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Decision Making Strategies of Children from Two Different Socio- Economic Strata

Godwin A. Ugal

Fifteen pairs of 10-12 years old of Nigerian children from the High and 15 pairs from the Low Socio-economic Status (SES) group played the Prisoner's Dilemma Game administered with simplified instruction. "IQ" and the "Cognitive Style" were also measured for each subject. A sequence-analysis of the first 200 choices of each subject indicated an overall similarity of the game-behaviour of dyads in the SES groups for the increasing utilization of "Competitiveness" as the major strategy, a good reciprocation of strategy-choice, and frequent getting into increasingly longer "Deadlocks" with a short deadlock-free game-behaviour in between two successive "Deadlocks" in the initial stages of the game. More "analytical" subjects were less "Forgiving" and Lower SES intelligent children were more "cognitive". The results have been discussed in terms of Emshoff's process-model and Kimmel's "Long-ranged" and "Short-ranged-thinking".

INTRODUCTION

A number of studies have reported different strategies employed in Mutual mixed-motive experimental games. Mills (1969) reported that in the initial stages of playing these games, the subject adhere to a "Win-Stay-Lose Change" strategy, while the rest of the game indicate an effort to induce the partner to the desired outcomes. McClintock and McNeel (1966) described the Own-gain, Joint-Gain, and the Relative-Gain Maximization strategies utilized for playing such games. Emshoff's (1970) Computer- Simulation model which admits four parameters, that is memory, Foresight, Competitiveness, and Rigidity, has described the strategies aspects of playing the Prisoner's Dilemma Game (PGD). The role of subject variable on game-played behaviour has also been widely investigated. Pareek and Dixt (1974) pointed out to the effect of co-operation and "competitive dispositions" on playing the maximizing difference game. McGurk (1974) investigated conformity and value effects on making the risky decision. Benton (1975) studies the effect of "anxiety" on Bargaining behaviour. The effects of "Information Processing-Style (Nydeggar, 1974), and the "Information-Processing-Complexity" in relation to Interpersonal Care Availability (Nydeggar, 1980) on playing PGD have also been investigated. The present study, aims at the analysis of strategies utilized by Nigeria children for playing PGD in terms of their SES, IQ and Cognitive-Style.

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METHOD

Fifteen pairs of 10-12 years old Nigeria male children from the Higher SES and fifteen pairs from the Lower SES group constituted the sample of the study. The partners of the game belonged to the same SES group. Children in the Higher SES attended a private school (Metessori School) in Calabar and the children in the Lower SES studied in Government run schools, located in Barracks Road and Akim areas of the City of Calabar.

TOOLS AND PROCEDURE

In order to investigate the decision-making strategies of children in a mixed-motive situation, each pair of children played PGD with "Simplified-Instructions" (simplified on the basis of study). The 2 x 2 pay-off matrix, used in the present study has been presented in Table 1.

Table 1: The Pay-off-Matrix

		B	
		1	2
A	1	5:5	7,-3
	2	-3:7	0:0

The "Simplified-Instructions" for the game were: "This is a very interesting money-making game which you shall play with your partner. Whatever you earn shall be actually paid to you. How you earn depends on how you play the game". The subject was told:

"As a time, you have to make a choice between 5 or 7 naira (see the card given to you) i.e., whether you would like to take 5 or 7 naira in the chance, however, the actual payment of money to you shall be based not on the choice of one person only, but on your joint choice. You are not allowed to see the choice of your partner in any chance. I shall let you know the payments after each trial".

"Now, in a particular trial, suppose you choose to take 5 naira, and your partner also chose 5, I shall pay 5 naira to each of you. However, if there is a clash, i.e., if one of you chooses 5 and the other chooses 7, then I shall follow a rule to pay you. The one who wanted 7 shall be paid 7, and the one who wanted 5 in this very trial, shall have to return 3 naira back to me out of his earnings up till that time. In case both of you choose to take 7 in a particular trial then neither of you shall get anything".

Besides, the pay-off in each trial, the subjects were told about their total earning after the 10th, 30th, 50th, and the 200th trial.

Questions regarding the determination of pay-offs were asked before starting the game. Instead of presenting the pay-matrix, the subjects were presented with a card containing the "Instruction", the contents of which have been presented in Table 2.

Table 2: Instructions

If the choice is 5.5	You each get 5.5
If it is 5.7 or 7.5	7 gets 7.5 returns 3
If it is 7.7	Then, it shall be D.D.

With this, each subject was given tagged pack of paper slips, one for each choice. The card containing "Instructions" was available to them throughout the game. The subjects were seated with screen in between them. The experimenter could see the choice of each partner in the game. The subjects made their first choice (simultaneously) as the signal "yes" was given. It was followed for each trial up to the 200th trial. The children were requested not to discuss the game with anyone in their class.

In order to investigate the "IQ" and the "cognitive Style" of the subjects the Weschler Intelligence scale for children performance part only (Weschler, 1949) and the children's Embedded Figure Test (Witkin, Oltman, Raskin, and Stephen, 1971) respectively, were also administered to each subject in the sample.

RESULTS

Strategies were derived on the basis of "sequence analysis" of first 200 choice trials of the game. Atrial consisted of the choice of each partner in a dyad in response to the precedings joint choices of the pair. The method by delineating strategies was as described by Rapoport and Chammah (1969). The following additional strategies were added to the list of Rapoport and Chammah (1965) for the present investigation.

1. **Cut-Throat Competition:** Described as the scores of D/DD, i.e., a choice reflecting "Defection" (D) after previous joint choices of "Defection" (DD).
2. **Obstinate Competition:** Described as the scores of D/DC indicating "Defection" after a previous joint choice of "Defection" by the subject in question, and a cooperative (C) choice by his partner, and
3. **Total competition:** It was a sum of the above mentioned two strategy choices.

The mean of the percentages of choices out of a total of 200, made by each subject in each of the two SES groups, was calculated. None of the differences for any of the 8 strategy choices was found to be statistically significant for the two SES groups. In both the SES groups, mean percentage of trials was larger for "Competition" strategy in comparison to others. It was 83.97 percent for the higher SEs and 85.30 percent for the Lower SES group. For each of the other strategy choices in the two SES groups, it ranged from .33 to 4.23. The game behaviour may, thus, be taken as similar in both these groups.

Significant values of Rho were obtained for the percentage of choices of the two partners in dyed under the strategies of "Trustworthiness" ($Rho = .71$; $p < .01$), "Forgiveness" ($Rho = .51$; $p < .05$), "Repentance" ($Rho = .61$; $p < .05$), "Exploitation" ($Rho = .86$; $p < .01$) in the higher SES groups. In the Lower SES group, however, significant Rho values for the percentage of choices of the two partners in a dyad were obtained for "Trustworthiness" ($Rho = .76$; $p < .10$), "Repentance" (Rho

= .70; $p < .10$), "Retaliation" ($Rho = .54$; $p < .10$), "Exploitation" ($Rho = .71$; $p < .10$), and "competition" ($Rho = .94$; $p < .01$).

The entire game of 200 choices was divided into the following four stages:

Stage 1: First 10 trials of the game:

Stage 2: The next 20 trials of the game:

stage 3: Next 20 trial of the game after stage 2: and

Stage 4: The rest 150 trials of the game.

The average percentage of trials indicating the utilization of each of the strategies by subjects in each SES groups, separately, for the four stages of the game has been presented in Table 3.

The utilization of all the strategies decreases gradually in each SES group, as the game proceeded. "Competition" increased consistently from Stage 1 to 4 of the game and which was finally broken by at least one of the players, resulted in a number of such "Deadlocks" throughout the same until they completed 200 trials. For the purpose of analysis, a "Deadlock" was defined as a sequence of 5 consecutive DD choices.

The average number of trials after which the first "Deadlock" started was 27.31 for the Higher SES and 37.46 for the Lower SES group, the mean difference having been found to be statistically insignificant.

The average total number of trials for which each of the "Deadlock" continued, separately, in each SES group, has been presented in Table 4.

Table 3: Average Percentage of Choices by Higher and Lower SES Subjects for each Strategy under Different Stages of the Game

S/N Strategies	Stage							
	Stage 1		Stage 2		Stage 3		Stage 4	
	Higher SES	Lower SES	Higher SES	Lower SES	Higher SES	Lower SES	Higher SES	Lower SES
1. Trust	15.66	16.66	8.33	11.33	4.22	8.07	2.36	1.99
2. Trust								
Worthiness	3.00	3.00	.67	.67	1.05	0.00	.55	.15
3. Forgiveness	2.34	3.34	.67	.83	.17	.52	.40	.88
4. Repentance	5.68	9.33	2.17	2.34	1.05	1.58	.97	.51
5. Retaliation	18.00	19.67	9.33	10.17	3.86	5.96	2.74	.75
6. Exploitation	7.00	9.00	1.33	4.00	1.75	3.86	.83	.37
7. Competition	48.32	39.00	77.50	70.66	87.90	80.01	92.16	96.35

Table 4: Average Length of each Deadlock

S/No Deadlock		Higher SES	Lower SES	t value & the Level of Significant of the Difference	
1.	First	19.50	8.09	$t = 2.09$	$df = 19$; $p < .05$
2.	Second	37.71	15.40	$t = 3.58$	$df = 15$; $p < .0$
3.	Third	64.00	38.00	$t = 1.41$	$df = 8$; NS
4.	Fourth	16.50	52.67	$t = 1.28$	$df = 3$; NS
5.	Fifth	39.00	17.50		

The average number of trials for which the first and the second "Deadlock" continued, was significantly larger in the Higher SES as compared to those in the Lower SES group.

Length of the gap between the two successive "Deadlock" in terms of the number of trials taken by the two SES groups, ranged between 1.00 and 3.55. "deadlocks" was found to be significantly different in the two SES groups.

in the Higher SES group, percentage of trials under "forgiveness", and "Cut-Throat Competition" correlated negatively with scores on the children's Embedded Figures Test ($Rho = -.36$; $p < .05$) and ($Rho = -.40$; $p < .05$) respectively. In the Lower SES group, a negative correlation between these two variables was obtained only for the "Forgiveness" strategy ($Rho = -.43$; $p < .05$). A negative correlation of "IQ" with percentage trials for "Trust-worthiness" was also obtained in this group ($Rho = -.49$; $p < .01$).

DISCUSSION

Findings have supported the use of "Competition" as the major strategy for playing the game by subjects in the two SES groups. A computation of the values of the C/D choices, based on the nature of the "strategic-environment" (payoff matrix) of the game probable indicated to the subjects the rationality of making "Competitive" choices.

It was also indicated in the present investigation that as the game proceeded, the gradually accumulating knowledge of the opponent's choices, "Semantic-Memory-System" of the subject (Greene, 1973) provided data for the subsequent competition of the values of C/D choices. Increasing use of "Competition" with each of the four stages of the game by subjects in each of the two SES groups, and their fast getting into "Deadlocks", thus, indicated that recent preceding choices were given more weightage than others in the "decision-making" for the present choice, though certain random attempts were made by usually the same player in a dyad in the present study, the switch to CC choices could not be achieved. Data indicated that the subjects reformed their goal situation with experience in the game. Initially, they tried "Own-Gain-maximization" by relying on heavy "Exploitation" false signals of "Co-operation", and being "Competitive", but later on attempted to maintain a status quo by rigidly following the "Defensive" strategy, so that their partners could not "Exploit" them.

The effect of the subject variables, such as SES, IQ, and Cognitive-Style, have also been found to be interacting in strategy utilization. In the present investigation, while more "intelligent" and "analytical" subjects (than others in the group) in the Lower SES group utilized "Exploitation" and "Competition" those in the Higher SES group showed an inclination to less "Competitive" which however, could not be followed because of the interplay of mixed-motives of the "self", as well as, the "partner" in the game. It may also be argued in this context that mutual co-operation is the most fruitful outcome in multi-trial PDG, involving an insight regarding the "other's" motivation, and an effective communication of one's own motives to the other. Had the subjects been asked to fill up a questionnaire, or to write up a "super-strategy", or a plan of how they would play in such a game-situation, the individual differences would have been more prominent. Moreover, if the constraints of the

present situation, as represented by PDG, were made more relaxed with no continuing rewards (money) or losses, the strategic manoeuvres could be more revealing.

It may, thus, be seen that even though the "aim" (Own-Gain-Maximization) was not realized in a decision-making situation due to the exactly similar "aims" of the partner who had all the power of thwarting the realization of thereby a subject, the information received through the payoff-matrix and through the reactions of the "other" was processed while making subsequent decisions.

CONCLUSION

It may be concluded, thus, that when placed in an unfamiliar "strategic environment" against a partner with whom competition has been usually encouraged, where the alternatives available are extremely few, and the price of trying an initially unproductive is too high, with no direct means of communicating / perceiving the interacts of the "self / other" respectively, a child in concrete-operational period of cognitive development shall be typically restricted to "Short -ranged-Thinking" in making decisions, and would be highly "Competitive" and "defensive" in behaviour.

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