A PRELIMINARY STUDY OF TENDENCIES TO COOPERATE AND COMPETE BY JAPANESE AND JAPANESE RETURNEE STUDENTS IN A MODIFIED MULTI-PLAY PRISONER'S DILEMMA GAME (PDG)

David W. Rackham
Yoko Kuriyama

INTRODUCTION

Social dilemmas can frequently turn out to be major hallmarks of human experience for the consequences of choosing to compete or cooperate with others regarding the dispensation of mutually desired resources may often have profound political and/or economic implications for the individuals, groups or nation states involved. As Bethlehem (1982) has argued, cooperation and competition are the primary factors determining whether a set of individuals with diverse interests can accommodate conflicting demands for finite resources to the extent that a viable society can emerge.

Various definitions have been offered of social dilemmas (e.g., Pruitt, 1967; Dawes, 1980), but as Baron (1988) points out, the essence of a social dilemma is that while each individual may be better off he/she chooses the anti-social response of defecting or competing, the actions of others being held constant, the benefits for everyone are maximized if all choose to cooperate.

Since social dilemmas are a central aspect of human experience, it is not surprising that they have come under intensive experimental study over the

last thirty to forty years. The major impetus for this may be traced to the landmark volume by von Neumann and Morganster (1947) entitled *Theory of Games and Economic Behavior* which provided a mathematical basis for studying the consequences of cooperating or competing in a social dilemma situation. Of the various attempts to simulate social dilemmas in laboratory settings, that embodied in the Prisoner's Dilemma Game (PDG) first developed by Flood (1958) is typical.

Table 1. Possible Combinations of Cooperative and Competitive Choices in a Two-person PDG

	Player 2	
Player 1	Cooperative	Competitive
Cooperative	Cooperative/ Cooperative	Cooperative/ Competitive
Competitive	Competitive/ Cooperative	Competitive/ Competitive

The social dilemma posed to PDG players is exemplified in a payoff matrix specifying the consequences to players of deciding to cooperate or defect (compete) on a given trial of a multitrial game (see Table 1).

The name "prisoner's dilemma" derives from an anecdotal account of two prisoners who, having collaborated in a criminal act, are subsequently apprehended by the authorities and separated from one another for interrogation. If one prisoner chooses to confess to the authorities (defect) while the other remains silent (cooperate), the one who confesses will go free while the other will receive a maximum sentence. If both choose to confess (defect), they will both receive a moderate sentence, while if both remain silent (cooperate), both will receive a minimum sentence. This dilemma is complicated, furthermore, by the fact that the two prisoners cannot coordinate their actions in any direct way since communication between them is forbidden.

Of the various types of experimental games developed by investigators, Colman (1982) has argued that "The PDG (is) especially attractive because in the paradox it poses, many real world situations are simulated ... . Individual rationality is self-defeating in the PDG; what is required is some principle of collective rationality... ." (Colman, 1982, p. 119). The question then becomes one of determining what factors will promote and what factors will impair the exercise of this collective rationality.

Of the thousand or more studies employing the PDG paradigm which have been reported in the literature, the great majority have involved two individuals playing a multi-trial, as opposed to, a "one shot" game. Players are usually instructed to maximize their own gain but the remuneration they receive can be maximized or minimized depending upon the particular pattern of cooperative and competitive choices which emerges over the course of the game.

A number of factors have been identified which seem to influence the pattern of cooperative and competitive choices seen in the PDG. One subset of these relates to the amount and nature of information available to players and their ability to exploit this information as they take their decisions to cooperate or defect from trial to trial. Dawes (1980) has argued that people suffer from an inherent processing limitation which substantially reduces the amount of information they are able to extract in a social interaction. In-appropriate responses presumably develop to the extent that people fail to take account of information potentially available in such a setting. In the PDG context, players theoretically have access to information from a variety of sources including the instructions they receive from experimenters regarding the goals they should set for themselves in the game, the structure of the payoff matrix (intact or decomposed), knowledge derived from indirect or direct communication with opponents, and the actual behaviour of opponents as a basis for inferring motives. Each of these will be considered briefly in

turn.

Several investigators have shown that the instructions provided to players regarding the goals they should pursue in the game can have a significant impact on the pattern of cooperative and competitive choices which emerges. As McClintock (1972) has noted, the "rational" choice of players instructed to maximize their individual returns with no particular regard for the welfare of the other player(s) is never entirely clear since the effectiveness of cooperative or competitive choices is critically dependent upon the actions of the other player(s). In contrast, players instructed to maximize the payoffs to all players should obviously choose to cooperate, while competition (defection) is the rational choice for players instructed to maximize their own returns by minimizing the returns of opponents.

The way in which the payoff matrix is structured has also been shown to have a significant effect on performance in the PDG. Decomposed matrices, while logically equivalent to the intact matrix in terms of the information they convey regarding payoffs and penalties, nevertheless seem to differ in terms of the amount and nature of the information players are actually capable of extracting from them (see Evans and Crumbaugh, 1966; Pruitt, 1967; Pruitt, 1970; Tognoli, 1975). The major factor at work here seems to be the extent to which a given player perceives that his outcome is dependent upon the actions of the opponent. Cooperative behaviour is more likely if the good will of the opponent is seen to be a critical factor in one's own welfare.

An obvious source of information for PDG players lies in the opportunity to communicate with opponents. Nevertheless, in many PDG settings, players have been deliberately prevented from communicating with one another, leading Nemeth (1972) and others to observe that this may be a major reason why competitive choices have tended to predominate in many PDG scenarios. Of course, communication between players may take place in a variety of ways, direct or indirect, in real time, or on a post hoc basis, although the accuracy of

the information acquired in these different ways is likely to vary to a substantial degree. Bixenstine, Levitt and Wilson (1966), Jerdee and Rosen (1974) and Fox and Guyer (1978) have all demonstrated that cooperative behaviour is more likely when choices (cooperative or competitive) are publicly disclosed so that each player knows what decisions opponents have taken on preceding trials. This is an indirect form of communication in the sense that players must discover after the fact what opponents have done and then try to make inferences about the motives of the opponent on the basis of this kind of post hoc information.

Communication in the sense of allowing some sort of real-time interaction between players during the course of the game has also been demonstrated to enhance the prospects for cooperation. Deutsch (1958) found that players instructed to maximize their personal gains with no particular concern (altruistic or competitive) for the welfare of the other player showed an increased tendency to cooperate when the opportunity to communicate with their opponents was provided. Wichman (1972) varied the extent to which players were isolated from one another in a multi-play PDG paradigm in which personal gain was stressed. Results indicated that the opportunity for players to see and hear one another was most likely to lead to cooperative behaviour while the highest level of competitive behaviour was observed under conditions where players were completely isolated from one another.

In seeking to explain why the tendency to cooperate increases when opportunities for communication between PDG players are provided. Dawes, McTavish and Shaklee (1977) argued that face-to-face communication by individuals involved in a social dilemma enhances the prospects for cooperation by allowing players to get to know one another, to work through the aspects of the dilemma together, and to make a case for reciprocity in terms of a commitment to adopt a cooperative stance. With such basic information in hand, players may be able to develop effective strategies which will carry them successfully

through the game. Indeed, the finding by Crumbaugh and Evans (1967) that a tit-for-tat strategy (I'll cooperate if and only if you cooperate) is more likely to elicit cooperative behaviour can probably be traced to the fact that players are able, either directly or indirectly, to communicate to one another the implications of their choices for the opponent. In short, the more information players can tap during the course of the game, the more likely they are to behave in a rational manner which, in most cases, involves a preference for the cooperative as opposed to the competitive option.

The beliefs players hold about the motives and behaviour of opponents is also a significant factor affecting the tendency to cooperate or compete. Tyska and Grzelak (1976), Dawes, McTavish and Shaklee (1977) and Marwell and Ames (1979) have all found a positive relationship between the tendency of individuals to cooperate and their belief that opponents will also cooperate.

Kelley and Stahelski (1970a, b, c) conducted a series of studies designed to explore how players make inferences about the intentions of their opponents and how these inferences affect their own performance in the PDG. They found that players with cooperative intentions were more accurate in judging the intentions of their opponents than those whose intentions were basically competitive. Competitors, on the other hand, were inclined to misjudge the intentions of their cooperatively inclined opponents, assuming that they were also competitively minded. The result was often an assimilation of cooperatively minded opponents to a competitive stance consistent with the behaviour of their competitively minded opponents. Moreover, competitors also seemed to be unaware of their role in transforming the behaviour of their cooperatively minded opponents. These findings suggested to Kelley and Stahelski (1970c) that while competitively minded individuals may actually participate in cooperative arrangements and recognize these arrangements as cooperative, they nevertheless fail to learn much, if anything, about the true dispositions of their opponents, assuming, instead, that everyone is competitively inclined as they are.

Kelley and Stahelski (1970c) accounted for their findings in terms of a "triangle hypothesis" which suggests that cooperators are more capable of recognizing heterogeneity of motive compared to competitors who show a strong tendency to assume that everyone has a competitive orientation. Reflecting on the implications of their findings for real-world settings, Kelley and Stahelski suggested that there are two stable personality types existing in the world who interact in such an automatic or ritualistic fashion that effective communication between them is difficult, if not impossible. Each is thus immune to the attempts of the other to change his dispositions or world view. While other investigators such as Miller and Holmes (1975) and Wimberley (1976) have corroborated the triangle hypothesis in the PDG context, its relevance to other social dilemma situations remains uncertain.

Still other factors have been found to play a role in determining the pattern of cooperative and competitive choices in the PDG. Evidence suggests that to the extent that the payoffs for joint cooperation exceed those derived from competitive choices, players are more inclined to cooperate. However, as Oskamp and Kleinke (1970) have noted, the effects of manipulating incentives for cooperative and/or competitive behaviour are not uniform, suggesting that other factors may exert a more powerful influence in modulating the tendencies to cooperate and compete. What has been demonstrated, however, is that when monetary incentives are substantial, players can become very seriously involved with the game to the extent that emotional trauma may develop between the participants (Bonacich, 1972, 1976; Dawes, McTavish and Shaklee, 1977).

Apart from such basic considerations as the structure of the payoff matrix and instructions given to players which are inherent in the game, itself, Dawes (1980) has identified such extra-game "utilities" as altruism, dictates of conscience and social norms as significant factors in encouraging cooperative behaviour. Messick and McClintock (1968), Messick (1969) and McClintock, Messick, Kuhleman, and Campos (1973) have all pointed to altruism as a potentially

significant factor in inducing cooperative behaviour, although others tend to view altruism in a rather more cynical light as a basically selfish strategy ultimately designed to maximize the returns to individuals practicing it.

In his discussion of social predicaments such as the "commons dilemma", Hardin (1968) dismissed "appeals to conscience" as a significant factor in inducing cooperative behaviour. Nevertheless, as Dawes (1980) has argued, "appeals to conscience" cannot be dismissed out of hand simply because they are difficult to quantify in an experimental setting or are secondary to other factors affecting the tendency to cooperate.

All societies exhibit patterns of social norms designed to encourage socially acceptable patterns of behaviour. Social norms can thus play a significant role in encouraging cooperative attitudes and behaviour if cooperation is an established value of that society. Although social norms may often exert their influence on behaviour in terms of negative consequences to be incurred by those who violate them, the incentive to conform is not invariably negative, especially if the value in question is widely accepted within the community. To the extent, therefore, that cooperation is an established value of the society to which players belong, one is likely to detect a bias in favour of cooperative choices in PDG scenarios, all other factors being equal.

Greed and fear are two motives for competition or defection which spring from a perceived injustice or unfairness in a social dilemma situation. It seems that once an injustice has been perceived to occur, defection can be rationalized as a matter of course. Yamagishi and Sato (1986) have provided an experimental demonstration of the efficacy of these motives in inducing competitive behaviour in Japanese subjects by manipulating the extent to which bonus points were dependent upon the actions of other individuals. Yamagishi and Sato (1986, cited by Baron, 1988) were also able to claim a degree of "ecological validity" for their findings by demonstrating that their laboratory results regarding fear and greed as motives for defection correlated quite well with attitudes their

subjects revealed concerning real world social issues.

It has also been suggested that there are sex differences in terms of the tendency to cooperate or defect in a PDG context although the experimental findings in this regard continue to be equivocal. Rapoport and Chammah (1965) reported an apparent tendency for women to cooperate more than men in the PDG. This observation was subsequently confirmed by Hottes and Kahn (1974) and Mack (1975) although Kanouse and Wiest (1967) had earlier failed to find any differences between the sexes in this regard. Interestingly, sex differences, if they do exist, seem to disappear in n-Person PDG scenarios, suggesting that sex differences may be far less potent than other factors in affecting the tendency to cooperate or compete in the PDG (see Caldwell, 1976; Goehring & Kahan, 1976; Dawes, McTavish, and Shaklee, 1977, in a commons dilemma situation).

The final factor to be considered here is the number of players involved in a game. As the two-person PDG paradigm began to give way to the n-person PDG in the 1970's in an attempt to more accurately simulate real-world social dilemmas, a number of investigators reported that the tendency to cooperate declined as the number of players increased (Rapoport, Chammah, Dwyer, and Gyr, 1962; Bixenstine, Levitt and Wilson, 1966; Marwell and Schmidt, 1972; Hamburger, Guyer, and Fox, 1975; Hamburger, 1977). Several overlapping accounts have been offered to explain this phenomenon. It has been suggested that the tendency to cooperate decreases as the number of players increases simply because the probability also increases that competitively minded individuals are more likely to be included among the players. Alternatively, it has been argued that as the number of players increase, the opportunity to exert direct control over the actions of others also decreases so that reciprocal cooperative arrangements between individuals are much more difficult to establish and sustain. The most compelling account to date has been the "deindividuation hypothesis" of Hamburger, Huyer, and Fox (1975) which suggests that the

tendency for individuals to assume responsibility for their actions declines as anonymity becomes a more viable prospect. As the number of players increases, the possibility of attributing outcomes to the attitudes or behaviour of specific individuals declines so that competitive choices can be taken more or less with impunity.

It is clear, therefore, that many factors conspire, singly or in combination, to affect people's tendencies to cooperate or compete (defect) in the Prisoner's Dilemma Game. Notwithstanding the complexity of this phenomenon, it continues to be important to study under laboratory conditions the factors that promote cooperative and competitive behaviour simply because the implications for a future understanding of the dynamics governing human behaviour in real-world social dilemma situations are so profound. As Kelley and Stahelski (1970c) have argued, the goals players set for themselves in simplified laboratory simulations such as the PDG are likely to be based on orientations which govern their real-world social relationships. In a further extension of their findings in the laboratory context, Kelley and Stahelski pointed to the possibility that processes similar to those embodied in their "triangle hypothesis" may be at work at the level of relationships between cultures and nation states where the decision to cooperate or compete is of crucial importance to regional or even world peace.

Rationale for the Present Study

Most, although not all, studies using the PDG paradigm have been conducted in an American cultural context. In a world in which bilateral and multilateral political and economic contacts between individuals or representatives of different nationalities or cultures are becoming increasingly common, it is important to extend the use of experimental games to cross-cultural or international contexts in an effort to discover whether the factors which appear to promote cooperative or competitive behaviour in an intracultural American setting are

also operative in social dilemmas with an intercultural dimension. Just as Kelley and Stahelski (1970c) have differentiated between the basically cooperative and basically competitive person on an individual level, so the anthropologist Margaret Mead (1937) has demonstrated that it is possible to categorize cultures in terms of their tendency to be cooperative, competitive or individualistic (see Bethelehem, 1982). The major purpose of the present descriptive study, therefore, was to develop a laboratory paradigm which would begin to incorporate some of the essential elements of a mixed motive social dilemma in an intercultural setting. Accordingly, a modified version of the two-person PDG was devised in which two teams of three subjects each engaged one another over fifteen trials of a PDG for a modest monetary return, the actual value of which depended on the pattern of cooperative and competitive choices which developed over the course of the game. For each of the ten renditions of the game reported here, two new teams consisting of female Japanese nationals were formed. One team designated "Japanese" consisted of three individuals who had little or no prior experience in a non-Japanese culture while the other team consisted of individuals who had been exposed to another culture as a result of having lived abroad for a number of years. The use of teams, as opposed to individual players, was rationalized as being more representative of the way in which nation states typically engage one another in bilateral negotiations. Moreover, the use of teams made it possible to observe any differences that might appear between the cooperative or competitive choices of individual players and the teams to which they belonged.

Apart from an intuitive feeling that Returnee teams might be more competitively inclined than their Japanese counterparts, no formal hypotheses were entertained in this study. By using a semantic differential procedure to assess various aspects of the behaviour, motives, attitudes and personalities of individual players and the teams to which they belonged, the hope was to set the stage for future experimental studies by identifying factors which potentially

predispose individuals and their teams to cooperative or competitive choices in an intercultural version of the Prisoner's Dilemma Game.

METHOD

Subjects.—Subjects serving in this experiment were 60 female volunteers from the undergraduate student population of International Christian University (ICU), Mitaka, Tokyo, Japan. Half of the subjects were Japanese nationals with little or no experience abroad (designated as "Japanese"). The other half were classified as "Returnees" who were also Japanese nationals currently resident in Japan but who had lived outside their home country for a minimum of three years. Subjects ranged in age from 18 to 22 years and none reported any prior experience in a Prisoner's Dilemma Game. Each subject received a modest monetary return for her participation in this study in an amount proportional to the accumulated winnings of her team in the game.

Apparatus.—The experiment was conducted in two separate rooms of an experimental suite equipped with audio-visual monitoring resources. These rooms were visually and acoustically separated from one another by a control room housing the audio-visual monitoring and recording equipment. The control room was fitted with one-way viewing mirrors which permitted the experimenters to monitor activity in each of the adjacent rooms.

File folders supplied to each subject contained a copy of the payoff matrix as well as individual record sheets to enable each participant to record her own choice to cooperate or defect (compete) on each trial of the game as well the choice of her own team and that of the opposing team for each trial. Two "flash cards" bearing the letters "A" and "B", respectively, were supplied to each team to enable. By presenting one or the other of these cards at a signal from the experimenters, teams were able to simultaneously announce their decision to cooperate or compete on each trial.

Each team was also provided with a three-minute sand glass to help them gauge the passage of time during the decision-making stage preceding each of the three blocks of trials comprising the game. Copies of a questionnaire and a semantic differential scale (see Table 2) were also prepared and these were distributed to each subject for completion at the end of the PDG proper.

Table 2. Semantic differential scale to assess behavioural, attitudinal, emotional and personality variables related to the tendency to cooperate or defect in the Prisoner's Dilemma Game

Semantic Differential Scale

Focusing first on *your own team* and then on the opposing team, please respond to each of these dimensions by circling the number that best represents your assessment of the entire experience.

1	cooperative	1------2------3------4------5	Competitive
2	harmonious	1------2------3------4------5	discordant
3	open	1------2------3------4------5	closed
4	positive	1------2------3------4------5	negative
5	peaceful	1------2------3------4------5	aggressive
6	friendly	1------2------3------4------5	unfriendly
7	generous	1------2------3------4------5	selfish
8	strong	1------2------3------4------5	weak
9	flexible	1------2------3------4------5	inflexible
10	clever	1------2------3------4------5	inept
11	genuine	1------2------3------4------5	deceitful
12	satisfied	1------2------3------4------5	dissatisfied
13	active	1------2------3------4------5	passive
14	consistent	1------2------3------4------5	inconsistent
15	calm	1------2------3------4------5	agitated
16	decisive	1------2------3------4------5	indecisive
17	direct	1------2------3------4------5	indirect
18	effective	1------2------3------4------5	ineffectivce
19	fair	1------2------3------4------5	unfair
20	rational	1------2------3------4------5	irrational
21	pleasant	1------2------3------4------5	unpleasant

Procedure.—For each of the ten sessions reported here, two teams were formed consisting of three Japanese (Team 1) and three Returnees (Team 2), respectively. As each subject served only once during the course of the experi-

ment, six new subjects were required for each rendition of the game.

Upon arriving at the laboratory for a scheduled session, each subject was provided with a name card and allowed to engage in casual conversation with the experimenters and/or fellow subjects while awaiting the formal start of the session. Once all six subjects had assembled for a given session, the two teams were formally established and the following instructions were delivered orally to the group as a whole.

"You are asked to participate as a member of a three-person team (or triad) in a decision-making simulation exercise known as the PRISONER'S DILEMMA GAME. In this game, your team (designated #1 or #2) will play against an opposing team also consisting of three individuals. The game will run for 15 trials and the payoff matrix for each trial is defined as follows (see Table 3):

Table 3. Payoff Matrix for Modified Prisoner's Dilemma Game

		Team 2	
		A	B
Team 1	A	¥100 (1); ¥100 (2)	¥50 (1); ¥200 (2)
	B	¥200 (1); ¥ 50 (2)	¥50 (1); ¥ 50 (2)

This matrix may be interpreted in the following way. If Team 1 chooses A (cooperation) and Team 2 also chooses A (cooperation) on a given trial, each team will receive ¥100. If Team 1 chooses A (cooperation) on a given trial and Team 2 chooses B (competition or defection), then Team 1 will receive ¥50 and Team 2 will receive ¥200. If Team 1 chooses B on a given trial and Team 2 chooses A, then Team 1 will receive ¥200 while Team 2 receives ¥50. Finally, if Team 1 chooses B on a given trial while Team 2 also chooses B, then both teams will receive ¥50. The earnings of each team will accumulate over the 15 trials of the game and will be equally divided among the members of that team at the end of the session.

Each of you should play this game in a way which will lead to maximum personal earnings over the 15 trials. The game will be played in three consecutive blocks of five (5) trials each. Each block of 5 trials will be preceded by a period not exceeding 10 minutes during which the teams will meet in separate rooms where each team member may first make individual choices for the upcoming block of 5 trials followed by a team decision for each of the trials comprising that block. Proceedings during these decision-making periods will be videotaped for later analysis.

Following the decision making period for the first block of 5 trials, the two teams will face each other across a table and at a verbal signal given by the experimenter, the decision of each team for Trial 1 of Block 1 will be presented simultaneously using a flash card placed on the table between the two teams. The experimenter will announce the decision and earnings of each team for that trial (according to the payoff matrix) and each of you are asked to record this information on your data sheet.

Following a brief interval during which each team may change their initial decision for the upcoming trial if they wish, team decisions for the second trial are presented simultaneously and announced by the experimenter along with the cumulative earnings of each team. Following the fifth trial of Block 1, teams will return to their assigned rooms to prepare for the second block of five trials and, finally, the third block of five trials. Please be advised that each of these decision-making sessions will also be videotaped for later analysis.

You are also advised that your team will suffer a penalty of 50% of accumulated earnings in a given trial block should the same decision (A or B) be taken for five consecutive trials. Teams are thus encouraged to modify their strategy within a trial block to accommodate this constraint.

As teams face one another while playing the game in blocks of five trials, free communication between members of the opposing teams may take place

but communication about decisions (A or B) should be avoided. Free discussion within teams may, of course, take place but care should be taken not to reveal upcoming decisions (A or B) to members of the opposing team.

Upon completing the 15th trial, you will be asked to complete a questionnarire and a semantic differential scale dealing with various aspects of your experience during the game. You are asked to complete the semantic differential scale twice, focusing first on your own team and then on the opposing team. Following this, the accumulated earnings of each team will be distributed equally among the members of that team."

Following these instructions, any points requiring further clarification were addressed by the experimenters. When it was clear that all participants understood what was expected of them, the teams retired to their respective rooms to take their decisions for the first block of five trials. These same procedures were in effect without exception for all ten renditions of the game.

RESULTS AND DISCUSSION

The findings reported here are largely descriptive in nature and represent the product of a preliminary and partial analysis of the data provided to date by subjects. A more detailed analysis awaits a larger data base currently in the process of being established.

Beginning with the outcomes of the ten renditions of the game in terms of monetary return to each team by the end of the fifteenth trial, it was found by this criterion that three games were won by Japanese teams, three by Returnee teams with the remaining four games ending in a draw.

Figure 1 shows the frequency of cooperative choice for Japanese and Returnee teams over the 15 trials of the game. This figure suggests that the Returnee teams were more inclined to be cooperative over the course of the game but both Japanese and Returnee teams showed a steadily increasing

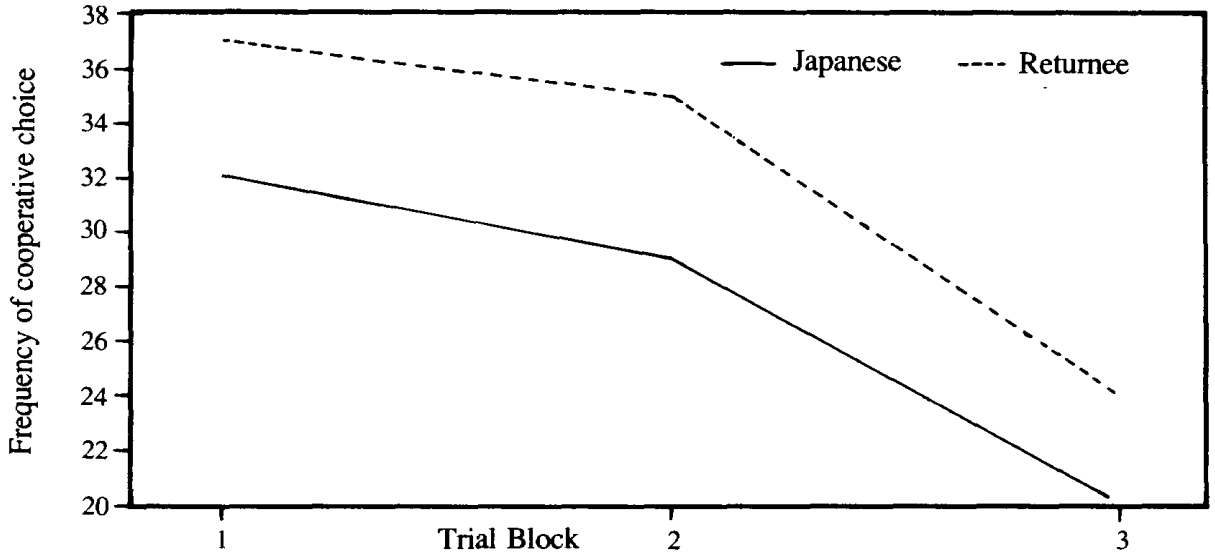

Fig. 1. Frequency of cooperative choice by Japanese and Returnee Teams over 3 blocks of 5 trials each

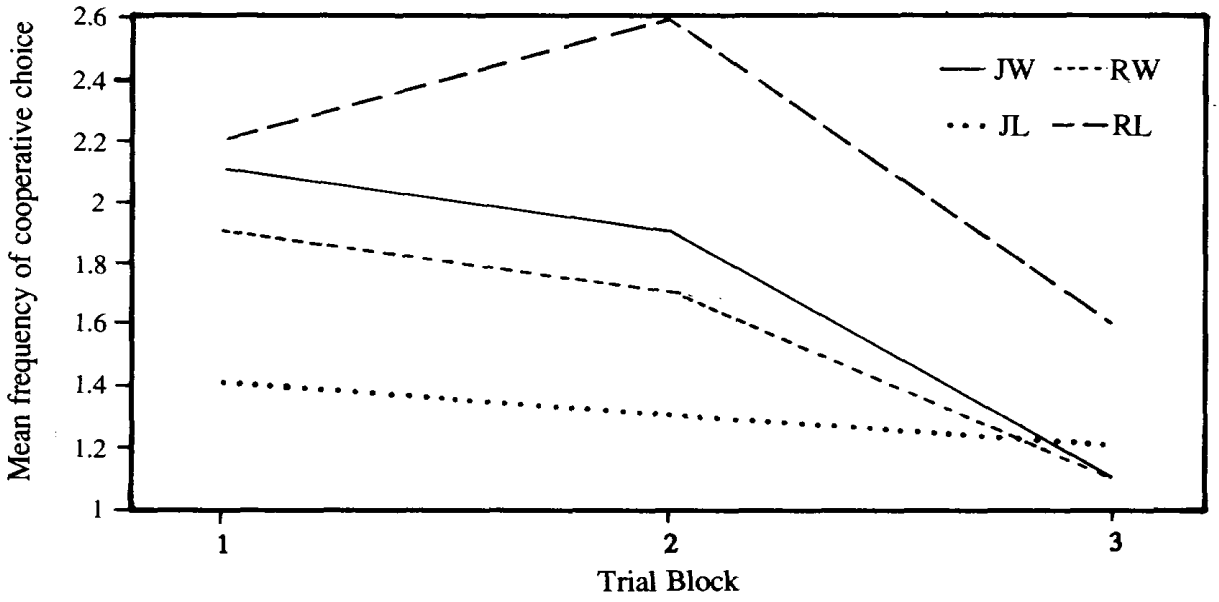

Fig. 2. Mean frequency of individual cooperative choice over 3 trial blocks by members of the Japanese Winning (JW), Returnee Winning (RW), Japanese Losing (JL) and Returnee Losing (RL) teams, respectively.

tendency to become more competitive as they proceeded through the 15 trials of the game.

Figure 2 presents the mean frequency of cooperative choice by individuals during the decision-making period preceding each of the three blocks of five

trials. It can be seen that the most cooperatively minded individuals were those belonging to the three Returnee teams which lost their games in terms of the amount of money earned. It can be seen that the tendency to be cooperative increased to a maximum level by the end of the 10th trial, following which there was a fairly precipitous decline in the tendency to make cooperative choices during the last five trials of the game. The most competitively inclined individuals, in contrast, were members of the Japanese losing teams who were highly competitive from the very beginning of the game and who became even slightly more competitive as the game progressed despite their losing position. Intermediate levels of cooperation were seen in members of the Japanese winning and Returnees winning teams although both became more competitive over the course of the game, even exceeding by a slight margin the competitive level of members of the Japanese losing teams by the end of the 15th trial.

Overall, then, with respect to individual, as opposed to team, choices, an excessive tendency to cooperate on the part of Returnees or an excessive tendency to compete on the part of Japanese were associated with reduced monetary returns for their teams while individuals showing intermediate levels of cooperation belonged to the winning teams, Japanese and Returnee alike. Nevertheless, the overall tendency was for individuals and their teams to become increasingly competitive over the course of the game although individual preferences for competitive choices during the latter part of the game seemed to be tempered to some degree by the negotiations leading to the actual choices made by each team over the course of the game. In short, these preliminary findings suggest that in terms of overall individual and team preferences, the Returnees were more cooperatively minded than their Japanese opponents.

Semantic Differential Scale

To follow up on these preliminary observations, the semantic differential data for subjects' evaluations of their own and opposing teams were subjected

Table 4. Factor Loading Matrix, Communality and Percentage of Variance for Four Factors

	Items	Factor 1 Efficiency	Factor 2 Altruism	Factor 3 Accommodation	Factor 4 Concision	Com-munality
8	Strong-Weak	.54	−.45	.29	.27	.65
10	Clever-Input	.75	−.15	.24	.10	.64
12	Satisfied-Dissatisfied	.64	.05	.45	.12	.63
14	Consistent-Inconsistent	.61	.04	−.07	.19	.42
15	Calm-Agitated	.75	.20	−.20	.07	.65
18	Effective-Ineffective	.77	−.18	.19	.29	.75
20	Rational-Irrational	.77	.06	.06	.25	.66
1	Cooperative-Competitive	−.09	.64	.35	−.23	.60
5	Peaceful-Aggressive	−.02	.76	.25	−.28	.71
6	Friendly-Unfriendly	.03	.71	.42	.05	.69
7	Generous-Selfish	−.04	.65	.37	−.34	.68
11	Genuine-Deceitful	−.04	.78	−.07	.04	.62
19	Fair-Unfair	.26	.54	.16	.30	.48
2	Harmonious-Discordant	.09	.29	.63	.13	.50
3	Open-Closed	−.00	.31	.63	.34	.60
9	Flexible-Inflexible	.14	.10	.69	−.05	.51
21	Pleasant-Unpleasant	−.00	.40	.52	.45	.63
4	Positive-Negative	.24	−.26	.24	.65	.61
13	Active-Passive	.35	−.21	.24	.57	.55
16	Decisive-Indecisive	.36	.17	−.08	.56	.48
17	Direct-Indirect	.29	−.14	.03	.74	.66
	Percentage of Variance	26.7	21.3	7.2	5.4	

to factor analysis, the results of which are shown in Table 4 in the form of a factor loading matrix together with communalities and percentage of variance accounted for by each of the four factors which were labelled Efficiency (Factor 1), Altruism (Factor 2), Accommodation (Factor 3) and Assertiveness (Factor 4).

As Table 4 indicates, the factors accounting fo the largest proportions of the variance in the data were Factor 1 (Efficiency) with 26.7% and Factor 2 (Altruism) with 21.3% with Factors 3 (Accommodation) and 4 (Assertiveness) accounting for 7.2% and 5.4%, respectively. It may also be noted that the

correlations between scale items and the factors with which they are identified all exceed the .5 level.

To consider a subset of these findings in greater detail, the semantic differential data provided by members of Japanese and Returnee winning and losing teams concerning the opposing team and their own team are presented in pictorial form in Figures 3 through 6. The data points in each of these figures represent the average semantic differential score for each of the items loaded under the four factors identified above.

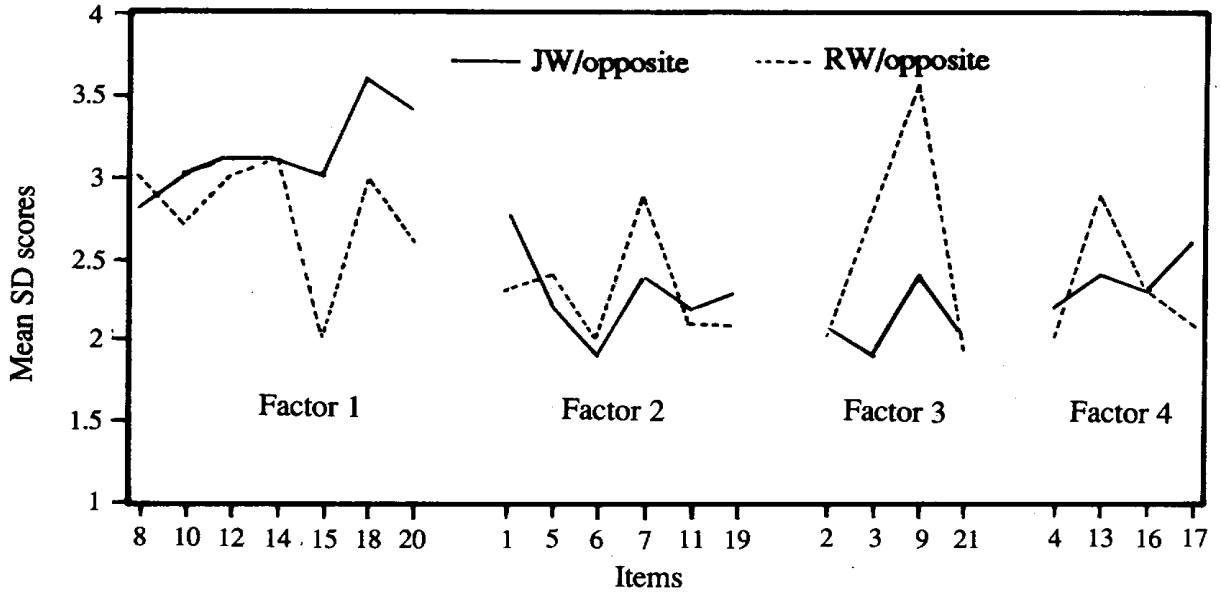

Fig. 3. Mean semantic differential scores for assessment of opposing team by members of Japanese Winning (JW) and Returnee Winning (RW) teams

Assessments by Members of Japanese and Returnee Winning Teams of Their Opponents

Turning first to Figure 3, which represents the assessments of the opposing team by members of the Japanese and Returnee winning teams, the data suggest with respect to Factor 1 (Efficiency) that members of the Japanese winning teams viewed the opposing Returnee teams to be less efficient in playing the game while members of the Returnee winning teams viewed their Japanese opponents to be somewhat more efficient overall. The greatest differ-

ences between the Japanese and Returnees were observed for items 15 (calm-agitated), 18 (effective-ineffective) and 20 (rational-irrational). Members of Japanese winning teams viewed their Returnee opponents to be more agitated while members of Returnee winning teams found their Japanese opponents to be more calm. Likewise, Japanese viewed Returnees to be less effective as game players while Returnees judged Japanese to be somewhat more effective in this regard. Nevertheless, both assessments were biased somewhat more toward the ineffective than the effective end of this scale. Fianlly, Japanese winners judged their Returnee opponents to be more irrational than rational in their game playing behaviour while Returnees judged their Japanese opponents to be midway between the extremes of rationality and irrationality on this cale.

Turning to Factor 2 (Altruism) in Figure 3, it appears that from an overall perspective, members of Japanese winning teams found their opponents to be slightly more altruistic in their conduct while members of Returnee winning teams found their Japanese opponents to be somewhat less altruistic although the differences between these two assessments seems to be minimal. The greatest differences were found for items 1 (cooperative-competitive) and 7 (generous-selfish). It is, perhaps, of some interest to note that while members of Japanese winning teams judged their Returnee opponents to be somewhat more competitive than cooperative, they also found their opponents to be somewhat more generous than selfish. The reverse held true for Returnee evaluations of their Japanese opponents on these two items.

Regarding Factor 3 (Accommodation) in Figure 3, the differences in the asessments of opponents by members of Japanese and Returnee winning teams were quite substantial for Item 3 (open-closed) and Item 9 (flexible-inflexible). It is clear that the Japanese judged their Returnee opponents to be reasonably open in playing the game while the Returnees, in contrast, found their Japanese opponents to be more closed. Likewise, while the Japanese judged their Returnee opponents to be reasonably flexible in their conduct, the Returnees found the

Japanese to be rather more inflexible in the way they played the game. No differences between Japanese and Returnees emerged with respect to Items 2 (harmonious-discordant) and 21 (pleasant-unpleasant), both finding their opponents to be somewhat more harmonious and pleasant than discordant and unpleasant.

Finally, with regard to Factor 4 (Concision), differences between Japanese and Returnees emerged on three of the four items under this factor. Both Japanese and Returnees judged their opponents to be somewhat more positive than negative (Item 4) with the Returnees being somewhat more charitable in their assessments than were the Japanese. For Item 13 (active-passive), Japanese judged Returnees to be somewhat more active than passive while Returnees found Japanese to be somewhat more passive than active. No difference was found between Japanese and Returnees for Item 16 (decisive-indecisive), but for Item 17 (direct-indirect), the Japanese judged the Returnees to be roughly at the midpoint of this scale while the Returnees found the Japanese to be somewhat more direct than indirect in their actions.

Assessments by Members of Japanese and Returnee Winning Teams of Their Own Team

Figure 4 presents the average SD score for each item under each of the four factors for evaluations by members of Japanese and Returnee winning teams of their own team.

With respect to Factor 1 (efficiency), the data suggest that, overall, members of the Japanese winning teams viewed their own team to be reasonably efficient in the way they played the game while members of the Returnee winning teams judged themselves to be somewhat less efficient in their performance. As can be seen, clear differences between Japanese and Returnees emerged for all seven items loaded under this factor. To be more specific, Japanese judged themselves to be stronger (Item 8), more clever (Item 10), more satisfied (Item 12), more consistent (Item 14), calmer (Item 15), more effective (Item 18), and

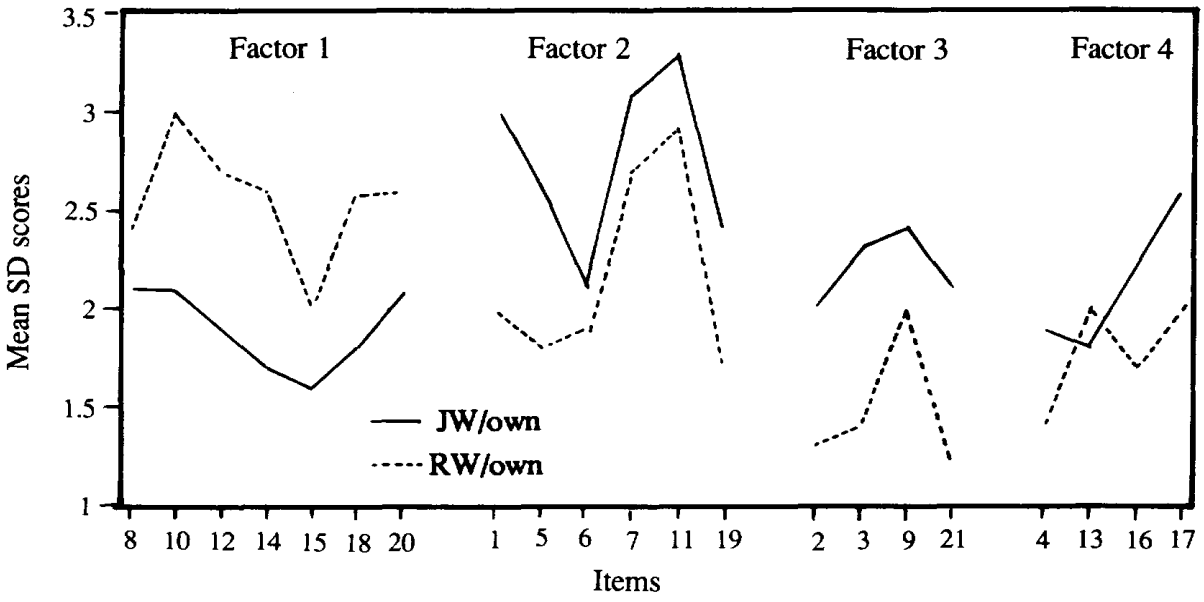

Fig. 4. Mean semantic differential scores for assessment of their own team by members of Japanese Winning (JW) and Returnee Winning (RW) teams

more rational Item 20) while the evaluations by members of Returnee winning teams of their own performance were displaced somewhat more to the negative end of the scale for each of these items. These findings suggest, therefore, that members of Japanese winning teams held themselves in somewhat higher esteem in terms of their efficiency of play than did their Returnee winning counterparts.

Regarding Factor 2 (altruism) in Figure 4, it appears that members of Japanese and Returnee winning teams differed somewhat in their evaluation of the altruistic tendencies of their own teams. The data indicate that, overall, Japanese found themselves to be somewhat less altruistically inclined while the Returnees perceived themselves as behaving in a somewhat more altruistic manner. The greatest differences between Japanese and Returnees were for items 1 (cooperative-competitive), 5 (peaceful-aggressive), 7 (generous-selfish), 11 (genuine-deceitful) and 19 (fair-unfair). The overall impression here is that members of Returnee winning teams perceived themselves to be somewhat more considerate of their Japanese opponents while the members of Japanese winning teams were somewhat more inclined to give first priority to their own welfare.

Looking at Factor 3 (Accommodation) in Figure 4, it is apparent that while members of both Japanese and Returnee winning teams judged themselves to be somewhat more harmonious (Item 2), open (Item 3), flexible (Item 9) and pleasant (Item 21) than discordant, closed, inflexible or unpleasant, members of Returnee winning teams perceived themselves to be considerably more accommodating to the demands of the situation than did members of Japanese winning teams.

Turning finally to Factor 4 (concision) in Figure 4, the overall tendency seems to be that while members of both Japanese and Returnee winning teams perceived themselves to be reasonably concise or explicit in their conduct, Returnees judged themselves to be somewhat more concise than did their Japanese counterparts. The only exception to this trend is for Item 13 (active-passive) where the Japanese found themselves to be somewhat more active than the Returnees judged themselves to be. It may be noted in passing that the greatest differences between Japanese and Returnees were observed for Items 4 (positive-negative), 16 (decisive-indecisive) and 17 (direct-indirect).

Assessments by Members of Japanese and Returnee Losing Teams of Their Opponents

Figure 5 presents the average SD score for each item under each of the four factors for evaluation of the opposing team by members of the Japanese and Returnee losing teams.

With respect to Factor 1 (Efficiency), the overall indication is the not unexpected finding that members of both the Japanese and Returnee losing teams found their winning opponents to be more efficient than inefficient in their conduct of the game. It appears, however, that members of the Returnee losing teams found their winning Japanese opponents to be more efficient than members of Japanese losing teams perceived their winning Returnee opponents to be. This difference is particularly clear with respect to Items 18 (effective-

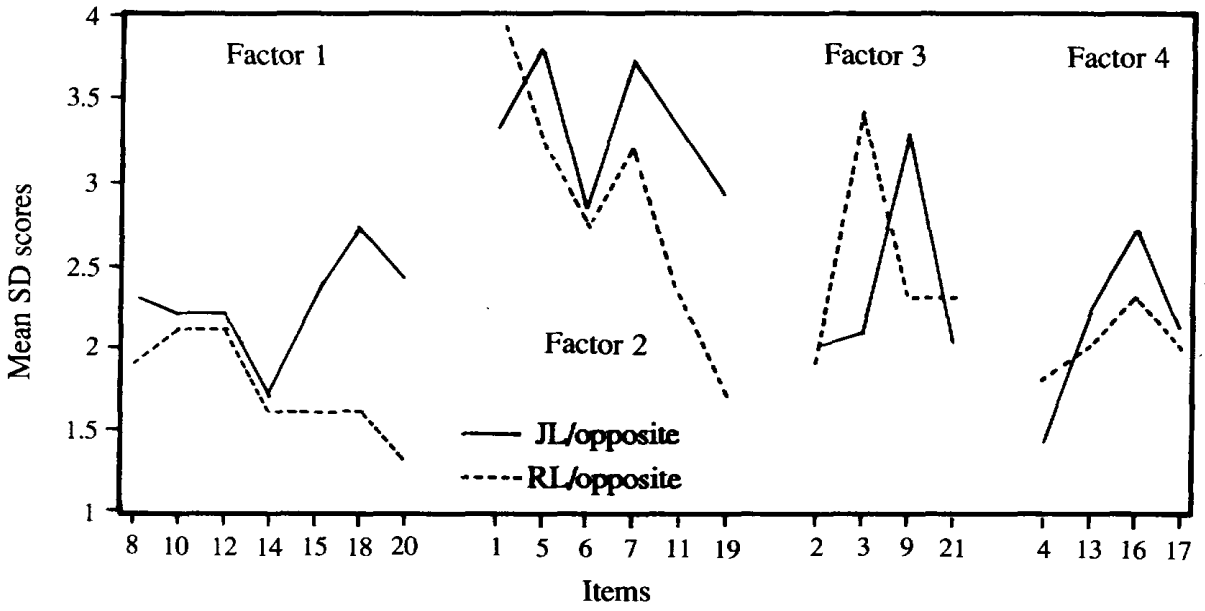

Fig. 5. Mean semantic differential scores for assessment of opposing team by members of Japanese Losing (JL) and Returnee Losing (RL) teams

ineffective) and 20 (rational-irrational) with the losing Returnees finding their winning Japanese opponents to be much more effective and rational in their conduct of the game than losing Japanese found their winning Returnee opponents to be.

Turning to Factor 2 (Altruism) in Figure 5, the overall impression is that members of both Japanese and Returnee losing teams did not find altruism to be a major feature of the play of their opponents. Members of Japanese losing teams were more negative about their opponents in this respect than were the Returnees. Apart from Item 1 (cooperative-competitive) on which the Japanese judged their winning opponents to be somewhat less competitive compared to the Returnees' judgments of their opponents, the most substantial differences between Japanese and Returnees were found for Items 7 (generous-selfish), 11 (genuine-deceitful), and 19 (fair-unfair). Item 19 is particularly interesting with respect to the Returnees for although their overall tendency was to find their Japanese winning opponents to be somewhat less than altruistic in their conduct, they did judge them to be reasonably fair in their actions.

The findings for Factor 3 (Accommodation) in Figure 5 are somewhat ambivalent with scores crisscrossing the median values of the scales for the

four items loaded under this factor. As no overall trend is apparent, each of the items is discussed in turn. With respect to Item 2 (harmonious-discordant), there was little difference between members of Japanese and Returnee losing teams in the assessments of their opponents. Both found their opponents to be somewhat more harmonious than discordant in their conduct. For Item 3 (open-closed), members of Returnee losing teams found their Japanese opponents to be much more closed in their conduct while members of Japanese losing teams found their Returnee opponents to be relatively more open. For Item 9 (flexible-inflexible), we find another inversion with members of Japanese losing teams finding their Returnee opponents to be rather inflexible compared to members of Returnee losing teams who found their Japanese opponents to be moderately flexible in their conduct. Finally, it can be seen for Item 21 (pleasant-unpleasant) that members of both Japanese and Returnee losing teams found their opponents to be moderately pleasant in their conduct with the Japanese being somewhat more charitable in their assessment than their Returnee counterparts.

Looking finally at Factor 4 (Concision) in Figure 5, the overall tendency for members of both Japanese and Returnee losing teams was to judge the conduct of their opponents to be moderately concise in nature. With respect to Item 4 (positive-negative), members of Japanese losing teams found their Returnee winning opponents to be strongly positive in nature while members of Returnee losing teams rendered a similar, although somewhat less strong, assessment of their Japanese opponents. The other item of interest here is decisive-indecisive (Item 16) where members of Japanese losing teams found their Returnee winning opponents to be slightly indecisive while members of Returnee losing teams found their Japanese opponents to be moderately decisive in their conduct.

Assessments by Members of Japanese and Returnee Losing Teams of Their Own Team

Figure 6 presents the average SD score for each item under each of the four factors for evaluation of their own team by members of the Japanese and Returnee losing teams.

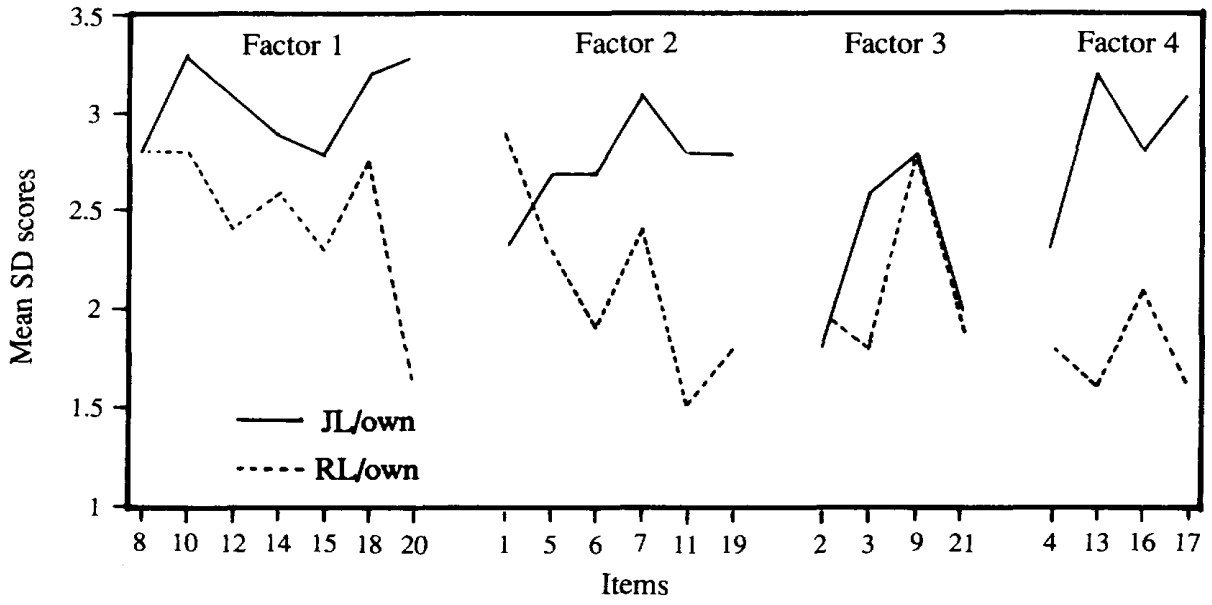

Fig. 6. Mean semantic differential scores for assessment of their own team by members of Japanese Losing (JL) and Returnee Losing (RL) teams

Turning first to Factor 1 (Efficiency) in Figure 6, the overall impression is that members of both Japanese and Returnee losing teams judge themselves to be relatively inefficient in their conduct of the game. This is especially true for the members of Japanese losing teams who were highly critical of themselves in this regard. Members of Returnee losing teams were somewhat less inclined to view their performance as inefficient compared to their Japanese counterparts although the overall tendency was still biased more toward inefficiency than efficiency. The only major exception to this trend was for Item 20 (rational-irrational). While members of Japanese losing teams judged their conduct to be relatively irrational in nature, members of Returnee losing teams perceived their conduct to be quite strongly rational in nature.

With regard to Factor 2 (Altruism) in Figure 6, major differences are once again seen between the assessments offered by members of Japanese and Returnee losing teams of the performance of their own teams. By and large, members of Japanese losing teams found their own conduct to be less altruistic in nature while members of Returnee losing teams perceived themselves to be rather more altruistic in their conduct. Differences are particularly striking with respect to Items 6 (friendly-unfriendly), 7 (generous-selfish), 11 (genuine-deceitful), and 19 (fair-unfair).

For Factor 3 (Accommodation) in Figure 6, it can be seen that the assessments of their own team by members of Japanese and Returnee losing teams are more or less similar. Generally speaking, it appears that individuals of both groups perceived themselves to be moderately accommodating to the demands of the situation. The major difference between members of the Japanese and Returnee losing teams came with respect to Item 3 (Open-Closed) with the Returnees once again judging the conduct of their own team to be more open while the Japanese judged the performance of their team to be relatively more closed.

Turning finally to Factor 4 (Concision) in Figure 6, major differences between members of Japanese and Returnee teams are once again apparent. Members of Japanese losing teams found their performance to lack concision in contrast to members of Returnee losing teams who perceived the performance of their own team to be reasonably concise. Looking briefly at individual items, it is clear that while Japanese judged themselves to be relatively positive (Item 4) in their conduct, Returnees perceived themselves to be considerably more positive in their approach to the game. For Item 13 (active-passive), the Japanese judged themselves to be relatively passive while the Returnees perceived themselves to be relatively more active. Members of Japanese losing teams perceived the conduct of their team to be relatively more indecisive (Item 16) in contrast to members of Returnee losing teams who assessed the performance

of their own team as rather more decisive. Finally, with respect to Item 17 (direct-indirect), members of Japanese losing teams found the conduct of their own team to be relatively indirect in nature while members of Returnee losing teams perceived the actions of their own team as being relatively direct.

SUMMARY AND CONCLUSIONS

The primary purpose of the present descriptive study was to begin to develop a laboratory based procedure which would incorporate some of the essential elements of a mixed motive social dilemma in an intercultural setting. The results of the present study suggest that the modified version of the two person PDG utilized here holds some promise as a technique for exploring the various dynamics which govern patterns of cooperative and competitive choices when individuals or teams of individuals of differing cultural backgrounds meet in a situation in which conflicting motives and/or goals are an inherent part of the context. The use of players organized in teams also seems to be informative in the sense that this arrangement provides a closer simulation of the way in which representatives of different cultural or national groupings often engage one another in bilateral negotiations. Moreover, it offers an opportunity for the study of collective decision making since individual desires must, in the end, become subordinate to the overall inclination of the teams. Although the results of the present study must be recognized as tentative at best, since requisite control procedures were lacking, the following basic trends are sufficiently informative that a series of followup studies are warranted.

First, the choices made by individuals and their teams gradually shift away from the cooperative toward the competitive option as subjects continue to play the game over a number of trials. While this tendency in the present study was, by no means, as pronounced as the defect-defect (competitive-competitive) lock-in effect reported by Flood (1958) and Rapoport and Chammah

(1965) in PDGs consisting of hundreds of trials, it is clear that even in a 15 trial game, the increasing tendency to compete minimizes the joint returns of the two teams. The reasons for this phenomenon in the present study are unclear but may relate to a number of factors including the lack of direct communication between members of the opposing teams and the requirement in the present game that teams make periodic shifts in strategy as strings of five consecutive cooperative or competitive choices were discouraged. Moreover, the relatively small number of trials in this game may have biased individuals and teams against the cooperative option as the initial losses by cooperatively minded teams to their competitively minded opponents could not be recouped in the relatively few trials available, especially if the opposing team persisted in its competitive stance. This observation is reminiscent of the observation by Kelley and Stahelski (1970c) that cooperatively minded players tend to become behaviourally assimilated towards the competitive stance of their opponents.

The second observation of interest was that Japanese teams seemed to be more competitively inclined than their Returnee counterparts although differences between individual and team choices make a clear interpretation of this observation very difficult at this stage. In terms of established stereotypes at least, this finding seems counterintuitive as it might have been expected that Returnees would be more competitively inclined than their Japanese counterparts.

The semantic differential technique yielded a number of interesting findings in terms of how the members of Japanese and Returnee winning and losing teams assess the conduct of the opposing team and their own team. In a general sense, the findings seem to mirror many real or perceived differences which conventional wisdom suggests may exist between Japanese and non-Japanese cultures although the absence of baseline data for pure Japanese and pure Returnee teams makes it impossible at this point in time to ascribe the observed differences to cultural factors.

Briefly, Japanese winners saw Returnee losers as less efficient while

Returnee winners saw Japanese losers as more efficient. Japanese winners saw Returnee losers to be more altruistically inclined while Returnee winners judged Japanese losers to be less altruistic in nature. Japanese winners found Returnee losers to be more accommodating (open, flexible) while Returnee winners perceived Japanese losers to be less accommodating (more closed and inflexible). Finally, Japanese and Returnee winners rendered similar judgments of the degree of concision with which their losing opponents played the game.

Japanese and Returnee winners also offered somewhat different assessments of their own teams. Japanese winners judged themselves to be more efficient, less altruistically inclined, less accommodating and reasonably concise while Returnee winners assessed themselves as being somewhat less efficient, more altruistically inclined, more accommodating, and reasonably concise, although less concise than Japanese winners considered themselves to be.

Members of Japanese losing teams assessed Returnee winners as being somewhat more efficient and moderately concise with altruism not playing a major role in motivating the behaviour of their opponents. Members of Returnee losing teams assessed Japanese winners to be reasonably efficient and moderately concise in their conduct of the game with altruism, once again, not perceived as a major factor motivating the behaviour of their opponents.

Finally, in their evaluation of their own team, Japanese losers were more negative than their Returnee counterparts, judging themselves to be relatively inefficient, les altruistic, only moderately accommodating, and lacking in concision. Members of Returnee losing teams also judged their play to be inefficient but less so than the assessment of their own team's performance offered by their Japanese counterparts. Returnee losers also perceived themselves to be more altruistic and accommodating in their conduct and, in contrast to their Japanese counterparts, judged their own performance to be reasonably concise.

Overall, the results seem to suggest that Japanese losers were more negative about themselves than Returnee losers and certainly more negative about

themselves than Japanese winners. Returnee losers, in contrast, offered negative evaluations of themselves in terms of efficiency of performance while simultaneously rating themselves quite highly in terms of altruism and accommodation. These findings may suggest that Japanese were more inclined to attribute their failure to internal factors (their performance in a technical sense was inferior in some way) while Returnees placed a somewhat greater emphass on external factors (lack of altruistic and accommodating tendencies on the part of their Japanese opponents) in explaining their lack of success.

In conclusion, the findings reported in this study provide a rationale for studies of a more experimental nature in the future. To attribute the differences observed in this study between Japanese and Returnees to cultural factors, it will first be necessary to establish baseline data by arranging for teams of "pure" Japanese to confront other teams of "pure" Japanese and teams of "pure" Returnees to confront other teams of "pure" Returnees within the constraints of this modified PDG format.

The PDG format presented here might also be further modified to good effect by substantially increasing the number of trials beyond the current upper limit of 15 and by eliminating the restriction forcing teams to change their choice to avoid penalties associated with consecutive strings of cooperative and competitive choices.

In the longer term, the various factors already demonstrated in the American context to affect the probability of cooperative and competitive choices should be subjected to experimental test within the constraints of this modified PDG paradigm. In a world in which intercultural dialogue on matters of mutual concern is becoming an increasingly common aspect of daily life, it is more essential than ever to continue to seek to identify the factors which encourage cooperative attitudes and behaviour which, in the long run, are most likely to most effectively serve the collective welfare. The present study offers a possible experimental vehicle that may enhance future efforts in this direction.

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