

**CASTALIA**

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**Egbe Ifie**

1. **“CASTALIA** is a place that does not exist on this earth, yet it does exist as a kingdom of the spirit”.

2. **“CASTALIA** exists as a training ground and refuge for that small group of men who have consecrated their lives to the Mind and to Truth.

June Singer

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## A STUDY OF SEX DIFFERENCES IN SMALL GROUP INTERACTION

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### *Abstract*

*This study aimed at testing various hypotheses dealing with sex differences in social interaction using prisoner's Dilemma Game (P.D.G) under two different strategies. The motives operating at the time of the game and attitudes towards the other partner in groups were studied for male, female and mixed pairs, separately sixty (60), subjects – 30 male and 30 females from our departments volunteered to take part in the study. The study highlights two important features of social interaction –*

*(1) That the interaction of sex and strategy provide significant results, i.e. male, female and mixed pairs reacted differently to competitive and cooperative conditions. (2) The mixed dyads tend to be more cooperative than male and female dyads in the cooperative conditions. These two factors of dyadic interaction have some very important implications for the real life situations.*

### **Introduction**

A number of studies have been carried out in a mixed motive game situation to demonstrate the relationship between the sex of the players and the game behaviour. Infact, this has been one of the variables in recent research on social interaction. In the various games which have been employed, Prisoner's Dilemma has been one of the major games. The PDG is one of the several types of games devised by Mathematicians and Economists to describe possible two party outcome relationships (Von Neumann & Morgenstein, 1947). The standard PDG, "is a relationship of responses to outcomes of two interacting parties where each party has competitive and comparative, has knowledge of reward structure and is aware that he is playing against another party like himself", (Schlenker & Bonoma, 1978:28) each is required to respond on that trial and no other communication is allowed. The standard instruction to players is that they should try to maximise their outcome. The PDG, thus, is a 'Prototype' or 'Analogue' of many social relationships that involve combinations of competition and co-operation. The general research findings regarding sex have been that when men and women play PDG many times in succession with partners of their own sex, large differences are observed in the two

mixed populations. These differences are reflected in several indices and the general finding is that women tend to co-operate less than men. Most of the times female dyads have been found to compete more than male pairs of mixed sex pairs. (Bixenstein, Chambers & Wilson, 1964; Oskamp & Perlman, 1965; Rapoport & Chammah, 1965; Steele & Tedeschi, 1967; Bedell & Sistrunk, 1973). Explanations of sex differences typically revolve around cultural differences in sex roles which lead females to act from different motivational stance than males. Bixenstein et al. (1964) postulated a 'revenge theory' which assumes a high degree of sensitivity in females than in males, to the partner's non-co-operative behaviour. They state that women tend to be more frustrating than men, but are less willing to forgive violations of trust, and as a result they repeatedly lock into competitive response with the partner. Vinacke (1969) suggest that greater female defection levels are a result of an interaction of the demand characteristics of the experiment and a tendency for females to be more compliant i.e. more sensitive to the demand characteristics mediated by the experimenter than are males.

Reviewing the game literature as a whole, one finds inconsistent results concerning sex differences. Some researchers have found that males are more cooperative than females (Wilson & Bixenstein, 1962; Chambers & Wilson, 1964; Rapoport & Chammah, 1965; Oskamp & Perlman, 1965; Komorita, 1965) whereas others have reported exactly the opposite finding (Smith, Vernon & Tarte, 1969). A consistent finding, however, has been that sex differences in game behaviour do not exist in the beginning of the game. Thus, both males and females start a game cooperating at the same level and sex differences come about as a result of experimental conditions (Grant & Sermat, 1969; Kahn, Hottes & Davis, 1971; Downing, Hastings, Rywick & Kahn, 1968; Tedeschi, Powell Gahagan, 1969).

But it has been found that in most studies there is a considerable smaller degree of co-operation in women as compared with men. Furthermore, the performance of the mixed population is intermediate between the two populations of homogenous pairs. It is as if men have been brought down by women and vice-versa. However, regarding this there are inconsistent findings. According to some researchers, the levels of cooperation are high in mixed dyads. Apparently, this is due to females becoming more cooperative in the presence of a male partner (Grant & Sermat, 1969), since the males do not become less cooperative, the cooperation of mixed dyads is high, not intermediates.

These differences, according to Kahn, Hottes & Davis, (1971) are due to different goals pursued by members of each sex. According to Kahn, males apparently ignore the attributes of social situation. So they respond solely on the basis of strategic conditions cooperating in a cooperative condition and competing in a competitive condition

(Downing et al, 1968). Females on the other hand respond less to the strategy employed but show reliable changes in behaviour as a result of the sex partners, i.e. the social aspect of the situation (Ghai & Johri 1981). Males are oriented toward winning and achieving while females are oriented towards social and interpersonal concerns.

Based on the theory of group interaction and sex differences, the present study was designed to compare the interactional patterns of Males, Females, and Mixed dyads playing PDG with cooperative and competitive strategies. Since cultural factors (Argyle, 1973; La Barre, 1969) have been found to affect the interactional patterns, the behaviour of Nigerian subjects seemed promising for investigation.

### ***Method***

The study was designed to compare the interactional patterns of males, females and mixed dyads. The basic design was to study the influence of sex, strategy, and their interaction on behaviour in a controlled experiment based on a seven trial Prisoner's dilemma game. For this purpose the following hypotheses were formulated.

### ***Hypothesis***

- i. The number of A and B choices given by Males and Females under condition of co-operation and competition will be significantly different, i.e. the initial action being cooperative, females will be less cooperative than Males and Males would be more competitive when given a competitive strategy.
- ii. There will be a significant difference between Males, Females and Mixed dyads on different motives.
- iii. Group cohesiveness will be a function of strategy to which the group is exposed.
- iv. There will be a significant differences between Males, Females and Mixed dyads on the group attitudes

### ***Sample***

The sample consisted of 30 males and 30 females. All the subjects were university students with ages ranging from 17 – 19 years. As the design of the experiment required equal number of subjects in each cell, it was decided to select the subjects from the volunteers to avoid last minute drop-outs. The subjects were selected from the same age group and same educational background. As one of the variables was sex and its effects on interaction, equal number of men and women were selected.

***Instrumentation***

- a. **A motive Questionnaire:** A motive questionnaire consisting of 15 items dealing with motives involved in playing the game was used. The subject had to respond on a five point scale. This questionnaire was first administered to 50 males and 50 females of the same age group for a pre-test of the items. Several items dealing with competition, cooperation, and individualistic motives were rated by this group. The responses were analysed on the basis of this pre-test analysis and the final selection of items were made.
- b. **The In-Group Questionnaire:** The questionnaire consisted of 25 items to assess the attitude of the subjects towards the other member of the dyad. This questionnaire was developed for use in the Prisoner's Dilemma Game situation by Rabbie & Visser (1977).

***Variables***

**Independent Variables:** There were two independent variables (i) Sex and (ii) Strategy

- i. **Sex:** There were 30 dyads in all, out of which 10 were male-male dyads, 10 were female-female dyads and 10 mixed dyads. Male dyads were playing against male dyads, female against female and mixed found to effect behaviour of subjects in PDG experiment.
- ii. **The Strategy:** This variable had two conditions:
  - a. **Competitive:** This was defined as ABBABBB in the prisoner's dilemma game. The A-B combination (i.e., when the subject gives A and receives B) leads to a loss of 30 naira and the B-B combination results in a loss of 15 naira. Obviously an opponent giving B is competitive rather than co-operative in the eyes of the players. With this in mind the Competitive strategy was composed of 5 B's and 2A's as mentioned above. It was decided not to give even B's because such a scheme would have made the intentions of the opponent rather clear to the subjects because of its consistency.
  - b. **Cooperative:** This followed a similar pattern with one difference. The position of A's and B's were reversed. If the combination is A-A, the subject wins 45 naira and the combination of B-A also results in a win of 25 naira. So obviously an opponent giving A's is seen as cooperative. Within this in mind the co-operative strategy was composed of 5A's and 2B's. Again 7A's were given so that the intentions of the opponent remained unclear to the subject.



These strategies were pre-planned and fully under the control of the experimenter.

**Dependent Variables:** The responses of the subjects were studied in terms of:

i. **Choice:** This was a binomial variable i.e., each subject could either give A or B choices on a particular trial. There were 3 types of choices:

a. **Individual choice** – in this each subject had to choose between A and B on a particular trial, (b) **Expected choice** – Each individual could indicate his expected choice from the group either A or B.

b. The response to the motive questionnaire indicating the motives playing the dominant role in the game.

c. Attitudes toward the partners in the dyads as measured by the Ingroup questionnaire.

### ***Design***

As mentioned earlier, this study was designed to study the influence of sex, strategy, and their interaction on behaviour in a controlled experiment based on a seven trial Prisoner's Dilemma Games. In all 60 subjects were taken. A 2 x 3 analysis of variance design was used. This design can be schematised in the following manner.

### ***Composition of Dyads***

Strategy	MM	FF	MF	Total N
Comp.	10	10	10	30
Coop.	10	10	10	30
Total N	20	20	20	60

The 60 subjects were equally divided in each cell, i.e. 5 dyads in every cell. Thus there were 10 dyads which were composed of 2 male subjects each, of mixed pairs. These 30 dyads were exposed to two different treatments or strategies. 15 dyads (5 of each composition) were exposed to the Competitive strategy and the other 15 to the Cooperative strategy. The two-way analysis of variance was used for data analysis. For analysing the binomial variable of choice the chi - square test was used.

### ***Procedure***

In each experimental session, four subjects were called. They were divided into two groups and were then made to sit in separate rooms. Each subject was given a Code Number. After establishing rapport, the following instructions were given:

“In this experiment you are placed opposite another party in a situation in which you can earn money or you have to pay money. Your

task is to make a decision, i.e. to make a choice between A and B. In all there will be seven parts to this experiment, each part dealing with money. The manner in which the amount will be divided between both the parties will depend upon the combinations of the choice of two parties so when both the parties make the choice, there would be four possible combinations”.

Choice of Green	Choice of Blue	
A	B	Green pays 30 Blue wins 25
B	A	Green wins 25 Blue pays 30
B	B	Green pays 15
A	A	Blue plays 15 Green wins 15 Blue wins 15

“You are provided with typed sheet. Please mark your individual and expected choices. And on this plain piece of paper, write down your group choice. I would then communicate your group to Blue and convey Blue’s choice to you. Then you can come to know for yourself what you have earned or lost”.

After giving the instructions every dyad was given N150.00 in the form of loose change. After every trial, the money was either taken or given to the dyad depending upon the outcome. Although, the subjects played against the experimenter, the impression was that they were playing against each other. The strategy to which the subjects were exposed was pre-planned. Irrespective of the response of the groups, the experimenter responded by the determined competitive or Cooperative strategy. For every trial the individual choices, expected choices, and the group choices were taken. Based on the combination of the group choice and the strategy, money was either given to dyads or taken from them. There were seven parts to the game. For every trial the same procedure was followed. After finishing the game, the motive questionnaire and the attitude questionnaire were administered.

## Results

The data were analysed in three separate sections: Section I dealing with Analysis of Choices, Section II dealing with Analysis of Responses to the Motive Questionnaire and Section III dealing with Analysis of Responses to the Attitude Questionnaire.

### Section I – Analysis of Choices

To analyse the result on the variables of Choice, the chi-square test was applied. The chi-squares were calculated for (a) Group Choices, (b) Number of B’s given under different strategies, (c) Individual Choices,

and (d) Expected Choices. The results of the chi-square test for the above are given in Table 1 to 4.

**Table 1**

The Chi-Square Test for Group Choice	
Male Dyads	**4.88
Female Dyads	**4.15
Mixed Dyads	1.19
Significant at .05 level	

**Table 2**

The Chi-square Test for Number of Bs under Different Strategies	
Competitive Strategies	2.0
Cooperative Strategies	**11.6
Significant at .05 level	

**Table 3**

The Chi-square Test for Individual Choices	
Males	0.26
Females	**12.83
Significant at .05 level	

**Table 4**

Chi-square Test for Expected Choices on Strategy	
Males	0.76
Females	**5.19
Mixed	0.65
Significant at .05 level	

#### Section II – Analysis of Responses to the Motive Questionnaire.

The result of the two way analysis of variance on the responses to the motive Questionnaire are given in Table 5.

An observation of the table indicates that sex was found to be significant for items II, IX, and X, strategy for none and interaction was found to be significant for items, VII, IX, X and XIV.

#### Section III – Analysis of Responses to the Attitude Questionnaire.

The responses to the attitude questionnaire were also analyzed. Some of the items on which sex or strategy of interaction were significant are given below in Table 6.

Table 5

F-Ratios for the Analysis of Three Motives (A) Competitive, (B) Cooperative (C) Individual

Item	Sex	Strategy	Sex X Strategy (Interaction)
<b>Competitive Motives</b>			
I	*1.60	1.05	0.0
II	**4.10	2.21	2.68
III	1.68	2.16	2.98
IV	1.00	1.40	0.59
V	0.625	1.54	0.14
<b>Cooperative Motives</b>			
VI	0.38	0.307	2.42
VII	0.72	0.09	0.77
VIII	0.53	0.13	**4.06
IX	**6.09	0.09	**8.80
X	**4.60	0.40	**3.73
<b>Individualistic Motive</b>			
XI	1.83	0.61	0.66
XII	1.94	0.39	1.82
XIII	0.47	0.58	3.05
XIV	0.01	0.24	**3.94
XV	2.43	0.14	1.61

\*\*Significant at .05 level

Table 6

F-Ratios for the Items dealing with Attitudes of the Individuals Towards their partner in the group

	Item	Column (sex)	Row (Strategy)	RXC (Interaction)
1.	On being competitive Vs non-competitive	*3.45	0.335	0.42
2	On being defensive	*3.47	1.79	3.02
3	On being careful	*5.72	0	0.04
4	Contentment Vs discontent	*4.76	3.10	0.35
5	Favourable Vs unfavourable	*3.667	2.104	1.04
6	Difference of opinion clear	*5.30	0.798	0.164
7	Very hostile Vs non-hostile	0.41	0.13	*4.75
8	Agreement Vs over-decision	2.51	*4.06	*4.34
9	Atmosphere in the group Vs not warm	1.36	*4.96	0
10	Responsibility for the proceedings in the group	1.85	1.098	*4.16

\*Significant at .05 level

### Discussion

It was hypothesized that the number of A and B choices given by Males, Females and Mixed pairs will be function of strategy. The hypothesis has been supported by the present study for male dyads and

female dyads but not for mixed dyads. This is an important finding considering several previous studies (Rabbie & Visser, 1976; Sehgal & Johri, 1977) having failed to find a significant result on this variable. The whole idea behind using PDG to study small group interaction is to have a direct behavioural measure of Cooperation and competition in contrast to the reactive measure, i.e. the response to a questionnaire item. In view of this consideration, the present results highlight the job of strategy in shaping behaviour in a game situation. When difference between number of Bs was studied under the different strategies, it was observed that females gave as many as 85% Bs as compared with men who gave just 60% Bs. This finding confirms the hypothesis that initial action being cooperative, females tend to be less cooperative. Theoretical findings indicate a similar tendency on the part of females (studies by Bixenstein, et al., 1964; Oskamp & Perlman, 1965; Rapoport & Chammah, 1965; Bedell & Sistrunk, 1973). Explanations of these differences typically revolve around the cultural differences which lead females to act from a different motivational stance. Since the female sex has always been considered the weaker sex it is as if females want to surpass everyone, when given an opportunity to do so. It can also be assumed that there is a high degree of sensitivity in females, which leads them to perceive the game as competitive and hence they persist in competing rather than cooperating. The concept of 'limit testing' seems to be at work. It is as if the female dyads are challenging and pushing the opponent to test how far he will take the competitive stance of the player. Males, however, play rationally and are quick to perceive the strategy.

Analysis of motives, indicates that the dominant motive in all the subjects has been competition. It may be due to the fact that all the subjects have perceived the game as being non-cooperative and hence have responded in similar manner. The fact that strategy has not made any difference in the responses stand out clearly. Interaction is also not significant, indicating that subjects have not reacted to the combination of strategy of sex. The tendency to be competitive, on the whole, could be due to many factors. It has been apparent that individual behaviour is facilitated in several ways by how people act in the presence of others. Behaviour under group situation gives rise to a tendency on the part of group members to act in a way that maximises their own gain. The group wants to excel the performance of others and for achieving this goal it needs to be competitive and to think solely in terms of its own gains. These results could be due to this factor of the 'group goal' of winning from the other party. Moreover, since the game involves money, the results could be explained in terms of the effect of win or lose. The subjects involved in this game were University students, who believe in gaining rather than losing. This factor might explain the highly competitive motive on the part of the subjects. Theoretical

findings also support the results of studies by Steele & Tedeschi, 1967; Bedell & Sistrunk, 1973; Kahn, Hottes & Davis, 1971.

An analysis of the data based on the cooperative motive indicates that the results are inverse of the above discussed findings based on competitive motive. This points to the consistency of the results. Another feature of the results is that whereas the items on competitive motive have not yielded any significant differences, the items on cooperative motives have done so. This could be interpreted as a pointer to the fact that cooperative motives tap the response tendencies of the subjects with greater efficiency.

An analysis of data on the set of individualistic motives, indicate a tendency on the part of all the subjects to be individualistic. Thus although the group goal was present, the dominant motive operating in the game was individualistic. This may be due to the fact that man by nature wants to maximise his own gain. Although groups' gains do matter as stated above, if given a choice he would like to go for the individual gain. Also individualistic motives are interconnected with the competitive motive, so it could be that both the motives were rated by subjects on the basis of just competition.

The results of the present study do not support the hypothesis that inter-group competition leads to the greater in-group cohesiveness. The fact that the super-ordinate goal of winning from the other group emphasizes the common fate of the members and overrides all divisive interests the members may have not been proved. Intergroup competition does not lead to heightened in-group cohesiveness, rather it leads to blaming each other for the loss that has been suffered. On the other hand, inter-group cooperation leads to greater in-group cohesiveness. These findings are supported by studies of Rabbie & DeBrey (1971) and Orium, H., Stendler, D., Haines, L. (1972).

The hypothesis that there would be sex differences regarding the attitudes has been supported, but the differences are not in one direction. The same finding has been reported by other research workers. Whereas, studies like Rapport & Chammah (1965), Oskamp & Perlman (1965) indicate sex differences, studies by Bixenstein & Wilson (1963), Bixenstein et al. (1964) report on sex differences with regard to behaviour. One clear-cut fact is that strategy does not affect cohesiveness to the extent that sex does.

In conclusion, the results of this study highlight the significance of difference arising as a result of the sex of the subjects and the strategy to which they are exposed. The importance of strategy for real life situation cannot be minimised. In international relations, industrial disputes and other kinds of negotiations and bargaining situations where two or more parties are involved, the repercussions of strategy on the behaviour of the parties concerned are of great importance. The PDG provides a satisfactory model to study such situations.

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