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ABSTRACT

Theoretical interpretations of cooperation and competition are discussed in relation to motivational and situational determinants. It is suggested that the degree of competition exhibited in an interaction is an inverse function of the quantity of resources available, and that the effect of situational characteristics on cooperative behavior is related to pressure from the social environment. The present experiment examines the dyadic interaction resulting when a competitive situation defined in terms of limited resources is altered by presentation of a cooperative contingency. The results of this study indicate that for each reward that can control the behavior of a subject in a social situation there exists a cooperative or competitive contingency for obtaining that reward. The results of this study are discussed in relation to the importance of analyzing situational forces. (SJL)

"FACTORS AFFECTING CO-OPERATIVE VS. COMPETITIVE BEHAVIOR IN DYADS"

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Quite a few theorists and experimenters have grappled with the diverse aspects of co-operation-competition. One consistent conclusion is that co-operative and competitive behavior result from the complex interaction of forces within man and external to him (Deutsch, 1962, Mead, 1966). Deutsch sees competition as resulting from the objective situation, restrictions and limitations of the environment, its demands on individuals to perform in specific ways.

One theory, derivable from the economic view of man, states that co-operative or competitive behavior can be predicted from the immediate past effectiveness of any particular strategy. Ss must act to maximize gain and minimize loss. According to this theory, Ss will try to obtain and process all available information in a situation, responses are strictly determined by this information, behavior in a game situation is predicatable from the knowledge of the effectiveness of particular responses in obtaining a desired goal. Factors which increase the information derived from the game situation increase the level of cooperation.

In these studies in which the only reinforcement available was defined in such a way that for one S to obtain the reward the other S must also receive a reward (Azrin & Lindsey, 1956), cooperation was a reliable outcome. (50%)

McClintock & McNeal (1966), however, stated that the interpersonal motives of individuals within the social interaction determine the goals which are sought. Man does not always interact in order to maximize "economic" gain. Vinacke (1969) insists an alternative theory to the economic theory can be developed bases on S's motives, attitudes and preconceived goals.

Also, where social interaction has become ritualized, stabilized or forced into patterns by a particular society, predictable stimulus situations may exert pressures on Ss to perform in prescribed ways. Mead, (1966) points to societies which prevent competition by a rigidly prescribed, sanctioned hierarchical arrangement, other societies which have converted goals from individual achievement to group, and cultural phasings which displace emphasis from one objective situation to some other sphere in which competition is not so possible.

This brief survey has cited environmental constraints, minimax strategies, goals and social pressures as factors which might predict to a cooperative interaction. The aim of our study is to test whether randomly selected Ss follow the "economic man" model, or as Vinacke (1969) suggests, have personality patterns which tend to make them compete in situations in which competition is not always the most rational course of action.

INTRODUCTION TO THE EXPERIMENT

We aimed at devising a simple two-person competitive social interaction in which competition was lessened by imposing cooperative restraints in order to study ensuing patterns of social interaction. Competitive situations can be redefined in ways that can exert pressures to perform cooperatively. Mead (1966) points to one type of redefinition - to set up a dominance hierarchy (DH). When a DH is set up in a dyad, the dominant Ss reaches the goal first and most often, the submissive S permits the dominant other to reach the goal first.

A dominant S must have an advantage of some kind in order to win more often than the submissive S. When the submissive S realizes that the other S has an advantage, it may serve as a sanction for the submissive S to avoid fruitless competition. This advantage of one S over another can be rationalized in two ways. The first is to assume that the behavior which forms a DH is a function of the situationally defined goal (e.g. winning points).

This implies the most effective strategy for one S is to be dominant (obtain goal first), and the most effective strategy for the other S is to be submissive (let the other be first). Such a payoff relationship could be considered to force a DH economically, in the sense that obtaining a "first" when in the dominant payoff position (DPP) is of less expense to the other S who is in the submissive payoff position (SPP), and should be easier to achieve than being dominant in the submissive position. The payoff matrix in Table 1 sets the possibility for a dyadic game to form a DH, as just stated.

In Table 1, points are gained by the S in the SPP by either being submissive (2 points) or by being dominant (4); however the S is in the DPP can only gain by being dominant (4), and will gain nothing by being submissive(0).

To determine whether this payoff structure results in a DH, it is hypothesized that if the Ss follow the DH suggested by the payoff matrix, then there should be more Ss who obtain the situationally defined goal (being first) while in the DPP than will those Ss influenced by the SPP. If this is the case, then the same reward, obtaining points, produces two opposite behaviors, cooperative and competitive, in the same setting. By competitive we mean that in order to be dominant a S must deprive the other S of obtaining a goal, in this case being first. Alternately, submissive behavior may be considered cooperative since a submissive response by a S allows the other S to obtain a goal, i.e. points.

There is a second way in which there could be an advantage for one S in obtaining a goal over another S. According to Vinacke (1969), behavior may

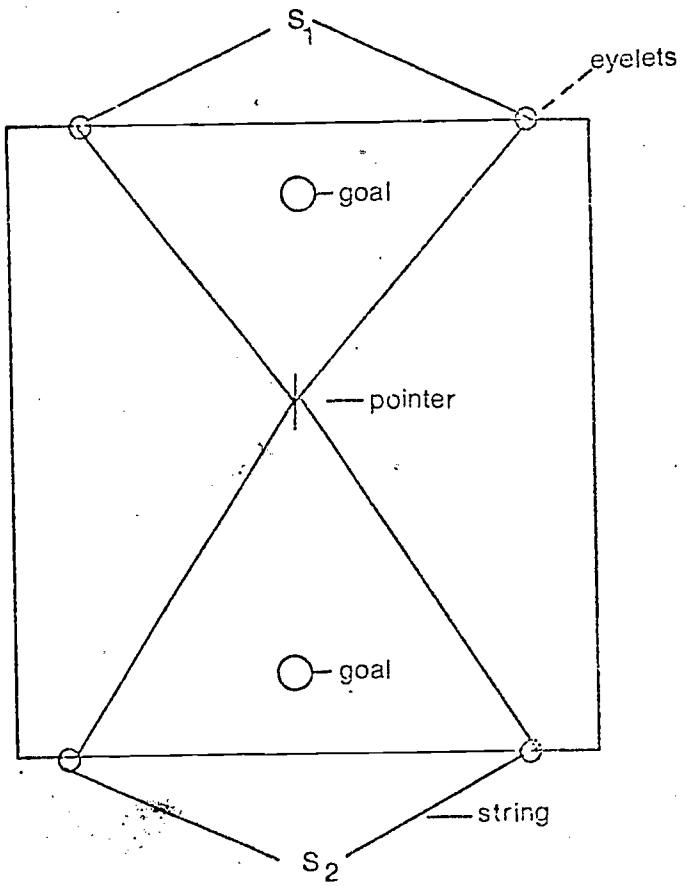
Table 1

Payoff matrix which might result in a DH

SUBMISSIVE PAYOFF POSITION (SPP)	Behavior	Dominant (DPP)	Submissive (DPP)
	DOMINANT (being 1st	0 / 0 Cell I	4 / 0 Cell II
	SUBMISSIVE (let others be first)	2 / 4 Cell III	0 / 0 Cell IV

Figure 1

The Madsen Cooperation Board is presented below, modified for the use of two persons. Notice, in order for one S to reach his goal it is only necessary for the other S to release control of the string. This board is still considered a cooperation board since for one S to win the other has to cooperate by releasing the control of the string.



also be a function of goals, "... which are not situationally defined but the intrinsic properties of the person determine the perception of goals, the interpretation of task and situational conditions, and that motivational state determine the responses that will be made."

These intrinsic properties may define the individual's goals so that behavior necessary to obtain these goals will still conform to the DH suggested by the most effective strategy to obtain points (Table 1). Another possibility is that these intrinsic qualities may define an individual's goals so that behavior does not conform to the DH (i.e. submissive response in the DPP or a dominant response in the SPP). This last possibility implies that the payoff position does not affect whether some Ss will be dominant or submissive.

The intrinsic properties defining the reward which might affect behavior are also assumed to differ between Ss, since for some Ss the former possibility may be more appropriate than the latter, and vice versa. Thus if behavior does result in the form of a DH (i.e. Ss differ in the amount of submissive behavior): and this DH is the function of the intrinsic qualities, than for some Ss the amount of submissive behavior will not depend on the payoff position, and therefore the reward of obtaining points is not a reward to which they are responding.

An experiment by Madsen (1967) suggests that whether behavior is competitive or not depends on both the situational constraints and individual differences in the way the rewarding characteristics are perceived. In this study Madsen used a cooperation board paradigm to study differences in cooperative behavior among second grade children of different social classes. This "Cooperation Board" game is represented in Figure 1, and is used to study the interaction of four subjects. When cooperative interests are emphasized, the object of the game is to move the pen pointer through each of the target spots. A record of the subjects' responses is kept on paper placed on top of the board. For the competitive condition Madsen presented a limited reward. That is, the

first person to cross his target point within a time limit would win a prize. The Ss were informed that the game would be played five times. Cooperation could develop if each player took turns winning. Madsen found that in the competitive task, urban middle-class Mexican children showed the highest performance, as compared to Mexican children with somewhat poorer backgrounds. However, when the situation was defined in terms of a group reward, the opposite relation developed. That is, the urban middle-class were more cooperative. This might suggest that the reward used in this game was more effective in controlling urban middle class Ss' behavior. The individual's perception of the rewarding aspects of the situation might be the controlling characteristic of the cooperative and competitive behavior.

Nelson & Madsen (1969) used a Cooperation Board which required the cooperation of each subject of a dyad in order to move a pointer to a certain target spot. An adaption of the Nelson & Madsen Cooperation Board paradigm may be well suited for the present study. They have found that when it was possible for only one S to get a prize on a trial, interaction was most frequently of a dominant-submissive variety. This suggest the DH could be produced without the present experiment's proposed restriction of the payoff matrix. If a DH forms, then Ss will differ in the amount of behavior which is considered submissive. However, if the DH depends on the payoff condition, there will be more more submissive behavior in the SPP than in the DPP. It is also assumed that for some Ss the situationally defined goal will not be an effective reward. If submissive and cooperative behavior is not affected by the situationally defined goal of obtaining points and is independent of the situational demand to conform to the DH then submissive behavior for some S should not depend on whether the S was in the dominant payoff position or in the submissive payoff position.

METHOD

Subjects. Three sets of three college sophomores served as Ss. These students were all females and were 19-23 years old. Since the task depended to a degree on physical strength, each set of three were chosen to have approximately the same physical stature. Other individual differences were not controlled. Each S served with each of the other two Ss in each condition in order to counter-balance the effect of the other's personality on the S's cooperative response.

Materials. The Cooperation Board (Madsen, 1967) was modified to a form appropriate for use with two individuals. Target spots were adhesive unprinted labeles (1 inch diameter). A movable pointer, which could be pulled and slid easily upon the board by strings, is shown in Figure 1 at the starting position in the center of the board. Each subject held one string in each hand. Nelson & Madsen (1969) required the cooperation of both subjects to move the pointer to either target. In the present experiment the cooperation of both subjects was not required in order for them to move the pointer to either target since this is more appropriate for a dominant-submissive relationship. That is, in order for one subject to be dominant it was only necessary for the other subject to release control of the string. However, for one S to overpower the other required a large degree of difference in strength since there was a physical disadvantage for pulling the strings but an advantage for resisting.

There were no prizes except points. It is difficult to determine the subject's personal value of prizes that might be offered. A small monetary reward may mean a great deal to a subject who is not wealthy but very little to one who is wealthy. Since it was impractical to use a monetary reward high enough to be of substantial motivational value to each subject, only points were used as reward.

This adaption of the Cooperation Board paradigm was well suited for the study of cooperative and competitive interaction in a dyad since it provided a competitive situation (pulling strings) in which a cooperative aspect (payoff) could be superimposed. It also provides for an increase in the amount of social interaction over the usual payoff matrix games such as the Prisoner's Dilemma Game. Vinacke (1969) stated that this added interaction seems a more relevant dimension for the study of cooperation and competition.

Experimental Design. The experimental design was 2 x 2 x 3 factorial with repeated measures. Each S played the game in the DPP with every other S and received one score for each trial. This score indicated the number of times the S in the DPP was submissive (allowed the other to win). In the other condition, each S played the game in the SPP with each of the other Ss and also received a score which represented the number of submissive responses by that S. There were five trials for each dyad under each of the conditions.

A submissive response was counted when the pointer crossed the goal farthest away from that S's seating position. In order for a S to win a trial, the opponent must submit his control of the pointer to the other S.

Each trial was considered a limited reward condition, since only one S could cross the pointer over his goal. The trial was ended when this occurred. The situation could also be considered limited since only one S could obtain the maximum number of points for each trial (four points, Table 1). The situation presented to the S in the SPP was considered a cooperative condition since in order for that S to effectively gain points he must allow the S to also gain points.

Instructions and Procedures.

A) Each trial consisted of instructions which maintained the cues for limited reward associated with a competitive situation.

1) This means only one S could cross his goal per trial

2) There was a limited amount of time in order to complete a trial

(30 seconds). If neither S crossed a goal within the set time, neither S received points.

B) The payoff matrix was presented to each S in the most noticeable and understandable manner. This was done so that each S was well informed of the payoff associated with each of the four possible outcomes. Evens & Crumbaugh (1966) found that presenting the PDG matrix in decomposed form produced more cooperation within a dyad. The reason for this increased cooperation was considered to be due to simplification of the matrix. The payoff matrix for each trial that was placed in front of each S was a decomposed form of the payoff matrix presented in Table 1.

The S in front of the DPP matrix read the following:

IF THE RESULT OF THIS TRIAL IS:	YOU RECEIVE	THE OTHER RECEIVES
You are first to cross goal	4	2
The other subject crosses goal first	0	4
Neither cross	0	0

The S in front of the SPP matrix read the following:

IF THE RESULT OF THIS TRIAL IS:	YOU RECEIVE	THE OTHER RECEIVES
You are first to cross goal	4	0
The other subject crosses goal first	2	4
Neither cross	0	0

C) The Ss were asked, after they had finished reading the instructions and matrix what the object of the game was, and how they thought each could gain points. If they answered that the object was to gain points and indicated they understood their payoff options the game proceeded.

Pilot Study. A pilot study was conducted with three female college sophomores. In this pilot study it was found that the overall level of cooperative responding was very low, one of 36, and only 3.3 percent of the total possible points were earned. In order to increase the amount of cooperation more emphasis was placed on the cooperative restraint, by increasing the S's knowledge of the payoff matrix. This was done by asking each S what his payoff would be under each possible outcome.

It was assumed that decreasing the emphasis on the competitive aspects would provide for more cooperative response. This assumption is based on the conclusion by Mead, (1966) that competition may be prevented in the society "by a cultural phrasing which displaces the emphasis from the objective situation to some other sphere in which competition is not so possible." In the present game there is physical interaction in the form of a "tug-of-war" with respect to the competitive aspect of the situation. It was assumed that less emphasis would be placed on the competitive aspect by removing the physical interaction. This condition is referred to as LP (less physical interaction).

The LP condition represented the same situation and instructions presented to the DH condition except that the Ss were told not to pull the strings to determine which S crossed his goal first. Rather, the Ss were told to display one of two 3x5 index cards on which was written either WIN or LOSE to determine which S would obtain their goal first. If S_1 placed a WIN card and S_2 placed a LOSE card this would indicate that S_1 would receive credit for crossing his goal first. When the Ss pulled strings to determine the winner in the DH condition, if both Ss resisted their opponent's attempts to win they had 30 seconds time limit in which to change their choice. In an analogy to the DH condition,

in case of ties (i.e. both Ss displayed the same card) each S had to option to change her choice.

Mead (1937) also stated that competition may be prevented in a society by a social system where the desired end is converted from an individual end to a group end. The DH condition provided an asymmetrical payoff in which the S in SPP receives less (two points) for allowing the other S to win than the other S receives for winning (four points). Therefore, it is assumed that by increasing the equality of the reward for cooperative behavior in the SPP the amount of cooperation in the SPP will increase. This condition is referred to as GR (group reward).

Thus the following hypotheses were added to the present experiment:

1. If cooperative responding is increased by reducing the emphasis on the competitive aspect of the situation, then there should be more cooperative responding in the LP (less physical interaction) condition than in the DH condition.

2. If cooperative responding is increased by providing equal payoffs then there should be more cooperative responding in the GR (Group Reward) condition than in the DH condition.

RESULTS

The primary analysis was based upon 4x2x2 repeated-measures analysis of variance[1] with cooperative responses during a five-trial interaction (defined in terms of individual responses occurring within dyads) as the dependent variable. An analysis of variance over a total of 20 trials is presented in Table I. Both payoff position (B factor) and the payoff position interaction with the type of cooperative emphasis (AXB) were significant at the point..05 level. The analysis of the simple main effects of the AB interaction showed that all except the DH_1 (type of co-operative emphasis) condition were in the direction predicted and significant (α=.05). That is, Ss made more co-operative responses in the DPP than in the SPP.

The differences between the A_3 (GR) and A_1 or A_2 (DH) conditions were not significant nor were there significant differences between the A_4 (LP) and A_1 or A_2 (DH) conditions. In order to determine the differences in cooperative behavior between Ss across payoff conditions it was necessary to compute separate analysis of variances for each group of three Ss. A 2x2x2 analysis

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[1]The present data is in the form of discrete responses which are not particularly suited for analysis of variance. However, a particular comparison which was of interest within the experimental design did not provide for a suitable nonparametric analysis. In a discussion in Klings and Riggs (1971) it was suggested that data important for experimental analysis may be used even though the characteristics of that data do not exactly meet all the requirements for suitable analysis. In this case analysis of variance might be used, since continuous data is a relative concept in the sence that observations was also considered that the distribution was robust with respect to the assumption of continuity.

of variance was run for each group of three Ss in each of the four conditions. There was no significant difference in the amount of cooperative responding between Ss. Only in the A_1 (DH_1) condition was there a difference which approached ($F=14.35$, $df=2$, $p=.25$) significance. A Newman-Keul analysis (Winter, 1971) found that this difference existed between S_2 and S_1, and between S_2 and S_3. We analyzed the number of cooperative responses for each S in DH_1 across payoff conditions. S_2 was not only the most cooperative in the SPP but this cooperativeness increased while responding in the DPP.

We calculated the percentage of the Total points possible as received by each S during 20 trials. The total possible points could be earned if each S was 100 percent cooperative while serving in the SPP. This would mean that the S in the SPP would receive two points and the opponent would receive four points for each trial. In the GR condition both players received four points if a cooperative choice was made by the S in the SPP. The average for the two dominance hierarchy conditions (DH_1 and DH_2) is 31.5 percent as compared to each of the other two conditions which were much higher, GR - 58.3 percent and LP - 53 percent. This seems to indicate that the assumed dominance hierarchy imposed by the unsymmetrical payoff condition may produce less cooperativeness than either the group reward condition or the condition which had less physical interaction with respect to the competitive aspect of the game.

At the end of the 20 trials Ss were asked to discuss their general feelings with respect to the game situation. There seemed to be a longer discussion about positive aspects of the game, the Ss' interactions with the other Ss, and the amount of points each S earned, for both the GR and the LP conditions as compared to the DH conditions. Ss in the LP conditions felt that their choices were related often to trying to outguess the other S rather than trying to compete or cooperate.

DISCUSSION

The purpose of this study was to define a social interaction which would produce cooperation in a competitive situation (limited resource). The adaption of the Madsen "Cooperation Board" reflected a limited resource condition, i.e. only S could cross his goal on any trial. The payoff matrix presented to the S in the SPP was considered to be the imposed cooperative element which in order for one S to win the most points for herself she must allow the opponent S to cross the goal first. It was assumed that this situation represented a social setting similar to a dominance hierarchy. In order for a dominance hierarchy to exist it is necessary for one S to win more often than the other Ss.

The main hypothesis considers that if situational constraints control cooperative responding, then there should be more cooperative responding in the submissive payoff position than in the dominant payoff position. This study indicates that cooperative responding is controllable by situational constraints imposed in a competitive situation. The differences between payoff presentations were significant for all but one of the conditions (DH_1). There also may be reasonable explanation for the lack of significance in this DH_1 which is related to the effect of one S. It was assumed that the situational defined goal, i.e. "obtaining the most number of points for yourself," would not be an equally effective reward for all Ss. It was then hypothe-

sized that the number of cooperative responses for some Ss would differ independently of the payoff conditions. This would indicate that there may exist in the game goals other than obtaining the most number of points. The analysis of variance computed for each of the four conditions provided only partial support, i.e. Ss differed in the amount of cooperative respoinding without interaction with the payoff conditions in only the DH_1 analysis. Supplementary analysis of the DH_1 condition indicated that S_2 was more cooperative than the other Ss within this condition. If points were the effective goal for S_2, then this S would most likely follow the situational constraints for obtaining points. (i.e. more cooperation in the SPP than in the DPP.) If points were not the effective goal then it is reasonable that there would not necessarily be an increase in the number of cooperative responses in the SPP for S_2.

The effect due to payoff matrix was not considered to be significant at DH_1. Whether points represented an effective goal or reward for S_2 could not be determined. However, as the only change that did occur across payoff matrices for S_2 was in the direction opposite the one predicted, i.e. more cooperative responses in the DPP than in the SPP. This would seem to indicate the possibility that the situational goal was not effective. A more reasonable explanation for S_2's behavior would be that the goal to which she was responding was defined in this particular social setting so that she could obtain this goal only by cooperating in both payoff conditions.

Some association with strength was implied by the "tug-of-war" competitive aspect of the game. A desire to reflect physical weakness which is appropriate for a female is an example of a possible goal which could be achieved by cooperating in both payoff conditions. This might be a salient goal for a shy female S placed in a competitive situation in which a male (the experimenter, in this care) is observing her behavior.

This type of explanation for S_2's behavior emphasizes that social interaction can be considered to be cooperative or competitive on more than one level. For each reward that exists in a particular interaction, and can effectively control behavior, there can be a cooperative or competitive constraint imposed in obtaining that reward. Thus the important aspect of predicting whether behavior will be cooperative or competitive is to determine which reward is influencing behavior in that particular situation, and to decide whether there are cooperative or competitive constraints in obtaining that reward.

The results of this study indicate that situational forces can produce cooperation in a dyad, in the similar theoretical respect that limited resources can force competitive behavior. This study also suggests that the effect of situational constraints, such as a DH must be considered relative to a particular reward which is controlling behavior in the particular situation. The importance of this type of analysis is in its implication in describing individuals or groups as competitive or cooperative. It is not reasonable to conclude that

some individuals are more cooperative or competitive than others from information obtained from one situation, since that relationship may change when either different rewards are considered or different constraints in obtaining the same reward are changed. In the Madsen (1967) experiment discussed earlier, Madsen found that urban middle-class children were more competitive than rural children. However, when the situation was defined in terms of group reward, urban middle-class children were the most cooperative. These social classes did not differ in the tendency to be cooperative or competitive, but rather the results reflected difference in the effect of the reward used in that experiment to control behavior. That is, urban middle-class children were more affected by the reward than the rural children. The general conclusion of this argument is that any measurement of cooperation (or competition) must be made with respect to a particular reward and relative to differences in responding when this reward is presented in a situation which requires cooperative behavior to obtain the reward, and when competitive behavior is required. This argument is based on the conclusions of the present experiment which found that the same reward (points) produced both cooperative and competitive behavior under different situations, and that not all Ss were responding to the situationally defined reward of points.

The present experiment also attempted to determine whether the amount of overall cooperation could be increased over than amount which occurred in the DH conditions. In one condition (LP) it was assumed that the amount of cooperative responding was related to the amount of emphasis placed on cooperative goal. It was also assumed

that physical interaction was a method of placing emphases. It was then hypothesized that by removing the physical interaction there would be less emphasis on the competitive goal (crossing goal first) and thus more emphasis placed on the cooperative goal (obtaining points), and therefore more cooperative responding. In the other condition (GR) it was assumed that the more equal or symmetrical the payoff the more cooperatively the goal of obtaining points would be defined. Therefore, there should be more cooperation.

Summary

Theoretical interpretations of cooperation and competition were discussed in relation to motivational and situational determinants. It was suggested that competition could easily be seen to be related to the amount of resources. That is, the amount of competition exhibited in an interaction is an inverse function of the amount of resources available. However, the effect of situational characteristics on cooperative behavior was considered to be related to pressure from the social environment. The present experiment examined the dyadic interaction which resulted when competitive situation defined in terms of limited resources was altered by presentation of a cooperative contingency. An adaption of the Madsen "Cooperation Board" was used to provide the competitive situation, and a game matrix the cooperative contingency.

There was significantly more cooperative response in the submissive payoff position associated with the cooperative contingency (SPP). However, it was considered that this external force (payoff matrix) for cooperation was not equally effective for each S. In at least one three-person group, alternating in dyadic interaction (DPP_1), Ss did differ in the amount of cooperation. This difference was confirmed to the effect of one S who responded highly cooperative independent of payoff position. It was suggested that this S's behavior was not controlled by the cooperative element defined by the experimental situation but rather by another cooperative element in which the contigencies for the reward remained the same across payoff conditions. The internal force, which produces cooperation, then is assumed to be related to a S affectability to particular rewards which exist in a dyadic interaction. Thus for each reward that can control an S behavior in a social situation there exists a cooperative or a competitive contingency for obtaining that reward. Any bias for responding cooperatively or competitively must be determined independently of the behavior controlled by other rewards.

It was also assumed that cooperation was directly related to the equality in which the situationally defined reward (points) could be achieved; and that physical interaction could be a method of placing emphasis on that reward. Thus decreasing physical interaction with respect to the competitive aspect of the

game (pulling strings) should increase cooperation (LP); and increasing the equality of the reward should increase cooperation (GR). The LP and GR conditions did not significantly increase cooperation, but differences were in the predicted direction.

TABLE 2

This table represents an analysis of variances of the cooperative responses. Factor A represents the type of cooperative emphasis (i.e., GR, DH_1, DH_2 or LP). Factor B represents the type of payoff (i.e. SPP or DPP). The main effect of the payoff and its interaction with the A factor were significant at the .05 level.

Source of Variation	MS	F
Between Ss		
A (cooperative)	1.41	
S w groups (error a)	6.00	
Within S		
B (Payoff)	13.02	14.3*
AB	6.46	7.1*
BxSub w groups (error b)	.91	
C (Trials)	.19	
AC	3.02	
CxSub w groups (error c)	.65	
BC	.36	
ABC	3.41	
BCSSub w groups (error bc)	2.31	

* $p < .05$, df 1/8
* $p < .05$, df 3/8

REFERENCES

Azrin, N.H. & Lindsley, O. R. The reinforcement of cooperation between children, J. Abnorm. So. Psychol., 1956, 52, 100-102.

Deutsch, M. Cooperation and Trust, some theoretical notes in Nebraska Symposium on Motivation, Jones, M. R. (ed) 1962, 10, pp.275-320, Lincoln, Nebr., Univ. Nebr. Press.

Evans, G. W. & Crumbaugh, C. M. Payment schedule, sequence of choice, and cooperation in the prisoner's dilemma game. Psychonom. Sci., 1966, 5, 87-88.

Madsen, M. C. Cooperative and competitive motivation of children in three Mexican subcultures. Psych. Repts., 1967, 20, 1307-1320.

McClintock, C. G. & McNeel, S. P. Societal membership, score status and game behavior: a phenomenological analysis. Intern. J. Psychol., 1966, 1. 263-272.

Mead, M. Cooperation and competition among primitive peoples. Enlarged edit., Boston, Mass, Beacon Press, 1966.

Nelson, L. & Madsen, M. C. Cooperation and competition in four year olds as a function of reward contingency and subculture. Devel. Psychol., 1969, 1, 340-344.

Vinacke, W. E. Variables in experimental games: toward a field theory. Psych. Bullet., 1969, 71, 293-318.

Winer, B. Statistical principles in experimental design. 2nd edit., New York, McGraw Hill, 1971.