the understanding of the dynamics and planning the development of cooperation. Bonacich (1972) argues that the PDG is a prototype of the problems of order and collective action, which are both types of conflict between individual and collective goals. He discusses an index to characterize situations with respect to the degree of conflict between individual and collective goals. Results of a 5-person PD game with 120 college students as Ss showed that an increase in D leads to an increase in group friendliness and in attempts by group members to define the potential noncooperator as immoral and untrustworthy. Thus an increase in the potential for conflict within groups can lead to strengthened group norms and cohesion if this conflict is of the sort described

by the PD. This is contrary to the prevalent conception that norms arise from an identity of interests between group members.

In order to understand the theory of cooperative behaviour, it is important to know the internal structure of cooperative and competitive behaviour. Data from study 1 and 2, from study 3, and from study 4 were factor analysed. The factor analysis gives the dynamic picture of the internal structure of the variables. Centroid method of factor analysis was used, and the factors were rotated with varimax method. The factor loadings on the several variables for various factors are given in Tables 7, 8 and 9 respectively for the three studies. As may be recalled, for samples 1 and 2 and for sample 3, only 8 variables were used, while for sample 4, 10 variables were used. The results are very interesting. As it may be seen, the three factors come out very clearly. In tables only three factors were considered and the fourth factor was dropped. The three factors jointly explain a large variance and the fourth factor explains only a small percentage of variance. It was interesting to find that in all cases three factors emerged which are discussed below:-

Factor I : Cooperative Initiative: This factor consists of trust and retaliation. In the first factor analysis (Table 1) the loadings of trust and retaliation are .7 and .9, in the second factor analysis, these were .9 and .9, whereas in the third factor analysis, these were 1.1 and .7. These are very high loadings. Therefore, consistently, these two variables have high loadings. Trust is an initiative on the part of the individual after both he and his partner have given moves of defection. After this kind of tableau, the individual making a cooperative move, takes major initiative as well as risk. However, the loading of retaliation is also high in this factor. After both the

partners have made cooperative moves, if the other partner exploits the situation, the subject makes a move of defection, and thereby, take a retaliation for breaking such a relationship. This again is initiative for building cooperation. Since initiative is the main characteristic of this behaviour, we can call it as cooperative **initiative.**

Factor II : Compensatory cooperation: The second factor has high loadings of exploitation and repentance. These loadings are .8 and .8 in the first factor analysis, .8 and .7 in the second factor analysis, and almost 1 and .9 in the third factor analysis. Again, the loadings are consistently high. The main characteristic of cooperation as far as this factor is concerned is that it comes out of the compensation a person makes for having accepted the situation of mutual cooperation. Exploitation and repentance go together. However, the factor does not show a tendency to continuously exploit, but shows a tendency to make cooperative moves not as an initiative and as a risk taking behaviour, but as making up for the exploitation of the situation. Therefore, this factor can be called compensatory cooperation.

Factor III : Unconditional cooperation: The third factor has high loadings of forgiveness and trustworthiness. These loadings are .8 and .9 for first factor analysis, .6 and .2 for second factor analysis and about 0 and 1.9 in the third factor analysis respectively. It may be seen that it is not as consistent as the other two factors. However, these **loadings** are very high. Both these show unconditional cooperation on the part of the subject. Forgiveness is a cooperative move even when the other partner made a move of defection although the subject had made a cooperative move, and trustworthiness is responding to the continued trust

of the partner. In both cases, there is consistency in the cooperative behaviour. Giving cooperative move in spite of the other partner making a move of defection would show unconditional cooperation, and, therefore, this factor has been named as such. In the third factor analysis, another factor explaining about 16 variances was found to indicate very high loading of cooperation on almost 1, and fairly high loadings of forgiveness and trust. This factor may also be recorded as a similar one, although this is a little different from the factor of unconditional cooperation.

Factor IV : Chronic competition: In the first two factor analysis, only three factors have been identified. However, in the third factor analysis, in which two more variables of O and M were added, one factor explaining almost 25% variances has come out of this factor as high loadings of competition obduracy and mistrust. All these variances are variables of competition without any consideration. The factor has almost 0 loadings of exploitation, and, therefore, has nothing to do with exploitation per se. It is the general competition feeling which is strong in this factor, and, therefore, this has been named as chronic competition.

The discussions of various results in the previous chapters as well as those of the factor analysis presented here can be used both to understand the theory of cooperative behaviour as well as its use for various purposes.

The various researches have implications for planning of cooperation. For effective cooperative behaviour the perception of the power of both is essential. As seen in the results reported in this

monograph, unconditional cooperation may result in exploitation rather than cooperation. This was dramatically demonstrated in an experiment in which four groups composed of educationalists from six Asian countries played Win As Much As You Can (Pfeiffer and Jones, 1970). The game consisted of 10 moves. One of the four groups consistently made cooperative move, and, as was revealed in a later interview and discussion, was fully convinced that only cooperative behaviour could help all the groups get maximum points. However, their unconditional cooperation blocked the emergence of cooperation amongst the group, and the group was exploited by the other three groups. The final result of the game was that this cooperating group snapped communication with the other three groups, and the other groups also refused to come for negotiation, as they saw themselves in more powerful and advantageous position which could be threatened by negotiation. Lindbom (1969) found that children exhibited cooperation after initial defection.

One who cooperates unconditionally and continuously behaves like a martyr. Martyr behaviour has been defined in terms of both an unreciprocated cooperation and the reward of cooperation at the cost to oneself (Wood, Pilisuk and Wren, 1973). Measuring both the covert behaviour of the subjects, and the overt behaviour as reflected in the game, Wood et al (1973) found that the individual's ego ideal was more important than the super ego as a factor predicting his tendency to be positively influenced by martyrdom. No relationship was found between this behaviour and authoritarianism.

Table 7

Factor Analysis of Results of Samples 1 and 2

FACTOR LOADINGS					
Variables	Factor I Cooperative initiative	Factor II Compensatory cooperation	Factor III Unconditional cooperation	Factor IV Dropped	Communi- ties
Coop	.131	.165	.295	.266	.202
Comp	.188	.027	-0.031	-.727	.566
F	.078	.219	.847	-.016	.773
R	.007	.819	.259	-.0004	.738
T	.732	.048	-.136	-.055	.560
Tr	-.080	.212	.861	.101	.803
Re	.890	.023	.256	-.137	.877
E	.045	.790	.165	.032	.655
variance	17.467	17.731	21.584	7.908	

Table 8

Factor Analysis of Results of Sample 3

<u>Factor Loadings</u>					
Variables	Factor I Cooperative initiative	Factor II Compensatory cooperation	Factor III Unconditional cooperation	Factor IV Competition	Communa- lities
Coop	-.055	.181	.244	-.622	.483
Comp	.144	-.006	-.491	.337	.375
F	.108	-.029	.599	-.121	.386
R	.011	.719	-.123	-.117	.547
T	.865	.129	-.003	.176	.796
Tr	-.316	-.014	.175	-.806	.781
Re	.859	-.021	.039	.144	.760
E	.080	.831	.104	-.014	.709
variance	20.344	15.752	8.970	15.394	

Table 9
Factor Analysis of Results of Sample 4

FACTOR LOADINGS

Variables	Factor I Cooperative initiative	Factor II Compensatory cooperation	Factor III Unconditional cooperation	Factor IV Chronic competition	Factor V Cooperative tendency	Factor VI Dropped	Communalities
Cocp	-.048	.013	-.225	-.572	1.059	.065	1.506
Comp	.149	.0006	-.182	1.192	-.197	-.227	1.567
F	.249	-.223	-.032	-.302	-.354	-.088	.339
R	.042	.873	-.006	.027	-.022	-.006	.764
J	1.100	.083	-.135	.129	.344	-.081	1.376
Cr	.117	-.042	1.382	-.302	-.213	.020	3.694
Ro	.688	-.074	.155	-.006	-.192	.020	.540
E	.096	.979	-.019	.004	-.022	.067	.974
O	-.039	.084	-.056	.535	-.165	.170	.354
M	.111	-.263	-.078	.501	-.371	-.295	.536
Variance	18.087	18.613	36.778	24.862	16.265	1.915	

It has also been found that a long stalemate as a result of competitive acts may be effective against a competitive person (Komorita, 1973). This was not found to be effective against a cooperative person. This again shows that perception of power the other person holds is an important element in making a competitive person move towards cooperation. In the same study, it was found that conciliatory acts which are costly may facilitate communication and perception of cooperation intent, and thereby a mutually cooperative solution.

One important question is how cooperation can be developed? One research with the famous Sesame Street series showed influence only on cognitive learning of cooperation and no evidence was available of the transfer of this learning in behaviour (Paulson, 1974). It is only through behavioural training that cooperation can be taught and reinforced. Probably, participation in creative activities influences cooperative tendency. For example, Chertok (1974) found that in 6 to 9 year old children, non-cooperative behaviour was greatly reduced under music and mod music than under either reading or in experimental group. Creating a climate for cooperative behaviour is important. Wodaraski et al (1974) found in 5th grade children that group contingency consistently produced the higher incidence of cooperative behaviour both within and between groups. The reinforcement conditions tried out consisted of 100% individual, 67% individual and 33% group, 33% individuals and 67% group, and 100% group. The 100% group contingency was the most effective. These results suggest that a group contingency may be useful in creating cooperative work patterns in class room **settings**. Children can be taught to cooperate by rewarding them for cooperative response (Azrin and Lindsley, 1956). They were able to teach, eliminate and then reestablish

cooperation through reward system. If cooperative behaviour can be made more satisfying, it will be reinforced faster. Cherrington (1973) has concluded that the effects of competition on satisfaction can best be predicted from a reinforcement analysis. Competition in itself does not influence choice of tasks. Sattler et al (1973) found that contrived information concerning competition success did not make people shift their preferences for the tasks.

These various researches indicate that cooperative behaviour is the result of relationship existing between two individuals or two groups in which both have minimum level of trust, and see each other as having power. Furthermore, the reward attached to cooperative behaviour in sharing a goal and in working together for the attainment of the goal, will significantly determine the behavioural pattern. These findings have implications for designing of education. If education helps to increase interaction amongst pupils and emphasises the perception of the strengths of each other, at the same time creating conditions for working for superordinate goals, the chances of increasing cooperative behaviour are fairly good. The reinforcement system will play an important role. The more cooperative assignments are rewarded, and the more evaluation system emphasises working together without sacrificing competition in terms of working for excellence, the more cooperative behaviour can be generated. Researches have similar implications for organisational designing and designing of systems, including rural areas.

1. Abric, J.C. & Kahan, J.P. The effects of representations and behaviour in experimental games. European Journal of Social Psychology, 1972, 2(2), 129-144
2. Albert, Stuart, Motivational properties of observed **competition** Proceedings of the annual convention of the American Psychological Association, 1971, 6(pt.1), 347-348
3. Alcock, James E. Cooperation, competition and the effects of time pressure in Canada and India, Journal of Conflict Resolution, 1974, 18(2), 171-197.
4. Anderson, W.A.; and Parker, P.B. Society, New York: D. Van Nostrand Company, Inc., 1964.
5. Arnstein, F.; and Feigenbaum, Kenneth, D. Relationship of three motives to choice in the prisoner's dilemma. Psychological Reports, 1967, 20, 751-755.
6. Atkinson, John, W., (Ed.) Motives in Fantasy, Action and Society, New York : D. Van Nostrand Company, Inc. 1958.
7. Atkinson, J.W., and Reitman, W.R. Performance as a function of motive strength and expectancy of goal attainment. Journal of Abnormal and Social Psychology, 1956, 53, (361-366).
8. Ayers, Lawren, Macci, Peter & Tedeschi, James, T. Attraction and reaction to noncontingent promises. Bulletin of the Psychonomic Society, 1973, 1(1-B), 75-77.
9. Azlim, N.M., & Lindsley, O.R. The reinforcement of cooperation between children. Journal of Abnormal and Social Psychology, 1956, 52, 100-102
10. Banerjee, Debadatta. Development of cooperative and competitive behaviour and its relationship with need for achievement. Doctoral dissertation in Psychology, University of Udaipur, 1973.
11. Banerjee, Debadatta & Zareek, Udai. Personality differences amongst three subcultures of Udaipur. Journal of Education & Psychology, 1973, 31(3), 117-134.

12. Banerjee, Debadatta and Pareek, Udai. Development of cooperative and competitive behaviour in children of some subcultures. Indian Journal of Psychology, 1974, 49(3), 237-256, (b)
13. Banerjee, Debadatta & Pareek, Udai. Mach in children of some subcultures. Journal of Educational Research and Extension, 1974, 11(1), 12-22, (a).
14. Baner, Natasa., & Krinothlang, Jaro, cooperative conflict resolution in institutionalized boy dyads. Journal of child Psychology Psychiatry & Allied Disciplines, 1974, 15 (1), 13-21.
15. Bedell, Jeffrey & Sistrunk, Frank. Power, opportunity costs and sex in a mixed motive game. Journal of Personality and Social Psychology, 1973, 25(2), 219-226.
16. Bell, C.H., Jr. The effects of Group size on bargaining outcomes and interaction patterns in a mixed motive game. Dissertation Abstracts International 1970, 31 (5-B), 3014.
17. Bethlehem, Douglass W. Cooperation, competition and altruism among school children in Zambia. International Journal of Psychology, 1973, 8(2), 125-135.
18. Bigelow, Robert. The evolution of cooperation, aggression and self-control. Nebraska Symposium on Motivation, 1972, 20, 1-57.
19. Dinestine, V.E., Petash, H.M., and Wilson, K.V. effects of level of cooperative choice by the other player on choices in a prisoner's dilemma game. Part I. Journal of Abnormal and Social Psychology, 1963, 66, 308-313.
20. Dinestine, V.W., and Wilson, K.V. Effects of level of cooperative choice by the other player in a prisoner's dilemma game Part II. Journal of Abnormal and Social Psychology, 1963, 67, 139-147.
- 21 Blair, G.M.; Jones, R.S.; Simpson, R.H. Educational Psychology, New York, The Macmillan Company, 1962, 200-202.

22. Bonama, Thomas V., Tedeschi, James T. & Helm, Bob. Some effects of target cooperation and reciprocated promises on conflict resolution. Sociometry, 1974, 37(2), 251-261.
23. Bruning, J.L., Sommer, D.K., and Jones, B.R. The motivational effects of cooperation and competition in the means independent situation. Journal of Social Psychology, 1966, 68, 269-274.
24. Carment, D.W. and Hodkin, Barbara. Coaction and competition in India and Canada. Journal of Crosscultural Psychology, 1973, 4(4), 459-469.
25. Carment, D.W. Effects of sex role in a maximizing difference game: A replication in Canada. Journal of Conflict Resolution, 1974, 18(3), 461-472 (a).
26. Cherrington, Daud J. Satisfaction in competitive conditions. Organizational Behaviour & Human Performance, 1973, 10(1) 47-71.
27. Chartok, Sanford L. Effect of music on cooperative problem solving by children. Perceptual & Motor skills, 1974, 39 (2),986.
28. Christie, R., & Geis, F.L. (Eds). Studies in Machianellianism, New York: Academic Press 1970
29. Cancha, Est., ~~Barita~~ Lourdes., & Perez, Ana. Cooperation versus competition, a comparison of Anglo American and Cuban-American youngsters in Miami. Journal of Social Psychology, 1975,95(2) 273-274.
30. Conrath, David, W. Sex role and cooperation in the game of Chicken. Journal of Conflict Resolution, 1972, 16(3), 433-443.
31. Deutsch, M. The effect of motivational orientation upon trust and ~~suspicion~~. Human relation, 1960, 13, 123-139.
32. Deutsch, M. The effect of cooperation and competition on group processes. In D. Cartwright & A. Zander (Ed) Group Dynamics, Evanston, I 11 Row, Peterson, 1953
33. Deutsch, M. An experimental study of the effects of cooperation and competition upon group process. Human Relations, 1949, (b), 2, 199-231.
34. ~~Deutsch~~, M., & Krauss, R.M. Studies of interpersonal bargaining, Journal of Conflict Resolution 1962, 6, 52-76.
- 34 A Deutsch, M., & Krauss; R.M. The effect of threat on interpersonal

35. De Vries, David L., Edwards, Keith J & Wells, Elizabeth H.
Team competition effects on classroom group process, Center for Social Organization of School Report 1974, No.174, 43 p.
36. Dickstein, Louis S. & Brown, Nancy. Effect of role orientation and instructions regarding competition on cognitive performance of college females. Psychological Reports, 1974, 34(1), 291-297.
37. Dixit, Narendra. Correlates of competitive & cooperative behaviour in a non zero-sum-game situation. Master thesis in psychology submitted to the university of Udaipur, 1973.
38. Dixit, Narendra and Pareek, Udai. Personality patterns of four sub-cultural groups from Udaipur, 1976.
39. Dixit, Narendra and Pareek, Udai. Some correlates of achievement motivation in four sub cultural groups 1976.
40. Durkin, J.E. Moment of truth encounters in the Prisoner's Dilemma. Paper presented at the meeting of the American Psychological Association, Washington, D.C., September, 1967.
41. Eiser, J. Richard., & Bhavani, Kum-Kum. The effect of situational meaning on the behavior of subjects in the Prisoner's Dilemma game. European Journal of Social Psychology, 1974 4(1), 93-97.
42. Enzle, Michael E., & Morrison, Bruce J. Communication of intentions and requests, and the availability of punitive power in a mixed motive situation. Psychological Reports, 1974, 34(3, pt.1), 899-905.
43. English, H.B. and English, A.C. A comprehensive dictionary of psychological and Psychoanalytical terms New York, Longman Green & Co., 1958.
44. Fancqin, M.A. Cooperation, Competition and group structure. Journal of Psychological Researches, 1958, 2(2), 60-70
45. Friedland, Nehemia., Arnold, Susan E., & Thibant, John. Motivational bases in mixed-motive interactions: the

46. Fuleher, Diannen, & Perry, David G. Cooperation and competition in interethnic evaluation in preschool children. Psychological Reports, 1973, 33 (3), 795-800.
47. Gallo, F.S. Jr.; Funk, S.G.; and Levine, J.R. Reward size, method of presentation, and number of alternatives in a Prisoner's Dilemma Game. Journal of Personality and Social Psychology, 1969, 13(3), 239-244.
48. Gallo, F.S. & Meclintock, C.G. Cooperative and competitive behaviour in mixed motive games. Journal of Conflict Resolution, 1965, 9, 68-78.
49. Gallo, F. and Sheposh, John, Effects of incentive magnitude on cooperation in the Prisoner's Dilemma game; A reply to Gumpert, Deutsch and Epstein. Journal of Personality and Social Psychology, 1971, 19 (1), 42-46.
50. Gallo, F.S., Jr., and Winchell, J.D. ~~Matrix indices~~ large rewards and cooperative behaviour in a prisoners Dilemma Game. Journal of Social Psychology, 1970, 81(2), 235-241.
51. Garden, Harshell et al Proxemic effect on cooperation, attitude and approach-avoidance in a Prisoner's Dilemma game. Journal of Personality and Social Psychology, 1973, 27 (1), 13-18.
52. Garner, Katherine & Deutsch, Morton. Cooperative behaviour in dyads: effects of dissimilar goal orientations and differing expectations about the partner. Journal of Conflict Resolution, 1974, 18 (4), 634-645.
53. Galwits, F.J. The effects of threats on Prisoner's Dilemma. General Behavioural Science, 1967, 12, 232-233.
54. Greenwood, James G. Opportunity to communicate and social orientation in imaginary reward bargaining, Speech Monographs, 41(1), 79-81.
55. Gregovich, Robert, Peter, Jr. Sex differences in the Prisoner's Dilemma Game. Dissertation Abstracts, 1969, 29, (7-A), 2357.
56. Grzelak, Janusy & Tyszka, Tadenaz. Some preliminary experiments on cooperation in N person games. Polish Psychological Bulletin,

57. Gumpert, P.; Deutsch, M. & Epstein, Y. Effect of incentive magnitude on cooperation in the Prisoner's Dilemma Game. Journal of Personality and Social Psychology, 1969, 11, 66-69.
58. Hamburger, H., Gayer, M. and Fox, J. **Group** size and cooperation. Journal of Conflict Resolution, 1975, 19(3), 503-531.
59. Harford, Thomas; and Cutter, Henry, S. Cooperation among Negro and White boys and girls. Psychological Reports, 1966, 18(3) 818.
60. Hargordy Thomas, and Cutter, Henry, S. Cooperation among Negro and white boys and girls. Psychological Reports, 1966, 18(3) 818.
61. Hewett, Thomas T., O'Brien, Gordon E. & Hornick, John. The effects of work organization, leaderships style, and member compatibility upon the productivity of small group working on a manipulative task. Organisational Behaviour & Human Performance, 1974, 11 (2), 283-301.
62. Hirota, K. Experimental Studies of Competition, Japanese Journal of Psychology 1951, 21, 20-81.
63. Hogan, James L., Fisher, Roger H. & Morrison, Bruce J. Accuracy of perception and cooperative game behaviour. Perceptual & Motor skills, 1973, 37 (2), 391-398.
64. Hogatt, ...C. Measuring the cooperativeness of behaviour in quantity variation duopoly games. Behavioural Sciences, 1967, 12, 109-121.
65. Hori, Noriko, The interpersonal behaviour of children:
1. Japanese Journal of Educational Psychology, 1968
16 (2), 72-79.
66. Janousek, Jaromir. (Task directed dialogue of cooperating persons possessing different initial information). Ceskoslovenska Psychologie, 1973, 17 (2), 109-124.
67. Jellison, Jerald M & Jekes, William J. The power of the glance: desire to see and be seen in cooperative and competitive situations. Journal of Experimental Social Psychology,

68. Kagan, Spencer, and Madsen, Milliard, C. Cooperation and Competition of Mexican, Mexican-American, and Anglo American children of two ages under four instructional sets, Developmental Psychology, 1971, 5(1), 32-39.
69. Karabenick, Stewart, A. The effect of sex of competitor on the performance of females following success. Proceedings of Annual Convention of the American Psychological Association, 1972, 7(1), 275-276.
70. Katz, Marsha. Trivial games as predictors of a mixed-motive game. Journal of Conflict Resolution, 1974, 18(4), 700-706.
71. Kelly, Richard, T.; Rawson, Harve, E. & Terry Roger, L. Interaction effects of achievement need and situational press on performance. Journal of Social Psychology, 1973, 89(1), 141-145.
72. Kitano, Eimasa. Effect of group competition and cooperation on recall. Japanese Journal of Educational Psychology, 1972, 20(4), 226-235.
73. Klauer, K.J. Ucerforderung bei Zeichenaufgaben. Archives of Psychol., 1961, 113, 167-221.
74. Komorita, S.S. Cooperative choice in a prisoner's Dilemma game. Journal of Personality and Social Psychology, 1965, 2(5), 741-745.
75. Komorita, S.S. Concession making and conflict resolution. Journal of Conflict Resolution, 1973, 17(4), 745-762.
76. Komorita, S.S., Sheposh, J.P., and Breauer, L.S. Power, the use of power, and cooperative choice in a two-person game. Journal of Personality and Social Psychology, 1968, 8, 134-142.
77. Kuppaswamy, B. Manual of Socio-economic Status Scale (Urban), Delhi, Mansayan, 1962.

78. Lamm, Helmut & Rossch, Ekkehard. Information and competitiveness of incentive structure as factors in two-person negotiations. European Journal of Social Psychology, 1972, 2(4), 459-462.
79. Larsen, Ruds. Attributed power, response strategies and non zero sum game behaviour. Psychological Reports, 1972, 30(3), 821-822.
80. ~~Lewis~~, R.J. The effects of cooperative and exploitative relationships on subsequent interpersonal relation. Dissertation Abstracts International, 1970, 30(10-A), 4550.
81. ~~Lewis~~ Srenon, & Horai, Joan. Effects of targets disclosure of intent on exercise of influence in conflict. Psychological Reports, 1974, 34(2), 623-629.
82. Loomis, J.L. Communication, the development of trust and cooperative behaviour. Human Relations, 1959, 12, 305-315.
83. Mack, David. "Leader" : An unbiased mixed motive game. Psychologische Beitrage, 1972, 14(2), 244-252.
84. Mack, David, & Knight, George P. Identification of other players' characteristics in the reiterated Prisoner's Dilemma. Psychological Record, 1974, 24(1), 93-100.
85. Madsen, M.G. Cooperative and competitive motivation of children in three Mexican Sub-Cultures. Psychological Reports, 1967, 20(3 Pt.2.), 1307-1320.
86. Madsen, M.C., and Shopira, A. Cooperative and Competitive behaviour of urban ~~Afro-American~~ Anglo American, Mexican American and Mexican village children. Developmental Psychology, 1970, 3(1), 16-20.
87. Mahler, I., and Lal, C.B. The need for competition among Indian College students. Journal of Psychological Researches, 1964, 8(2), 53-58.

88. Marin, G., Mejia, B., and De Oberle, C. Cooperation as a function of place of residence in Colombian children. Journal of Social Psychology, 1975, 95(1), 127-128.
89. Marvell, Gerald., Schmitt, David R., & Bayesen, Bijorn. Pacifist strategy and cooperation under interpersonal risk. Journal of Personality & Social Psychology, 1973, 28(1), 12-20.
90. Marwell, G.; Schmitt, D.R.; and Shotola, R. Cooperation and interpersonal risk. Journal of Personality and Social Psychology, 1971, 18(1), 9-32.
91. McClelland, David, C. The Achieving Society, Princeton, D. Van Nostrand Company, Inc., 1961.
92. McClelland, David, C.; and Winter, David, C. Motivating Economic Achievement, New York, The Free Press, 1969.
93. McClintock, Charles G., Development of Social motives in Anglo American and Mexican-American children. Journal of Personality & Social Psychology, 1974, 29(3), 348-354.
94. McClintock, C.G., Harrison, L., Strand, S.; and Gallo, P.S. Internationalism, isolationism, strategy of the other player and two-person game behaviour. Journal of Abnormal and Social Psychology, 1963, 67, 631-636.
95. McClintock, C.G. and Nuttin, J.M. Jr. Development of competitive game behaviour in children across two cultures. Journal of Experimental Social Psychology, 1969, 5, 203-218.
96. McNeel, S.P.; McClintock, C.G. and Nuttin, J.M. Effects of sex role in a two-person mixed motive game. Journal of Personality and Social Psychology, 1972, 24, 372-380.
97. McNeel, Steven P., Sweeney, James D. & Bohlin, Peter C. Cooperation and competitive goals: a social-comparison analysis. Psychological Reports, 1974, 34(3 Pt.1), 887-894.

98. Meeker, B.F. Experimental study of Cooperation and Competition in West Africa. International Journal of Psychology, 1970, 5(1), 11-19.
99. Mehta, P. The Achievement Motive in High School Boys, New Delhi, National Council of Educational Research and Training, 1969.
100. Miller, A.G. Integration and acculturation of cooperative behaviour among Blackfoot Indian and non-Indian Canadian children. Journal of Cross-Cultural Psychology, 1973, 4(3), 374-380.
101. Miller, K.S. & Worchel, P. The effects of need-achievement and self-ideal discrepancy of performance under stress. Journal of Personality, 1956, 25, 176-190.
102. Monteverde, Frank J., Paschke, Richard, & Tedeschi, James T. The effectiveness of honesty and deceit as influence tactics. Sociometry, 1974, 37(4), 583-591.
103. Moore, Michael and Mack, David. Dominance - ascendance and behaviour in the reiterated PDG, Acta Psychologica, 1972, 36(6), 480-491.
104. Nelson, L.L. The development of cooperation and competition in children from age five to ten years old; effects of sex, situational determinants, and prior experiences. Dissertation Abstracts International, 1971, 31(7(B), 4368.
105. Noland, S., and Catron, D.W. Cooperative behaviour among high school students on the Prisoner's Dilemma game. Psychological Reports, 1969, 24, 711-718.
106. Nagato, Keiko. A study of the relationship among self-evaluation, evaluation from others, and interpersonal attitude: on the effects of commitment and of cooperation versus competition. Japanese Journal of Psychology, 1973, 44(3), 115-123.
107. Nelson, L.L. The development of cooperation and competition in children from age five to ten years old: effects of sex, situational determinants, and prior experiences. Dissertation Abstracts International. 1971, 31,7(B), 4368.

108. Nydegger, Rudy V. Information processing complexity and gaming behaviour. The Prisoner's Dilemma. Behavioural Sciences, 1974, 19(3), 204-210.
109. Oskamp, Stuart. Comparison of sequential and simultaneous responding matrix and strategy variables in a Prisoner's Dilemma game. Journal of Conflict Resolution, 1974, 18(1), 107-116.
110. Oskamp, S.; & Kleink, C. Amount of reward as a variable in the Prisoner's Dilemma Game. Journal of Personality and Social Psychology, 1970, 16, (1), 133-140.
111. Owens, Kenneth, L. Competition in children as a function of age, race, sex and socio-economic status. Dissertation Abstracts International, 1970, Feb. 30 (8-B), 3873.
112. Pareek, Udai, A motivational paradigm of development. Journal of Social Issues, 1968, 24(2), 115-122.
113. Pareek, Udai. Planning ~~post~~-training motivation. Defence Management, 1976 (in press).
114. Pareek, Udai & Banerjee, Debadatta. Developmental trends in the dimensions of cooperative and competitive game behaviour in some subcultures. Indian Educational Review, 1974, 9(1), 11-37(a).
115. Pareek, Udai & Banerjee, Debadatta. Personality and cooperative and competitive game behaviour in three subcultures. In Krishnan, B. (Ed). Studies in Psychology, Mysore: University of Mysore, 1974, pp.106-112(b).
116. Pareek, Udai & Banerjee, Debadatta. Achievement motive and competitive behaviour. Manas, 1976.
117. Pareek, Udai & Banerjee, Debadatta and Chattopadhyay, Somnath. How is achievement motive related to competition? Journal of the Academy of Applied Psychology (in press).

118. Pareek, Udai and Dixit, Narendra. Some correlates of extension's motivation measure. Manas, 1976 (in press).
119. Pareek, Udai and Dixit, Narendra. Effect of partner's response and communication on competitive and cooperative game behaviour. Psychologia (submitted).
120. Pareek, Udai & Dixit, Narendra. An Analysis of cooperation and competition amongst preadolescents. Indian Journal of Social Work, 1974, 35(1), 73-85(a).
121. Pareek, Udai; Rao, T.V.; Ramalingaswami, P. and Sharma, B.R. Developing a battery of pre-adolescent personality tests. Indian Educational Review, 1970, 5, 1-20.
122. Pareek, Udai, and Rao, T.V. Motivation training for mental health. A project report, National Institute of Health Administration and Education, New Delhi, 1971.
123. Paulson, F. Leon. Teaching cooperation on television: an evaluation of Sesame Street social goals programs. AV Communication Review, 1974, 22(3), 229-246.
124. Perry, L.R. Competition and Cooperation. British Journal of Educational Studies, 1975, 23(2), 127-134.
125. ~~Holtzer~~ Holtzer, J.W. and Jones, J.E. A handbook of Structured experiences for human relations training. Volume 2, Iowa City: University Associates, 1970.
126. Phillips, B.W. and DeVault, M.V. Evaluation of researches on cooperation and competition. Psychological Reports, 1957, 3, 289-292.
127. Rabbie, J.M. Effects of a competitive and cooperative intergroup orientation on within and between group behaviour. Nederlands Tijdschrift voor de Psychologie en haar toepassing, 1974, 29(4), 239-257.

128. Rabbie, Jacob M., Benoist, Frits, Oezterbaan Henk, & Visser, Lienwe. Differential power and effects of expected competitive and cooperative intergroup interaction on intragroup and outgroup attitudes. Journal of Personality & Social Psychology, 1974, 30(1), 46-56.
129. Radlow, R., Weidner, M.F., and Hurst, T.M. Effect of incentive magnitude and motivational orientation upon choice behaviour in a two-person, non-zero-sum game. Journal of Social Psychology, 1968, 74, 199-208.
130. Rapoport, A. and Chammah, A.M. Prisoner's Dilemma: A study in Conflict and Cooperation. Ann Arbor : University of Michigan Press, 1965.
131. Rapoport, A. Conflict resolution in the light of Game theory and beyond. Chapter I in The Structure of Conflict, ed. by Paul, G. Swingle. New York, Academic Press Inc., (in press), 1970.
132. Reitman, W.R. Motivational induction and the behaviour correlates of the achievement and affiliation motives. Journal of Abnormal and Social Psychology, 1960, 60, 8-13.
133. Richman, J.L. An analysis of the concept of cooperation in the Prisoner's Dilemma Game, some need structure correlates. Dissertation Abstracts International, 1971, 3(11-A), 6162-6163.
134. Richmond, Bert O. & Weiner, Gerald, P. Cooperation and competition among young children as a function of ethnic groupings, grade, sex and reward condition. Journal of Educational Psychology, 1973, 64(3), 329-334.
135. Roberts, J.I.: The effects of personality Characteristics on cooperation. Dissertation Abstracts, International, 1971, 31(10-A), 5519.
136. Rudow, Edward & Hantaluoma, Jacob. Competition with oneself versus others as a facilitator in the classroom. Journal of Social Psychology, 1975, 95(2), 281-282.

137. Ryan, E.D. & Lakie, W.L. Competitive and non-competitive performance in relation to achievement motive and manifest anxiety. Journal of Personality and Social Psychology, 1965, 1(4), 342-345.
138. Rychman, Richard M., & Sherman, Martin F. Locus of control and perceived ability level as determinants of partner and opponent choice. Journal of Social Psychology, 1974, 94(1), 103-110.
139. Sattler, Howard E., Van Wageningen, R.K., Fry, Maurine A. & Slattery, Patrick D. Effect of competitive success and failure on pupil's choice of task. Psychological Reports, 1973, 33(2), 641-642.
140. Schelling, T.C. The Strategy of Conflict. Cambridge, Mass : Harvard University, 1960.
141. Schlenker, Bary, R., Helm, Bob & Tedeschi, James, T. The effects of personality and situational variables on behavioural trust. Journal of Personality and Social Psychology, 1973, 25(3), 419-427.
142. Schmitt, D.R. & Marwell, G. Reward and punishment as influence technique for the achievement of cooperation under inequity. Human Relations, 1970, 23(1), 37-45.
143. Schonpflog, Ute. Expectations in chance and achievement control and their influence on group formation. Zeitschrift fur sozial Psychologie, 1972, 3(3), 177-226.
144. Scott, W.E., & Cherrington, David J. Effects of competitive, cooperative and individualistic reinforcement contingencies. Journal of Personality & Social Psychology, 1974, 30(6), 748-758.
145. Sermat, V. The effect of an initial cooperative on competitive treatment upon a subjects response to conditional cooperation. Behavioural Science, 1967, 12, 301-313.

146. Shapira, Ariella, & Madsen, Millard C. Between and within group cooperation and competition among kibbutz and non-kibbutz children. Developmental Psychology, 1974, 10(1), 140-145.
147. Silverthorne, Colin., Chelune, Gordon, & Imada, Andrew. The effects of competition and cooperation on level of prejudice. Journal of Social Psychology, 1974, 92(2), 293-301.
148. Sinha, Jai B.I. The need for achievement and need for cooperation under limited - unlimited resource conditions. Journal of Experimental Social Psychology, 1968, 4, 233-246.
149. Skotko, Vincent., Langmeyer, Daniel, & Lundgren, David. Sex differences as artifact in the Prisoner's Dilemma Game. Journal of Conflict Resolution, 1974, 18(4), 707-713.
150. Slusher, E. Allen., Roering, Kenneth J., & Rose, Gerald L. The effects of commitment to future interaction in single plays of three games. Behavioural Science, 1974, 19(2), 119-132.
151. Smead, Anne. Cooperation and competition. In Wrightsman, L.S. Social Psychology in the Seventies. Monterey, Calif: Brooks/Cole, 1972.
152. Summers, David, A; Peirce, Stephens; Olen, Dale & Baranowski, Thomas. Strategy detection in prisoner's dilemma game, Journal of Social Psychology, 1972, 88(1), 131-138.
153. Tedesco, John F., & Fromme, Donald K. Cooperation, competition and personal space. Sociometry, 1974, 37(1), 116-121.
154. Terada, Cherry W. & Masur, Jandira. Amphetamine and opomorphine-induced alteration of the behaviour of rats submitted to a competitive situation in a straight runway. European Journal of Pharmacology, 1973, 24(3), 375-380.
155. Terhune, K.W. Motives, situation, and interpersonal conflict within Prisoner's Dilemma. Journal of Personality and Social Psychology, Monograph, 1968, 8(3), Part-II.

156. Terhune, K.W. The effects of personality in cooperation and conflict. In Swingle, P. (Ed.). The structure of Conflict, New York: Academic Press, 1970.
157. Valins, Stuart, & Baum, Andrew. Residential group size, social interaction, and crowding, Environment & Behaviour, 1973, 5(4), 421-439.
158. Van Heymbeeck, Rudi. The sense of cooperation in task-oriented groups. Psychologica Belgica, 1972, 12(1), 95-105.
159. Vinacke, W.E., Wilson, W.R., Meredith, G.M. Dimensions of Social Psychology, India, D.B. Taraporewala Sons & Co. Pvt. Ltd., 1959, p.385.
160. Wara, Catherine, K. Cooperation and competition in children, a developmental study of behaviour in Prisoner's Dilemma Game and Maximizing Difference Games. Dissertation Abstracts International, 1970, Feb., 30(8-B), 3857-3858.
161. Wasik, B.H., Senn, S.K., and Epauchin, A. Cooperation and sharing behaviour among culturally deprived preschool children. Psychonomic Science, 1969, 17(6), 371-372.
162. Wheeler, ~~Ronald~~ & Ryan, Frank L. Effects of cooperative and competitive classroom environments on the attitudes and achievement of elementary school students engaged in social studies inquiry activities. Journal of Educational Psychology, 1973, 65(3), 407-409.
163. Wichman, H. Effects of isolation and communication on cooperation in a two-person game. Journal of Personality and Social Psychology, 1970, 16(1), 114-120.
164. Wiley, Mary, G.M. Sex differences in cooperation and competition. Dissertation Abstracts, 1969, 29(9-A) 3223.

165. Wiley, Mary G. Sex roles in games. Sociometry, 1973, 36(4), 526-541.
166. Wodarski, John, S. et al. The effects of low performance group and individual contingencies on cooperative behaviours exhibited by 5th graders. Psychological Records, 1974, 22(3), 359-368.
167. Wolf, Edith. The joint influence of cognitive and emotional tendencies among cooperating groups. Zeitschrift Fur Psychologie, 1972-1973, 180-181(1), 15-40.
168. Wood, Donald; Filisuk, Marc & Wren, Emmanuel. The martyr's personality: An experimental investigation. Journal of Personality and Social Psychology, 1973, 25(2), 177-186.
169. Workie, Abaineh. The relative productivity of cooperation and competition. Journal of Social Psychology, 1974, 92(2), 225-230.
170. Wrightsman, L.S., O'Conner, J. & Baker, N.J. (Eds.). Cooperation and competition: Readings on mixed motive games. Monterey, Calif. : Brooks/Cole, 1972.
171. Zajonc, R.B. Social Psychology. An Experimental Approach California, Wadsworth Publishing Company, Inc., 1966.