

INGROUP BIAS: THE EFFECT OF STATUS,  
LEGITIMACY AND COOPERATION ON INTERGROUP RELATIONS.

G. Finchilescu, B.Sc.(Hons)

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ABSTRACT

Research on the effect of intergroup cooperation on intergroup relations has produced contradictory results. The functionalist proposition that cooperation leads to the reduction of intergroup discrimination has not been widely supported by empirical evidence. An emerging trend indicates that cooperation reduces bias only in circumstances where the distinction between ingroup and outgroup can be rendered less salient.

The cognitive-motivational theory of intergroup relations (Tajfel and Turner, 1979) provides a framework through which intergroup bias and the salience of group distinctiveness may be understood as a function of the group's position on a status hierarchy and the perceived legitimacy of that status order. This study considered the effect of intergroup cooperation, compared with no cooperation and with intragroup cooperation, within this framework.

A 3x2x2 factorial design was employed to investigate the interactive effects of Cooperation (no cooperation, intragroup cooperation and intergroup cooperation); Status (high and low); and Legitimacy (legitimate and illegitimate). 126 undergraduate psychology students were randomly assigned to the various conditions of the study. The procedure closely paralleled the standard methodology of the 'minimal group paradigm': two groups were created within the laboratory situation, one of which was endowed with high status, the other with low. The Subjects were cognizant of their own group membership but not of the other Subjects. Prior to completing the matrix booklet, the instrument measuring ingroup bias, Subjects performed a computer-controlled

maze task which they either did alone, or in cooperation with an unseen member of the ingroup or outgroup, in an endeavour to win money. The matrix task required Subjects to distribute money between anonymous members of the ingroup and outgroup. The proportional distribution between these was the measure of bias. A Prisoner's Dilemma Game was also completed as a means of determining the Subjects' preference for the competitive versus cooperative strategy.

The results failed to reveal an effect due to cooperation, and did not support the general predictions of the cognitive-motivational theory. This was attributed to the presence of an extraneous variable - subjective identification with the assigned group. Subsequent analysis of this factor in conjunction with the variable, status, mirrored previous findings of the effect of marginal identity on intergroup discrimination (Breakwell, 1978, 1979).

The findings are discussed in terms of the problems of variable manipulation within the laboratory, and with reference to the short-comings of Tajfel's theory. It is concluded that further replications are required to elaborate the effect of cooperation on intergroup relations. The need for a closer alliance between theory and research is emphasized.

## 1. INTRODUCTION

### 1.1. Ethnocentrism and ingroup bias

English and English (1958) define ethnocentrism as:

1. The tendency to exalt the superiority of the group (esp. the national or ethnic group) to which one belongs and to judge outsiders, often contemptuously, by the standards of one's own group.
2. A hypothesized syndrome of underlying attitudes that involve the following: division of the social world into in-groups with which one identifies and to which one submits, and out-groups to which one is hostile; positive stereotypy of the former and negative stereotypy of the latter; and the arrangement of the in-groups and out-groups into an evaluative hierarchy in which the former are always dominant and the latter always subordinate.

(English and English, 1958: 189)

Nationalism, sexism, racism, prejudice and stereotypy are thus instances of this general syndrome, in which the over-riding feature is a favourable bias towards the ingroup and discrimination against the outgroup. This discrimination may manifest in behaviour, attitudes, evaluations and frequently in the allocation of resources within a society. Cross-cultural research on ethnocentrism has shown that irrespective of the groups in question, and their historical and proximal relations, perceptions of the outgroup are remarkably similar. The outgroup is inevitably viewed as morally inferior in comparison with the ingroup, with attributions such as pride, loyalty, honesty, trustworthiness, cleanliness being applied to the ingroup and egotism, dishonesty, slyness, aggressiveness, immorality and uncleanness to the outgroup (Campbell, 1967; Brewer, 1979b; Sunar, 1978). But this pattern of positive bias towards the ingroup is not inevitable. Negative ethnocentrism, where the positive bias is towards the outgroup and negative toward the

ingroup, frequently occurs in dominated or minority groups (Fanon, 1970; Bloom, 1971; Milner, 1973; Vaughan, 1978b). Essentially, negative ethnocentrism involves the 'inferior' group's acceptance and introjection of the denigrating stereotypes placed on them by the 'superior' group.

Ingroup bias is the laboratory equivalent of ethnocentrism (Tajfel and Turner, 1979). A number of other terms - intergroup bias, intergroup discrimination, ingroup favouritism - are used interchangeably with ingroup bias. All describe the tendency to favour the group to which one belongs, which is almost inevitably accompanied by discrimination against the group to which one does not belong. Understanding this behaviour is one of the primary aims of a social psychology of intergroup relations.

## 1.2. Social psychology and ingroup bias

There is a conspicuous lack of attention paid to intergroup relations, including ingroup bias and ethnocentrism, in most texts of traditional social psychology. When considered, prejudice and stereotypy are characteristically explained in terms of intra-psychic factors or as an instance of inter-individual perception and attitudes. The focus of analysis is invariably the person who is prejudiced and rarely the victim of this prejudice (Harrison, 1974). This failure to take into account the social, intergroup nature of prejudice is indicative of the lack of social context in traditional social psychology (Tajfel, 1972; Resler and Walton, 1974; Steiner, 1974).

Boutilier et al (1980) distinguish between the two streams of social psychology: psychological social psychology and

sociological social psychology, both of which are in a 'state of crisis'. Psychological social psychology - typified by a positivistic approach in the American tradition - concentrates on intra-group interindividual behaviour and generally employs a tight experimental methodology. This social psychology has been criticized on a number of counts. Firstly, the emphasis on methodological exactitude has led to detailed and technically sophisticated investigations of sterile and often insignificant phenomena (Billig, 1977). Aside from the current scepticism about the validity of psychological experiments (Orne, 1970; Boutilier et al, 1980), this approach lacks theoretical direction (Tajfel, 1972; Taylor and Brown, 1979). Thus the 'mini-theories' that have emerged tend to be generalizations of experimental findings rather than theories per se. Secondly, psychological social psychology tends to ignore the social context within which behaviour occurs. This social context does not merely provide the backdrop against which behaviour takes place, but is strongly instrumental in eliciting and shaping social behaviour (Tajfel, 1972 ; Resler and Walton, 1974 ; Steiner, 1974 ; Billig, 1976). Moscovici (1972) has further criticized traditional social psychology as reflecting only the American reality. Speaking of European social psychologists vis-à-vis the work of Americans, he reports:

As we read them and try to understand and assimilate the principles that guide them we must often conclude that they are strangers to us, that our experience does not tally with theirs, that our views of man, of reality and of history are different.

(Moscovici, 1972: 18)

This criticism that psychology reflects the cultural bias of the practitioner and, in fact, promotes and maintains the status quo, has become a theme of increasing concern (Innes and Fraser, 1971; Sampson, 1977, 1978; Ingleby, 1974, 1981).

Sociological social psychology, or the 'new social psychology', as termed by Billig (1977) is constituted by three approaches : ethnomethodology, symbolic interactionism and ethogeny. These approaches are basically anti-positivistic, rejecting a mechanistic model of man in favour of a more dynamic one. Their main concern is with the processes of social interaction; how people create, maintain and understand social reality with particular reference to such things as language, symbolism, norms and social rules. While sociological social psychology has moved away from the narrow focus and rigid methodology of traditional social psychology, a number of criticisms may still be levelled at this alternative. The three approaches constitute a different philosophical orientation and research disposition, but have not presented any theories of social behaviour (Billig, 1977; Boutilier et al, 1980). Further, it is doubtful whether they can lead to an understanding of intergroup relations or social change, as they focus on the minutiae of social behaviour, often disregarding the broader social context. Taking the topic of fascism as a case in point, Billig (1977) illustrates how the research orientations of each of the approaches would fail to "foster a discipline which is capable of combining empirical inquiry to social critique" (pp 429).

Billig (1977) suggested that an alternative, more productive approach to intergroup relations is presented by 'action - research'. Deriving from Lewin (1946), this orientation seeks to understand the various forms of social behaviour with a view to stimulating social action. While not anti-positivistic, the methodology of action-research is far broader than mainstream social psychology. But its primary advantage is its commitment to relevant social research with a focus on intergroup rather than

interpersonal phenomena.

Theories of intergroup behaviour have emerged from both the psychological social psychology and action-research traditions. The 'new social psychology' has not (as yet) given rise to such a theory. These theories may be dichotomized according to whether they employ interindividual or intergroup modes of explanation.

### 1.3. Inter-individual theories

These theories confine themselves to two levels of analysis: either focusing on individualistic intra-psychic processes; on individual, face-to-face interactive processes; or most commonly on a combination of both. But no attention is given to large scale social or group processes. Purely intra-psychic modes of explanation posit innate factors or instincts as the basis of intergroup discrimination, eg. aggressive instincts (Lorenz, 1966) or territorial instincts (Ardrey, 1966). These theories have not achieved wide acceptance in social psychology. The majority of the theories which deal with prejudice and ethnocentrism tend to hypothesize both intra-psychic and interpersonal variables, the intra-psychic variables deriving (often tenuously) from Freudian concepts. A number of these are briefly outlined below.

#### 1.3.1. Frustration - aggression hypothesis

Dollard et al (1939) first proposed the frustration - aggression hypothesis in an attempt to link certain Freudian concepts with learning theory principles (Billig, 1976). The basic premise of this theory is: when an action or desire is blocked, ie. frustrated, the energy which motivates the behaviour does not

simply dissipate but remains as a form of arousal. This frustration instigates aggression. If the aggression cannot be directed against the cause of the frustration it is displaced onto another object or person. The aggressive act, whether directed at the 'proper' target (the frustrator) or at the 'improper' target (the scapegoat) results in a catharsis, dissipating the accumulated energy. This basic formulation, frustration aggression - displacement, has been modified to acknowledge the role of certain mediating external cues. The need for this arose from the demonstration by social learning theorists that aggression is a learned response which is selectively reinforced through childhood by the various socializing agents (Bandura et al, 1963; Bandura and Walters, 1963). Experimental research on the frustration - aggression hypothesis has failed to produce any consistent trends. A major reason for this is the frequent inability of the research design to distinguish between generalized hostility and displaced aggression.

The frustration - aggression hypothesis has been extrapolated to intergroup relations by postulating that outgroups are the objects for hostility displacement. There is some support for this, eg. Hovland and Sears (1940) found there was a strong negative correlation between the annual per-acre value of cotton (cause of frustration) and the number of Negro lynchings (displaced aggression) in Southern U.S.A. between 1882 and 1930 (cited in Ashmore, 1970). However, while the hypothesis may be used to explain instances of hostility when prejudice already exists, it cannot explain how these prejudices develop nor predict when hostility will occur. Dollard et al (1939) suggested that the hostility which arises from frustrations within the ingroup must necessarily be displaced onto the outgroup if the social order is

to be maintained (Billig, 1976). This postulation that outgroup hostility leads to ingroup cohesion is not fully supported by research. Evidence from a number of studies on group cohesion suggest that ingroup cohesion in itself leads to outgroup discrimination (Dion, 1973, 1979; Louche and Magnier, 1978). Thus, while the frustration - aggression hypothesis may be useful in understanding certain aspects of intergroup relations, eg. Gurr (1970) and Berkowitz (1972) proposed that it constitutes the motivational link between relative deprivation and social revolution (Billig, 1976), it fails to provide an adequate explanation of all intergroup discrimination.

### 1.3.2. The authoritarian personality

The authoritarian personality hypothesis also derives its basic premise from Freudian concepts. Broadly speaking, Adorno et al (1950) proposed that prejudice is entrenched in the individual's character structure. The authoritarian - personality explanation of prejudice rests on three basic hypothesis:

... intergroup attitudes (1) are part of a broader ideological framework and are thus correlated with other political, social, and economic beliefs (as well as with one another), and (2) this correlation exists because all beliefs and attitudes are caused by more basic personality factors .... (3) ... the personality sources of prejudice are shaped by the quality of parent control used during the formative period of personality organization. The ultimate major cause of prejudice, therefore, is the practices parents use to control their children.

(Ashmore, 1970: 272-273)

The authoritarian person is typically someone who idealises her/his parents, while subconsciously holding hostile feelings toward them. This pattern is paralleled in her/his attitudes to all authority figures. The authoritarian is thus excessively concerned with rank and status, being highly deferential to

superiors while venting his/her aggressiveness on inferiors, especially outgroups considered inferior. Characteristically, the authoritarian individual is conforming, rule bound, intolerant of ambiguity and unable to handle ambivalent emotions, especially within interpersonal relations.

Adorno et al (1950) developed a number of scales which measured different aspects conventionalism, authoritarianism and prejudice. One of these, the F scale, has since come into use as a instrument to measure prejudice and ethnocentrism. Research on the link between childrearing practices and prejudice has produced contradictory findings. A number of studies have found that children raised in a rigid, strict manner tend to be highly prejudiced (Ashmore, 1970). However, it has been argued that even if this were consistent, there would be no way of discerning whether the childrearing practices caused the prejudice or whether the prejudicial, authoritarian attitudes were learnt directly from the parents (Pushkin and Veness, 1974). Similarly, since conformity is an attribute of the authoritarian personality, it may be questioned whether prejudice is caused by the personality structure or simply a norm to which s/he conforms (Sanford, 1974).

In conclusion, it is important to note that while Adorno et al (1950) saw personality as a causal factor in intergroup discrimination, they did not negate the importance of social and ideological influences (Billig, 1977).

### 1.3.3. Belief similarity and congruence

Rokeach et al (1960) proposed a theory of intergroup discrimination based on perceived belief similarity or

dissimilarity. According to this theory, it is not the fact that outgroup is of a different race or ethnicity to the ingroup that leads to prejudice, but it is rather the assumption that the members of the outgroup hold different beliefs and are not 'like' the ingroup. Members of the ingroup are assumed to hold similar beliefs. This hypothesis has been confirmed by numerous studies (Ashmore, 1970; Taylor and Guimond, 1978). However, these studies have been criticized on a number of methodological issues. Ashmore (1970) pointed out that in many of the studies comparing the influence of race with belief, it was questionable whether the race and belief manipulations were given equal emphasis. The finding that belief similarity was more important than race may then be attributable to demand effects. The kind of evaluation of prejudice also affects the relative importance of race and belief. Boyanowsky and Allen (1973) found that highly-prejudiced subjects who discriminate against blacks in social behavioural circumstances do not necessarily do so in non-behavioural situations, such as on pencil-and-paper measures.

Aside from the methodological controversy, there remains the question whether this theory could feasibly be extrapolated to large social contexts.

.. it would be bordering on the absurd to suggest, to take a more important example, that the hostility between blacks and whites in southern Africa today is caused principally by a perception of belief dissimilarity.

(Taylor and Brown, 1979: 176)

There are a number of other inter-individualistic explanations of ingroup bias. The main criticism of these theories along with those discussed above, is the fallacy of proposing a linear extrapolation from individual to group situations (Tajfel, 1972, 1979; Sherif and Sherif, 1979). Contrarily, Taylor and Brown

(1979) argued that many of these theories would have considerable validity for intergroup relations if they were integrated with the social context. This argument was rejected by Tajfel (1979a) who illustrated the implausibility of this, and reiterated that what is needed is not patchwork adjustments of these ideas, but a completely different theoretical orientation.

#### 1.4. Intergroup theories

Intergroup theories focus on the group as their unit of analysis, where the group is perceived as more than a collectivity of individuals. Tajfel (1979a) notes that to understand social behaviour:

we must know (i) something about the ways 'groups' are constructed in a particular social system, (ii) what are the psychological effects of these construction; and (iii) how the constructions and their effects depend upon, and relate to, forms of reality.

(Tajfel, 1979a: 185)

This does not imply that the individual is ignored, it simply acknowledges that there are processes which derive from the group context which do not exist between individuals. The manner in which these manifest within individuals as members of a group is implicitly the primary subject matter of a social psychology of intergroup behaviour.

Two theorists who have proposed explanations using the group level of analysis, are Muzafer Sherif - realistic group conflict theory and Henri Tajfel - cognitive - motivational theory. Tajfel's theory constitutes the framework of this study so will be considered in some detail in the next chapter. Before outlining Sherif's theory, a brief examination of how the two theorists conceptualize a 'group' is expedient.

Sherif (1966) defines a group as a structural social unit in which the members have definite role and status relations, and have a set of norms and values which regulate their attitudes and behaviours. Yet earlier in the same book he says:

Speaking generally, the mere awareness of other groups within the range of our designs generates a process of comparison between "us" and the others .... In this comparison process, we evaluate and categorize other groupings of people, comparing them with our notions of ourselves, our conceptions of our place in life and the places of others.

(Sherif, 1966: 3)

Thus, Sherif implicitly accepts the existence of groups without the structural relationships specified earlier. Tajfel's (1978) definition of a group carries no requirements for structure of any sort. He sees a group as a collection of people who perceive themselves, or are perceived by others as belonging to the same social category. Along with this categorization process there is the connotation that members:

... share some emotional involvement in this common definition of themselves, and achieve some degree of social consensus about the evaluation of their group and of their membership of it.

(Tajfel and Turner, 1979: 40)

From the above two quotes it can be seen that the two theorists share a basic conceptualization of a group as fundamentally a linguistic category, whose members share evaluation and perceptions of their category vis-à-vis others. The more stringent definition of Sherif (1966) fits certain circumscribed face-to-face groups, but is difficult to apply to large scale social groups such as nations or races. Thus, it may be argued that the two theories are essentially comparable.

1.4.1. Sherif: realistic group conflict theory

The realistic group conflict theory hypothesizes that intergroup behaviour is determined by the functional relationship the groups bear to each other (Sherif, 1966, 1979). If groups are in competition for some scarce resource or goal, hostile relations will evolve. Ingroup favouritism and outgroup discrimination, with their numerous outlets - over-evaluation of ingroup products, negative attitudes to the outgroup, increased group cohesion - are thus seen as the result of intergroup competition. If, on the other hand, the groups are cooperating to attain some superordinate goal there will be little intergroup discrimination and relations between the groups will be friendly.

The basic evidence on which this theory is built comes from a series of experiments, termed the Robbers' Cave Experiment, performed with pre-adolescent boys at a holiday camp. In its entirety this experiment entailed four stages. During the first stage the boys were left to develop natural friendships. After a few days the experimenters divided the boys into two groups, deliberately cutting across these friendships. These groups were then physically separated - they ate, slept and had activities apart. In the third stage the groups were brought together in competitive circumstances - competitions and tournaments were held. During this stage the various indicators of intergroup discrimination and hostility became apparent. Then at the fourth stage a superordinate goal was introduced - the groups had to cooperate in an operation to rescue a broken-down food truck. Consequent to this it was observed that the previous intergroup hostility decreased and gradually friendships across the groups were formed. Doise (1978) describes a number of studies that

support, to various degrees, Sherif's formulation: Blake and Mouton (1962) working with adults on an executive training course, found ingroup bias in the evaluation of group products when the groups were placed in a competitive relation. Bass and Dunteman (1963) also found intergroup discrimination when groups were in competition, but which lessened when an opposing group became a cooperative one. Diab (1970) replicated the Robber's Cave Experiment with Lebanese Moslem and Christian children. This study found a slight tendency for the created groups to exhibit ingroup bias, which supported Sherif's findings, but this tendency was not statistically significant. The failure to reach significance was attributed to the influence of religious membership which intersected with the created groups.

However, a number of studies fail to verify Sherif's theory. Rabbie and Wilkens (1971) did not find stronger ingroup bias in competing groups compared with non-competing groups; and Brewer and Silver (1978) and Doise et al (1972) found no difference in the bias of competing and cooperating groups. It may be significant that these studies employed laboratory groups which did not have a social structure. However, Hendriques (1977) reports a 'naturally' occurring intergroup situation which fails to support Sherif's hypothesis that a superordinate goal reduces hostility. Discussing the Rhodesian War of Independence, he details how the conflict between the two guerilla organizations, ZANU and ZAPU continued unabated throughout the war despite their shared goal - the overthrow of the white regime. This goal clearly fulfilled the definition given by Sherif:

Superordinate goals are defined as goals that encompass all parties caught in dispute or conflict (eg, mutual survival), which cannot be fulfilled by the resources and energies of the parties separately, but require the concerted efforts of all parties involved.

(Sherif, 1979: 258)

Yet, the intergroup hostility remained despite its debilitating effect on the war effort. Furthermore, the numerous experiments of Tajfel (discussed in the next chapter) indicate that categorizing people into groups is sufficient to elicit intergroup discrimination. This questions whether the competitive relationship between the groups is the causative factor. Billig (1976) pointed out that Sherif has neglected to consider the role of the experimenters in the Robbers' Cave Experiment. They constitute a third group who institutionalize the competitive or cooperative situations. So the paradox is raised: does the functional relations between the groups lead to intergroup discrimination, or has already existent intergroup behaviours been channeled into a pattern determined by this third group.

The realistic group conflict theory presents an explanation of intergroup behaviour which is neither reductionistic nor indifferent to the social context. However, it is unable to account for certain intergroup variables, eg. the effect of status; or the occurrence of negative ethnocentrism. Sherif (1966) discusses these in an ad hoc manner, but does not place them within a theoretical interpretation. These limitations, plus the growing evidence throwing doubt onto the role of functional relations in determining intergroup behaviour, has resulted in the realistic conflict theory receiving less attention than the cognitive-motivational theory.

## 2. TAJFEL: COGNITIVE-MOTIVATIONAL THEORY

Tajfel's cognitive-motivational theory of intergroup relations attempts to move away from intra-psychic explanations of social behaviour towards an account based in the social context. The essential distinction of this mode of explanation is that social behaviour is conceived as more than the agglomeration of a number of individualistic behaviours. In reply to the criticism by Taylor and Brown (1979) that his theory does not differ fundamentally from the more traditional approaches since his explanations still rest on individual behaviour, Tajfel stated that the substantive innovation in his theory is not that individuals are disregarded, but that the central processes considered "cannot be conceived to originate outside of their social context" (Tajfel, 1979a: 185).

### 2.1. Intergroup Relations

Intergroup relations are a dynamic process, not a static condition. Tajfel (1975, 1978, 1981) describes a continuum of behaviour, ranging from the purely interindividual to the purely intergroup. On the interindividual side, people are perceived and interacted with in terms of their personal characteristics. People are seen as individuals, diverse in personality, attributes and motivation. On the intergroup pole, people are encountered as members of a group or category, typically perceived as an homogeneous whole, having similar attributes and motivations. Tajfel (1978) is careful to point out that occurrences of behaviour on either extreme are very rare. This is certainly the case on the interindividual side, since this would mean that an interaction must be completely devoid of influence from such

things as gender, race, class or nationality. As these all infuse a person's manner and appearance, such a situation is improbable. The only instance of purely intergroup behaviour offered is that which may occur in a highly technical war, eg. the bombing of enemy populations using remote control (Tajfel, 1978). The 'minimal group' experiments establish a situation on the intergroup extreme.

Ingroup bias (ethnocentrism) is correlated with the position that the intergroup relations takes on this continuum; the closer to the intergroup pole they fall, the stronger the intergroup discrimination. Ingroup bias may manifest in a number of different behaviours. Some that have been considered in field situations as well as 'laboratory' experiments are:

- (i) subjective ratings - where the ingroup and/or outgroup are rated as a group per se (Doise et al, 1972; Doise and Sinclair, 1973; Skevington, 1980); or individuals from these groups are evaluated on trait scales (Tajfel et al, 1964);
- (ii) rating of the product, or quality of the process of the ingroup and/or outgroup (Turner and Brown, 1978; Hinkle and Schopler, 1979);
- (iii) behavioural measures which usually involve the distribution of resources (money, points, etc.) (Tajfel, 1970a, 1981; Dion, 1973);
- (iv) differential memory for faces, statements made or actions of the ingroup and outgroup (Eiser et al, 1979; Howard and Rothbart, 1979); and
- (v) differential inclination to help members of the ingroup and outgroup (Sole et al, 1975).

Tajfel's theory of intergroup relations rests on three basic

concepts; social categorization (representing the cognitive component), social comparison and social identity (the motivational components). In this chapter, a brief exposition of the theory will be made, with consideration of relevant empirical evidence. This account has been informed by the numerous books and papers authored by Tajfel and his associates.

## 2.2. Social Categorization

The categorization process not only enables the individual to organise his subjective experience of the social environment but also, and perhaps more importantly, constitutes a process by which social interaction is structured, differentiates among, and shapes individuals.

(Doise, 1978: 151)

The process of social categorization can be understood as a combination of the cognitive operations: category differentiation and perceptual over-estimation. Tajfel (1981) reviewed a number of findings in the realm of perceptual over-estimation, leading to the synopsis that:

in a series of stimuli where value changes concurrently with the dimension subjected to investigation, the differences between the stimuli of the series will be perceived as larger than the objectively equivalent differences between the stimuli of a neutral series, where no such association exists between value and magnitude.

(Tajfel, 1981: 77)

A typical example of this is: subjects required to estimate the size of coins (where the size is positively correlated with value) perceive the difference in size between smaller and larger coins as much greater than they do when required to judge the size of equivalently dimensioned discs (Tajfel, 1981).

The process of category differentiation acts in an analogous fashion. While categorization is a necessary function for making sense of the world, it has certain consequences:

- (a) Objects of the same category are perceived as being more similar to one another than is actually the case ; and
- (b) Objects of one category are perceived as more different and distinct from those in another category than is warranted.

These effects have been demonstrated, to occur in the judgement of attributes both of physical objects (Tajfel, 1959; Tajfel and Wilkes, 1963), and of people (Taylor et al, 1978; Doise et al, 1978).

In social categorization, the social environment - people - are differentiated into groups on the basis of criteria which have relevance to the classifier. Common criteria in Western society are sex, race, religion, class, nationality, language and age. While these are not the only criteria (eg. hair colour, temperament, body structure, rugby team allegiance are others), they are characterized by a strong emotive and evaluative component. Thus the 'value' dimension is added to the general categorization process resulting in an enhanced polarizing effect, accentuating similarities within groups and differences between groups. These operations have been elaborated as the cognitive basis of stereotyping and prejudice (Tajfel, 1963 1969a, 1974b; Lerner, 1976; Taylor et al, 1978)

The link between social categorization and ingroup bias was made quite fortuitously by Tajfel when attempting to establish a situation devoid of discrimination (Tajfel, 1978). It led to the emergence of a methodology which has proved extremely useful in the study of intergroup relations. This methodology is commonly known as the 'minimal group paradigm', though the term 'minimal intergroup situation' is gaining popularity.

### 2.2.1. The minimal group paradigm

This methodology involves the creation of an intergroup situation in the laboratory which has the following features:

1. The groups are (allegedly) created on the basis of irrelevant attributes.
2. The subjects are actually randomly assigned to these groups. This ensures there is no instrumental link between group attributes and the subsequent behaviours.
3. The subjects are informed of their own group membership but do not know to which group the other subjects belong. Thus there can be no history of intergroup hostility.
4. There is no face-to-face interaction between members of the various groups or between members of the same group.
5. The behavioural responses, generally allocation of money or points, have no direct utilitarian value to the subjects themselves.

This paradigm is best illustrated by the classic 'Klee-Kandinsky' experiment of Tajfel (1970a):

The subjects of this study were a class of Bristol schoolboys. In the first phase of the experiment the subjects were shown slides of pairs of modern art pictures. They were required to state their preference for one of each pair. The subjects were told that in each pair one painting was by the artist Klee, and the other by Kandinsky, and were given to believe that people consistently preferred one or other of the artists. Thus groups or categories were created purportedly on the basis of preference for either artist - a criterion which in this context and among these subjects was scarcely likely to have much importance. The experimenter ostentatiously pretended to score the subjects' responses prior to the next phase. In the second phase of the experiment the subjects were treated individually. Each subject was taken to a cubicle where he was told he was in the group that preferred Klee (or Kandinsky). The subject was in fact randomly assigned to this group. The subject was then given the task of distributing money between pairs of his fellow subjects, where each was identified only by a code number and group membership. Thus the subject had no way of determining who was in the ingroup or outgroup. It was made clear that the subject would never be giving money to himself. So the subject's decision was not

motivated by personal gain. The method of money allocation was the matrix booklet (similar to the one described in chapter 4).

The results indicated a strong tendency for subjects to favour people in their own group, though it was noted that this was tempered by the fairness norm. A later study (Tajfel et al, 1971) demonstrated that subjects would frequently sacrifice higher ingroup profits in favour of larger gain relative to the outgroup.

This fundamental finding, that social categorization is a sufficient condition for the arousal of intergroup bias, has been replicated in a number of studies (Billig and Tajfel, 1973; Tajfel and Billig, 1974; Billig, 1973; Brewer and Silver, 1978). This categorization effect has been shown to have as strong an influence as personal friendship commitments (Vaughan et al, 1981). An exception is the study by Rabbie and Horwitz (1969), who did not find ingroup bias in their created groups. However, it has been argued that this was due to the methodology, in that there was insufficient accentuation of the notion of 'groupness' (Tajfel et al, 1971). Tajfel's claim, that it was the social categorization per se that elicited ingroup bias in the minimal group experiments, has been contested and a number of alternative explanations postulated. These are discussed below:

#### 2.2.2. Artifactual effects of the experiment

Numerous authors have commented on the imprudence of taking responses in the psychological experiment as reflective of 'natural' behaviour. These arguments emerge both from metatheoretical criticisms (Bannister and Fransella, 1971; Heather, 1976) as well as from demonstrations of the demand characteristics of the experiment (Orne, 1970). This latter source of criticisms will be considered in this context.

One possible source of confounding error examined was the

strangeness of the experimental situation. Tajfel and Billig (1974) refuted this by demonstrating that subjects who were familiarized with the experimental environment discriminated between the ingroup and outgroup more than the unfamiliar subjects.

Another possible source of distortion is the bias introduced into the experimental situation by virtue of the experimenter's personality, behaviour, attitudes and expectations. This experimenter effect has been well documented (Rosenthal, 1968, 1970a; Innes and Fraser, 1971), though there has been little apparent attempt to control for it in current research (Suls and Gastorf, 1980).

Gerard and Hoyt (1974) suggested that the intergroup bias found in the minimal group experiments was a function of perceive demand characteristics of the methodology. This criticism has been countered in a number of ways. Billig (1973) investigated this by performing a typical minimal group experiment (cf. Billig and Tajfel, 1973) using one set of subjects, then required that set of subjects to instruct a subsequent set on the use of the matrix booklet. It was hypothesized that if the first 'generation' of subjects perceived the demand that they should make intergroup discriminations, this would be communicated to the second generation of subjects, and further should result in an increased degree of bias. Only one instance of such a communication occurred, and there was a nonsignificant tendency for the second generation to exhibit less ingroup bias.

Turner (in press) reported that postexperimental enquiries by both Billig (1972) and Turner (1975b) did not discern a perceived cue to discriminate on the part of the subjects. Turner (in press) also cites the findings of a study by St. Claire and Turner (in

preparation) that the socially desirable strategy in the intergroup situation is, in fact, fairness.

Tajfel argues that if intergroup discrimination is perceived as the 'demand' of the experiment, this in itself is a heuristic finding:

The experimenter effect cannot, by definition, be considered here without its collateral, the 'subject effect'. The former effect could have worked within our experimental procedures only through the salience for the Ss of the relevant normative background and of the expectations consequent to it.  
(Tajfel et al, 1971: 174)

### 2.2.3. Similarity

An alternative explanation for the ingroup bias, elicited in the minimal group experiments, is that subjects may have assumed that they were more similar to members of their ingroup than to members of the outgroup. A number of studies have considered similarity as a variable with or without categorization (Dion, 1973; Billig and Tajfel, 1973; Allen and Wilder, 1975; Sole et al, 1975; Brewer and Silver, 1978, Hewstone et al, 1981). The general finding was that categorization alone was sufficient to arouse ingroup bias and this was enhanced by perceived similarity. But similarity alone was not sufficient to elicit bias. The exception to this is the study of Hewstone et al (1981) who found bias in the condition where subjects thought they were similar to their colleagues but were not classified into groups. However, the subjects in this study were required to allocate penalties not rewards which may have been an influential variable.

In her review on the effect of similarity, Brewer (1979a) summarizes:

Results from all of these studies are consistent in indicating that explicit dissimilarity within the in-group reduces in-group bias but that information on similarity between the subject and out-group members makes no difference.

(Brewer, 1979a: 318)

#### 2.2.4. Competition

As discussed in the previous chapter, the functionalist approach suggests that ingroup bias results from intergroup competition for scarce resources (Sherif, 1966, 1979). Hence, a possible explanation for the bias in the minimal group experiments is that there was an implicit assumption of intergroup competition on the part of the subjects. It is important to note that competition in this section refers to 'real' competition (conflict of group interests) as opposed to social competition which is discussed later. The studies which have considered competition or anticipated competition have not, in general, indicated that competition is a sufficient condition for the arousal of ingroup bias (Rabbie and Horwitz, 1969; Doise et al, 1972; Brewer and Silver, 1978). A further contradiction has been the demonstration that intergroup bias also exists, though to a lesser degree (often insignificant) in situations of cooperation or coaction (Doise et al, 1972; Brewer and Silver, 1978; Turner, in press). An interpretation of this enhancing effect has been that competition makes group differentiation more salient (van Knippenberg, 1978; Turner, in press).

In summary, it would seem that none of the alternative explanations discussed - perceive-demand effects, similarity and 'real' competition - provide an adequate account of the minimal group experimental results.

### 2.3. Social comparison and social identity

The cognitive process of social categorization divides the social environment into 'ingroups' and 'outgroups', 'wes' and 'theys', upon which the motivational components act to determine the structure of intergroup relations. But this does not only determine people's attitude to others, it also provides a means of self-reference and self-definition:

... in any complex society an individual confronts from the beginning of his life a complex network of groupings which presents him with a network of relationships into which he must fit himself. One of the most important and durable problems that is posed to an individual by his insertion into society is to find, create and define his place in these networks.

(Tajfel, 1974a: 67)

The term, social identity, refers to those aspects of the individual's identity and self-concept which are associated with, and to a certain extent determined by her/his group memberships. Most people belong to a large number of groups - age group, sex, race, nationality, religion, peer group, etc. - but these group memberships differ in their importance and salience to the individual and hence in the degree to which they contribute to her/his social identity. This contribution may be positive or negative, which in turn is determined by the process of social comparison. The concept of social comparison derives from Festinger (1954). In his theory of social comparison, Festinger sets out a number of hypotheses, the most important of which is:

There exists in the human organism, a drive to evaluate his opinions and his abilities.

(Festinger, 1954: 117)

Festinger's theory refers primarily to comparisons between individuals of the same group, though he does concede the importance of group comparisons. Tajfel (1974a, 1975, 1978) adapts

this theory to the intergroup situation, arriving at three basic assumptions with regard to social identity:

1. Individuals strive to maintain or enhance their self-esteem: they strive for a positive self-concept.
2. Social groups or categories and the membership of them are associated with positive or negative value connotations...
3. The evaluation of one's own group is determined with reference to specific other group through social comparisons in terms of value-laden attributes and characteristics ...

(Tajfel and Turner, 1979: 40)

A prototypical sequence of events may be presented. In accordance with Festinger's (1954) hypothesis, the individual seeks to evaluate his/her group (since group membership contributes to social identity) through comparison with other group(s). If the comparison is favourable, the individual's need for a positive self-concept is gratified. However, if the comparison is not favourable, the individual must attempt to achieve positive social identity, either by leaving his/her present group and joining a more positively distinct group, or by reconstruing the present existing group as more positively distinct.

For the social comparison process to take place, certain conditions must be present. Firstly, membership of the group in question must actually contribute to the individual's social identity. Thus there must be some identification with and internalization of the membership. Secondly, the group to which the individual is compared must be considered relevant and accessible (in a psychological sense), and thirdly, the dimensions or attributes on which the comparison is made must be accepted and have importance to both groups.

The social comparison process establishes a gradation which is termed a status hierarchy (Tajfel, 1978). If the ingroup is judged to be superior to another on some relevant dimension, it has high

status; if judged inferior - low status. This status determines whether or not the group membership contribute positively to the individual's social identity, and provides positive group distinctiveness.

#### 2.4. Social status and security of social identity

The nature of intergroup behaviour, ie. to which side of the interindividual - intergroup continuum it swings, is a function of both the social context and the individual's subjective identification with the group. This identification is determined by the emotional investment in and salience of the group membership to the individual, in conjunction with the evaluation of the group's status and the consequent effect on self-concept. There is an interaction between situational determinants and subjective identification which may influence the arousal of group distinctiveness. For instance, in a social context where group membership is primary (eg. a situation of conflict), group distinctiveness may be aroused in people who previously possessed weak group identification. Similarly, strong intergroup behaviour may occur without there being any contextual emphasis on group membership in cases where subjective identity is high. Empirical studies that manipulated group salience have confirmed that greater intergroup discrimination occurs under conditions of high salience than under low (McKillip et al, 1977; Louche and Magnier, 1978; Taylor et al, 1978).

Inextricably linked with the interindividual - intergroup continuum is the social mobility - social change continuum. This latter dimension is important for understanding the consequences of the social comparison process (Tajfel, 1975, 1978, 1981). If

the outcome of a comparison confers low status on the ingroup, the individual is faced with a negative self-identity infringing on his/her need for a positive self-concept. The individual's response to this predicament will be positioned somewhere along the social mobility - social change continuum. On the social mobility pole, the response would be to attempt to leave the negatively valued group and enter a more positively distinct one. On the social change extreme, attempts will be made to change the intergroup situation that has led to the negative evaluation. The social mobility option is a purely individualistic one which leaves the intergroup situation unaltered, whereas the social change option attempts to remedy this. Thus, it is to be expected that the interindividual mode of behaviour will be associated with social mobility tendency, and the intergroup mode with the social change side.

Tajfel's discussion on the outcome of the social comparison process concentrates on the situation of groups which are evaluated as inferior. Moscovici and Paicheler (1978) suggest that there is another process of identification besides social comparison called social recognition. This process enables an understanding of positively evaluated, 'superior' groups.

The fundamental idea is that an individual or a group who are deeply involved in their opinions and certain of them, or who feel safe about their material or intellectual resources, seek the consensus of other individuals or groups. The aims of actions trying to establish this consensus are to obtain a confirmation of the singularity of one's opinions, of the entitlement of one's resources and to see them shared out with others .... In this way, a common goal is achieved: that of being identified, listened to and individualized.

(Moscovici and Paicheler, 1978: 224-5)

Moscovici and Paicheler (1978) distinguish between two forms of group distinctiveness: assertive distinctiveness and defensive distinctiveness. Assertive distinctiveness occurs when there is a

reaffirmation of the group and a rediscovery of a possible positive group identity. Defensive distinctiveness, on the other hand, occurs in situations of perceived threat or uncertainty for the group, which results in an avoidance or rejection of the outgroup in order to preserve the group's identity. Both forms of distinctiveness give rise to ingroup favouritism. Brewer (1979a), reviewing studies on intergroup bias, reports mixed findings in analysing the locus of bias, ie. whether bias stems from enhanced favouritism towards the ingroup or from increased discrimination against the outgroup. The differentiation between assertive and defensive group distinctiveness may account for the diverse opinions, since enhanced ingroup favouritism is characteristic of assertive distinctiveness and increased outgroup discrimination of defensive distinctiveness.

A number of factors determine whether a social mobility or social change response will occur. Firstly, the permeability of group boundaries is an important determinant. The social mobility option is only available where stratification between groups is not rigid and movement between groups is possible. Social mobility may be prevented by both internal and external factors. External factors are such things as authoritative legislative (eg. state laws such as those maintaining apartheid in South Africa) or religiously based edicts (eg the religious stipulations maintaining the caste system among Hindus). Internal factors are such things as emotional commitment and loyalty ties to the group. In the circumstances where group boundaries are rigid and actual social mobility is not possible, a form of 'psychological' mobility may occur. This involves the psychological dissociation of the individual from his/her group, frequently accompanied by a mental alignment with the outgroup. Secondly, the security of the

individual's social identity is a crucial determinant.

In this context, secure social identity refers to the belief that the present intergroup situation - the status hierarchy and consequent social manifestations - is stable and immutable. Insecure social identity results when cognitive alternatives to the present intergroup situation are recognized. A number of concepts have been used to circumscribe this factor, both in 'real life' situations and in laboratory studies:

1. Fluidity of relations and imminence of social change (Vaughan, 1978a, 1978b ; Skevington, 1980, 1981). In all the cited studies a natural situation was tapped. Vaughan worked in New Zealand over a number of years, where the different regions at certain times presented different forms of relations between the European and Maori groups. The rural regions studies were described as feudal in nature, with limited prospects of social change, whereas in the urban areas there was more fluidity in the relations between the groups and hence held the 'promise' of social change. Skevington used an event of current importance in the nursing profession, a parliamentary debate on whether State Registered Nurses (higher status group) and State Enlisted Nurses (lower status group) should be trained together (ie. merged). Proposals for this were presented in the Briggs Report in 1972.
2. Stability and legitimacy (Turner and Brown, 1978). In this study legitimacy was manipulated by impressing on subjects the notion that the status situation was either reasonable and fair or unreasonable and unfair. Stability was manipulated by the experimenter specifying that he either expected or did not expect the status hierarchy to be validated. This closely follows Tajfel's (1978) definition of perceived legitimacy/

illegitimacy of status differences in terms of values such as fairness, justice, equity and rightness; and of perceived stability/instability in terms of whether the status positions could be reversed or not.

3. Nomic and anomic groups (Moscovici and Paicheler, 1978). A nomic group is a group which is sure of its position and opinions and is accustomed to success. An anomic group is one which is threatened, unsure of its position and is accustomed to failure. Thus, almost by definition a nomic group is one with a secure social identity, and an anomic group one with an insecure identity. In their study, Moscovici and Paicheler (1978) manipulated this by leading their subjects to believe that they were either in the majority group or the minority group. This makes use of the implicit connotation that majority groups are the 'in' group, while minority groups are the outsiders :

... when one speaks of "minorities", one is not referring to their number (sometimes minorities are, from the demographic point of view, as important as the majority) - one is referring to the inequality of the distribution of power, to the logic of domination.

(Moscovici, 1976: 19)

Tajfel does not claim that the social categorization and comparison processes alone are sufficient to explain the relations between existing social groups. He accepts that various sociological, economic and historical considerations are necessary for such an understanding (Tajfel, 1978). Billig (1976), however argues that cognisance of the role of ideology is essential for a social psychological analysis of intergroup relations:

The basic point is that social categorizations do not arise in a social vacuum, but are integrated to serve particular ideological ends.

(Billig, 1976: 361)

Tajfel also does not detail how the security of the social status quo comes to be questioned. Du Preez (1980) suggests that:

Factors such as the collapse of an ideology in other countries, war, news, the failure of the ruling classes to perform their central functions, a relative rise in the self-esteem of the excluded class (due to better performance or comparison with like people in other countries and capacity to wring concessions out of those who rule), will contribute to questioning the legitimacy of a social order.

(du Preez, 1980: 40)

However, using his basic formulation, Tajfel is able to predict the intergroup behaviour of groups under the various conditions of status evaluation and identity security. These predictions may be summarized in the following model:

	HIGH STATUS	LOW STATUS
SECURE SOCIAL IDENTITY	A	B
INSECURE SOCIAL IDENTITY	C	D

A: Groups in this category are deemed superior, and this status is viewed as unalterable. Tajfel suggests a possible example of such a group is the position of men relative to women which prevailed in some cultures at certain historical periods (Tajfel, 1974a). Tajfel considers such groups to be rarities, since the conditions which would enable this superiority to be perpetuated, free of threat from the inferior group are extremely difficult to maintain. In consequence, he refrains from making conjectures about their intergroup behaviour. However, the nomic majorities defined by Moscovici and Paicheler (1978) may be argued to fulfil these criteria. These authors hypothesize that such a group will exhibit the interindividual mode of behaviour, being able to tolerate the existence of a different group and to decentre its own identification. Thus, little intergroup bias is anticipated.

This was in fact confirmed by the results of their study (Moscovici and Paicheler, 1978).

B: Low status groups, in circumstances where the status relations is perceived as static, are considered in this section. Two contingencies are distinguished, depending on whether or not conditions are conducive to individuals leaving the group.

(i) Conditions conducive to leaving: Typically, the social mobility response will occur, with members attempting to leave the group to enter the more highly valued one. These members tend to direct their 'positive relations' (ie. expressions of admiration and approval) to the higher status group and their 'negative relations' to their own lower status group (Thibaut, 1950; Mann, 1961; Skevington, 1981).

(ii) Conditions not conducive to leaving: Examples of this are the lower castes of India, and the Negroes of Southern U.S.A. and colonized Africans at certain periods in history. Under these conditions the group members will seek to enhance their self-image through individual means. This may be achieved through comparing their individual positions with other members of the group (eg. attaining relative status through becoming 'chief' slave), or through psychologically dissociating themselves from the group. Under both these conditions there is likely to be a denigration of the ingroup and esteem of the outgroup, ie. negative ethnocentrism. Characteristically, there is little ingroup favouritism and frequently there is bias in favour of the outgroup (Tajfel et al, 1970; Tajfel et al, 1972; Asher and Allen, 1969; Milner, 1973; Skevington, 1980).

C: This category refers to high status groups with insecure status relations. Tajfel (1978) defines two conditions leading to this

insecure identity:

(i) The group's position is under threat from another lower status group.

(ii) The superior status embodies a contradiction of moral values - some members may perceived their status as based on unfair advantages, injustice or exploitation.

Exit from the group, under either condition, is not a frequent occurrence, though possible examples may be found in the 'hippy' movement (dropping out of the middle class life style) and the radical left movement where working class status is adopted by (former) members of the bourgeoisie.

The more characteristic response is for defensive distinctiveness to arise, with the resultant increase of intergroup discrimination. This has been illustrated in a number of studies (van Knippenberg, 1978; Moscovici and Paicheler, 1978; Commins and Lockwood, 1979; Skevington, 1980)

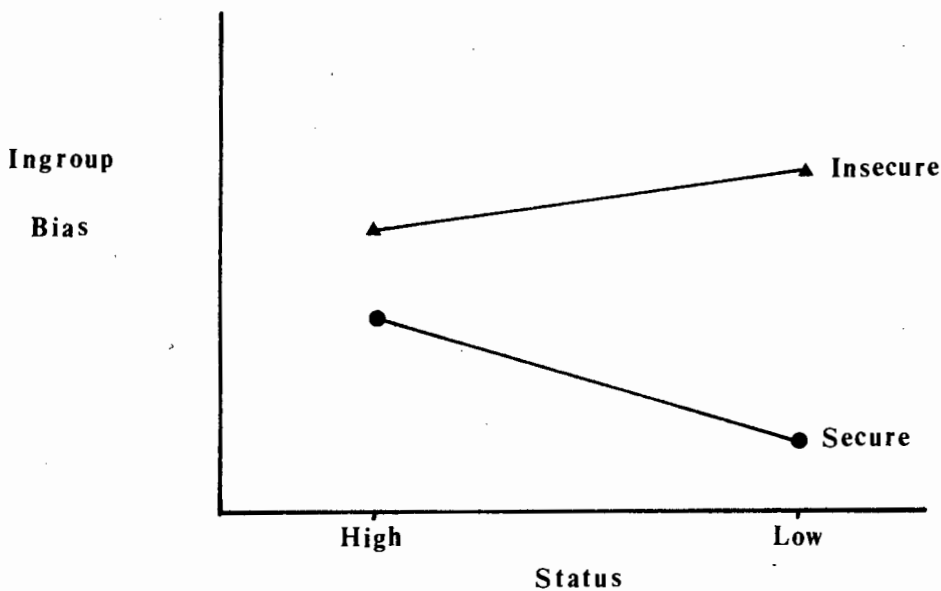
D: This pertains to low status groups where the status hierarchy is perceived as mutable. Members of such groups will tend to enhance their social identity through social action. Two basic strategies may be used:

(i) Social creativity - This refers to the attempt to establish equality with the superior group by (a) redefining as positive group characteristics which were previously negatively valued (eg. the 'Black is Beautiful' movement); or creating new dimensions on which the group is seen as positively distinct from the superior group (Lemaine et al, 1978; Turner and Brown, 1978).

(ii) Social action - This includes the various tactics used in attempting to change the social order - e.g. giving 'voice' (Tajfel, 1975), political protest, strikes, revolution.

These groups characteristically exhibit strong ingroup favouritism, emerging from assertive distinctiveness (Hraba and Grant, 1970; Branthwaite and Jones, 1975; Lemaine et al, 1978; Branthwaite et al, 1979).

The previous discussion may be clarified by the following graphical representation of the relative degrees of ingroup bias under the various conditions of status and security of social identity:



2.5. Overview

There are a number of criticisms that may be levelled at the cognitive-motivational theory. Most of them pertain to Tajfel's basic formulation of the social categorization - social identity - social comparison tripod which specifies that (a) the outgroup must be perceived as a comparison group; (b) that the individual must subjectively identify with the ingroup; and (c) the dimension of comparison must be recognized and shared by both comparison groups.....

Tajfel and Turner (1979) suggest that the relevance of the comparison outgroup is determined by such variables as similarity, proximity and situational salience. However, there has been little systematic attempt to identify the factors and processes circumscribing the acceptance of comparison groups, though a number of findings do suggest that these variables are important. Turner (1978b) found more ingroup bias when the outgroup was perceived as similar to the ingroup, but this occurred only under conditions of secure status. When the status differences were unstable there was a tendency for subjects to be more biased when the outgroup was dissimilar. A number of studies have also demonstrated that there is more ingroup bias when the outgroup has high salience than when it has low salience (McKillip et al, 1977; Taylor et al, 1978). It is, however, questionable whether these findings have direct relevance to the issue, since the comparison groups in these studies were determined and imposed by the experimenter. It is clear that a more rigorous investigation into factors determining comparability is required, which would include a careful analysis of the ideological and societal forces that influence this process among real groups.

The question of what factors determine subjective identification with a group is largely glossed over by Tajfel. There is an implicit assumption that subjective identification is subsumed within the social categorization process. Tajfel (1969b, 1970b) notes that children internalize their national and ethnic identities and attitudes before they cognitively understand the meaning of these categories. The existence of intergroup bias in children is explained in terms of their tendency to dichotomise along the lines of 'good' and 'bad', 'like' and 'dislike'. These dichotomies are superimposed on social categories leading to bias,

which is further reinforced by numerous social influences. Thus, the categorization process together with socialization effects may be used to account for the development of subjective identification in 'natural' groups. But this cannot explain identification within the minimal group paradigm. It is assumed that since the subjects exhibited ingroup bias, they must have identified with the provided categories. Initially, Tajfel (1970a) considered the ingroup bias a result of a 'generic norm' of Western society, whereby the inculcated norms of general intergroup behaviour (ingroup favouritism - outgroup discrimination) is extrapolated to any group situation. This explanation was later discounted as tautologous (Tajfel, 1978). Turner (1975a, 1978a) suggested that the subjects did not identify with the categories, as such, but rather used them as a vehicle through which they could exercise their social competitiveness. Turner (1975a) distinguishes social competition from real competition real competition refers to rivalry for concrete rewards, whereas social competition refers to the drive for positive social identity. This is exemplified by the finding that if subjects are allowed to allocate money/points to themselves and another, they will frequently sacrifice personal real gain in favour of relative superiority over the other person (Turner, 1975a, 1978a; Turner et al, 1979). However, this concept of social competition does not contribute to the understanding of subjective, often emotive identifications with a group. If social competition alone was the primary determinant, it would presumably be a simple matter to take on or cast off social group affiliations. This is palpably not the case.

Zavalloni's (1971, 1975) research further complicates matters by demonstrating that it is possible for a person to identify with a

group, associate certain traits with that group and yet not see her/himself as possessing these traits. Thus the nature and means of the contribution that group membership provides to self-identity remains an important question. It is, perhaps, fitting to end this discussion by pointing out that Freud himself could not shed much light on this question :

In the preface to the Hebrew edition of Totem and Taboo, and again in his address to the Society of B'nai B'rith in Vienna (1926, Vol, 20), Freud recognises his Jewish identity, but admits his inability to explain the nature of this identification.

(Billig, 1976: 325)

The issue of how dimensions of comparisons come to be recognized and shared is also not dealt with in Tajfel's theory. Various authors have noted that the dominant group determines what attributes are considered important and used for comparison (Moscovici and Paicheler, 1978; Billig, 1976). This has been demonstrated empirically in a study by van Knippenberg (1978) in which he found that the group valued the dimensions on which it was superior far more than the comparison group. However, in this study the dimensions of comparison was provided by the experimenter. To understand how these dimensions arise and are instituted in societal groups, it is necessary to consider the role of ideology and the linguistic system perpetuating it (Billig, 1976).

From the above discussion, it is clear that further research is required to elaborate these inadequacies. At present, there is no evidence that would dispute the theory as a whole, though a number of alternative interpretations have been proposed. Two of these alternatives are presented below.

### 2.5.1. Cognitive versus motivational explanations

Tajfel's theory of intergroup relations incorporates both cognitive and motivational aspects. Doise (1978), however, proposes a model of intergroup relations based entirely on the cognitive process of category differentiation. This model maintains that the social categorization operation leads members of the ingroup to perceive themselves as more similar to each other and more distinctly different from the outgroup, through the polarization accentuation principle discussed earlier. This in turn gives rise to behavioural, evaluative and representational differentiation in treatment between the ingroup and outgroup. This explanation is based fundamentally on the supposition of a general norm of behaviour in society leading to such discriminations. As mentioned previously, this assumption was initially proposed by Tajfel (1970a) but later rejected as a tautologous and non-heuristic explanation (Tajfel, 1978; Turner, 1980). Although Doise (1978) has interpreted many of the findings of both Sherif and Tajfel in terms of this model, there are certain forms of intergroup behaviour that it cannot explain. This inadequacy became apparent in the study by Doise and Sinclair (1973). To explain why the lower status 'apprentis' show a bias in favour of the higher status 'collegiens', the researchers were forced to postulate the existence of two scales. They hypothesize, in a rather ad hoc manner, that categorization took place on the 'social status scale' and on the 'ethnocentric scale'. Furthermore, van Knippenberg and Wilke (1979) have argued that the results of this study are better explained using the social identity-social comparison theory. An important criticism that may be made is that the category differentiation model is a

very static view of society and cannot suitably account for processes of social change.

Turner's position is one which largely discounts the importance of the cognitive process of categorization and focuses almost exclusively on the motivational aspects (Turner, 1975a, 1978a; Turner et al, 1979). As mentioned previously, he interprets the role of categorization as providing a means through which the individual can exercise social competitiveness. Turner (1975a, 1978a) demonstrated that if the matrix task is adapted so that the subject is able to allocate points to him/herself as well as to members of the ingroup and outgroup, the subject will not use the group categories as a basis for discrimination. This supports his view that ingroup bias only occurs if the subject has no other means of competing. However, if the subjects are first required to distribute points between the ingroup and outgroup before being allowed to allocate money to themselves, they will continue to exhibit intergroup discrimination, tempering their self-favouritism with ingroup favouritism (Turner, 1978a). This would appear to indicate that once subjects had identified with the ingroup this identification persists (Billig, 1976). Thus social competition on an individualistic basis was not strong enough to reverse the social categorization tendency. In view of this, a reinterpretation of Turner's first results could be made, hypothesizing that the opportunity to award points to oneself resulted in a three group situation being established - the self, the ingroup and the outgroup. This, in a sense, creates a situation of cross-category membership. Research on cross-category membership has shown that ingroup bias is reduced under these conditions (Deschamps, 1977; Deschamps and Doise, 1978), which would concur with Turner's finding. Brown and Turner

(1979) contested this interpretation, proposing that the reduced ingroup bias in the latter study was due to the complexity of the task required of the subjects in the crossed-category condition, not to the lessening effects of categorization. Further research is required to settle this dispute.

Oakes and Turner (1980) found higher self-esteem in subjects who had performed the matrix task than in subjects who performed a neutral task, which was interpreted as evidence that motivational processes were involved in the intergroup discrimination task. There is little doubt that motivational processes are an important feature of intergroup relations, but it is questionable whether they can account for much of intergroup behaviour without the framework of social categorization.

From the preceding discussion it may be concluded that neither a wholly cognitive nor a wholly motivational model can suitably account for intergroup behaviour.

This chapter has presented the basic propositions of the cognitive-motivational theory, concentrating on the theory's prediction for ingroup bias under the different status and security of social identity conditions. The empirical evidence reviewed provides considerable support for many aspects of the theory, though further research is clearly required. But, despite the short-comings discussed, the theory provides an excellent framework for understanding intergroup relations.

### 3. RATIONALE

The underlying motivation for this study emerged from an interest in the psychology of women, in particular from the position of women as a minority group. The cognitive-motivational theory therefore, provides a means of understanding and predicting their intergroup relations. However, women are faced with a number of unique influences by virtue of their position in society. This study represents a preliminary investigation into the effect of possible factors.

#### 3.1. Women as a minority group

The definition of a 'minority' group presents a number of difficulties. While many definitions have been proposed, none can adequately include all minority groups at their various stages of development (Tajfel, 1979b). There is general agreement that minorities are not necessarily numerically smaller than majorities; that they are negatively evaluated and discriminated against by the dominant group and that this has psychological repercussions for members of the minority groups.

Women have been widely recognised as constituting a minority group, though they have rarely been studied as such in the behavioural sciences (Hochschild, 1973). The similarities between the position of blacks and of women are plain. Both are discriminated against in terms of limitation on education, confinement to traditional jobs, deprived of political importance and suffer social and professional segregation. Similar stereotypes are ascribed to both -- inferior intelligence, emotional and moral weakness, etc. (Hacker, 1951; Hochschild,

1973; Sunar, 1978). The psychological effects of their minority status also bears certain similarities - the accommodation to their positions through differential attitudes towards the dominant group as well as their subjective feelings toward their own group. Firestone (1972) goes further than drawing analogies and proposes that racism is merely an extension of sexism. Marx and Engels also recognized sexism as the first instance of class oppression:

The first class opposition that appears in history coincides with the development of the antagonism between man and woman in monogamous marriage, and the first class oppression coincides with that of the female sex by the male.  
(Engels, 1974: 480)

Tajfel's theory of intergroup relations is relevant to the study of women as a minority group. The consequences of a negative social identity in secure social orders has been well documented in the theory - the denigration of the ingroup, acceptance of the negative evaluations and stereotypes and consequent learned helplessness. These anticipated reactions have been observed to occur in women (Hacker, 1951; Pheterson et al 1971; Goldberg, 1974; Goldberg et al, 1975). The 'Queen Bee' syndrome, in which highly achieving women psychologically dissociate themselves from their group and use males as their reference figures, is also a typical strategy. These patterns typify the weak group identification and consciousness prevalent among women (Gurin et al, 1980; Kalmuss et al, 1981). But some women do perceive the illegitimacy of the situation and are moving towards the social action strategy. Williams and Giles (1978) detail numerous instances of this: attempts to gain equality in work, education, social status; attempts to redefine women's 'inferiority' through objecting to the negative image of women perpetuated in the culture, and through emphasizing the positive attributes of women.

The defensive reaction of the dominant group, men, is also evident: the denigration of women's attempts to change the status quo, eg. the anti-'women libbers' jokes; the denunciation of feminists as being sexually, emotionally or physically deficient. Brownmiller (1976) further suggests that rape is covertly sanctioned by all men as a means of 'keeping women in their place'.

However, there are factors which militate against women forming strong identification with their group and hinder the move towards social action. Women as a minority group are unique in that their lives are completely enmeshed with members of the outgroup:

Women have played a specific role in male-led society in ways no other suppressed groups have done. They have been entwined with men in intimate and intense relationships, creating the milieu - the family - in which the human mind as we know it has been formed.

(Miller, 1978: 1)

Women are socialized to define themselves in terms of men and existing only in conjunction with men (Friedan, 1963; Angrist, 1969; Weitz, 1977; Weinreich, 1978; Weitzman, 1979). To understand how this affects the development of women's subjective identification with their group and their movement towards social action, it is necessary to consider these factors within the framework of the cognitive-motivational theory. A number of variables may be isolated from women's social position for consideration:

1. Cooperation: Women are in constant cooperation with men, within the family and elsewhere, throughout life. This factor is discussed at length below.
2. Crossed category membership: Women are invariably members of other groups, which may also be minority groups within the society e.g. subordinate race or ethnic groups. Mitchell

(1966) identifies women's involvement with other political movements, eg. civil rights and new left movements, as one of the factors which retarded the development of the feminist movement. Cock (1980) illustrated how the race-cum-class divisions in South Africa obstructs the development of group consciousness as women.

Studies on crossed membership have given contradictory results. Deschamps (1977) and Deschamps and Doise (1978) found that ingroup bias decreased under these conditions. Brown and Turner (1979), however, found evidence supporting the hypothesis that ingroup bias is additive, ie. there is more favouritism towards people who share both one's category memberships, less towards people who share only one and least to those who share none. More research is required to determine which prediction is correct and to elaborate the implications for women.

3. Individuation of outgroup: women's continual personal contact with men prevents perception of the outgroup as a dehumanized unit which is dissimilar from the ingroup. Studies by Wilder (1978) and Wilder and Thompson (1980) have shown that ingroup bias decreases as outgroup contact increases, and when the outgroup is seen as individuated. Skevington's (1980) findings indicate that the subordinate groups are more influenced by this factor than dominant groups.
4. Psychodynamic and ideological influences which counteract the formation of a subjective identification with women as a group.

As a first step in attempting to understand the position of women within the cognitive-motivational theory of intergroup relations, this study will focus on the variable, cooperation. However, this

does not negate the possible importance of the other factors. While other minority groups are subjected to the influence of crossed category membership and individuation of the outgroup, cooperation to the degree experienced by women is rare.

### 3.2. Cooperation

Research dealing with cooperation as a variable falls into four basic categories. These are studies which investigate:

1. The effect of cooperation within groups on intragroup relations. These studies typically focus on problems such as decision-making, leadership, group organization and group processes (cf. Davis et al, 1976).
2. The effect of cooperation between groups on intragroup relations. Investigations into the effects of cooperation, usually contrasted with competition, on variables such as intragroup cohesiveness, conformity and interpersonal attributions fall into this category (cf. Dion, 1979; Stephan et al, 1979).
3. The effect of cooperation within groups on intergroup relations. These studies have focused on the effect of competition versus cooperation between group members on attitudes to the outgroup. Results indicate that the effects are dependent upon whether the group is perceived as successful and strong, or unsuccessful or weak. Competitive groups displayed high ingroup bias, but this was significantly lower when the group was weak or unsuccessful. Cooperative groups were more positive towards the outgroup, especially when the ingroup was weak or unsuccessful (Rabbie et al, 1974; Kennedy and Stephan, 1977).

4. The effect of cooperation between groups on intergroup relations. This category is of primary interest in this study.

Research on the effect of intergroup cooperation on ingroup bias has produced contradictory results. The work of Sherif (1966), and Blake and Mouton (1962) led to the conclusion that intergroup bias and hostility result from competitive interaction between groups, and this is reduced or even revoked by intergroup cooperation. However, other studies have found that either the same degree of ingroup bias was elicited in cooperative as in competitive conditions (Doise et al, 1972; Brewer and Silver, 1978), or a lesser though still significant degree was elicited in the cooperating groups (Kahn and Ryen, 1972; cited in Turner, in press). Reviewing the work on intergroup relations, Turner (in press) observed that all intergroup interaction: competitive, cooperative or coactive, whether actual or anticipated, elicits ingroup bias. He argued that intergroup contact enhances the salience of the ingroup-outgroup distinction, resulting in intergroup discrimination.

However, cooperation has been found to reduce ingroup bias under certain conditions. Worchel et al (1977) compared the effect of a successful versus unsuccessful cooperative endeavour on the outgroup attitudes of groups which had previous experience of a cooperative, competitive or independent interaction with that outgroup. The results indicated that when the outcome was successful there was a reduction in ingroup bias regardless of the previous experience. When the outcome was not successful, the reduction only occurred when the previous experience had been cooperative. Worchel et al (1977) suggested that the success experienced allowed the ingroup-outgroup distinction to fade. This

explanation was supported when the study was repeated, while also manipulating the visibility of the ingroup-outgroup (Worchel et al, 1978). In the high visibility condition, cooperation failed to reduce ingroup bias. Worchel and Norvell (1980) also found that if environmental conditions could be blamed for the failure of the cooperative endeavour, ingroup bias was reduced in groups with a previous history of competition. From the above studies it may be In summary, it appears that the simplistic functionalist argument that cooperation per se reduces intergroup discrimination - may be discounted. However, there is a trend emerging from the work of Worchel and his associates, which indicates that cooperation reduces ingroup bias only in circumstances where the salience of the intergroup distinctiveness is de-emphasized (Worchel, 1979).

It is significant to note that none of the studies on cooperation have considered the effect of status and of security of social identity. The various conditions of status and security result in different degrees of salience of intergroup distinctiveness. Hence if the above hypothesis is correct, it may be predicted that cooperation will interact differentially with status and security in its effect on intergroup bias. Two studies indirectly support this prediction. Weigel et al (1975) described a teaching programme designed to reduce interracial conflict in a newly desegregated school consisting of black, white and AmericanMexican children. In their results, the authors report increased positive attitudes and behaviour between the white and American-Mexican children, but not between the blacks and the other two groups. It could be argued that the lower status of the black children may have been a significant factor. Skevington (1980) reported that the cooperative nature of the (high status) SRN's and (low status) SEN's work was viewed with more hostility by the lower status

nurses (SEN's). Thus, there are indications that a more formal investigation of the variable, cooperation within the framework of the cognitive-motivational theory is needed.

### 3.3. Aims of the present study

This study was designed to investigate the effect of cooperation, in conjunction with status and security of social identity, using the minimal group paradigm. In accordance with the paradigm, the following specifications were met :

1. Subjects were randomly assigned to the different groups.
2. Group membership was anonymous - subjects knew their own group membership, but not that of any other subjects.
3. There was no face-to-face interaction between subjects.
4. The behavioural response required of the subjects had no direct utilitarian value to them.

To establish the status hierarchy, the groups were allegedly created on the basis of certain personality dimensions. This differs from the usual practice of creating groups on the basis of irrelevant attributes.

Insecurity of the status hierarchy, ie. of social identity was manipulated by questioning the validity of the means of determining the status group. This was conceived as a function of legitimacy rather than stability. However, as Tajfel (1979b) points out:

... a theoretical separation of perceived instability and illegitimacy cannot be taken very far without losing touch with social reality.

(Tajfel, 1979b: 9)

This factor was therefore termed legitimacy (or illegitimacy) throughout the study.

Three cooperation conditions were established: no cooperation, cooperation with the ingroup and cooperation with the outgroup. The no cooperation condition acted as a control condition, and also allowed for a test of the effects of status and legitimacy alone. In accordance with the cognitive-motivational theory, it is anticipated that there will be an interaction between status and legitimacy in this condition. As described in chapter 2, there should be high ingroup bias, and strong group distinctiveness in both the illegitimate high status group (emerging from a defensive position) and the illegitimate low status group (resulting from an assertive position). The legitimate high status group is expected to exhibit ingroup bias, but less so than the illegitimate groups, since their secure social identity obviates the need for assertiveness or defensiveness. The legitimate low status group should exhibit negligible ingroup favouritism, since the negative evaluation of the group, which adversely affects the members' self-concept, is perceived as unalterable.

Cooperation with the ingroup was expected to result in an accentuation of the above effects. If, as predicted, the effect of intergroup cooperation is related to salience of group distinctiveness, it is expected that ingroup bias will be more reduced in the legitimacy conditions than in the illegitimacy conditions. In summary, it was hypothesized that there would be:

- (a) An interaction between the three factors; status, legitimacy and cooperation, in their effects on ingroup bias.
- (b) An interaction between status and legitimacy, with stronger ingroup bias being evident in the illegitimate (high and low status) conditions than in the legitimate, occurring in both the no cooperation and intragroup cooperation conditions.

(c) A reduction of ingroup bias in the legitimacy conditions after intergroup cooperation, but not in the illegitimacy conditions.

A number of indices of ingroup bias were measured. The most important of these was ingroup favouritism, defined as a strategy attempting to achieve highest profit for ones own groups as well as maximizing the 'win' over the outgroup. Other measures indicated the relative pull this strategy had over the motive to be fair, or to give the maximum amount of money to both recipients.

#### 4. METHOD

##### 4.1. Subjects

126 first year Psychology students were subjects in this study, which was offered as one of the options available in their Practical Programme. Thus participation in the experiment contributed towards their Course credits, as well as offering monetary reward. 12 subjects, 8 women and 4 men, were used for the control study; and the remaining 114, 70 women and 44 men, participated in the main experiment.

##### 4.2. Apparatus

###### 4.2.1. Barron-Welsh Art Scale

The Barron-Welsh Art Scale, which is derived from the Welsh Figure Preference Test, is essentially a test of artistic potential and creativity. The test consists of a book containing eighty-six 8x5cm black and white drawings. Testees are required to indicate whether they like or dislike each of the drawings on a standard answer sheet. As the Scale was not used as a measuring device, but as a 'blind', the properties of the Barron-Welsh will not be detailed.

The function of the Barron-Welsh Art Scale in this study was to provide the means by which the Subjects were (allegedly) divided into two groups, and a status hierarchy established between these two groups. Subjects were told that the Scale distinguishes two

"types of artistic potential, one called Gamma and the other called Delta". In the status conditions, they were told that certain personality traits were linked with the different types of artistic potential:

People with 'Delta type potential' tend to be highly creative, innovative, individualistic, unpredictable, energetic and questioning.

Whereas

People with 'Gamma type potential' tend to be competent, conservative, practical, worrying, peaceable and accepting of authority.

The terms 'Gamma' and 'Delta' were fabricated, though the personality traits mentioned were selected from a number reputed to be correlated with various subscales of the test (Barron; 1952, 1953). To a certain extent the dichotomy mirrors that of the Complexity-Similarity dimension detailed by Barron (1953). However, the actual traits used were selected on the following basis: The one set had to be more desirable than the other (i.e. have higher status); and at the same time the 'low status' set could not be too negative. This was in view of certain ethical considerations. Debriefing could not take place immediately due to the risk of disclosure to untested Subjects. Thus some Subjects would have to live with the unfounded belief that they possessed the 'negative' Gamma traits for up to a month, the time taken for all testing to be completed. Within these limitations, three pairs of Gamma-Delta traits were formulated and a survey of independent judges asked to select which of each pair of personality traits was most desirable. The pair in which the Delta set was unanimously selected was used in the study.

4.2.2. Maze task

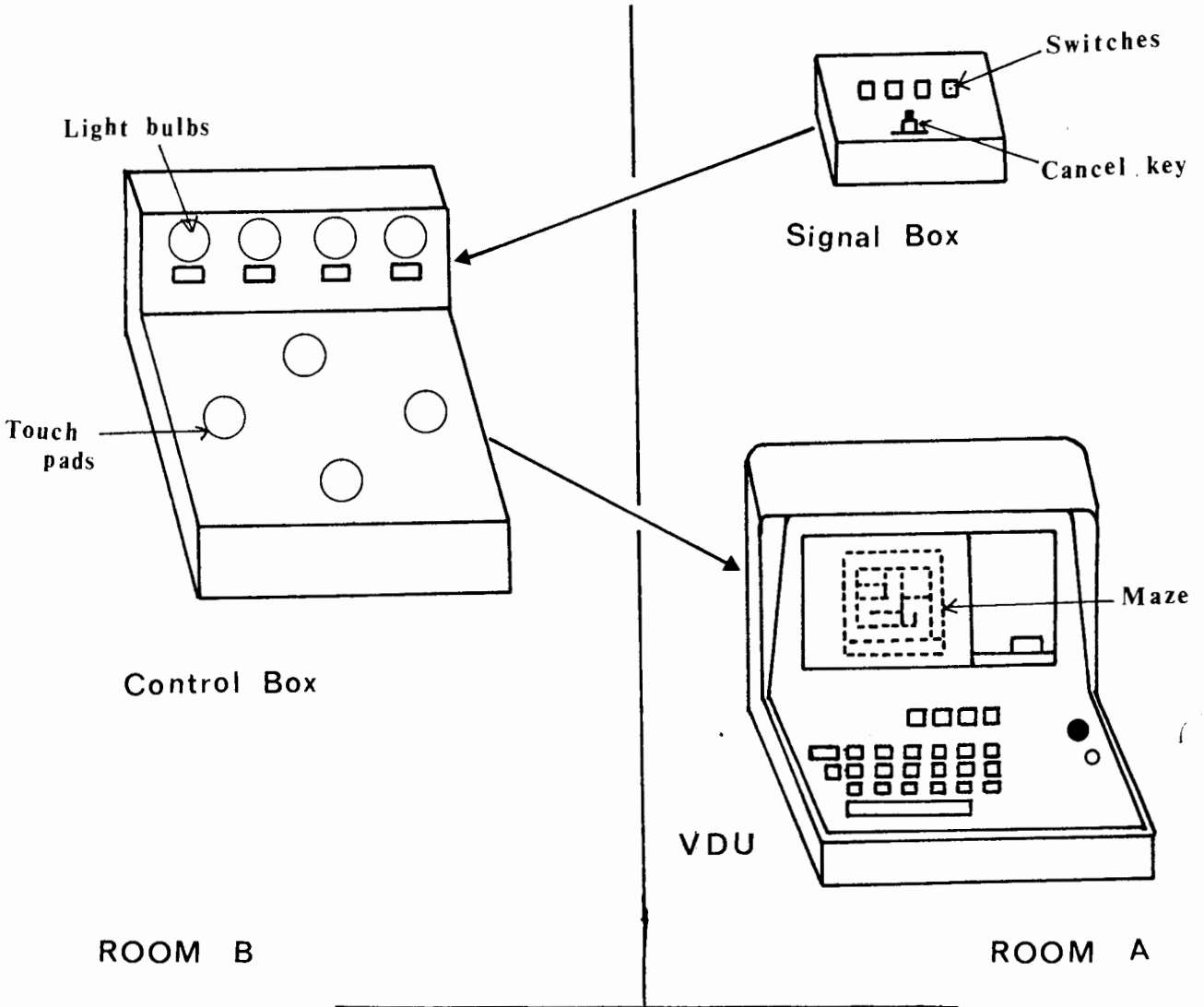
This task was designed to create a situation requiring cooperation between two Subjects, in the sense that they had to work together towards a common goal (maximizing their monetary gain), while at the same time keeping their identities hidden. It was also necessary that the same task be performed by a lone Subject without much adjustment.

The apparatus consisted of five pieces of equipment:

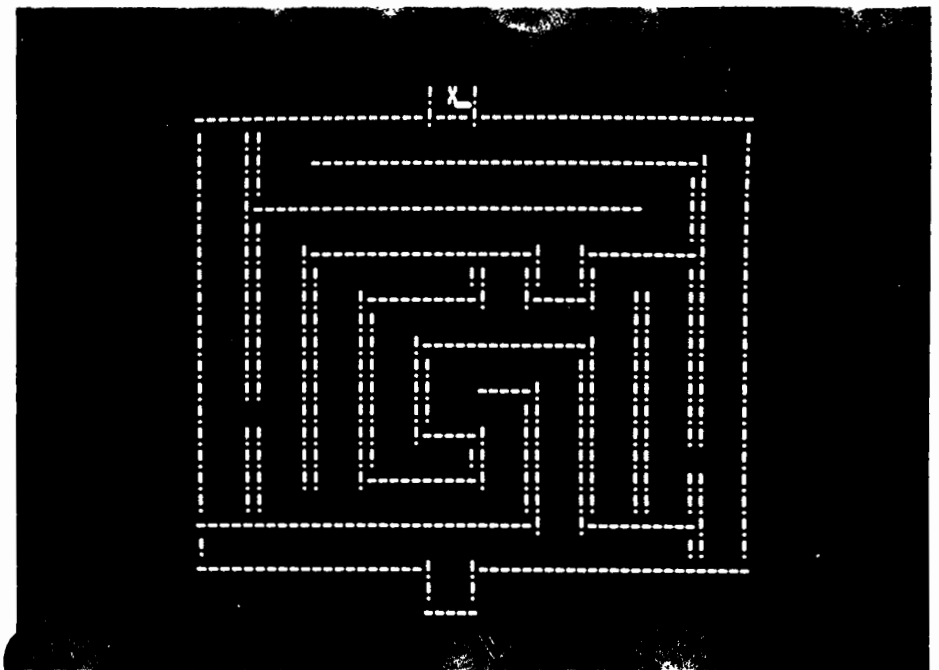
- (i) a Data General MicroNova Computer;
- (ii) a Visual Display Unit (VDU);
- (iii) a closed-circuit television;
- (iv) a control box consisting of a panel of 4 different coloured light bulbs and a set of 4 touch sensitive pads; and
- (v) a signal box consisting of 4 switches and a cancel button.

The television was used only in the Control and No Cooperation conditions, to relay the display on the VDU to the appropriate room. The VDU and the touch pads of the control box were wired to the computer, and the switches of the signal box were connected to the light bulbs of the control box through an independent electricity source. The buttons on the signal box each turned on one of the light bulbs on the control box, while the cancel button switched them all off. The touch pads, the light bulbs and the signal box switches were appropriately labelled 'UP', 'DOWN', 'RIGHT' or 'LEFT'. The VDU and signal box, along with the computer were situated in Room A; and the control box, and the television in the appropriate condition, were placed in Room B.

Figure 4-1. Maze Apparatus



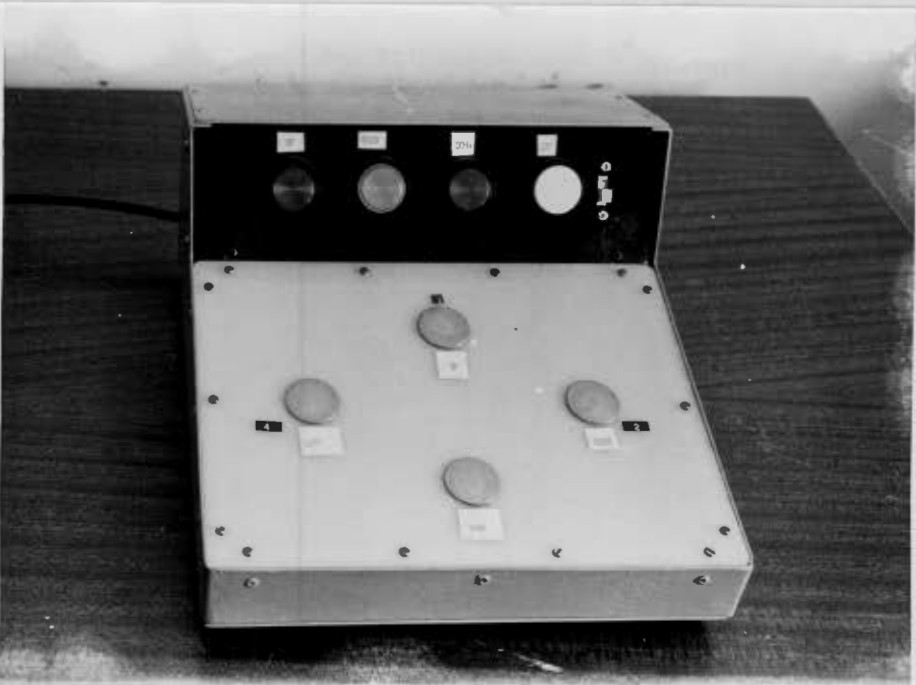
MAZE



VDU  
and  
SIGNAL BOX



CONTROL  
BOX



NO  
COOPERATION  
CONDITION



Three different mazes were used, one as a practice example and two on which measurements were recorded (See Appendix B). The mazes were individually displayed on the VDU with a movable marker 'X' at the start point. The marker had to be moved through the maze to an exit on one of the other sides. This marker was controlled by the touch pads on the control box. Each pad moved the 'X' one step in one of four directions - up, down, left or right. An attempt to direct the 'X' into a barrier resulted in a tone sounding in both experimental rooms, but no movement. This constituted an error. The time taken for the Subjects to complete the two mazes, and the number of errors made, was recorded and immediately filed on the floppy disc under the Subject's name as part of the computer programme.

In the Control and No Cooperation conditions, the screen of the VDU was relayed on the television screen in Room B. Subjects directed the 'X' through the mazes using the control box while watching the maze on the television. The light bulbs and signal box were not used at all in this condition. In the Cooperation conditions, the Subject in Room A observed the maze on the VDU and instructed her/his partner how to move the 'X' by switching on the appropriate light bulb. The Subject in Room B responded to the lighted bulb by touching the corresponding pad.

#### 4.2.3. Matrices

These constituted the instrument with which intergroup bias was measured. Five sets of matrices were selected from the various experiments of Tajfel and his co-workers (Tajfel, 1970; Tajfel et al, 1971; Billig & Tajfel, 1973; Tajfel & Billig, 1974). These matrices, which consist of 13 or 14 vertical pairs of numbers,

were each presented in four different ways. Each presentation is set out on a separate page of the matrix booklet in a manner that makes it clear that the top set of points were to be received by one person, and the bottom set to be received by another. These recipients were identified only by a code number and a group name, Delta or Gamma. The distinction between Delta and Gamma group members was reinforced by using code numbers from 1 to 80 for Gamma members and from 600 to 680 for Delta members. An example of a page is given in Appendix C.

Figure 4-2. Matrices

A.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	14	13	12	11	10	9	8	7	6	5	4	3	2	1
B.	18	17	16	15	14	13	12	11	10	9	8	7	6	5
	5	6	7	8	9	10	11	12	13	14	15	16	17	18
C.	7	8	9	10	11	12	13	14	15	16	17	18	19	
	1	3	5	7	9	11	13	15	17	19	21	23	25	
D.	14	15	16	17	18	19	20	21	22	23	24	25	26	
	14	13	12	11	10	9	8	7	6	5	4	3	2	
E.	19	18	17	16	15	14	13	12	11	10	9	8	7	
	1	3	5	7	9	11	13	15	17	19	21	23	25	

The four presentations of each matrix varied the possible combinations of group membership of the two recipients:

- (i) both recipients were members of the Subject's group, i.e. the ingroup (I/I);
- (ii) both recipients were members of the group to which the Subject did not belong, i.e. the outgroup (O/O);

(iii) the top recipient was a member of the ingroup, the bottom a member of the outgroup (I/O); and

(iv) vice-versa (O/I).

For each presentation of the matrices, the Subject was required to select one of the boxes containing a pair of numbers, knowing that the top number's worth of cents would be given to the upper recipient, and the bottom to the lower recipient. In selecting the box, there were four main strategies the Subject could employ:

1. Fairness (F): selecting the box which most nearly gives both recipients an equal amount of points (money);
2. Maximum Joint Profit (MJP): selecting the box which maximizes the totalled points to be given out, irrespective of the relative distribution among the two recipients;
3. Maximum Ingroup Profit (MIP): selecting the box which gives the ingroup member the most number of points; and
4. Maximum Differentiation in favour of the ingroup (MD): selecting the box which gives the largest discrepancy between the points of the two recipients, the most being allocated to the ingroup member.

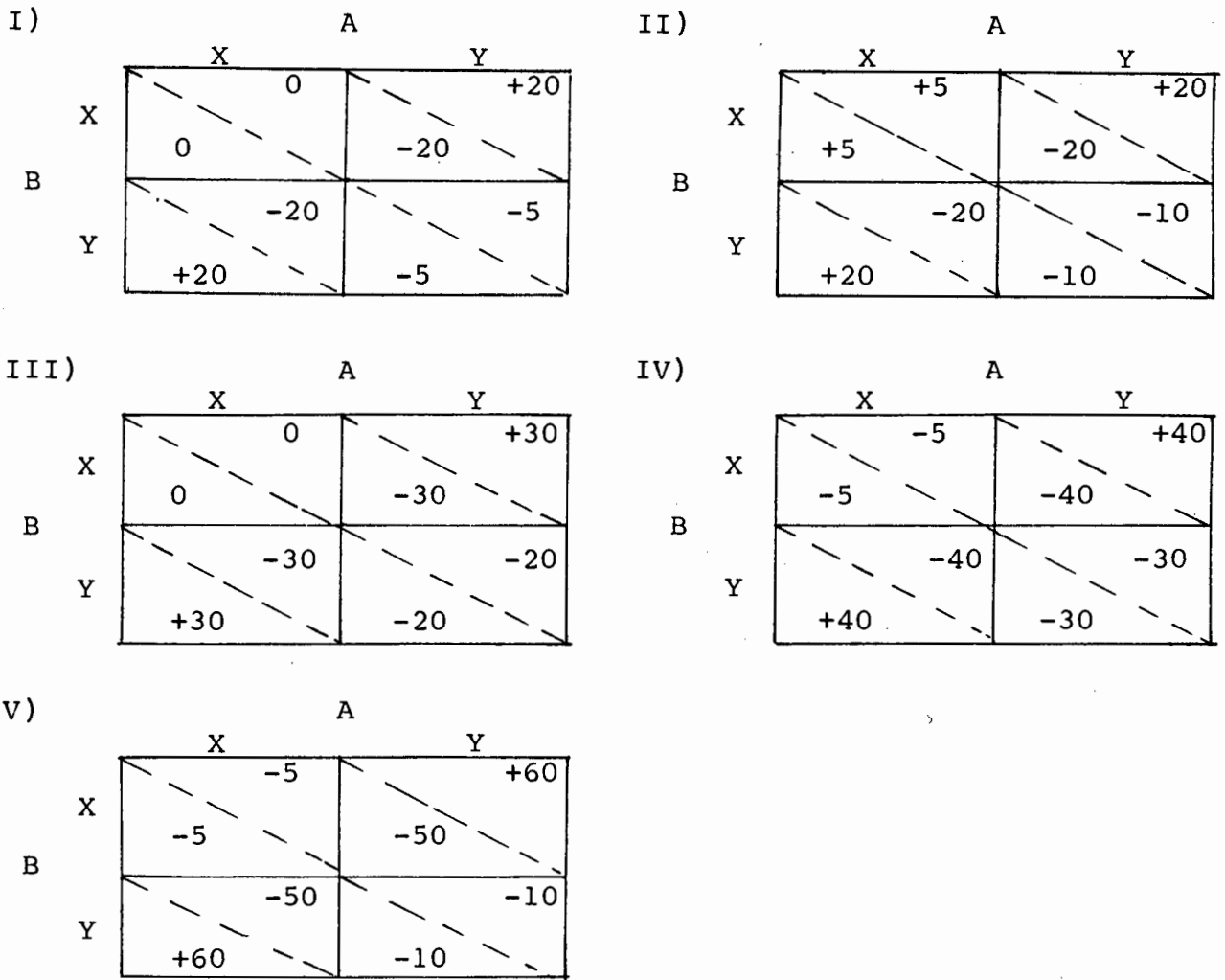
#### 4.2.4. Prisoner's Dilemma Game

This classic 'non-zero-sum' game, which presents players with the option of making either a competitive choice (confessing) or a cooperative one (not confessing), was presented using standard instructions (Freedman et al, 1970). Five different situations were presented varying the amount of reward or penalty that could result from the different combinations of choices. The situations are represented below.

The two people playing are termed A and B; and their choices are X

(not to confess) or Y (to confess):

Figure 4-3. Prisoner's Dilemma Game Outcomes



Each of these situations was presented on a separate page of a booklet. The front page of the booklet detailed the 'story' behind the game and explained how the decision to confess or not would be converted to a gain or loss of money for the two players. (See Appendix D).

The Subject's partner in this game was either another Subject randomly assigned (Control and No Cooperation conditions), or the same person with whom the Subject did the maze task (Cooperation conditions).

The number of times (out of 5) the Subject chose to confess was used as a measure of competitiveness.

#### 4.2.5. Subjective questionnaires

After each stage in the experiment the Subjects were required to complete a questionnaire:

- A.1 was completed immediately after the Barron-Welsh Art Scale had been filled out and removed.
- A.2 was completed after the 'purpose' of the Barron-Welsh had been explained to the Subject. (See Appendix A). In the Control condition this questionnaire was given at the end of the study, after Questionnaire D.
- B was completed after the maze task. Slightly different forms of the questionnaire were presented to the Cooperation and No Cooperation conditions.
- C was completed after the matrix booklet had been filled in and removed.
- D was completed after the Prisoner's Dilemma Game was removed. Again, slightly different forms of the questionnaire were given to the Cooperation and No Cooperation conditions.
- E was completed after leaving the experimental situation.

Aside from providing a general notion of how the Subjects viewed the study (i.e. what they thought it was about, what they felt affected their responses, etc), the questionnaires had a number of specific functions.

Question No. 2 of A.2 asked the Subject to decide to which of the two groups, Delta or Gamma, s/he thought s/he belonged. This was intended to ensure the Subject connected the given characteristics to the group name, underlining the 'status' differences.

In questionnaire B the Subjects were asked to rate, on a 5 point scale:

- (a) how well they felt they, personally, had performed on the maze task;
- (b) how well they, working with their partner, had done; and
- (c) whether they thought they could have done better with a different partner.

Subjects were also asked to rate (in D) whether their previous partnership (on the maze task) with the other 'prisoner' affected their decisions on the Prisoner's Dilemma Game. It was hoped that these measures might give an indication as to whether the condition manipulations had succeeded.

In Questionnaire C the Subjects were asked to articulate the strategy they had used in making their choices on the matrices, as another possible source of useful information.

#### 4.3. Design

##### 4.3.1. Control study

A simple two group design was used. In this study, the terms, 'Delta' and 'Gamma' were used as category names without any status connotation. All the dependent variables discussed below were analyzed in this design.

##### 4.3.2. Main study

A 3x2x2 factorial design was used. The variables manipulated were:  
A. Cooperation - No Cooperation (N.C.); Cooperation with a member of the Ingroup (C.I.); and Cooperation with a member of the Outgroup (C.O.).

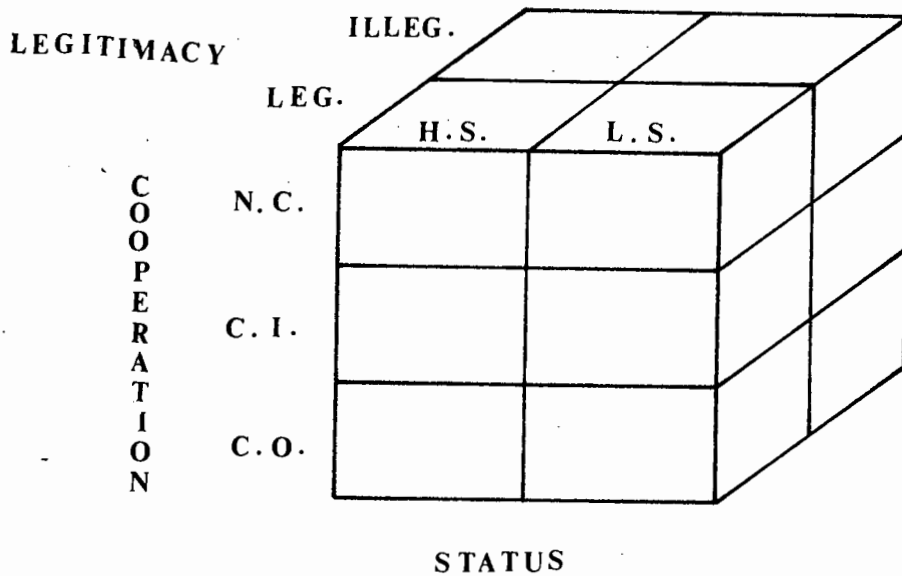
These conditions were established using the maze task. In the N.C. condition the task was done alone; in the C.I. condition the Subjects were told that their partner was a member of the same group (Gamma or Delta), and in the C.O. condition

the Subjects were told their partner was a member of the 'opposite' group.

B. Status - High Status (H.S.) and Low Status (L.S.). The status hierarchy was established through the personality traits associated with each group. As mentioned previously, the traits linked with Delta group had been assessed as more desirable those associated with Gamma group. The Delta group thus represented H.S. and the Gamma group L.S.

C. Legitimacy (of the status hierarchy) - Legitimate (Leg.) and Illegitimate (Illeg.). This condition was manipulated through the information given to the Subjects about the Barron-Welsh. In the Legitimate condition the Subjects were given to believe that the association of the personality traits with the groups was a well validated and replicated research finding. In the Illegitimate condition, Subjects were led to doubt this.

Figure 4-4. Main Study Design



4.3.3. Dependent variables

The following variables were measured using the appropriate matrices:

1. Ingroup Favouritism (Fav) - This is defined as the combination of Maximum Ingroup Profit (MIP) and Maximum Differentiation (MD). The I/O and O/I presentations of matrices A and B were used to measure this. The distance of the chosen box from the point of maximum fairness (i.e. midway between the 7th and 8th boxes) was calculated for each of these 4 matrices. The distance was counted as negative if this box gave more money to the outgroup member. The mean of these 4 scores represented the measure of degree of Ingroup Favouritism.
2. Pull of Maximum Differentiation on Maximum Joint Profit and Maximum Ingroup Profit (MD on MJP+MIP). This was assessed using the I/O and O/I presentations of matrix C. The measure of the degree of this pull was the difference between the boxes chosen on the two presentations. This score was negatively signed if

the outgroup was favoured.

3. Pull of Ingroup Favouritism on Fairness (Fav on F). This was assessed using the I/O and O/I presentations of matrix D. The degree of this pull was again measured as the difference between the boxes chosen on the two presentations. A negative score occurred if the difference favoured the outgroup.
4. Pull of Ingroup Favouritism on Maximum Joint Profit (Fav on MJP). The I/O and O/I presentations of matrix E was used for this variable. The degree of pull was measured as the difference between the choices on the two presentations, with the negative indicating that the outgroup was favoured.

A detailed illustration of the method of calculating these variable scores is given in Appendix C.

5. Competitiveness. This fifth variable was assessed as the number of times the Subject chose to confess on the Prisoner's Dilemma Game. In this game, competitiveness is the inverse of cooperativeness.

#### 4.4. Procedure

Subjects were tested individually during the course of an afternoon, with approximately 10 being tested concurrently. As far as possible, Subjects were prevented from seeing one another. Their times of arrival were staggered and they were discouraged from leaving the room in which they were placed. Their progress through the stages of the experiment was monitored using signal lights located outside their rooms. As they finished each task the Subjects would switch on the signal and wait.

Each Subject experienced a similar sequence of events. On arrival

they were given a brief introduction and taken to a room, where they completed the Barron-Welsh Art Scale. This was then removed - allegedly to be scored - and they were left to answer Questionnaire A.1. When finished, the Experimenter entered and explained the function of the Barron-Welsh Scale. In the Control condition this was an account of how the Scale distinguishes between two types of artistic potential termed Delta and Gamma. Care was taken not to allow any connotation of value to be associated with the terms. Control Subjects were taken to do the maze task immediately after the explanation. In the main study, this explanation included a description of the personality traits correlated with the Delta and Gamma artistic potentials, thus establishing the status hierarchy. These Subjects were then given Questionnaire A.2 to complete.

Before taking the Subjects to do the maze task, the Experimenter informed them that their Barron-Welsh responses had been scored and specified the group, Gamma or Delta, to which they belonged. Subjects were actually assigned to these randomly. At this point, Subjects in the Illegitimate condition were told that there was some 'controversy' surrounding the Barron-Welsh Scale, and a number of criticisms which threw doubt onto the validity of the Scale were listed. Subjects were then taken to one of the computer rooms (A or B) to do the maze task.

The Subjects in the Control and No Cooperation conditions performed the task alone, observing the maze on the television screen. In the Cooperation conditions two Subjects performed the task in partnership. These Subjects were told their partners were either members of the same group or of the other group, depending on whether they were in the C.I. or C.O. condition. On completion

the Subjects were returned to one of the original testing rooms and given Questionnaire B to answer.

The Experimenter next brought in the matrix booklet and demonstrated its use with two surrogate pages. It was emphasized that this was the method by which the Subjects' money was to be allocated. In the maze task and the Prisoner's Dilemma Game the rewards were calculated as a percentage of this basic allocation. This was intended to enhance the relevance of the matrix task. The surrogate pages contained matrices which did not appear in the booklet and which were addressed to members of groups called 'X' and 'Y'. When Subjects finished the matrices, the booklet was removed and they were given Questionnaire C to complete.

In the next task, the Prisoner's Dilemma Game, Subjects in the Control and No Cooperation conditions were told that they would be randomly paired with another Subject. In the Cooperation conditions they were told the other 'Prisoner' was the same person with whom they had done the maze task. Questionnaire D was completed when the booklet had been removed.

When they had completed D, the Subjects in the Control condition were informed of the personality traits correlated with the groups. They were then given Questionnaire A.2 to complete. This made their experience equivalent with the other students, enabling them to do the required assignment.

In conclusion, the Subjects were asked to complete Questionnaire E at home. When all the testing was finished a debriefing meeting was held. Subjects were informed of the deceptions involved and the true hypotheses of the study discussed. Their earnings from the experiments, which were calculated as specified, were

distributed along with details of how long they had taken to do the mazes (with the number of errors); how much they had been allocated, and how much they had won or lost in the Prisoner's Dilemma Game.

The different conditions specified in the design were, by necessity, arranged in a systematic fashion. The Control study was completed first. The Legitimate conditions were tested next, followed by the Illegitimate conditions. It would have been preferable to randomize these conditions, but this was not feasible due to the risk that a tested Subject might tell a prospective Subject the details of the study. Such a disclosure is unlikely to have contaminated the results under this arrangement.

## 5. RESULTS

### 5.1. Control study

For each of the dependent variables, an independent t test was performed to test for a significant difference between Delta and Gamma. Single sample t tests were also used to establish whether the variables 'existed', ie. were significantly greater than 0. The scores of the two groups were combined for this analysis.

The results are arranged on the graph and table below.

Figure 5-1. Control Study: Variable Means

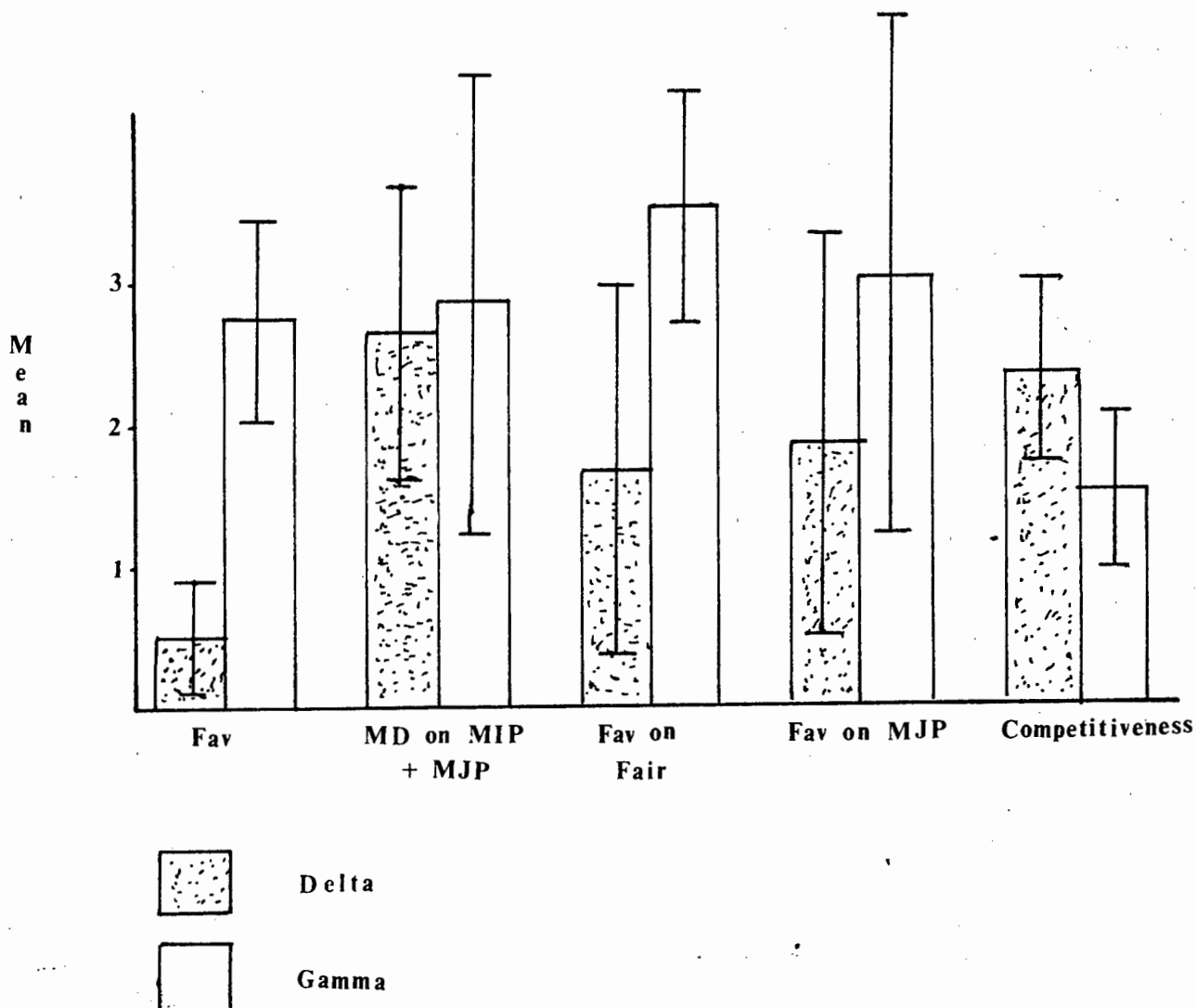


Table 5-1. Control Study: T Test Results

	Delta	Gamma	Combined Mean	T test (2 samples)	T test (1 sample)
<u>1. Ingroup Favouritism</u>					
Mean	0.5000	2.7500	1.6250	t=1.8904 +	t=2.4581 *
S.D.	(1.6279)	(2.4187)	(2.2900)	df=10	df=11
<u>2. Pull of MD on MJP+MIP</u>					
Mean	2.6667	2.8333	2.7500	t=0.0602	t=2.0822 +
S.D.	(3.7238)	(5.6716)	(4.5751)	df=10	df=11
<u>3. Pull of Fav on F</u>					
Mean	1.6667	3.5000	2.5833	t=0.8287	t=2.3694 *
S.D.	(4.6332)	(2.8107)	(3.7769)	df=10	df=11
<u>4. Pull of Fav on MJP</u>					
Mean	1.8333	3.0000	2.4167	t=0.3535	t=1.5263
S.D.	(5.1153)	(6.2610)	(5.4848)	df=10	df=11
<u>5. Competitiveness</u>					
Mean	2.3333	1.5000	1.9167	t=0.6670	
S.D.	(2.3381)	(1.9748)	(2.1088)	df=10	
+p<0.10    *p<0.05    **p<0.01    (2-tailed)					

None of the variables indicate a difference between the Delta and Gamma groups at the 5% level of significance, though Ingroup Favouritism does come close (t=1.8904; p=0.088). Ingroup Favouritism; pull of MD on MJP+MIP and Competitiveness are all significantly greater than 0. The pull of Fav on MJP is not greater than 0 (t=1.526; p=0.155), and the pull of MD on MJP+MIP just fails to be significant at the 5% level (t=2.0822; p=0.061).

## 5.2. Main study

Each of the dependent variables was analyzed using a simple 3-way ANOVA, using the method for unweighted means to account for the discrepancy in cell size (Kirk, 1968).

### 5.2.1. Ingroup Favouritism

Table 5-2. Fav: Means and Standard Deviations

		B1 Delta (H.S.)		B2 Gamma (L.S.)	
		C1 Leg.	C2 Illeg.	C1 Leg.	C2 Illeg.
A1	N.C.	0.7778 (2.1413) 9	0.4091 (2.2144) 11	1.5278 (2.4731) 9	-0.5000 (1.7480) 10
A2	C.I.	0.5556 (0.4468) 9	1.6136 (1.7477) 11	1.1111 (1.3982) 9	0.4500 (1.6236) 10
A3	C.O.	0.2222 (0.8966) 9	0.5000 (2.6190) 9	1.3611 (2.1254) 9	0.2500 (2.6605) 9

Table 5-3. Fav: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	3.3547	2	1.6773	0.4413
B (Status)	0.0117	1	0.0117	0.0031
C (Legitimacy)	6.3153	1	6.3153	1.6614
AB	2.7865	2	1.3932	0.3665
AC	9.2549	2	4.6275	1.2174
BC	17.8845	1	17.8845	4.7050 p<0.05
ABC	0.1462	2	0.0731	0.0192
ERROR	387.7212	102	3.8012	

The F ratio for the interaction between Status and Legitimacy is significant at the 5% level. No effect due to Cooperation is apparent. The interaction was investigated with an analysis of simple main effects.

Table 5-4. Fav: Legitimacy/Status Means

	High Status	Low Status
Legitimate	0.5185	1.3333
Illegitimate	0.8409	0.0667

Figure 5-2. Graph of Legitimacy/Status Mean Profiles

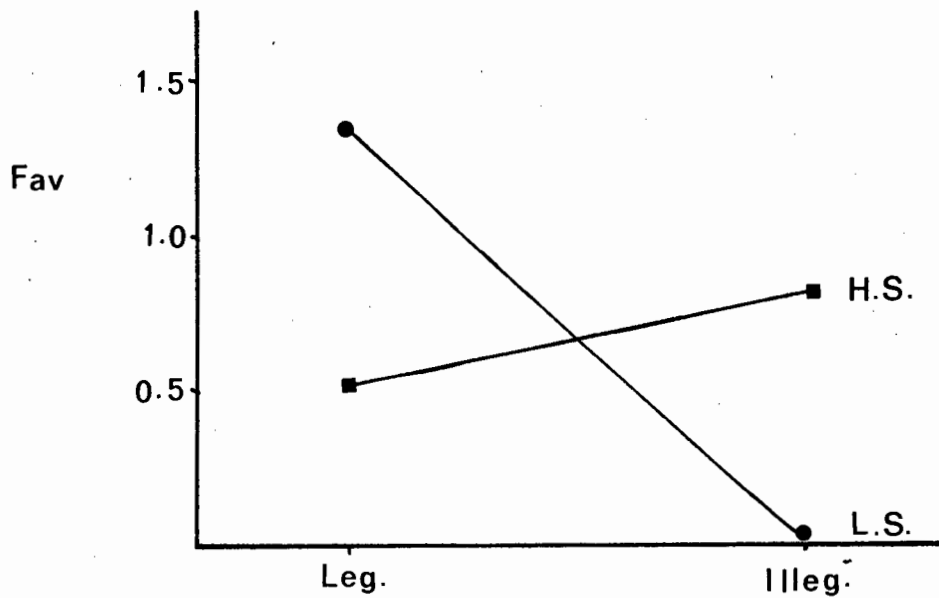


Table 5-5. Fav: Analysis of Simple Main Effects

SOURCE	SS	DF	MS	F
B AT C 1	9.4047	1	9.4047	2.4741
B AT C 2	8.4914	1	8.4914	2.2339
C AT B 1	1.4723	1	1.4723	0.3873
C AT B 2	22.7275	1	22.7275	5.9791 p<0.025
ERROR	387.7212	102	3.8012	

The analysis of simple main effects indicates a significant difference ( $F=5.9791$ ;  $p=0.016$ ) between the Legitimate and Illegitimate conditions of the Low Status group, the Illegitimate group showing less Ingroup Favouritism. There was no such trend with the High Status group. The Legitimate Low Status group exhibited more Favouritism than the Legitimate High Status group, but this failed to reach significance ( $F=2.4741$ ;  $p=0.12$ ). The Illegitimate High Status group exhibited more Favouritism than the Illegitimate Low Status group, but again this did not reach significance ( $F=2.2339$ ;  $p=0.138$ ).

5.2.2. Pull of MD on MJP+MIP

Table 5-6. MD on MJP+MIP: Means and Standard Deviations

		B1 Delta (H.S.)		B2 Gamma (L.S.)	
		C1 Leg.	C2 Illeg.	C1 Leg.	C2 Illeg.
A1	N.C.	1.4444 (3.0459) 9	-1.7273 (4.5627) 11	1.2222 (4.4096) 9	-1.9000 (5.5668) 10
A2	C.I.	0.3333 (2.0616) 9	1.2727 (3.7173) 11	0.0000 (2.5981) 9	-0.3000 (2.1628) 10
A3	C.O.	0.0000 (5.6347) 9	0.8889 (5.6224) 9	-0.4444 (0.8819) 9	-0.3333 (4.0311) 9

Table 5-7. MD on MJP+MIP: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	6.0708	2	3.0354	0.1902
B (Status)	12.3887	1	12.3887	0.7761
C (Legitimacy)	17.0494	1	17.0494	1.0680
AB	3.1148	2	1.5574	0.0976
AC	79.8002	2	39.9001	2.4995 p<0.10
BC	3.0469	1	3.0469	0.1909
ABC	2.0136	2	1.0068	0.0631
ERROR	1628.2525	102	15.9633	

The interaction between Cooperation and Legitimacy is significant at the 10% level ( $F=2.4995$ ;  $p=0.087$ ). Although this indicates that the probability of a Type I error is greater than is generally considered acceptable, it was decided to investigate further. The analysis of simple main effects was performed.

Table 5-8. MD on MJP+MIP: Cooperation/Legitimacy Means

	Legitimate	Illegitimate
N.C.	1.3333	-1.8136
C.I.	0.1667	0.4864
C.O.	-0.2222	0.2778

Figure 5-3. MD on MJP+MIP: Graph of Cooperation/Legitimacy Means

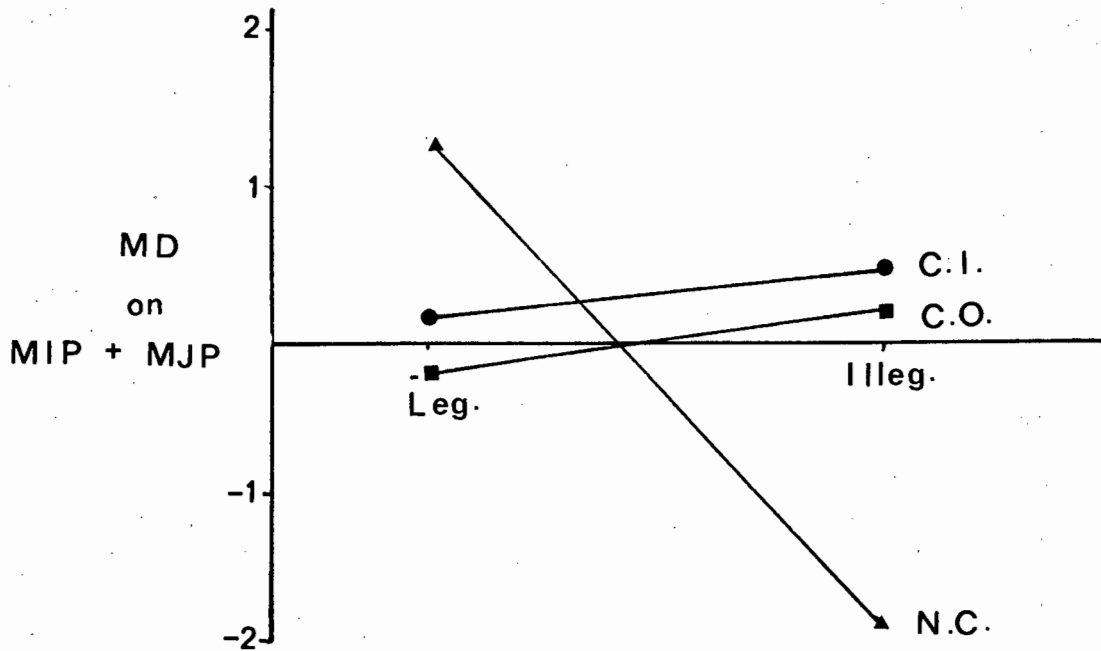


Table 5-9. MD on MJP+MIP: Analysis of Simple Main Effects

SOURCE	SS	DF	MS	F	
A AT C 1	24.7553	2	12.3777	0.7754	
A AT C 2	61.1157	2	30.5579	1.9143	
C AT A 1	93.5235	1	93.5235	5.8587	p<0.025
C AT A 2	0.9652	1	0.9652	0.0605	
C AT A 3	2.3609	1	2.3609	0.1479	
ERROR	1628.2525	102	15.9633		

In the No Cooperation conditions, the Legitimate groups exhibited

a significantly greater pull of MD ( $F=5.8587$ ,  $p=0.017$ ) than the Illegitimate groups. The mean of the Illegitimate groups is strongly negative, implying that there was a tendency to discriminate in favour of the outgroup.

5.2.3. Pull of Fav on F

Table 5-10. Fav on F: Means and Standard Deviations

		B1 Delta (H.S.)		B2 Gamma (L.S.)	
		C1 Leg.	C2 Illeg.	C1 Leg.	C2 Illeg.
A1	N.C.	0.0000 (2.0000) 9	1.2727 (5.9681) 11	2.5556 (4.3044) 9	0.1000 (5.0651) 10
A2	C.I.	0.4444 (3.8115) 9	1.7273 (3.7707) 11	1.6667 (3.2404) 9	1.3000 (4.2439) 10
A3	C.O.	1.4444 (5.6372) 9	0.4444 (4.7987) 9	2.2222 (3.9299) 9	0.2222 (1.7873) 9

Table 5-11. Fav on F: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	1.7915	2	0.8958	0.0491
B (Status)	5.8795	1	5.8795	0.3225
C (Legitimacy)	8.3978	1	8.3978	0.4607
AB	0.8557	2	0.4278	0.0235
AC	18.1349	2	9.0675	0.4974
BC	32.0106	1	32.0106	1.7560
ABC	9.5905	2	4.7953	0.2631
ERROR	1859.3636	102	18.2291	

The factors do not appear to have any affect on the pull of Ingroup Favouritism on Fairness.

5.2.4. Pull of Fav on MJP

Table 5-12. Fav on MJP: Means and Standard Deviations

		B1 Delta (H.S.)		B2 Gamma (L.S.)	
		C1 Leg.	C2 Illeg.	C1 Leg.	C2 Illeg.
A1	N.C.	0.3333 (2.0616) 9	0.9091 (3.2697) 11	2.5556 (4.6128) 9	3.0000 (3.5590) 10
A2	C.I.	-0.2222 (1.0929) 9	1.2727 (4.5627) 11	1.0000 (2.0000) 9	0.4000 (5.6999) 10
A3	C.O.	0.7778 (2.9907) 9	1.5556 (5.2228) 9	3.0000 (5.2915) 9	-1.1111 (5.0360) 9

Table 5-13. Fav on MJP: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	22.5654	2	11.2827	0.6834
B (Status)	14.0025	1	14.0025	0.8482
C (Legitimacy)	1.5828	1	1.5828	0.0959
AB	30.6721	2	15.3361	0.9289
AC	28.9975	2	14.4988	0.8782
BC	39.8403	1	39.8403	2.4132
ABC	26.9901	2	13.4950	0.8174
Error	1683.9354	102	16.5092	

None of the F ratios reach significance.

5.2.5. Competitiveness

Table 5-14. Competitiveness: Means and Standard Deviations

		B1 Delta (H.S.)		B2 Gamma (L.S.)	
		C1 Leg.	C2 Illeg.	C1 Leg.	C2 Illeg.
A1	N.C.	2.0000 (1.8708) 9	2.7273 (1.9022) 11	1.3333 (1.5000) 9	2.4000 (2.1187) 10
A2	C.I.	2.5556 (2.1858) 9	1.1818 (1.6624) 11	2.2222 (2.0480) 9	2.4000 (1.8379) 10
A3	C.O.	1.0000 (1.2247) 9	2.5556 (1.5899) 9	2.2222 (1.3017) 9	2.1111 (1.7638) 9

Table 5-15. Competitiveness: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	0.4396	2	0.2198	0.0694
B (Status)	0.3519	1	0.3519	0.1111
C (Legitimacy)	3.2828	1	3.2828	1.0365
AB	5.2571	2	2.6286	0.8299
AC	12.6177	2	6.3088	1.9919
BC	0.0396	1	0.0396	0.0125
ABC	12.4736	2	6.2368	1.9691
ERROR	323.0626	102	3.1673	

Competitiveness does not appear to be affected by any of the factors.

#### 5.2.6. Homogeneity of variance

The large error variances evident in most the dependent variables appear to have obscured much of the effects. The seemingly large discrepancies in the size of the cell variances necessitate a check of the assumption of homogeneity of variance. The data are unlikely to be normally distributed, being discrete in nature, so a test which is not sensitive to this had to be used. This ruled out the more common tests; the F max or Cochran's C statistics (Scheffé, 1959; Kirk, 1968; Winer, 1971). Instead, a method described by Scheffé (1959; 83) was employed. Using this test, it was established that the assumption was not violated in any of the dependent variables. (See Appendix H).

### 5.2.7. Testing $H_0: \mu = 0$

A one sample t-test was used to test whether each of the dependent variables 'existed', i.e. was significantly greater than 0. A comparison with the Control groups was also made using a two sample t-test. The results of these indicate that all the dependent variables, with the exception of the pull of MD on MJP+MIP are significantly greater than 0. The contradictory finding with MD on MJP+MIP may be accounted for by the strong negative mean of the Illegitimate No Cooperation groups, which counterbalances the other positive means bringing the overall mean close to 0. None of the variables in the Main study were significantly different from those in the Control study.

The details of the results of these analyses are presented in Appendix H.

### 5.3. Concordance of group assignment

The occurrence of Fs so small that their reciprocals are significant or the occurrence of many Fs less than 1 in a single analysis of variance merits further consideration, however. Such findings suggest that the model underlying the analysis of variance has somehow been violated. A frequent occurrence is the presence of some systematic effect that is not described by the analysis of variance model and consequently is not accounted for in the analysis of the data.

(Myers, 1979: 75)

All the ANOVAs have a number of very small F ratios. Noting Myers' (1979) suggestion that another effect might be acting, it was decided to investigate the effect of the Subjects' self-assignments into the groups, Delta and Gamma. As recounted in the Method, prior to being told into which group their responses on the Barron-Welsh assigned them, the Subjects had been asked to record on Questionnaire A.2 the group into which "they

thought they would fall".

A frequency count showed that 55 of the subjects thought they would fall in Delta and 51 thought they would fall in Gamma. A Chi-Squared analysis showed that there was no <sup>significant</sup> difference between these frequencies ( $\chi^2=0.151$ ;  $p=.7$ ).

8 of the Subjects could not decide on one group. Most wrote that they felt they had some of both sets of traits. The scores from these Subjects were not used in the following analyses.

A 2-way ANOVA was used to investigate whether the Subjects' agreement or disagreement with the group in which they were placed affected the dependent variables. Unfortunately, the numbers falling into the cells were considerably disproportionate, so a Multiple Linear Regression technique was used to produce the ANOVA Summary Table. This technique which is described by Kerlinger and Pedhazur (1973; 188), makes adjustment for the correlations arising from the different cell sizes.

5.3.1. Ingroup Favouritism

Table 5-16. Fav: Means and Standard Deviations

	High Status	Low Status
In Agreement	0.3158 (0.9055) 38	1.1364 (2.2449) 33
In Disagreement	1.2500 (2.6385) 18	-0.0882 (1.8644) 17

Table 5-17. Fav: ANOVA Summary Table

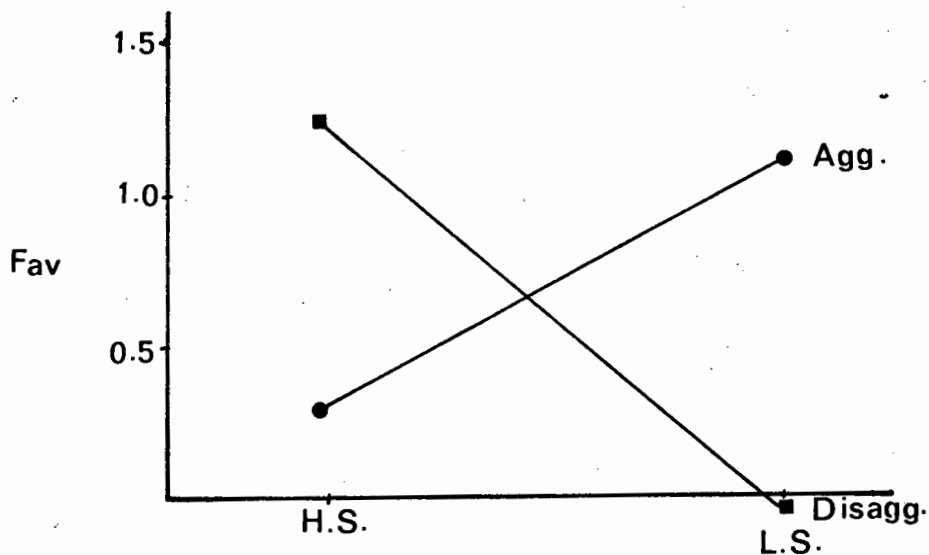
SOURCE	SS	DF	MS	F
A (Concordance)	0.2326	1	0.2326	0.0647
B (Status)	0.2957	1	0.2957	0.0823
AB	27.2535	1	27.2535	7.5856 p<.01
RESIDUAL	366.4658	102	3.5928	

The F ratio for the interaction between Status and Concordance is significant (F=7.5856; p=0.007). An analysis of simple main effects was performed.

Table 5-18. Fav: Analysis of Simple Main Effects

SOURCE	SS	DF	MS	F
A at B1	10.6565	1	10.6565	2.9670 p<.10
A at B2	16.8260	1	16.8260	4.6832 p<.05
B at A1	11.8933	1	11.8933	3.3103 p<.10
B at A2	15.6565	1	15.6565	4.3578 p<.05
RESIDUAL	366.4658	102	3.5928	

Figure 5-4. Fav: Graph of Cell Mean Profiles



The results indicate that in the High Status group, those who agreed with their membership showed less Ingroup Favouritism than those who did not ( $F=2.967$ ;  $p=0.088$ ). In the Low Status group those who agreed with their membership showed more Ingroup Favouritism than those who did not ( $F=4.6832$ ;  $p=0.033$ ) Of the Subjects who agreed with their group assignation, those in the Low Status group exhibited more Ingroup Favouritism than those in the High Status group ( $F=3.3103$ ;  $p=0.072$ ); whereas of those who did not agree with their group membership, Subjects placed in the High Status group exhibited more Ingroup Favouritism than those who were placed in the Low Status group ( $F=4.3578$ ;  $p=0.039$ ).

5.3.2. Pull of MD on MJP+MIP

Table 5-19. MD on MJP+MIP: Means and Standard Deviations

	High Status	Low Status
In Agreement	-0.2368 (4.3461) 38	-0.6667 (3.8134) 33
In Disagreement	1.5556 (4.1618) 18	0.1765 (3.8281) 17

Table 5-20. MD on MJP+MIP: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Concordance)	41.9557	1	41.9557	2.5276
B (Status)	14.6284	1	14.6284	0.8813
AB	5.2620	1	5.2620	0.3170
RESIDUAL	1693.1182	102	16.5992	

There is a trend for those who are not in concordance with the their group assignment to exhibit a greater degree of

differentiation than those who are in concordance ( $F=2.5276$ ;  $p=0.115$ ), though this does not reach significance. Inspection of the means show that it is, in fact, only the relatively large mean of the Subjects placed in the High Status group that leads to this trend.

5.3.3. Pull of Fav on F

Table 5-21. Fav on F: Means and Standard Deviations

	High Status	Low Status
In Agreement	0.8684 (4.2246) 38	1.7879 (4.7484) 33
In Disagreement	1.1667 (5.1134) 18	0.8235 (2.2426) 17

Table 5-22. Fav on F: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Concordance)	2.1943	1	2.1943	0.1174
B (Status)	6.6215	1	6.6215	0.3542
AB	9.3355	1	9.3355	0.4994
RESIDUAL	1906.8225	102	18.6943	

No effects are evident.

5.3.4. Pull of Fav on MJPTable 5-23. Fav on MJP: Means and Standard Deviations

	High Status	Low Status
In Agreement	0.8947 (3.1087) 38	1.7879 (4.6217) 33
In Disagreement	0.6667 (4.2565) 18	1.5882 (5.1607) 17

Table 5-24. Fav on MJP: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Concordance)	1.0786	1	1.0786	0.0620
B (Status)	21.4996	1	21.4996	1.2353
AB	0.0180	1	0.0180	0.0010
RESIDUAL	1775.2059	102	17.4040	

5.3.5. CompetitivenessTable 5-25. Competitiveness: Means and Standard Deviations

	High Status	Low Status
In Agreement	1.8684 (1.8184) 38	2.4242 (1.7145) 33
In Disagreement	2.5000 (1.7905) 18	1.4706 (1.6627) 17

Table 5-26. Competitiveness: ANOVA Summary Table

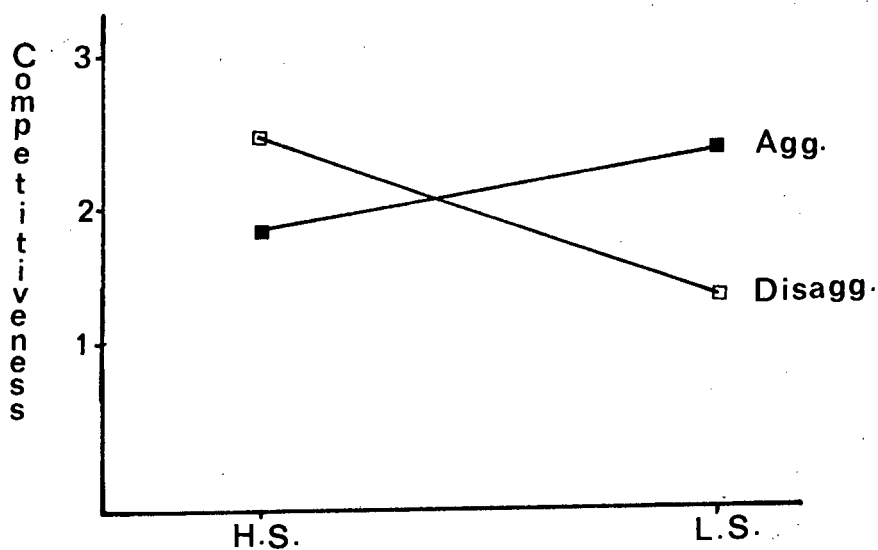
SOURCE	SS	DF	MS	F
A (Concordance)	0.3798	1	0.3798	0.1229
B (Status)	0.0264	1	0.0264	0.0086
AB	14.6955	1	14.6955	4.7565 p<.05
RESIDUAL	315.1374	102	3.0896	

The F ratio for the interaction between Status and Concordance is significant (F=4.7565; p=0.031). This was investigated with an analysis of simple main effects.

Table 5-27. Competitiveness: Analysis of Simple Main Effects

SOURCE	SS	DF	MS	F
A at B1	4.8725	1	4.8725	1.5771
A at B2	10.2029	1	10.2029	3.3024 p<.10
B at A1	5.4560	1	5.4560	1.7660
B at A2	9.2645	1	9.2645	2.9986 p<.10
RESIDUAL	366.4658	102	3.5928	

Figure 5-5. Graph of Cell Mean Profiles



Despite the interaction effect being significant at the 5% level ( $F=4.7565$ ;  $p=0.031$ ), none of the simple main effect F ratios reach this level of significance. The test for simple main effects is a more conservative test than the ANOVA. In the Low Status group, the Subjects who were in concordance with their placement exhibited a greater degree of competitiveness than those who were not ( $F=3.3024$ ;  $p=0.072$ ). Of the Subjects who were in disagreement with their group assignment, those placed in the High Status group exhibited more competitiveness than those placed in the Low Status group ( $F=2.9986$ ;  $p=0.086$ ).

Regrettably, the numbers in each cell are too small to allow an analysis of this variable (Concordance) together with the original three (Cooperation, Status and Legitimacy).

#### 5.4. Ratings on the subjective questionnaires

An analysis of four sets of ratings was made. They were:

1. Rating of how well Subjects felt they, personally had done on the maze.
2. Rating of how well Subjects felt they, with their partner had done on the maze.
3. Rating of how well Subjects thought they would have done with another partner.
4. Rating of whether Subjects felt they had been affected in the Prisoner's Dilemma Game by the fact that their partner was the same person with whom they had done the maze task.

A further analysis was done using the difference between their self-rating and their rating together with their partner. This difference was given a negative sign if the score indicated a

higher assessment was given to the partnership.

3-way anovas were performed on each of these, though the number of levels of factor A (Cooperation) varied. The No Cooperation conditions only yielded scores on the first rating. The only analysis which yielded any significance was on the first variable, the self-rating without the partner. The significant F ratio was for the A (Cooperation) main effect. The analysis of pairwise comparisons using the Tukey's HSD (Honestly Significant Difference) statistic indicated that subjects in the No Cooperation groups rated themselves lower than did both the Cooperation groups. There was no <sup>significant</sup> difference in the self-ratings made by the C.I. and C.O. groups. Details of these analyses are given in Appendix H.

#### 5.5. The fairness strategy

One of the questions asked the Subjects after filling in the Matrix booklet, was what strategy they had used. 55 of the Subjects stated unequivocally that they had been fair in their allocation of money. An analysis was done to see whether this was mirrored in their behaviour. An independent t-test determined that less Ingroup Favouritism was exhibited by these Subjects ( $t=3.4643$ ;  $p=0.001$ ). To check that large negative scores had not obscured the picture, a Chi-Squared test was used to see whether the proportion of these Subjects who had been fair was greater. If a Subject's score for Fav was between  $-0.25$  and  $+0.25$ , this was considered a fair response. The results indicate that more of the Subjects who claimed to be fair had actually been so, than of those who had made this claim ( $\chi^2=15.568$ ;  $p<0.001$ ).

## 6. DISCUSSION

### 6.1. Interpretation of the results

#### 6.1.1. The dependent variables

The control study was performed to check the efficacy of the Barron-Welsh procedure for creating groups that elicit ingroup bias. These created groups, Gamma and Delta, had no status or evaluative difference in this instance. The control study also provided a measure of the dependent variable for comparison with the main experiment, and with other studies using the same methodology.

The statistical analyses indicated that all the variables except the pull of FAV on MJP were significantly greater than 0. (The pull of MD on MIP + MJP just failed to reach the 5% critical level, but was taken as significant). Thus it was confirmed that:

- (a) the social categorization procedure had been sufficient to elicit ingroup bias (FAV);
- (b) the need for positive group distinctiveness was an important factor since the pull of maximum differentiation (MD) was significantly greater than the pull towards maximum gain (MIP + MJP).
- (c) ingroup bias (FAV) had a stronger pull than the 'norm' of fairness (F).

However, ingroup bias does not appear to be a stronger motive than that of maximum joint profit (MJP). This would seem to be in contradiction with the finding that MD has a greater pull than MIP

+ MJP. The reason for this may be the structure of the matrices themselves. In matrix C, which measures the pull of MD on MIP + MJP, the largest difference between the points to be distributed between the two recipients is 6 points, whereas in matrix E, measuring the pull of FAV on MJP, the largest difference is 18. It is likely that this pronounced difference made the 'social desirability' of fairness more salient, resulting in responses being pulled closer to the centre of the matrix. The countervailing influence of the fairness norm has been emphasized by a number of authors (Branthwaite et al, 1979; St Claire and Turner, in preparation). The failure to detect FAV over MJP using the same matrix was also recorded by Moscovici and Paicheler (1978).

No significant difference was found between the groups, Gamma and Delta on any of the dependent variables, though there was a trend for the Gamma group to exhibit more ingroup favouritism than the Delta group. This may possibly be explained in terms of the relative position of gamma and delta in the Greek alphabet. In this culture, it is fairly standard to assume that something graded with the symbol A is superior to something graded B, and so forth down the alphabet. Since gamma comes before delta, subjects may have assumed that gamma group was superior in some manner. This was not anticipated as a confounding factor in the main experiment since the active status manipulations would have over-ridden such a tentative assumption.

The means of the dependent variables in the main experiment, with the exception of the pull of MD on MIP + MJP, were all significantly greater than 0. This exception is explained by the strong negative scores of this variable in some of the conditions.

While the means of the control study are comparable in magnitude to those found in other studies using the same matrices (Tajfel et al, 1971; Billig and Tajfel, 1973; Turner, 1975), the means of the main experiment are seemingly smaller. No significant differences between the means of the control and main studies were indicated by the t-tests, but this may be due to the data parameters. The large discrepancies between the sample numbers (12 : 114) and between the size of the variances of the two sets of data may have decreased the power of the t-test. Moscovici and Paicheler (1978) also remarked that their means were not as high as those obtained by Tajfel and his associates. This may be accounted for by the effects of the factor manipulations.

#### 6.1.2. The main experiment

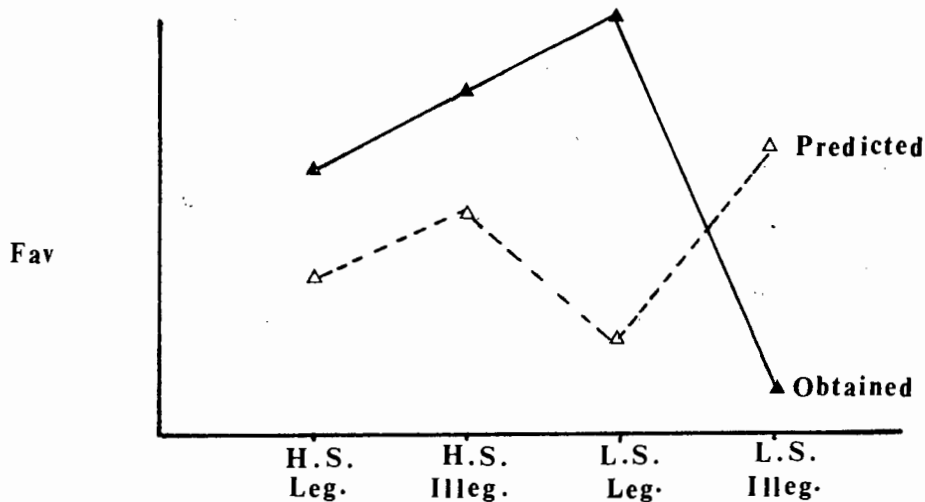
The 3-way ANOVAs investigating the effects of the factors; Cooperation, Status and Legitimacy gave significant results with only two variables - FAV and pull of MD on MIP + MJP.

##### Ingroup Favouritism

The factor, cooperation, had no effect on ingroup bias, either as a main effect or interacting with any of the other factors. Thus the hypothesized three-way interaction (ABC) was not supported. A significant interaction was found between Status and Legitimacy, but the pattern of differences did not reflect the expectations of the cognitive-motivational theory. Firstly, in the Legitimate conditions the Low Status group exhibited greater ingroup bias than the High Status group. Further, this was also significantly greater than the ingroup bias of the Illegitimate Low Status group, which was negligible. This was the reverse of the hypothesized outcome. The Illegitimate High Status group did

evidence stronger ingroup bias than the Legitimate High Status group as anticipated, but this difference was not statistically significant. The results' lack of congruence with the predicted outcome is illustrated in the graph below :

Figure 6-1. Comparison between predicted and obtained FAV results



From these results it would appear that most of the variability in the findings stem from the low status groups. A possible explanation for the negligible ingroup bias in the Illegitimate Low Status group may have been the implications that 'illegitimacy' held for the subjects. While the intention behind the concept was for the subjects to question the negative evaluation of their group, it is likely that subjects interpreted it as implying that they may have been mistakenly assigned to the Low Status group. This would, predictably, lead to low ingroup favouritism. The high ingroup bias of the Legitimate Low Status group may be attributed to a number of factors:

(1) It is possible that 'insecurity of status' was implicitly held by subjects. This notion is supported by a number of comments made on the subjective questionnaires expressing doubt that personality traits could be neatly parceled out in the manner described;

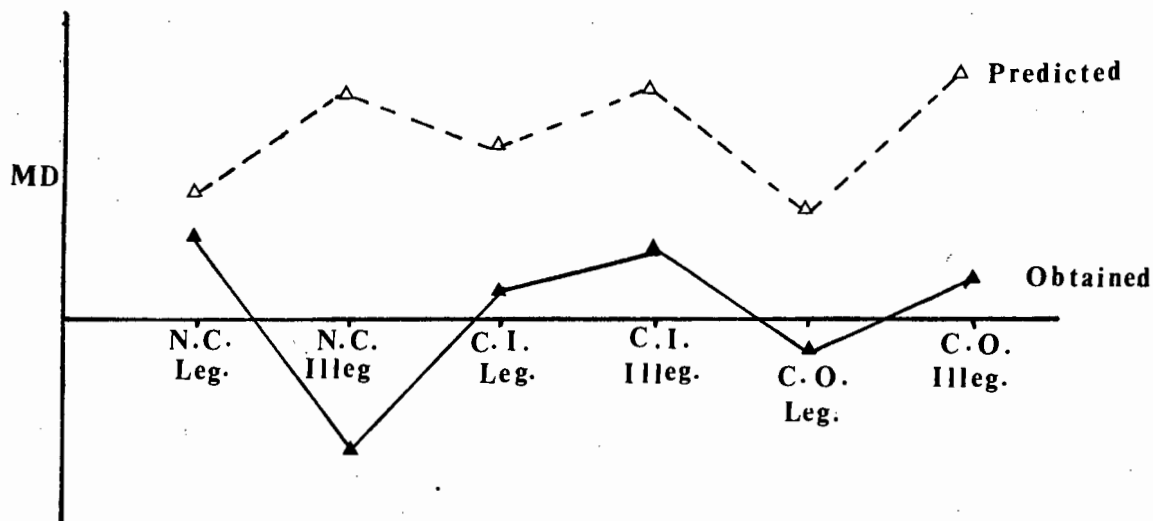
(2) the Low Status group was ascribed with qualities such as 'practicality' and 'competence'. It is possible that these subjects felt that their ascribed characteristics placed them at an advantage over the high status group on the maze task hence leading to a dimension of superiority. Unfortunately, this was not supported by the self ratings on the subjective questionnaires.

Thus, the results on ingroup bias have failed to support any of the hypothesis.

Pull of Maximum Differentiation on Maximum Joint Profit and Maximum Ingroup Profit

The interaction between Cooperation and Legitimacy was significant at the 10% level. This was considered worthwhile investigating as this study on cooperation is essentially exploratory, so it is preferable to make a Type I error rather than a Type II error. No effect due to status was found. The results indicate that the No Cooperation groups behaved differently from those in the two Cooperation conditions. In the No Cooperation condition the Legitimacy conditions exhibited higher MD scores than the cooperation condition, though this did not reach significance. But the No Cooperation Illegitimate groups displayed less ingroup bias than the other Illegitimacy conditions - they in fact displayed bias towards the outgroup.

Comparing the results with those expected under the hypothesis, it can be seen that the intra- and inter-group Cooperation conditions do slightly mirror the expectations, though this tendency was not statistically significant.

Figure 6-2. Comparison between predicted and obtained MD results.

The unexpected finding of note was the bias on the part of the Illegitimate Cooperation groups. Surprisingly, Intragroup Cooperation did not increase outgroup discriminations (relative to No Cooperation) as was found in other studies (Dion, 1973; Louche and Magnier, 1978). The tendency for Intergroup Cooperation to reduce outgroup discrimination in the Illegitimacy conditions (where the salience of group distinction is higher) supports the hypothesis, though it is reiterated that due to the high error variance this is not statistically significant. The unexpected findings in the No Cooperation conditions reflect similar trends to those found with variable FAV, hence similar causative factors may be assumed.

### Competitiveness

The Prisoner's Dilemma game was used to investigate whether the factors affected the choice of the competitive versus cooperative strategy. The overall means of both the control and main study indicate that fewer competitive choices were made than cooperative (though this was not statistically testable). No effect due to any of the factors emerged. It had been anticipated that, in the very

least, there would be less competitive choices when the partner was a member of the ingroup as compared to when the partner was a member of the outgroup. This outcome had been obtained, using the Prisoner's Dilemma game, by Wilson and Robinson (1968).

It may be significant that the only variable which was even slightly affected by the variable, cooperation, was MD on MIP+MJP. This measure isolates the aspect of ingroup bias relating to the desire for the ingroup to 'win' over the outgroup which Turner (1975a, 1978a) terms social competition. This may indicate that the effect that cooperation has on real competition (i.e. MIP) differs from its effects on social competition. This suggestion may account for the contradictory findings of the research on cooperation.

### 6.1.3. Concordance with group assignment

Prior to being told to which group their responses on the Barron-Welsh determined they belonged, subjects predicted their membership on the basis of the personality traits characterizing the groups. The concordance between their prediction and assignment gives a measure of subjective identification with the group membership.

The effect of concordance and status of the group on the various dependent variables was analysed using a 2-way ANOVA. The small numbers and their uneven distribution between the cells made simultaneous consideration of the other factors impossible. Significant results were obtained on two variables ingroup favouritism and competitiveness.

### Ingroup favouritism

The results indicate a different pattern of bias depending on whether or not subjects were in agreement with their group assignment (i.e. identified with their group). When there was concordance, the Low Status group exhibited more ingroup bias than the High Status group, whereas when there was not concordance the reverse was the case. A very interesting finding was the high ingroup bias of the subjects who were placed in the High Status group when they believed they should be in the Low. This may be explained as an instance of marginal group membership (Breakwell, 1978, 1979). Breakwell (1979) defined marginal group members as people who "do not truly fulfil the external criteria of group membership; they merely pretend to so do" (pp 141). Although the issue of pretense is not applicable in this case, the subjects are marginal in the sense that they do not perceive themselves as really belonging to the group, but having been assigned a desirable group they would wish to retain membership. The exaggerated degree of intergroup discrimination is a characteristic of marginal identity (Breakwell, 1978, 1979; Mann, 1974).

For those subjects who disagreed with their placement in the Low Status group, there was no motivation to accept this group membership. Hence, the negligible ingroup bias, and in fact slight outgroup bias, was predictable.

The concordant high status group fits the description of a nomic majority; a high status group with secure social identity, hence the relatively low ingroup bias concurred with the expectations of Moscovici and Paicheler (1978).

The high ingroup bias of the Concordant Low Status groups may be explained in a number of ways:

(1) It is possible that those subjects who were in the Illegitimate conditions elevated the scores as anticipated by the theory;

(2) The perceived superiority on the maze task, as mentioned earlier, may have been a contributing factor;

(3) some of the responses on the subjective questionnaire pointed to the possibility that some subjects perceived the Gamma group traits as exemplifying scientific people. In view of the superior status of science in this society, this would counteract the supposed lower status of Gamma group by creating a new dimension of comparison - artistic versus scientific. Hence the high ingroup bias may represent assertive distinctiveness.

#### Competitiveness

The results of this analysis showed a similar pattern to that of ingroup favouritism, though the differences were less pronounced. However, it cannot be stated that the degree of competitiveness was a measure of ingroup bias in this case since each condition contained instances where the partners were members of both the ingroup and outgroup. A possible interpretation is that the other factors, especially Intergroup Cooperation, influenced the scores.

It is unfortunate that a combined analysis of the effects of this factor of group identification, together with those of cooperation, status and legitimacy, could not be made. The various findings indicate that all four factors do affect intergroup bias, but it is only through a synthesis that a complete understanding of their interactive relationship can be reached. It is hoped that a future research project will achieve this.

#### 6.1.4. Subjective ratings

Analyses of the ratings of performances on the maze task produced only one significant result. It was found that subjects in the No Cooperation conditions rated their personal performance lower than did the subjects in both Cooperation conditions. This may have been because these subjects had direct visual feedback on the success of their performance and so formed a more realistic appraisal. It may also be hypothesized that the partnership in the Cooperation conditions led to diffusion of responsibility, hence the subjects could rate themselves higher.

In retrospect, it is questionable whether any real information could have emerged from the rating scales as they were structured. There are too many possible explanations as to why a rating is low or high, eg. a high rating by a member of a low status group could indicate high self confidence because (a) s/he rejected the negative status of the group; or (b) the traits ascribed to Gamma - practicality and competence - made her/him feel particularly capable on tasks such as this.

A more direct means of measuring the subjects perception of and responses to the manipulations would have been more useful. Unfortunately, the problem of disclosure (to subsequent subjects) prohibited the use of direct probing.

#### 6.1.5. Fairness

48% of the subjects claimed to have used the fairness strategy on the matrix task. But this was reflected in the actual choices of just over half (28%). This would seem to support Turner's (1980) argument that fairness is not as important an influence as

Branthwaite et al (1979) proposed.

## 6.2. Evaluation of the findings

The results of this study cannot be evaluated without considering the success of the experimental manipulations which produced the independent variables. The status hierarchy was established by using the Barron-Welsh Art Scale to define two groups which were characterized by two sets of personality traits, the one more favourable than the other. A similar technique was used by Moscovici and Paicheler (1978), who used the Riguet's test of the trees to establish two groups, one having high creativity the other low. In this study ethical considerations prevented the use of grossly negative traits for the low status group, so it may be queried whether the status hierarchy was clearly perceived. At the debriefing session, subjects were asked whether they perceived the Delta group as a 'better' group. Only nine admitted to not thinking this. It could also be argued, in a somewhat tautological fashion, that the results of the Concordance/Status analysis demonstrated that a hierarchy must have existed.

However, the use of personal characteristics as dimensions, on which the status of minimal groups are established, presents a major problem. Subjects do have perceptions of what their attributes are, so in certain circumstances they are being expected to accept and identify with an image which is not congruent with their present self-image. This problem of identification with the assigned group emerged as a clear extraneous variable in this study. There has been little research on the manner in which subjective identification with the ingroup affects intergroup relations. However, there are two findings

worthy of note:

(a) Breakwell's (1978, 1979) work on marginal group identity which indicated that the extent to which a person feels part the group influences their intergroup behaviour. The study by Thibaut (1950) lends support for this notion.

(b) The work of Zavalloni (1971, 1975) which indicates that people can identify with a group yet not accept that they share the attributes of that group.

These studies point to the immense difficulties involved in understanding subjective group identification, even before attempting to experimentally manipulate it. However, Turner and Brown (1978) managed to circumvent this problem by using 'naturally' occurring groups, art students and science students, and associated the status dimension with these groups. This ensured that the subjects identified with their groups.

While the above discussion has focused on the problem of identification with groups in experimental situations, it is important to recognize that the root of the problem lies in the lack of conceptual clarity of this variable at a theoretical level. This lack was pointed out earlier, in the overview of the cognitive motivational theory, and is reinforced by the results of this study.

The manipulation of the variable, Legitimacy, also presented a difficulty. In accordance with the theoretical definition of Illegitimacy, the aim of the manipulation was to make subjects doubt the evaluation of their group. However, there were strong indications that the manipulations may have, instead, caused subjects to doubt whether they were correctly classified, which establishes a different set of conditions from those hypothesized.

Thus, while the results of the Status - Legitimacy (No Cooperation) aspect the study do not lend support for Tajfel's cognitive motivational theory of intergroup relations, they cannot be said to confute the theory. The discussed problems with the variable manipulations make it questionable whether the actual precepts of the theory were tested. However, the results do call attention to the need for a rigorous definition of the experimentally created variables. It also reinforces the need for further replicatory studies, both within and without the laboratory.

The study failed to illuminate the effect of the variable, cooperation, which was considered within the framework of the cognitive - motivational theory. Again, because of difficulties with the experimental manipulations, it would be incorrect to discount cooperation as an unimportant variable. A number of aspects concerning the way the variable was constructed within the experiment should be noted. Firstly, most other studies used face-to-face encounters between groups to establish cooperation. There was no interpersonal contact at all in this study. Secondly, this experiment used only one cooperative endeavour between groups. Worchel (1979) suggested that a number of cooperative contacts are required before its influence is felt. Thirdly, all the previous research examined measured the outcome of intergroup cooperation in terms of attitude towards the outgroup. This study used allocation of money. Finally, it is possible that subjects did not perceive themselves as cooperating with their partner since there was no direct interpersonal contact. In fact, a few subjects did voice the doubt that there was another subject in the next room. These points may account for the apparent lack of influence of this factor, and must be

considered for further research.

The post-experimental questionnaires gave no indications that the subjects had responded to any demand effects. However, while excluding direct demand effects, this does not negate the influence of the experimenter :

... the form of experimenter influence is not a trivial one ; it is not as if the experimenters have given the subjects an order and the subjects obeyed it. Rather, as has already been shown, one of several response possibilities has been used by the subjects in a situation specifically designed by the experimenters. Instead of invalidating the results, the role of the experimenter seems to define the sort of theoretical problems, to which the minimal intergroup experiments can be addressed. These problems relate to the power of a prestigious authority to create group divisions, which can be counter to the objective material interests of those who are so divided .... Thus questions can be asked about the minimal conditions under which authority can create a false consciousness based upon a group identification.

(Billig, 1976: 356)

### 6.3. Limitations of this study

The main limitation of this study lies in its uncertain realization of the independent variables. As discussed previously, it not known whether the manipulations did produce the desired perceptions in the subjects. While this is a problem inherent in most experimental studies, it presents particular difficulties in studies such as this, where an attempt to consolidate or monitor the subjects' perceptions would influence their subsequent behaviour.

A high preponderance of the subjects were in agreement with their group assignment (71 were in agreement, 33 were not). This may imply that the control procedure used was not rigorous enough. Although the experimenter was overtly blind to the group membership of the subject at the time of describing the

characteristics of the Delta and Gamma - the random assignment of the subjects into groups had taken place some time before the experiment - a subliminal memory of the membership of some of the subjects may have remained. This may have resulted in the Gamma group being presented in a favourable light (via vocal intonation, etc.), as concern over the possible detrimental effects that low status assignment would have on the subjects was present throughout the experiment. However, it is more likely to have been a chance factor in the sampling variation.

The subjects were first year psychology students, constituting a non-random sample. Although the use of such subjects is extremely common in psychological research, this does not detract from the problems implicit in this practice. Rosenthal (1970b), among others, argued that these subjects have certain features which limit the generalizability of the results.

It was previously suggested that the sequence in which the experimental conditions were tested prevented contamination of results in the event of an experienced subject divulging the procedure to a naive subject. Although direct contamination was avoided it remains likely that any preliminary disclosure would have influenced subjects' behaviour in some manner.

In summary, it seems that to avoid the problems mentioned: ethical concerns, subject effects, possibility of disclosure, etc., it is necessary to use a truly random sample drawn from the general population. Practical considerations, unfortunately, militated against such a procedure.

#### 6.4. Implications for theory and future research

The methodological problems of this study precludes it standing as a valid test of the stated hypotheses. While not contributing directly to a theoretical understanding of intergroup relations, this study has raised certain issues:

1. The study illustrated the difficulties of manipulating variables in the laboratory situation. The problems emerged on two levels. Firstly, there had to be congruence between the conditions established and the subjects' perceptions of the conditions; and secondly, there had to be congruence between the theoretical definition of the condition and the experimental reality. Both requirements were difficult to ensure, and difficult to monitor. Future research in this area must endeavour to solve these issues.
2. The experiment underlined the need for theoretical and practical research into the concept of subjective identification with group membership. This indicates a necessary direction which research on intergroup relations should take.
3. The importance of ethical considerations when working with human subjects, and the limitations imposed by this was stressed.
4. The research also emphasized a recurring theme in psychology - the need for replication studies.

#### 6.5. Conclusion

This research endeavoured to investigate the influence of cooperation on intergroup relations. The motivation behind this

was an interest in understanding the position of women as a minority group. While it is emphasized that cooperation is not necessarily the only factor, nor the the most important, that distinguishes women from other minority groups, it represents a starting point in this analysis. The study has not produced any hypotheses as to how, why or whether cooperation influences ingroup bias, but it does suggest that a careful distinction be made between its effects on the realistic competitive and the social competitive aspects of intergroup discrimination.

Finally, it is clear that this research reinforces the call for a closer alignment between theory and research in the social psychology of intergroup relations.

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## APPENDICES

A: Instructions to subjects.

B: Maze task.

C: Matrices.

D: Prisoner's Dilemma Game.

E: Subjective questionnaires.

F: Raw data.

G: Programmes for data analysis.

H: Analyses not presented in the Results chapter.

APPENDIX A

INSTRUCTIONS TO SUBJECTS

INSTRUCTIONS TO SUBJECTS

On subject's arrival:

Thank you for taking part in this study. The object of this practical is to give you experience in what it is like being a subject in different kinds of psychological research. In the course of this afternoon you will do four different types of experiments; and on some of them you will be earning money. But this will be explained as you go along. After each experiment you will be given a questionnaire to fill in. The idea behind this is for you to capture how you felt about the experiment. This will help you remember your feelings when it comes to writing the essays. I will be asking you to hand in these questionnaires with your essays, but only I will see your essays. The demonstrators marking them will not. So please be as honest as you can. Have you any questions before I take you to do the first experiment?

BARRON-WELSH TEST

The subject was taken into a cubicle and settled at the desk. A Barron-Welsh booklet and a response sheet was placed on the desk.

This is a test called the Barron-Welsh Art Scale, which I'd like you to complete. As you can see, the booklet contains a number of drawings. All you have to do is decide whether you like or dislike each drawing. You must register your decision by marking the 'L' square if you like the picture, or in the 'D' square if you do not. There are no in between choices. There are 86 pictures altogether, the last 6 are on the back cover. Please do not leave any out, and be sure the square you are filling in corresponds with the number of the picture you are looking at. Please fill in your name here on the answer sheet. When you are finished do not leave the room. Just turn this signal switch on and one of us will come. While you are waiting help yourself to any of this reading material. Are there any questions?

When the subject finished, the booklet and answer sheet were collected and the questionnaire A.1 given. When this was completed, one of the following set of instructions was given, depending on which condition the subject was in.

CONTROL:

What did you think that test was about?..... Let me tell you a little about the test. This scale was devised by Frank Barron and George Welsh, two Americans, in the late 1940s. It was devised as a test of artistic potential and creativity. On the basis of responses to the pictures it is possible to determine whether a person has what is called a GAMMA-type potential or a DELTA-type potential. The distinction between these are on the basis of such things as perception of movement, light-dark contrast, structures, etc.

Your responses have been scored - you fall into the .... group. I will be using these groups to divide up people in the

practical. It just makes administration easier, and one of the experiments requires it.

I will now take you down to the computer room for the next experiment.

Control subjects were taken to do the maze task at this point.

#### LEGITIMACY AND ILLEGITIMACY CONDITIONS:

What did you think that test was about?..... Let me tell you a little about the test. This scale was devised by Frank Barron and George Welsh, two Americans, in the late 1940s. It was devised as a test of artistic potential and creativity. On the basis of responses to the pictures it is possible to determine whether a person has what is called a GAMMA-type potential or a DELTA-type potential. The distinction between these are on the basis of such things as perception of movement, light-dark contrast, structures, etc.

But, besides this, the test also acts as a projective, indirect type of personality assessment. Do you know what an indirect, projective personality test is in contrast to a direct self-report one? .... [THIS WAS EXPLAINED AS IT HAD RELEVANCE TO THE ASSIGNMENT THE SUBJECTS WERE REQUIRED TO PRODUCE]

Barron and Welsh found that specific personality traits were associated with the type of artistic potential - Delta or Gamma - people have. For instance, they found that people who have a Delta-type potential tend to be highly creative, innovative, individualistic, unpredictable, energetic and questioning. Whereas people with a Gamma-type potential tend to be competent, conservative, practical, worrying, peaceable and accepting of authority.

This has been verified by numerous other researchers, who repeated the studies and found the same thing. Will you now please fill in this questionnaire. By the time you have finished your responses on the Barron Welsh will have been scored.

Questionnaire A.2 was left with subjects in the legitimacy and illegitimacy conditions to complete.

When the questionnaires were complete:

#### LEGITIMACY CONDITION:

Your Barron-Welsh has been scored, and you fall into the .... group. Are you surprised?...Before we go on to the next experiment I just want to tell you that I will be using the groups - Delta and Gamma to divide the people in the practical. It makes administration easier, and one of the tasks requires it.(#)

I will now take you down to the computer room for the next experiment.

#### ILLEGITIMACY CONDITION:

Your Barron-Welsh has been scored, and you fall into the ....group. Are you surprised?...Before we go on to the next experiment I must tell you that there is some controversy about the Barron-Welsh Scale. This controversy rests on three main arguments. Firstly, the test is forced choice - you had to like

or dislike the picture, there was no measure of degree of this feeling. This, according to some arguments, makes it an insensitive test which oversimplifies matters. Secondly, the population on which the test was standardized was small town American college students. A pretty homogeneous population with a restricted range of personality traits and talent. So how generalizable are the results? Finally, a number of other researchers have failed to find the personality correlates with Gamma and Delta. In fact, two researchers Goolsby and Helwig (1975) compared the creativity scale of the Barron-Welsh with another widely used test of creativity, the Torrance and found there was no correlation between the results. This implies the tests are measuring different things. So, all in all, the validity of the Barron-Welsh is being queried.(#) I will now take you down to the computer room for the next experiment.

In the COOPERATION CONDITIONS the following was inserted at (#):

In the next experiment you will be working with a partner. But you will never know who your partner is, and your partner will not know who you are. But you will work together to increase your money. All I can tell you about your partner is that he or she is also in .....group (COOPERATION WITH INGROUP MEMBER)/ in ..... group (COOPERATION WITH OUTGROUP). Please come with me.

#### MAZE TASK

The subject was taken down to Room A or B, depending on which condition or role s/he was in.

#### CONTROL AND NO COOPERATION CONDITIONS:

This is a test of perceptual motor skill. Depending on how well or badly you do on the test, you will increase or decrease your earnings. The way it works is this: On the screen in front of you is a maze with a figure 'X' at the entrance. The object of the task is to move the X through and out the maze as quickly and accurately as possible. The way you move the X is with these discs here. If you touch this one the X will move one step to the right, this one - to the left, this - upwards and this downwards. Be careful the discs are very sensitive. If you direct the X into a barrier, a tone will sound but it will not move. This is recorded as an error and will be deducted from your score. Let me explain how your earnings on the test will be calculated. Your score is a function of the speed with which you do the task adjusted for the number of errors you make. This score is converted into a percentage which is added to your allocation. E.g. if you have been allocated R2, and do very well, coming out with a score that converts to 80%. Then you will receive R2+R1.60. You can also do badly and end up with a negative score resulting in money being removed from your allocation.

Lets do this practice maze to check everything is O.K.

Subject completed the practice maze under supervision.

Ready to start on the real thing?..You will do two mazes, one after the other. The time it takes the computer to draw the

maze will not be included in your score.

In the COOPERATION conditions, the subject placed in Room A, observing the maze, was called the Instructor. The subject in Room B, controlling the 'X', was called the Responder.

INSTRUCTOR:

This is a test of perceptual motor skill. Depending on your performance you will increase or decrease your earnings. You are working with a partner whose identity you do not know, and you both have different roles. You are the Instructor and your partner is the Responder. You are working together to earn as much money as possible. Here on the screen is a maze with a marker 'X'. The object of this task is to move this marker through and out of the maze as quickly and accurately as possible. Your partner is in control of the X, but cannot see the maze. So you have to instruct your partner how to direct the X, using these signal switches here. If you press this one, a light bulb will go on in the next room instructing your partner to move the X one step to the left. This switch indicates a move to the right, this up and this down. After each instruction you must cancel it by pressing this switch, otherwise that light bulb will remain on and confuse your partner. You should start off with all the switches on, then cancel it as a signal to your partner that you are about to begin, just as when finished the maze you should switch them all on at once to indicate its completion. If one of you makes a mistake and the X is directed into a barrier, a tone will sound but the X will not move. This is recorded as an error and will be deducted from your score.

Let me explain how your earnings on the test will be calculated. Your score is a function of the speed with which you do the task adjusted for the number of errors you make. This score is converted into a percentage which is added one the X will move one step to the right, this one - to the left, to your allocation. E.g. if you have been allocated R2, and do very well, coming out with a score that converts to 80%. Then you will receive R2+R1.60. You can also do badly and end up with a negative score resulting in money being removed from your allocation.

Lets do this practice maze to check everything is O.K.

Subject completed the practice maze under supervision.

Ready to start on the real thing?..You will do two mazes, one after the other. The time it takes the computer to draw the maze will not be included in your score.

RESPONDER:

This is a test of perceptual motor skill. Depending on your performance you will increase or decrease your earnings. You are working with a partner whose identity you do not know, and you both have different roles. You are the Responder and your partner is the Instructor. You are working together to earn as much money as possible. In the next room there is a screen displaying a maze with a marker 'X' on it, similar to this one drawn on this card. The object of the task is to move this

marker through and out of the maze as quickly and accurately as possible. Your partner can see the maze but cannot control the X. You can control the X using these touch pads here. If you touch this one the X will move one step to the left, this one - to the right, this up and this down. Be careful, the discs are very sensitive. Your partner has to direct you how to move the X, and she or he does so via these light bulbs. If this one goes on you are being told to move the X up, this one down, left, right. If one of you makes a mistake and the X is directed into a barrier, a tone will sound but the X will not move. This is recorded as an error and will be deducted from your score.

Let me explain how your earnings on the test will be calculated. Your score is a function of the speed with which you do the task adjusted for the number of errors you make. This score is converted into a percentage which is added to your allocation. E.g. if you have been allocated R2, and do very well, coming out with a score that converts to 80%. Then you will receive R2+R1.60. You can also do badly and end up with a negative score resulting in money being removed from your allocation.

Lets do this practice maze to check everything is O.K.

Subject completed the practice maze under supervision.

Ready to start on the real thing?..You will do two mazes, one after the other. The time it takes the computer to draw the maze will not be included in your score.

When the maze task was over, the subject was taken to another room and given questionnaire B to complete.

#### MATRIX TASK

When the questionnaire had been completed, the experimenter entered with the matrix booklet. The following instructions were identical for all conditions.

This is a judgement task and this is the way in which the money is allocated. I have a pool of money, which is not mine by the way, so do not worry about me - it has been provided by the university. This money has to be distributed to everyone doing this practical. But I am not going to do this. I am getting everyone to allocate money to a number of other people. So the money you will be allocated, which you have just increased or decreased on the maze task, is a result of a number of other people giving you small amounts of money. Now the way this is done is with this booklet. Everyone receives one of these booklets, quite randomly within each group. On the cover of the booklet it says "BOOKLET FOR MEMBER NO. .... OF ..... GROUP". This is your code name. Using the booklet you will be allocating money to a number of different people who are identified by their code names only. So you will never know who you are giving money to, as you will not know who gave you money. Let me explain how the booklet works. It contains 20 pages, each one looking something like this:

Two page examples, using matrices that do not appear in the actual

booklet, and addressed to members of groups X and Y, and to Y and Y were used for demonstration purposes.

On each page you give money to 2 people, in this case Member No... of .. group, and Member No... of .. group. This is the classic version of the test. But as I told you we are going to use the Delta and Gamma groups. You'll find those names in the booklet. Now, 1 point equals 1 cent. You have to choose one of these boxes which will result in the top number of points (cents) being given to the top recipient, in this case Member No... of ... group, and the bottom number of points being given to the bottom recipient. Once you decide which box you want to give out you must tick the box under it and transfer the number of points in the box to the lines below. You can only choose one box and you cannot mix the points from different boxes. So on this example if you select this box you will be allocating .. (THE TOTAL OF THE 2 POINTS IN THE BOX) cents such that .. goes to Member No. .. of .. group and .. goes to Member No. .. of .. group. You will find three types of matrices in the booklet. One, like this, has boxes which all add to the same amount. So there is no choice about how much money is to be given, only to whom. Another has boxes whose total increases in value as you go across the page, and the third has boxes which decrease in value. But the boxes will never vary sporadically.

Both examples were completed and queries answered.

I'll leave you to do the booklet. When you have finished please check that you have filled in all 20 pages, and be sure your name is on the front, before switching on the signal.

When the subject signalled, the matrix booklet was taken away, and questionnaire C given.

#### PRISONER'S DILEMMA GAME

When the questionnaire had been completed, the booklet for the Prisoner's Dilemma Game was brought in. The instructions for this varied slightly for the different conditions, at the point marked (\*).

This last experiment is a decision-making task. The story is this; you and your partner (\*) have committed a crime, but you've been caught.....

The 'story' is then given exactly as written on the first page of the Prisoner's Dilemma booklet. The variations at (\*) are:

#### CONTROL AND NO COOPERATION CONDITIONS:

(someone else participating in this practical, who will randomly be paired with you)

#### COOPERATION CONDITIONS:

(the same person you did the maze task with)

When subjects had completed this, the booklet was taken away and questionnaire D given. Once this was completed the Subject was given questionnaire E to answer at home, reminded that the questionnaires had to be submitted with their assignments and instructed to be at the debriefing meeting, where they would receive their earnings. They were thanked for their participation.

When they had finished D, the CONTROL group was given questionnaire A.2 with the following explanation. This served the function of making their experience similar enough to the other groups to enable their completion of the required assignment.

CONTROL

Do you remember me telling you about the Barron-Welsh test? I am now going to tell you of another aspect of the test. The test also acts as a projective, indirect type of personality assessment. Do you know what an indirect, projective personality test is in contrast to a direct self-report one? .... [THIS WAS EXPLAINED AS IT HAD RELEVANCE TO THE ASSIGNMENT THE SUBJECTS WERE REQUIRED TO PRODUCE]

Barron and Welsh found that specific personality traits were associated with the type of artistic potential - Delta or Gamma - people have. For instance, they found that people who have a Delta-type potential tend to be highly creative, innovative, individualistic, unpredictable, energetic and questioning. Whereas people with a Gamma-type potential tend to be competent, conservative, practical, worrying, peaceable and accepting of authority.

This has been verified by numerous other researchers, who repeated the studies and found the same thing. Will you now please fill in this questionnaire.

The CONTROL subjects were then given questionnaire E and dismissed as above.

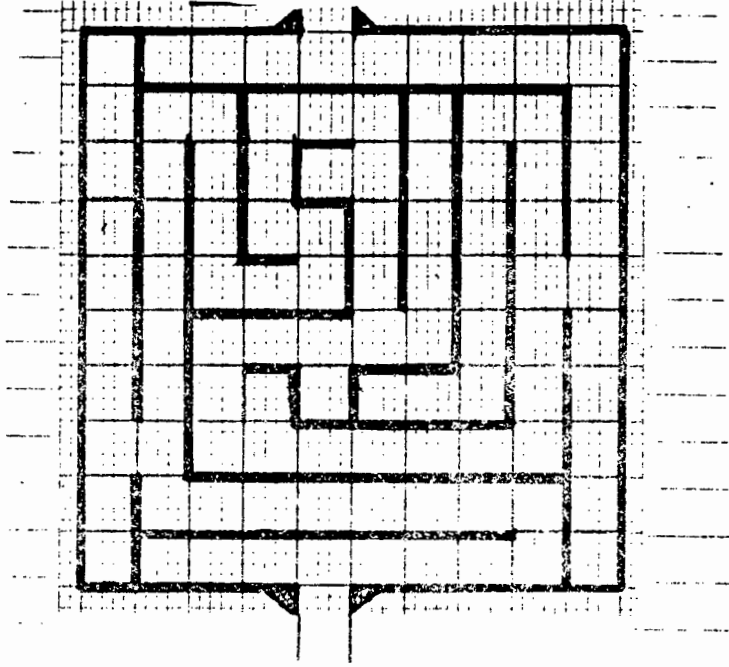
APPENDIX B

MAZE TASK

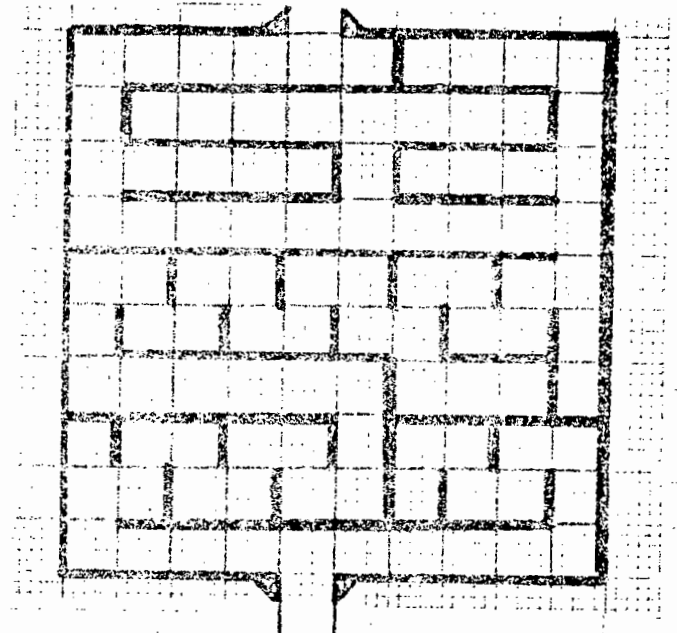
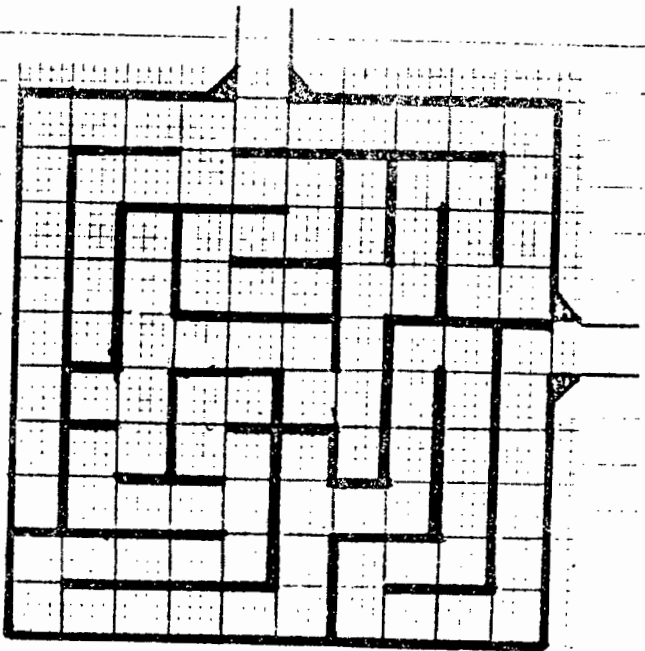
1. Diagram of Mazes.
2. Circuit Construction of the Control Box.
3. Computer Programme Controlling Maze Task.

MAZES

Practice maze



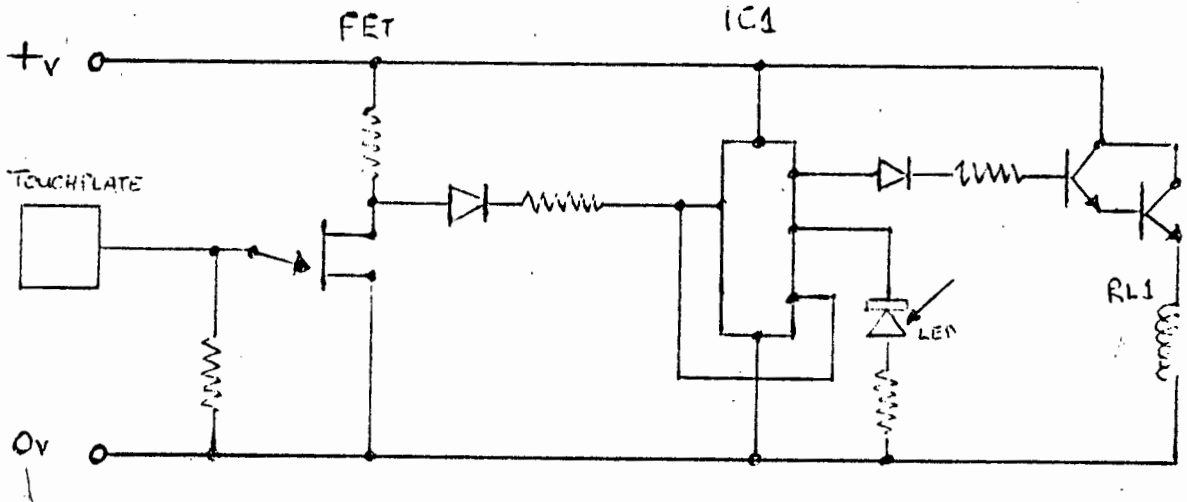
Test mazes



CIRCUIT DESIGN OF CONTROL BOX

The control box consisted of a purposely-made instrument box, housing four stimulus lamps and associate response keys in the form of touch pads.

Circuit Diagram



Four of the above were constructed, for each of the touch pads. Basically, each consisted of an FET detector/buffer at the input which triggers a Schmidt gate. The latter was configured from three triple nand gates and controls the bias at the output stage.

I am indebted to Mr. Alec Reynolds for the design and construction of the above instrument and all related apparatus. Mr. Reynolds provided the above account of the circuitry.

COMPUTER PROGRAMME CONTROLLING THE MAZE TASK

This programme controlled the following functions:

1. The 'drawing' of the maze on the VDU.
2. The movement of the marker 'X' through the maze.
3. The sounding of a tone when the marker was directed into a barrier.
4. The measurement of the time taken to do the mazes.
5. The recording of this time and of the number of errors (attempts to cross barriers) onto disc.

I am indebted to Mr. Gary Orman for the construction of this programme.

```

        COMPILER      NOSTACK
        CHANTASK      10, 4

C      MAIN PROGRAM          MAZE
C      -----

INTEGER      MAZE(0:101), TIME, LATENCY, MAZE NO, START
INTEGER      CO ORD START(2), CO ORD FIN(2)
INTEGER      ECNT

COMMON      /MBLK/ MAZE, MAZE NO
COMMON      /IBLK/ START, CO ORD START, CO ORD FIN
COMMON      /TBLK/ TIME, LATENCY
COMMON      /EBLK/ ECNT

CALL        INITIALIZE

DO          1000      MAZE NO = 0, 2

                TYPE      "<014>"                ; CLEAR SCREEN
                CALL      INPUT
                CALL      DRAW MAZE
                TIME      =      0
                CALL      WALK MAZE
                CALL      STATISTICS

                IF (MAZE NO .EQ. 0) PAUSE      READY TO BEGIN?

1000      CONTINUE

                CALL      RESET
                CALL      CLEAR

                STOP
                E N D
                COMPILER      NOSTACK
                SUBROUTINE      DRAWMAZE
                -----
    
```

```

INTEGER      ROW, COL, I, M, BIT
INTEGER      MAZE(0:101), MAZE NO, CO ORD START (2), CO ORD FIN (2)
INTEGER      START
LOGICAL      BTEST

```

```

COMMON      /MBLK/ MAZE, MAZE NO
COMMON      /IBLK/ START, CO ORD START, CO ORD FIN
COMMON      /DBLK/ ROW, COL

```

```

M          =          0

```

```

DO          3000      ROW = 2, 20, 2
DO          2000      COL = 18, 63, 5
                M = M + 1
DO          1000      I = 1, 4
                BIT = 4 - I
                IF (.NOT. BTEST(MAZE(M),BIT)) CALL DRAW LINE (I)
                                ; I : 1 = LEFT
                                ;     2 = RIGHT
                                ;     3 = UP
                                ;     4 = DOWN

```

```

1000          CONTINUE
2000          CONTINUE
3000          CONTINUE

```

```

CALL      DRAW BOX      ( CO ORD START, MAZE(0) )
CALL      DRAW BOX      ( CO ORD FIN, MAZE(101) )

CALL      DRAW X        ( CO ORD START )

```

```

RETURN
END
COMPILER      NOSTACK
SUBROUTINE    DRAWLINE ( DIRECTION )
;-----

```

```

INTEGER      ROW PLUS 1, ROW LESS 1
INTEGER      COL PLUS 2, COL LESS 2
INTEGER      DIRECTION, ROW, COL
COMMON       /DBLK/ ROW, COL
    
```

```

ROW PLUS 1   =      ROW + 1
ROW LESS 1   =      ROW - 1
COL PLUS 2   =      COL + 2
COL LESS 2   =      COL - 2
    
```

GO TO (1, 2, 3, 4), DIRECTION

```

1      DO      1000   I = ROW LESS 1, ROW PLUS 1
1000   CALL    XLOCO (I, COL LESS 2, "!")      ; LEFT
      RETURN
    
```

```

2      DO      2000   I = ROW LESS 1, ROW PLUS 1
2000   CALL    XLOCO (I, COL PLUS 2, "!")     ; RIGHT
      RETURN
    
```

```

3      DO      3000   I = COL LESS 2, COL PLUS 2
3000   CALL    XLOCO (ROW LESS 1, I, "-")     ; UP
      RETURN
    
```

```

4      DO      4000   I = COL LESS 2, COL PLUS 2
4000   CALL    XLOCO (ROW PLUS 1, I, "-")    ; DOWN
      RETURN
    
```

```

END
COMPILER      NOSTACK
SUBROUTINE    DRAW BOX ( POSITION, MASK )
;-----
    
```

```

INTEGER      POSITION (2), MASK, ROW, COL, BIT
LOGICAL      BTEST
COMMON       /DBLK/ ROW, COL
    
```

```

ROW      =      POSITION (1)
COL      =      POSITION (2)
    
```

```

DO      1000   I = 1, 4
BIT     =      4 - I
IF (.NOT. BTEST (MASK,BIT) ) CALL DRAW LINE (I)
1000   CONTINUE
    
```

```

RETURN
END
COMPILER      NOSTACK
SUBROUTINE    DRAW X (POSITION)
;-----
    
```

```

INTEGER      POSITION (2)

CALL  XLOCO  (POSITION (1), POSITION (2), "X")

```

```

RETURN
END
COMPILER      NOSTACK
SUBROUTINE    WALK MAZE
;-----

```

```

INTEGER      CURSOR (2), M, N
INTEGER      MAZE(0:101), MAZE NO, MASK, TIME, LATENCY
INTEGER      CO ORD START (2), CO ORD FIN (2)
INTEGER      START

```

```

COMMON      CURSOR
COMMON      /MBLK/ MAZE, MAZE NO
COMMON      /IBLK/ START, CO ORD START, CO ORD FIN
COMMON      /TBLK/ TIME, LATENCY

```

```

CURSOR(1)   =      CO ORD START (1)
CURSOR(2)   =      CO ORD START (2)

```

```

MASK        =      MAZE (0)
M           =      START
N           =      0

```

```

1000 CALL  MGETEX (LATENCY, MOVE, 1,2,3,4)      ; TIME = MS; MOVE = SWITCH
                                           ; 1,2,3,4 ARE SWITCHES FROM
                                           ; WHICH TO EXPECT RESPONSE
TIME        =      TIME + (LATENCY / 1000)    ; ACCUMULATED TIME IN SECONDS

```

```

CALL  XLOCO (23,1,"")
TYPE  "      "

```

```

IF      (ILLEGAL MOVE (MOVE, MASK)) CALL ERROR MESSAGE ($1000)
CALL    MOVE CURSOR (CURSOR, MOVE)

```

```

IF (M .LE. 0 .OR. M .GE. 101) M = START
CALL M UPDATE (M, MOVE)
N = N + 1

```

```

IF (M .LT. 0) M = 0
IF (M .GT. 101) M = 101
MASK = MAZE(M)

```

```

IF ( CURSOR(1) .NE. CO ORD FIN(1) .OR. CURSOR(2) .NE. CO ORD FIN(2) ) GO TO 1000

```

```

RETURN                                           ; --> REPEAT UNTIL END OF MAZE
END
COMPILER      NOSTACK
SUBROUTINE    INITIALIZE
;-----

```

```

INTEGER      TIME, LATENCY
COMMON      /TBLK/ TIME, LATENCY

```

```

TIME        =      0
ECNT        =      0

```

```
CALL APPEND (1, "RESULTS.DT", 3, IERR, 128)
CALL OPEN (0, "MAZE.DT", 1, IERR, 256)
```

```
CALL NAMES
CALL INTERFACE (1, 1)
```

```
RETURN
END
COMPILER NOSTACK
SUBROUTINE ERASE (POSITION)
;-----
```

```
INTEGER POSITION (2)
```

```
CALL XLOC0 (POSITION (1), POSITION (2), " ")
```

```
RETURN
END
COMPILER NOSTACK
LOGICAL FUNCTION ILLEGAL MOVE (MOVE, MASK)
;-----
```

```
INTEGER BIT MASK (4)
DATA BIT MASK / 10K, 04K, 02K, 01K /
```

```
ILLEGAL MOVE = IAND ( BIT MASK(MOVE), MASK ) .EQ. 0
```

```
RETURN
END
SUBROUTINE ERROR MESSAGE(L)
;-----
```

```
INTEGER ECNT
COMMON /EBLK/ ECNT
```

```
ECNT = ECNT + 1
```

```
CALL XLOC0 (23,1,"")
TYPE "WRONG MOVE"
```

```
TYPE "<007>" ; BELL
```

```
DO 1000 I = 1, 3
CALL ON (1)
CALL WAIT (50)
CALL OFF(1)
CALL WAIT (150)
```

```
1000 CONTINUE
```

```
CALL WAIT (350)
```

```
DO 2000 I = 1, 3
CALL ON (1)
CALL WAIT (150)
CALL OFF(1)
CALL WAIT (150)
```

```
2000 CONTINUE
```

```

CALL    WAIT (350)

DO      3000    I = 1, 3
        CALL    ON (1)
        CALL    WAIT (50)
        CALL    OFF (1)
        CALL    WAIT (150)

```

3000 CONTINUE

```

RETURN L
END
COMPILER      NOSTACK
SUBROUTINE    MOVE CURSOR (CURSOR, MOVE)
;-----

```

INTEGER CURSOR (2), MOVE

```

CALL    ERASE (CURSOR)
CALL    C UPDATE (CURSOR, MOVE)
CALL    DRAW X (CURSOR)

```

```

RETURN
END
COMPILER      NOSTACK
SUBROUTINE    XLOC (ROW, COL, CHARACTER)
;-----

```

INTEGER ROW, COL, CHARACTER, CH, VERT, HORIZ, SP, X, Y, BCD  
DATA VERT, HORIZ, SP / 13K, 20K, 40K /

BCD (COL) = COL/10\*16 + MOD (COL, 10)

X = ROW + SP  
Y = BCD (COL)

CH = CHARACTER

```

A    LDA    0, VERT
A    .SYSTEM
A    .PCHAR
A    JMP    .+1

```

```

A    LDA    0, X
A    .SYSTEM
A    .PCHAR
A    JMP    .+1

```

```

A   LDA    0, HORIZ
A   .SYSTEM
A   .PCHAR
A   JMP    .+1

```

```

A   LDA    0, Y
A   .SYSTEM
A   .PCHAR
A   JMP    .+1

```

```

A   LDA    0, CH
A   MOVS   0, 0
A   .SYSTEM
A   .PCHAR
A   JMP    .+1

```

RETURN

```

END
COMPILER      NOSTACK
SUBROUTINE    C UPDATE (CURSOR, MOVE)
:-----:

```

```

INTEGER      CURSOR(2), MOVE
              GO TO (1, 2, 3, 4), MOVE
1   CURSOR(2) = CURSOR(2) - 5      ; LEFT
   RETURN
2   CURSOR(2) = CURSOR(2) + 5     ; RIGHT
   RETURN
3   CURSOR(1) = CURSOR(1) - 2     ; UP
   RETURN
4   CURSOR(1) = CURSOR(1) + 2     ; DOWN
   RETURN

```

```

END
COMPILER      NOSTACK
SUBROUTINE    M UPDATE (M, MOVE)
:-----:

```

```

      INTEGER      M, MOVE
      GO TO (1, 2, 3, 4), MOVE

1     M = M - 1           ; LEFT
      RETURN

2     M = M + 1          ; RIGHT
      RETURN

3     M = M - 10         ; UP
      RETURN

4     M = M + 10        ; DOWN
      RETURN

      END
      SUBROUTINE      STATISTICS
      ;-----

      INTEGER      ECNT, TIME, LATENCY
      INTEGER      MAZE(0:101), MAZE NO

      COMMON       /EBLK/ ECNT
      COMMON       /TBLK/ TIME, LATENCY
      COMMON       /MBLK/ MAZE, MAZE NO

100   FORMAT (////////" <011>FOR THE TRIAL MAZE, YOU MADE", I3, " WRONG MOVES",
      &  //" <011>*** TIME : ", I4, " SECONDS ***"/)
200   FORMAT (I2, I2)
300   FORMAT (I3)

      TYPE      "<014>"           ; CLEAR SCREEN

      IF (MAZE NO .EQ. 0) WRITE (10,100) ECNT, TIME

      WRITE (1,200) "OERROR COUNT FOR MAZE", MAZEN0, " : ", ECNT
      WRITE (1,300) " TIME (IN SECONDS) : ", TIME

      RETURN
      END
      COMPILER      NOSTACK
      SUBROUTINE      INPUT
      ;-----

```

```

INTEGER      BUFFER(0:127), MAZE(0:101), MAZE NO, START
INTEGER      CO ORD START(2), CO ORD FIN (2)

COMMON      /MBLK/ MAZE, MAZE NO
COMMON      /IBLK/ START, CO ORD START, CO ORD FIN

CALL        READR (0, MAZE NO, BUFFER, 1, IERR)

1000 DO      1000    I = 0, 101
      MAZE (I)      =    BUFFER (I)

START      =    BUFFER (102)
FIN        =    BUFFER (103)

CO ORD START (1)    =    BUFFER (104)
CO ORD START (2)    =    BUFFER (105)

CO ORD FIN (1)      =    BUFFER (106)
CO ORD FIN (2)      =    BUFFER (107)

RETURN
END
COMPILER      NOSTACK

SUBROUTINE    NAMES
;-----

INTEGER      EXPERIMENTER (20)

100  FORMAT (20A2)
200  FORMAT (//////, " ", 20A2)

TYPE      "<014>"
TYPE      "PLEASE ENTER NAME OF EXPERIMENTER (FOLLOW BY 'NEWLINE' KEY)"
READ      (11,100) EXPERIMENTER

TYPE      "<015>"

WRITE (1,200) EXPERIMENTER

RETURN
END

```

## APPENDIX C

### MATRICES

1. Face sheet of the matrix booklet, and page examples showing each type of presentation.
2. Details of the method of scoring the matrices.
3. Fortran programme for converting the box choices to the various dependent variables.

BOOKLET FOR MEMBER NO.

OF DELTA GROUP

NAME

.....

THESE NUMBERS ARE TO BE AWARDED TO:

MEMBER NO. OF DELTA GROUP

14	15	16	17	18	19	20	21	22	23	24	25	26
----	----	----	----	----	----	----	----	----	----	----	----	----

MEMBER NO. OF GAMMA GROUP

14	13	12	11	10	9	8	7	6	5	4	3	2
----	----	----	----	----	---	---	---	---	---	---	---	---

TICK PREFERRED BOX:

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

PLEASE FILL IN THE DETAILS OF THE SELECTED BOX:

		<u>AMOUNT</u>
POINTS FOR NO.	OF DELTA GROUP	.....
POINTS FOR NO.	OF GAMMA GROUP	.....

MATRIX SCORING

On each matrix, the boxes were numbered from 1 to 13 or 14 (as applicable) starting on the left. The number of the box constituted the basic data from which the dependent variables were calculated. The method of calculation is described below. To make the logic behind the method clearer the position of the ideal choice for the relevant strategies is marked:

- (i) Fairness (F)
- (ii) Maximum Joint Profit (MJP)
- (iii) Maximum Ingroup Profit (MIP)
- (iv) Maximum Differentiation (MD)
- (v) Ingroup Favouritism (Fav) which is MIP and MD inextricably combined.

Matrix A

1	2	3	4	5	6	7	8	9	10	11	12	13	14
14	13	12	11	10	9	8	7	6	5	4	3	2	1
1	2	3	4	5	6	7	8	9	10	11	12	13	14

I/O							X						X
							F						Fav
O/I	X						X						
	Fav						F						

MJP is constant throughout.

Matrix B

18	17	16	15	14	13	12	11	10	9	8	7	6	5
5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	2	3	4	5	6	7	8	9	10	11	12	13	14

I/O	X						X						
	Fav						F						
O/I							X						X
							F						Fav

MJP is constant throughout.

Scoring of A and B.

On these matrices, each of the presentations (I/O and O/I) yield a score. Let the number of the chosen box be symbolized by Y Then for the I/O presentation of A and the O/I of B, the dependent variable:

$$Fav = Y - 7.5$$

E.g. If the chosen box on A was 8/15, then  $Y=11$  and

$$Fav = 11 - 7.5 = +3.5$$

On the O/I presentation of A and the I/O of B:

$$Fav = 7.5 - Y$$

The final measure of the dependent variable, Ingroup Favouritism was the mean of these four FAV scores.

Matrix C

	7	8	9	10	11	12	13	14	15	16	17	18	19
	1	3	5	7	9	11	13	15	17	19	21	23	25
I/O	X												X
	MD												MJP
													MIP
O/I													X
													MD
													MJP
													MIP

Scoring.

The dependent variable measured by C is the pull of MD on MJP+MIP. Let the chosen box on each presentation be Y. Then:

$$MD \text{ on } MJP+MIP = Y(O/I) - Y(I/O)$$

E.g. Let the chosen box on I/O be 13/13, so  $Y(I/O)=7$  and let the chosen box on O/I be 15/17. Then  $Y(O/I)=9$ :

$$MD \text{ on } MJP+MIP = 9 - 7 = +2$$



PROGRAMME TO CONVERT BOX CHOICES INTO DEPENDENT VARIABLES

This Fortran programme was self-written for use on a UNIVAC 1108 computer. This programme took as raw data the number of the chosen box on the relevant matrix presentations and converted these to the dependent variables as described in the last section. The dependent variables were stored in separate files for subsequent analysis.

```

10 C PROGRAM TO WORK OUT SCORES
20   PARAMETER NUM=114
30   DIMENSION NAME(NUM),IC(NUM),IS(NUM),IL(NUM),IGP(NUM)
40   DIMENSION A1(NUM),A2(NUM),A3(NUM),A4(NUM)
50   DIMENSION B1(NUM),B2(NUM),B3(NUM),B4(NUM)
60   DIMENSION C1(NUM),C2(NUM),C3(NUM),C4(NUM)
70   DIMENSION D1(NUM),D2(NUM),D3(NUM),D4(NUM)
80   DIMENSION E1(NUM),E2(NUM),E3(NUM),E4(NUM)
90   DIMENSION X(NUM),Y(NUM),Z(NUM),U(NUM),PD(NUM)
100  CHARACTER DV*20(5)
110  DATA DV/'INGP FAVOURITISM','MD ON MJP+HIP','FAV ON FAIRNESS'
,
120  & 'FAV ON MJP','PRIS DILEMMA'/
130  DO 1 I=1,NUM
140 1  READ(8,5) NAME(I),IGP(I),IC(I),IS(I),IL(I),A1(I),A2(I),
150  &A3(I),A4(I),B1(I),B2(I),B3(I),B4(I),C1(I),C2(I),C3(I),C4(I),
160  &D1(I),D2(I),D3(I),D4(I),E1(I),E2(I),E3(I),E4(I),PD(I)
170 5  FORMAT(I3,T6,I1,T8,3I1,T14,20(F2.0,1X),T77,F1.0)
180  DO 10 I=1,NUM
190  IF(IS(I) .EQ. 2) GO TO 15
200  X(I)=(A3(I)-7.5)+(7.5-A4(I))+(7.5-B3(I))+(B4(I)-7.5)
210  X(I)=X(I)/4.
220  Y(I)=C4(I)-C3(I)
230  Z(I)=D4(I)-D3(I)
240  U(I)=E4(I)-E3(I)
250  GO TO 10
260 15 X(I)=(7.5-A3(I))+(A4(I)-7.5)+(B3(I)-7.5)+(7.5-B4(I))
270  X(I)=X(I)/4.
280  Y(I)=C3(I)-C4(I)
290  Z(I)=D4(I)-D3(I)
300  U(I)=E3(I)-E4(I)
310 10 CONTINUE
320  DO 20 I=1,NUM
330 20 WRITE (13,25) NAME(I),IGP(I),IC(I),IS(I),IL(I),X(I)
335  DO 21 I=1,NUM
340 21 WRITE (14,25) NAME(I),IGP(I),IC(I),IS(I),IL(I),Y(I)
345  DO 22 I=1,NUM
350 22 WRITE (15,25) NAME(I),IGP(I),IC(I),IS(I),IL(I),Z(I)
355  DO 23 I=1,NUM
360 23 WRITE (16,25) NAME(I),IGP(I),IC(I),IS(I),IL(I),U(I)
365  DO 24 I=1,NUM
370 24 WRITE (17,25) NAME(I),IGP(I),IC(I),IS(I),IL(I),PD(I)
395 25 FORMAT(1X,I3,T6,I1,T8,3I1,T20,F20.15)
400  WRITE(5,30) (DV(J),J=1,5)
410 30  FORMAT(1H1,T12,5A20,/,T10,105(' ')/)
420  DO 40 I=1,NUM
430 40  WRITE(5,35) NAME(I),IGP(I),IC(I),IS(I),IL(I),X(I),Y(I),Z(I)
,
440  & U(I),PD(I)
450 35  FORMAT(1X,I3,1X,I1,1X,3I1,T12,5(F10.4,10X))
460  STOP
470  END

```

APPENDIX D

PRISONER'S DILEMMA GAME

The following two pages contain the five situations presented in the Prisoner's Dilemma Game. The pages were cut along the marked lines and fastened together forming a six-page booklet.

PRISON ER'S DILEMMA GAME

The situation is as follows:

You and your partner have committed a crime. You have been apprehended, but the evidence against you is rather scant. So the prosecutor is hoping to persuade at least one of you to confess (turn State's evidence), in order to have a water-tight case. He keeps you in different rooms so you have no way of knowing what your partner is doing. The offers the prosecutor makes, and the consequences are spelled out on the following pages. These consequences have been converted to add or detract from your money. Eg. on page 1, if you both confess you both lose 5% of your earnings, so if your earnings to date are R3.00 you will lose 15c. On each page a different set of rewards and penalties are presented. You must choose, independently for each, whether to confess or not. This will be matched with what your partner has decided to determine your wins or losses.

-1-

- If you BOTH confess, you will both go to gaol for a year ( - 5% )
- If NEITHER of you confess you will probably get off ( 0% )
- If ONE of you confesses and not the other,
  - the confessor gets off and gets a reward ( + 20% )
  - and the other goes to gaol for 5 years ( - 20% )

Your decision: Will you confess? ..... (Yes/No)

-2-

- If you BOTH confess, you will both go to gaol for 2 years ( - 10% )
- If NEITHER of you confess you will get off and get away with some of the booty ( + 5% )
- If ONE of you confesses and not the other,
  - the confessor gets off and gets a reward ( + 20% )
  - while the other goes to gaol for 5 years ( - 20% )

Your decision: Will you confess? ..... (Yes/No)

If you BOTH confess, you will both go to gaol for 5 years ( - 20%)

If NEITHER of you confess you will probably get off ( 0% )

If ONE of you confesses and not the other,  
the confessor gets off with a reward ( + 30%)  
while the other goes to gaol for 10 years ( - 30%)

Your decision: Will you confess? ..... (Yes/No)

If you BOTH confess, you will both go to gaol for 10 years ( - 30%)

If NEITHER of you confess you will both go to gaol for a year ( - 5% )

If ONE of you confesses and not the other,  
the confessor gets off with a reward ( + 40%)  
while the other goes to gaol for 15 years ( - 40%)

Your decision: Will you confess? ..... (Yes/No)

If you BOTH confess, you will both go to gaol for 10 years ( - 10%)

If NEITHER of you confess you will both go to gaol for a year ( - 5% )

If ONE of you confesses, and not the other  
the confessor gets off with a reward ( + 60%)  
while the other goes to gaol for 20 years ( - 50%)

Your decision: Will you confess? ..... (Yes/No)

APPENDIX E

SUBJECTIVE QUESTIONNAIRES

SECTION A.1

To be answered after completing the Barron-Welsh Scale.

1. What, exactly, do you think this test was measuring?
  
  
  
  
  
  
  
  
  
  
2. How "stable" do you feel your responses were - i.e. do you think you would have given the same responses on a different day?
  
  
  
  
  
  
  
  
  
  
3. Situational variables are things such as; the time of day, the noise in the testing room, the temperature, the presence or absence of other people in the room, the room itself, etc. Do you think any situational variables affected your responses in any way?
  
  
  
  
  
  
  
  
  
  
4. Experimenter effects are such things as the personality, the age, the sex, the status or the manner of the experimenter - i.e. any attribute of the experimenter as a person. Do you think your responses were affected by any such factors?
  
  
  
  
  
  
  
  
  
  
5. To 'cue' someone means to indicate to that person, in very subtle, often unconscious ways how one wishes them to act. Did you feel the experimenter was cuing you to respond in any particular way? Elaborate.

To be completed when the Barron-Welsh Scale has been explained.

1. Were you surprised at the real function of the test? Why?

2. Into which of the two groups do you think you will fall?

(Reminder:

DELTA - people who tend to be highly creative, innovative, individualistic, unpredictable, energetic and questioning.

GAMMA - people who tend to be competent, conservative, practical, worrying, peaceable and accepting of authority.

)

3. If you had known about this aspect of the test prior to doing it, do you think you could have completed it in a way which would ensure that you would fall into whichever group you chose? (i.e. could you have selectively responded in order to appear to be a delta-type, or a gamma-type person?)

4. Below is an extract from a direct, self-report type of personality test:

1. Do you often long for excitement?

YES NO

2. Do you often need understanding friends to cheer you up?

3. Are you usually carefree?

4. Do you find it very hard to take no for an answer?

5. Do you stop and think things over before doing anything?

Do you think you would have been able to manipulate your responses on this test in order to put across a certain 'image' - specifically, a socially desirable image?

5. Do you think you would have more faith in the assessment made of your personality from a projective, indirect test (e.g. the Barron-Welsh) or from the self-report, direct test (e.g. the above extract from the EPI - Eysenck Personality Inventory) ? Why?

6. General comments - please include anything you think might be remotely pertinent.

To be completed when the Barron-Welsh Scale has been explained.

1. Were you surprised at the real function of the test? Why?

2. Into which of the two groups do you think you should have fallen?

(Reminder:

DELTA - people who tend to be highly creative, innovative, individualistic, unpredictable, energetic and questioning.

GAMMA - people who tend to be competent, conservative, practical, worrying, peaceable and accepting of authority.

)

3. If you had known about this aspect of the test prior to doing it, do you think you could have completed it in a way which would ensure that you would fall into whichever group you chose? (i.e. could you have selectively responded in order to appear to be a delta-type, or a gamma-type person?)

4. Below is an extract from a direct, self-report type of personality test:

1. Do you often long for excitement?

YES NO

2. Do you often need understanding friends to cheer you up?

3. Are you usually carefree?

4. Do you find it very hard to take no for an answer?

5. Do you stop and think things over before doing anything?

Do you think you would have been able to manipulate your responses on this test in order to put across a certain 'image' - specifically, a socially desirable image?

5. Do you think you would have more faith in the assessment made of your personality from a projective, indirect test (e.g. the Barron-Welsh) or from the self-report, direct test (e.g. the above extract from the EPI - Eysenck Personality Inventory) ? Why?

6. General comments - please include anything you think might be remotely pertinent.

To be completed after the maze task.

1. What, exactly, do you think this task was measuring?

2. Were you affected by the fact that this task involved complex equipment (the computer)? In what way?

3. How did the fact that you were earning or losing money, as a consequence of your performance, affect you?

4. On the following 1 to 5 rating scale, where

- 1 = Very Badly
- 2 = Badly
- 3 = As Well As Anyone Else
- 4 = Well
- 5 = Very Well

rate how well you think you have done, relative to how you expect other people have done.

RATING = ..... Elaborate, if you wish.

5. Using the following scale, where

- 1 = Much Better
- 2 = Better
- 3 = The Same
- 4 = Worse
- 5 = Much Worse

rate how you think you could have done on a different day and / or time.

RATING = .....

6. Do you think you were affected by any situational variables (refer to question A.1. No.3 for the definition, if necessary) ?

7. Do you think you were affected by any experimenter variables (refer to question A.1 No.4 for definition, if necessary) ?

8. Did you feel you were being cued to respond in way ?

9. General comments:

To be completed after the maze task.

1. What, exactly, do you think this task was measuring?
  
  
  
  
  
  
  
  
  
  
2. Were you affected by the fact that this task involved complex equipment (the computer) ? In what way?
  
  
  
  
  
  
  
  
  
  
3. How did the fact that you were earning or losing money, as a consequence of your performance, affect you ?
  
  
  
  
  
  
  
  
  
  
4. Do you think you would have performed better in the other role - i.e. if you were the 'instructor' do you think you would have performed better as the 'responder', or vice-versa ?

5. On the following 1 to 5 rating scale, where

- 1 = Very Badly
- 2 = Badly
- 3 = As Well As Anyone Else
- 4 = Well
- 5 = Very Well

rate how well you think you and your partner did relative to how you expect other people have done ?

RATING = ..... Elaborate, if you wish.

6. On the same scale, rate how well you think you personally performed on the task.

RATING = .....

7. Using the following scale, where

- 1 = Much Better
- 2 = Better
- 3 = The Same
- 4 = Worse
- 5 = Much Worse

rate how you think you could have done with a different partner

RATING = .....

8. Do you think you were affected by any situational variables (refer to question A.1. No.3 for the definition, if necessary) ?

9. Do you think you were affected by any experimenter variables (refer to question A.1 No.4 for definition, if necessary) ?

10. Did you feel you were being cued to respond in way ?

11. General comments:

To be completed after the matrix task.

1. Rate how difficult you found this task on the following scale;

- 1 = Very Easy
- 2 = Easy
- 3 = Average
- 4 = Difficult
- 5 = Very Difficult

RATING = .....

2. Explain, if possible, how you decided which box to choose.

3. Did any situational factors affect your responses ?

4. Did any experimenter variables affect your responses ?

5. Did you feel you were being cued to respond in a certain manner ?

6. What, exactly, do you think this task was measuring ?

7. In most experiments where payment is given to the subjects, the procedure is usually to tell the subjects exactly how much s/he will receive. Subjects are usually told prior to doing the study, and in some cases are actually paid first. What effect do you think not knowing the amount of money you will receive, has had on your performance ?

8. Do you think you would have responded differently if you were receiving no payment ?

9. How did you feel about allocating money to anonymous people ?

10. General comments:

SECTION D. (No COOPERATION)

To be completed after the Prisoner's Dilemma Game.

1. What, exactly, do you think this test was measuring ?
  
  
  
  
  
  
  
  
  
  
2. Did you give the same, or variable responses for each page / situation ?
  
  
  
  
  
  
  
  
  
  
3. Explain, if possible, what made you decide whether to confess or not ?
  
  
  
  
  
  
  
  
  
  
4. On the following 1 to 5 scale,  
  - 1 = Not At All
  - 2 = Possibly
  - 3 = Slightly
  - 4 = To a Certain Extent
  - 5 = Definitelyrate whether you were influenced by the fact that the identity of the other 'Prisoner' was unknown to you.  
RATING = ..... Elaborate.
  
  
  
  
  
  
  
  
  
  
5. Did any situational variables affect your response ?
  
  
  
  
  
  
  
  
  
  
6. Were you affected by any experimenter variables ?

7. Did you feel you were being cued to respond in a certain manner ?

8. General comments:





# Welsh Figure Preference Test

## or the Barron-Welsh Art Scale

**START  
HERE**

**DIRECTIONS:** Be sure to fill in your name and other information requested. Then answer LIKE (L) or DON'T LIKE (D) for each drawing by making a heavy mark in the appropriate box, as in the example at right.

EXAMPLE ONLY

L	1	2	3
D	1	2	3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400	Reproduced from the Preliminary Manual for the Welsh Figure Preference Test. © Copyright 1959, by Consulting Psychologists Press, Inc., Palo Alto, California. This sheet may not be reproduced in any form without permission of the publishers. Printed in U.S.A.																			

NOT MARK BELOW THIS LINE

BW _____	<table border="1" style="border-collapse: collapse; width: 60px; height: 60px;"> <tr><td style="text-align: center;">RS + RC</td><td style="text-align: center;">=</td><td style="text-align: center;">RL</td></tr> <tr><td style="text-align: center;">+     +</td><td></td><td></td></tr> <tr><td style="text-align: center;">FS + FC</td><td style="text-align: center;">=</td><td style="text-align: center;">FH</td></tr> <tr><td style="text-align: center;">=     =</td><td></td><td></td></tr> <tr><td style="text-align: center;">SM</td><td></td><td style="text-align: center;">CM</td></tr> </table>	RS + RC	=	RL	+     +			FS + FC	=	FH	=     =			SM		CM	RS _____ RC _____ RL _____	CO _____ MV _____ XN _____
RS + RC	=	RL																
+     +																		
FS + FC	=	FH																
=     =																		
SM		CM																
L _____ RA _____		FS _____ FC _____ FH _____	SH _____ XM _____ XX _____															
P _____ MF _____			BK _____ XF _____ FG _____															
F _____ NP _____			DT _____ XC _____															
CN _____		SM _____ CM _____																



APPENDIX F

RAW DATA

1. Box choices.
2. Dependent variables.

BOX CHOICES

Key

SS: The code numbers of the subjects.

SF: The group to which the subject thought s/he should belong;  
 1 = Delta  
 2 = Gamma

A: Cooperation; 0 = Control group  
 1 = No Cooperation  
 2 = Cooperation with a member of the Ingroup  
 3 = Cooperation with a member of the Outgroup

B: Status; 1 = High Status (Delta group)  
 2 = Low Status (Gamma group)

C: Legitimacy; 0 = Control group  
 1 = Legitimate  
 2 = Illegitimate

A - E: Matrices as depicted in chapter 4;  
 1 = recipients are members of Delta / Delta  
 2 = recipients are members of Gamma / Gamma  
 3 = recipients are members of Delta / Gamma  
 4 = recipients are members of Gamma / Delta

PD: Competitive choices on the Prisoner's Dilemma Game

Control study

SS	ABC	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	PD
664	010	9	3	8	8	11	11	7	7	9	7	3	11	6	2	7	5	7	6	2	3	3
666	010	11	7	7	6	6	7	6	8	8	9	7	13	1	1	3	1	9	10	6	13	0
634	010	8	7	8	7	7	8	7	9	7	7	6	8	1	1	1	1	7	7	6	7	0
679	010	8	8	7	8	7	7	7	8	13	13	13	13	1	1	1	1	13	7	13	13	5
680	010	5	12	5	10	5	13	9	7	13	8	10	8	8	3	1	5	7	8	8	2	1
678	010	7	7	10	3	7	8	5	11	11	6	5	7	4	1	11	1	7	7	3	11	5
77	020	14	7	7	7	8	7	7	8	13	13	13	13	1	1	1	1	9	11	7	13	2
17	020	8	7	7	8	7	7	8	7	13	13	13	13	1	1	1	1	7	7	7	7	0
76	020	7	7	5	14	8	7	14	1	7	13	13	3	1	2	1	7	7	7	13	3	2
73	020	7	7	3	14	7	7	6	1	3	7	13	3	1	1	1	7	7	7	9	1	0
51	020	4	10	3	14	1	2	14	5	13	8	8	11	5	1	1	6	9	6	13	6	5
72	020	7	7	7	7	8	7	14	7	7	7	7	7	1	1	1	5	6	7	7	8	0

Main experiment

SS	SF	ABC	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	PD
657	2	111	7	8	8	7	7	8	8	7	8	3	3	7	1	1	2	2	7	3	7	8	1
656	1	111	7	8	7	8	8	8	8	7	13	13	13	13	1	1	1	1	7	7	7	7	0
667	2	111	9	6	7	1	7	9	4	4	7	8	4	10	3	3	1	5	11	7	3	8	3
640	2	111	8	7	7	9	6	7	7	7	8	7	7	6	1	2	1	1	7	8	7	7	5
621	1	111	7	8	7	7	8	8	8	8	7	8	7	13	1	3	5	1	6	7	10	7	0
631	1	111	7	7	8	7	7	8	8	7	7	6	8	6	1	1	1	1	7	7	7	7	2
628	1	111	7	7	7	7	8	7	8	7	7	7	7	7	1	1	1	1	7	7	7	7	4
632	1	111	8	8	8	8	7	8	7	9	13	13	13	13	1	1	1	1	7	7	7	7	3
643	0	111	1	7	14	1	7	13	1	13	13	13	13	13	13	1	13	13	11	1	13	13	0
641	1	112	6	7	5	10	9	9	7	4	3	7	7	4	1	13	1	13	7	7	7	7	2
675	1	112	8	7	7	8	7	8	7	7	7	13	13	7	1	1	1	1	7	7	7	7	1
665	2	112	8	7	14	1	7	8	1	14	7	1	1	7	1	1	13	1	7	7	1	8	0
647	1	112	7	7	8	7	7	7	7	7	7	7	7	7	1	1	1	1	7	7	7	7	0
650	1	112	3	10	7	14	14	7	9	14	5	4	13	1	1	7	13	6	3	8	5	1	3
601	1	112	10	7	10	6	9	9	9	10	7	7	2	2	7	9	7	1	6	1	4	11	5
604	1	112	7	7	8	7	7	7	7	8	7	7	13	13	1	1	1	1	7	7	7	7	5
603	1	112	7	8	8	7	7	7	7	7	11	7	11	7	2	2	3	2	7	7	8	7	2
602	2	112	8	8	1	7	7	8	8	8	7	7	7	7	13	1	1	1	7	7	7	7	3
620	1	112	7	7	7	7	7	7	8	7	13	13	13	13	1	1	1	1	7	8	7	8	5
618	1	112	8	7	7	7	7	8	7	8	7	7	7	7	1	1	1	1	7	7	7	7	4
65	0	121	7	7	7	7	7	7	7	7	13	13	13	13	1	1	1	1	13	13	13	13	2
74	2	121	14	9	8	1	7	7	11	7	7	7	7	11	1	1	2	1	7	7	7	7	2
70	2	121	9	7	1	12	7	8	11	1	1	1	8	6	1	1	1	7	7	13	11	2	1
61	1	121	7	8	8	7	7	8	7	7	7	7	7	7	1	1	1	1	7	7	7	7	0
63	2	121	7	8	1	14	6	1	14	7	13	7	13	13	1	1	1	13	7	7	7	7	3
64	1	121	7	8	6	12	7	8	13	3	1	7	13	1	11	1	1	6	1	7	13	1	0
60	0	121	7	7	8	7	7	7	7	8	10	9	8	9	1	1	1	1	7	7	8	8	0
65	1	121	7	8	7	8	7	8	8	7	13	13	13	13	1	1	1	1	7	10	7	7	0
56	0	121	8	8	7	8	8	8	8	7	7	9	8	6	1	1	1	2	7	7	8	6	4
6	2	122	8	8	8	7	7	7	7	7	7	7	7	7	1	1	1	1	7	7	7	7	0
8	2	122	6	8	4	6	5	2	8	9	5	10	9	7	3	12	5	12	3	8	12	4	5
10	2	122	7	8	8	7	8	7	7	1	13	13	13	13	1	1	1	1	13	7	13	7	1
1	1	122	13	10	10	9	2	13	14	12	13	2	3	12	7	1	4	5	1	13	13	7	3
9	2	122	7	7	8	7	7	7	7	7	13	7	7	7	1	1	1	1	7	7	7	7	5
53	2	122	8	1	14	1	7	7	1	8	7	1	1	13	1	1	13	1	1	1	13	13	2
5	1	122	7	9	5	5	9	1	7	14	7	7	13	12	2	3	1	7	10	9	9	1	3
4	0	122	7	7	7	8	7	8	8	8	7	7	7	7	1	1	1	1	7	7	7	7	0
2	2	122	7	7	7	7	7	7	7	7	13	13	13	7	13	1	13	13	1	13	13	13	5
3	2	122	8	7	8	8	8	5	9	8	12	7	4	11	2	1	2	1	8	7	8	6	0
654	2	211	5	8	8	9	11	7	7	10	13	7	13	13	1	1	1	1	7	12	10	8	5
663	1	211	6	5	10	1	6	7	14	9	4	7	7	7	1	5	3	1	4	7	7	7	1
662	1	211	8	7	8	7	8	7	7	8	7	7	7	8	1	1	2	1	7	7	6	8	0
649	2	211	7	8	8	8	7	8	7	7	13	13	13	13	1	1	1	1	13	13	7	7	5
657	1	211	7	7	8	8	7	8	7	7	7	7	7	7	1	1	1	1	7	7	7	7	0
674	2	211	7	7	8	7	7	7	7	7	7	7	7	7	1	1	1	1	7	7	7	7	1
676	1	211	8	7	8	7	7	7	7	8	7	7	7	7	1	1	1	1	7	7	7	7	5
646	2	211	8	5	13	9	6	8	6	7	3	1	8	5	11	5	1	8	11	7	4	3	4
652	1	211	5	7	7	4	12	10	9	10	6	7	3	8	1	3	11	3	6	8	7	6	2
627	2	212	7	14	8	14	8	14	1	7	13	13	13	13	1	1	13	13	7	7	7	7	2
629	1	212	7	8	8	8	7	7	7	7	7	7	7	7	1	1	1	1	7	7	7	7	0
606	1	212	7	7	9	6	8	7	4	10	7	7	6	10	1	1	3	1	7	7	7	8	0
607	2	212	14	7	11	1	1	4	1	14	9	10	9	2	8	10	1	1	7	9	6	9	5
608	2	212	7	9	7	7	7	7	1	8	13	13	13	13	4	2	7	2	8	7	13	7	1
605	1	212	7	7	14	7	7	8	7	9	7	7	1	7	1	1	2	1	7	7	7	8	0
622	2	212	7	7	8	7	7	7	7	8	7	7	6	7	1	1	1	1	7	7	7	7	0
625	2	212	5	8	8	5	6	8	7	9	9	5	8	10	2	8	1	2	7	8	6	11	3
626	1	212	8	7	7	7	7	7	7	7	13	7	13	13	1	1	1	1	6	7	7	8	0
624	1	212	2	7	14	1	6	7	14	14	7	1	6	13	1	1	13	1	12	1	1	13	2
623	1	212	7	6	13	6	8	9	13	9	11	7	9	10	3	7	2	2	8	8	11	8	0

DEPENDENT VARIABLESControl study

SS	SF	ABC	FAV	MD on MJP+MIP	FAV on FAIR	FAV on MJP	PD
664	010		0.00	8.00	2.00	1.00	3.00
666	010		0.75	6.00	2.00	7.00	0.00
634	010		0.75	2.00	0.00	1.00	0.00
679	010		0.00	0.00	0.00	0.00	5.00
680	010		-1.75	-2.00	-4.00	-6.00	1.00
678	010		3.25	2.00	10.00	8.00	5.00
77	020		-.25	0.00	0.00	-6.00	2.00
17	020		0.50	0.00	0.00	0.00	0.00
76	020		5.50	10.00	6.00	10.00	2.00
73	020		4.00	10.00	6.00	8.00	0.00
51	020		5.00	-3.00	5.00	7.00	5.00
72	020		1.75	0.00	4.00	-1.00	0.00

Main experiment

SS	SF	ABC	FAV	MD on MJP+MIP	FAV on FAIR	FAV on MJP	PD
657	2	111	0.00	4.00	0.00	1.00	1.00
656	1	111	-.50	0.00	0.00	0.00	0.00
667	2	111	1.50	6.00	-4.00	5.00	3.00
640	2	111	-.50	-1.00	0.00	0.00	5.00
621	1	111	0.00	6.00	4.00	-3.00	0.00
631	1	111	0.00	-2.00	0.00	0.00	2.00
628	1	111	-.25	0.00	0.00	0.00	4.00
632	1	111	0.50	0.00	0.00	0.00	3.00
643	0	111	6.25	0.00	0.00	0.00	0.00
641	1	112	-2.00	-3.00	-12.00	0.00	2.00
675	1	112	-.25	-6.00	0.00	0.00	1.00
665	2	112	6.50	6.00	12.00	7.00	0.00
647	1	112	0.25	0.00	0.00	0.00	0.00
650	1	112	-.50	-12.00	7.00	-4.00	3.00
601	1	112	1.25	0.00	6.00	7.00	5.00
604	1	112	0.50	0.00	0.00	0.00	5.00
603	1	112	0.25	-4.00	1.00	-1.00	2.00
602	2	112	-1.50	0.00	0.00	0.00	3.00
620	1	112	-.25	0.00	0.00	1.00	5.00
618	1	112	0.25	0.00	0.00	0.00	4.00
65	0	121	0.00	0.00	0.00	0.00	2.00
74	2	121	-.75	-4.00	-1.00	0.00	2.00
70	2	121	5.25	2.00	6.00	9.00	1.00
61	1	121	-.25	0.00	0.00	0.00	0.00
63	2	121	5.00	0.00	12.00	0.00	3.00
64	1	121	4.00	12.00	5.00	12.00	0.00
60	0	121	-.50	-1.00	0.00	0.00	0.00
65	1	121	0.50	0.00	0.00	0.00	0.00
56	0	121	0.50	2.00	1.00	2.00	4.00
6	2	122	-.25	0.00	0.00	0.00	0.00
8	2	122	0.25	2.00	7.00	8.00	5.00
10	2	122	1.25	0.00	0.00	6.00	1.00
1	1	122	0.25	-9.00	1.00	6.00	3.00

SS	SF	ABC	FAV	ND on MJP+MIP	FAV on FAIR	FAV on MJP	PD
9	2	122	-.25	0.00	0.00	0.00	5.00
53	2	122	-5.00	-12.00	-12.00	0.00	2.00
5	1	122	-1.75	1.00	6.00	8.00	3.00
4	0	122	0.25	0.00	0.00	0.00	0.00
2	2	122	0.00	6.00	0.00	0.00	5.00
3	2	122	0.25	-7.00	-1.00	2.00	0.00
654	2	211	0.50	0.00	0.00	-2.00	5.00
663	1	211	1.00	0.00	2.00	0.00	1.00
662	1	211	0.50	1.00	1.00	2.00	0.00
649	2	211	0.00	0.00	0.00	0.00	5.00
657	1	211	0.00	0.00	0.00	0.00	0.00
674	2	211	0.25	0.00	0.00	0.00	1.00
676	1	211	0.50	0.00	0.00	0.00	5.00
646	2	211	1.25	-3.00	-7.00	-1.00	4.00
652	1	211	1.00	5.00	8.00	-1.00	2.00
627	2	212	0.00	0.00	0.00	0.00	2.00
629	1	212	0.00	0.00	0.00	0.00	0.00
606	1	212	2.25	4.00	2.00	1.00	0.00
607	2	212	5.75	-7.00	0.00	3.00	5.00
608	2	212	1.75	0.00	5.00	-6.00	1.00
605	1	212	2.25	6.00	1.00	1.00	0.00
622	2	212	0.50	1.00	0.00	0.00	0.00
625	2	212	1.25	2.00	-1.00	5.00	3.00
626	1	212	0.00	0.00	0.00	1.00	0.00
624	1	212	3.25	7.00	12.00	12.00	2.00
623	1	212	0.75	1.00	0.00	-3.00	0.00
71	0	221	0.00	0.00	0.00	0.00	4.00
79	2	221	2.25	0.00	-2.00	0.00	3.00
80	1	221	0.00	0.00	0.00	0.00	0.00
78	2	221	0.00	0.00	0.00	0.00	1.00
72	2	221	3.50	3.00	8.00	6.00	1.00
68	2	221	1.25	-6.00	4.00	2.00	5.00
69	1	221	-.25	0.00	0.00	0.00	1.00
66	2	221	0.50	0.00	0.00	0.00	5.00
67	2	221	2.75	3.00	5.00	1.00	0.00
25	1	222	0.25	0.00	0.00	0.00	0.00
20	2	222	4.75	0.00	12.00	12.00	0.00
19	2	222	0.00	0.00	0.00	0.00	0.00
18	2	222	0.75	1.00	0.00	-3.00	4.00
24	2	222	0.50	1.00	0.00	-2.00	4.00
16	1	222	-.25	0.00	0.00	0.00	3.00
12	2	222	-.75	0.00	0.00	-6.00	2.00
13	1	222	-1.25	2.00	-3.00	1.00	3.00
14	1	222	0.25	-1.00	-1.00	8.00	5.00
15	2	222	0.25	-6.00	5.00	-6.00	3.00
630	1	311	-.25	-2.00	0.00	0.00	2.00
653	2	311	2.00	5.00	8.00	-4.00	0.00
669	1	311	0.75	9.00	1.00	5.00	0.00
644	1	311	0.50	0.00	-8.00	0.00	3.00
659	1	311	0.50	0.00	0.00	0.00	0.00
670	1	311	-1.00	-12.00	12.00	6.00	0.00
673	1	311	0.50	0.00	0.00	0.00	2.00
632	1	311	-.50	0.00	0.00	0.00	0.00
651	1	311	-.50	0.00	0.00	0.00	2.00

SS	SF	ABC	FAV	MD on MJP+MIP	FAV on FAIR	FAV on MJP	PD
611	1	312	0.50	0.00	0.00	1.00	4.00
661	2	312	-3.75	-1.00	-5.00	-7.00	3.00
672	1	312	0.00	-5.00	-4.00	0.00	2.00
645	1	312	0.25	5.00	0.00	9.00	5.00
639	1	312	0.00	0.00	0.00	2.00	1.00
671	1	312	0.50	-7.00	0.00	-2.00	4.00
658	0	312	0.00	0.00	0.00	0.00	0.00
648	2	312	0.50	4.00	1.00	1.00	2.00
677	2	312	6.50	12.00	12.00	10.00	2.00
59	2	321	2.50	-2.00	2.00	12.00	4.00
57	2	321	0.25	0.00	0.00	-1.00	3.00
53	1	321	1.75	-2.00	0.00	4.00	3.00
52	2	321	0.00	0.00	0.00	0.00	1.00
48	1	321	0.25	0.00	0.00	0.00	3.00
46	1	321	1.00	0.00	4.00	0.00	0.00
47	2	321	0.25	0.00	0.00	0.00	3.00
55	1	321	-.25	0.00	2.00	0.00	1.00
58	2	321	6.50	0.00	12.00	12.00	2.00
54	1	322	-5.50	0.00	0.00	-12.00	0.00
42	2	322	0.50	5.00	0.00	0.00	0.00
41	2	322	1.00	-6.00	0.00	0.00	2.00
50	1	322	-.25	0.00	0.00	0.00	0.00
49	2	322	2.25	-3.00	4.00	5.00	4.00
44	0	322	1.50	0.00	0.00	-5.00	4.00
45	2	322	0.25	-5.00	-3.00	-2.00	4.00
7	2	322	4.00	6.00	1.00	4.00	3.00
43	2	322	-1.50	0.00	0.00	0.00	2.00

## APPENDIX G

### PROGRAMMES FOR DATA ANALYSIS

1. T-tests for independent and single samples.
2. 3-way ANOVA
3. Scheffe's test for homogeneity of variances.
4. Programme to code data for multiple linear regression.
5. Programme to calculate a 2-way ANOVA summary table from regression coefficients.
6. Programme to count the numbers choosing each group.

These Fortran programmes were all self-written for use on a UNIVAC 1108 computer.

T-TESTS

```

10 C T TEST FOR INDEP SAMPLES + T TEST FOR SINGLE SAMPLES
20     PARAMETER N=12
30     PARAMETER DV='PRISONNER'S DILEMMA'
40     DIMENSION D(N),X(N),Y(N),IC(N),IS(N),IL(N)
50     CHARACTER*25 DV
60     NX=0
70     NY=0
80     DO 1 I=1,N
90     READ(8,2) IC(I),IS(I),IL(I),D(I)
100    IF (IS(I) .EQ. 1) THEN
110    NX=NX+1
120    X(NX)=D(I)
130    ELSE
140    NY=NY+1
150    Y(NY)=D(I)
160    END IF
161 1   CONTINUE
162 2   FORMAT(T8,3I1,T20,F20.15)
170    XM=0.
180    XS=0.
190    YM=0.
200    YS=0.
210    DO 10 I=1,NX
220    XM=XM+X(I)
230    XS=XS+(X(I)*X(I))
240 10  CONTINUE
250    XS=XS-(XM*XM/NX)
260    XM=XM/NX
270    DO 20 I=1,NY
280    YM=YM+Y(I)
290    YS=YS+(Y(I)*Y(I))
300 20  CONTINUE
310    YS=YS-(YM*YM/NY)
320    YM=YM/NY
330    DM=0.
340    DS=0.
350    DO 30 I=1,N
360    DM=DM+D(I)
370    DS=DS+(D(I)*D(I))
380 30  CONTINUE
390    DS=DS-(DM*DM/N)
400    DM=DM/N

```

```

410 C TESTING Ho: X=Y
420     ANUM=SQRT(NX*NY*(NX+NY-2))
430     ANUM=(XM-YM)*ANUM
440     DEN=((XS+YS)*(NX+NY))
450     DEN=SQRT(DEN)
460     T=ANUM/DEN
470     IDF=NX+NY-2
480     XS=SQRT(XS/(NX-1))
490     YS=SQRT(YS/(NY-1))
500     WRITE(5,50) DV
510 50  FORMAT(1H1,T30,A25,/T30,25(' ')/T10,
520     & 'DIFFERENCE BETWEEN DELTA (X) AND GAMMA (Y)',/)
530     WRITE(5,55) XM,YM,XS,YS,T,IDF
540 55  FORMAT(T21,'DELTA',T40,'GAMMA'/T20,40(' ')/
550     & T10,'MEAN',T20,2(F8.4,12X)/T10,'ST. DEVS',T20,2(F8.4,12X)/
560     & T20,40(' ')/T30,'T = ',F10.5,3X,'DF = ',I5)
570 C TEST OF Ho: DV=0.
580     DEN=SQRT(DS/(N*(N-1)))
590     TS=DM/DEN
600     IDF=N-1
610     DS=SQRT(DS/(N-1))
620     WRITE(5,70) DM,DS,TS,IDF
630 70  FORMAT(////T10,'TEST FOR DV GREATER THAN 0'//
640     & T10,'MEAN = ',F8.4,5X,'ST. DEV = ',F8.4//
650     & T30,'T = ',F10.5,3X,'DF = ',I5)
660     STOP
670     END
END OF FILE
->

```

3-WAY ANALYSIS OF VARIANCE

This programme uses the technique for unweighted means, extrapolated from the procedure described by Kirk (1968: 200) for 2-way ANOVAs.

```

10 C 3-WAY ANOVA
20   PARAMETER NA=3,NB=2,NC=2,NX=15
25   PARAMETER IVAR='SELF RATING ON HAZE'
60   DIMENSION N(NA,NB,NC),X(NA,NB,NC,NX),AN(NA,NB,NC)
70   DIMENSION CM(NA,NB,NC),CSD(NA,NB,NC),AB(NA,NB),AC(NA,NC)
80   DIMENSION BC(NB,NC),EA(NA),EB(NB),EC(NC),SS(8),DF(10),F(8),IDF(
10)
90   DIMENSION ID(NA,NB,NC,NX),IC(NA,NB,NC,NX),IS(NA,NB,NC,NX)
100  DIMENSION IL(NA,NB,NC,NX),U(40)
110  REAL MS(8)
120  CHARACTER IO*5(8)
130  DATA IO/'A','B','C','AB','AC','BC','ABC','ERROR'/
140    N(1,1,1)=9
150    N(1,1,2)=11
160    N(1,2,1)=9
170    N(1,2,2)=10
180    N(2,1,1)=9
190    N(2,1,2)=11
200    N(2,2,1)=9
210    N(2,2,2)=9
220    N(3,1,1)=9
230    N(3,1,2)=9
240    N(3,2,1)=9
250    N(3,2,2)=9
251  P=NA
252  Q=NB
253  R=NC
260  DO 10 I=1,NA
270  DO 10 J=1,NB
280  DO 10 K=1,NC
290  DO 5 L=1,N(I,J,K)
330 3  READ(8,1) ID(I,J,K,L),IC(I,J,K,L),IS(I,J,K,L),IL(I,J,K,L),
340  & X(I,J,K,L)
350 1  FORMAT(1X,I3,T8,3I1,T18,F1.0)
360  IF(IC(I,J,K,L) .NE. I) GO TO 9
370  IF (IS(I,J,K,L) .NE. J) GO TO 9
380  IF (IL(I,J,K,L) .NE. K) GO TO 9
390  GO TO 5
400 9  WRITE(5,2) ID(I,J,K,L),I,IC(I,J,K,L),J,IS(I,J,K,L),K,IL(I,J,K,
L)
410 2  FORMAT(1X,'ERROR: I.D., I, AI, J, BJ, K, CK.'/T5, 7I5)
420 5  CONTINUE
430 10 CONTINUE
440  T=0.
450  TM=0.
460  TMSQ=0.
470  TD=0.
480  DO 15 J=1,NB
490  DO 15 K=1,NC
500 15 BC(J,K)=0.
510  HN=0.
520  NT=0.
530  DO 20 I=1,NA
540  DO 25 K=1,NC
550 25 AC(I,K)=0.

```

```

560      DO 30 J=1,NB
570      AB(I,J)=0.
580      DO 40 K=1,NC
590      AN(I,J,K)=N(I,J,K)
600      HN=HN+(1/AN(I,J,K))
610      NT=NT+N(I,J,K)
620      CM(I,J,K)=0.
630      CSD(I,J,K)=0.
640      DO 50 L=1,N(I,J,K)
650      T=T+(X(I,J,K,L)*X(I,J,K,L))
660      CM(I,J,K)=CM(I,J,K)+X(I,J,K,L)
670      CSD(I,J,K)=CSD(I,J,K)+(X(I,J,K,L)*X(I,J,K,L))
680 50    CONTINUE
690      TD=TD+(CM(I,J,K)*CM(I,J,K)/AN(I,J,K))
700      CSD(I,J,K)=CSD(I,J,K)-(CM(I,J,K)*CM(I,J,K)/AN(I,J,K))
710      CSD(I,J,K)=SQRT(CSD(I,J,K)/(AN(I,J,K)-1.))
720      CM(I,J,K)=CM(I,J,K)/AN(I,J,K)
730      TM=TM+CM(I,J,K)
740      TMSQ=TMSQ+(CM(I,J,K)*CM(I,J,K))
750      AB(I,J)=AB(I,J)+CM(I,J,K)
760 40    CONTINUE
770      AB(I,J)=AB(I,J)/R
780 30    CONTINUE
790 20    CONTINUE
800      HN=(P*Q+R/HN)
810      DO 60 I=1,NA
820      DO 60 K=1,NC
830      AC(I,K)=0.
840      DO 65 J=1,NB
850 65    AC(I,K)=AC(I,K)+CM(I,J,K)
860      AC(I,K)=AC(I,K)/Q
870 60    CONTINUE
880      DO 70 J=1,NB
890      DO 70 K=1,NC
900      BC(J,K)=0.
910      DO 75 I=1,NA
920 75    BC(J,K)=BC(J,K)+CM(I,J,K)
930      BC(J,K)=BC(J,K)/P
940 70    CONTINUE
950      ZX=(TM*TM)/(P*Q+R)
960      ZA=0.
970      DO 80 I=1,NA
980      EA(I)=0.
990      DO 85 J=1,NB
1000 85   EA(I)=EA(I)+AB(I,J)
1010      ZA=ZA+(EA(I)*EA(I)/Q)
1020 80   CONTINUE
1030      ZA=ZA*R
1040      ZB=0.
1050      DO 90 J=1,NB
1060      EB(J)=0.
1070      DO 95 I=1,NA
1080 95   EB(J)=EB(J)+AB(I,J)
1090      ZB=ZB+(EB(J)*EB(J)/P)
1100 90   CONTINUE
1110      ZB=ZB*R
1120      ZC=0.
1130      DO 100 K=1,NC
1140      EC(K)=0.
1150      DO 105 I=1,NA
1160 105  EC(K)=EC(K)+AC(I,K)
1170      ZC=ZC+(EC(K)*EC(K)/P)
1180 100  CONTINUE
1190      ZC=ZC*Q
1200      ZAB=0.

```

```

1210      DO 110 I=1,NA
1220      DO 110 J=1,NB
1230 110  ZAB=ZAB+(AB(I,J)*AB(I,J))
1240      ZAB=ZAB*R
1250      ZAC=0.
1260      DO 120 I=1,NA
1270      DO 120 K=1,NC
1280 120  ZAC=ZAC+(AC(I,K)*AC(I,K))
1290      ZAC=ZAC*Q
1300      ZBC=0.
1310      DO 130 J=1,NB
1320      DO 130 K=1,NC
1330 130  ZBC=ZBC+(BC(J,K)*BC(J,K))
1340      ZBC=ZBC*P
1350      SS(1)=HN*(ZA-ZX)
1360      SS(2)=HN*(ZB-ZX)
1370      SS(3)=HN*(ZC-ZX)
1380      SS(4)=HN*(ZAB-ZA-ZB+ZX)
1390      SS(5)=HN*(ZAC-ZA-ZC+ZX)
1400      SS(6)=HN*(ZBC-ZB-ZC+ZX)
1410      SS(7)=HN*(TMSQ-ZAB-ZAC-ZBC+ZA+ZB+ZC-ZX)
1420      SS(8)=T-TD
1430      DF(1)=P-1.
1440      DF(2)=Q-1.
1450      DF(3)=R-1.
1460      DF(4)=(P-1.)*(Q-1.)
1470      DF(5)=(P-1.)*(R-1.)
1480      DF(6)=(Q-1.)*(R-1.)
1490      DF(7)=(P-1.)*(Q-1.)*(R-1.)
1500      DF(8)=NT-(P*Q*R)
1510      DO 150 I=1,8
1520 150  MS(I)=SS(I)/DF(I)
1530      DO 160 I=1,7
1540 160  F(I)=MS(I)/MS(8)
1550      F(8)=
1551      DO 410 I=1,NA
1552 410  EA(I)=EA(I)/Q
1553      DO 420 J=1,NB
1554 420  EB(J)=EB(J)/P
1555      DO 430 K=1,NC
1556 430  EC(K)=EC(K)/P
1560 C CALCULATION OF F MAX
1570      FU=-3**11
1580      FL=3**12
1590      DO 400 I=1,NA
1600      DO 400 J=1,NB
1610      DO 400 K=1,NC
1620      VAR=CSD(I,J,K)*CSD(I,J,K)
1630      IF (VAR .GT. FU) THEN
1640          FU=VAR
1650      ELSE IF (VAR .LT. FL) THEN
1660          FL=VAR
1670      END IF
1680 400  CONTINUE
1690      FMAX=FU/FL
1700      DF(9)=P*Q*R
1710      DF(10)=(HN-1.)
1720      DO 170 I=1,10
1730 170  IBF(I)=INT(DF(I))
1740 C CELL MEANS
1750      WRITE(5,200) IVAR
1755 200  FORMAT(1H1,T30,A30,/T30,30(' ')/T20,
1760      & 'CELL MEANS AND STANDARD DEVIATIONS'//)
1770      WRITE(5,201) ((J,K),K=1,NC),J=1,NB)
1780 201  FORMAT(T13,4(' B',I1,' C',I1,15X))

```

```

1785     WRITE(5,66)
1790     DO 205 I=1,NA
1800     WRITE(5,210) I,((CH(I,J,K),K=1,NC),J=1,NB),
1810     & ((CSD(I,J,K),K=1,NC),J=1,NB),((N(I,J,K),K=1,NC),J=1,NB)
1820 210   FORMAT(T3,'A ',I1,T10,4(F10.4,10X)//T10,4(F10.4,10X)//
1830     & T10,4(I10,10X)//T2,130('--'))
1840 205   CONTINUE
1850     WRITE(5,220) ((J),J=1,NB)
1860 220   FORMAT(T40,'AB MEANS'//T15,2(' B',I1,6X))
1865     WRITE(5,66)
1870     DO 225 I=1,NA
1880     WRITE(5,230) I,(AB(I,J),J=1,NB),EA(I)
1890 230   FORMAT(T3,'A ',I1,T10,3F10.4)
1900 225   CONTINUE
1905 233   FORMAT(T3,'B ',I1,T10,3F10.4)
1910     WRITE(5,235) (EB(J),J=1,NB)
1920 235   FORMAT(T10,30('--')/T10,2F10.4)
1930     WRITE(5,240) ((K),K=1,NC)
1940 240   FORMAT(T40,'AC MEANS'//T15,2(' C',I1,6X))
1945     WRITE(5,66)
1950     DO 245 I=1,NA
1960 245   WRITE(5,230) I,(AC(I,K),K=1,NC)
1970     WRITE(5,235) (EC(K),K=1,NC)
1980     WRITE(5,250) ((K),K=1,NC)
1990 250   FORMAT(T40,'BC MEANS'//T15,2(' C',I1,6X))
1995     WRITE(5,66)
2000     DO 260 J=1,NB
2010 260   WRITE(5,233) J,(BC(J,K),K=1,NC)
2020     WRITE(5,300)
2030 300   FORMAT(1H1,T40,'ANOVA SUMMARY TABLE'///
2040     & T5,'SOURCE',T15,'SS',T25,'DF',T35,'MS',T45,'F')
2045     WRITE(5,66)
2050     DO 310 I=1,8
2060 310   WRITE(5,320) ID(I),SS(I),IDF(I),MS(I),F(I)
2070 320   FORMAT(T5,A5,F10.4,I10,2F10.4)
2080     WRITE(5,66)
2090 66    FORMAT(1X,132('--'))
2100     WRITE(5,330) FMAX,IDF(9),IDF(10)
2110 330   FORMAT(///T10,'F MAX = ',F10.4,5X,'DF = ',2I5)
2120 C FILE FOR SHE.
2130     W(1)=P
2140     W(2)=Q
2150     W(3)=R
2160     W(4)=0.
2170     W(5)=MS(8)
2180     W(6)=DF(8)
2190     M=5
2200     N1=6
2210     DO 490 I=1,NA
2220     DO 490 J=1,NB
2230     DO 490 K=1,NC
2240     M=M+2
2250     N1=N1+2
2260     W(M)=CH(I,J,K)
2270     W(N1)=AN(I,J,K)
2280 490   CONTINUE
2290     DO 500 I=1,N1
2295     WRITE(5,*) W(I)
2300 500   WRITE(13,*) W(I)
2310     STOP
2320     END
END OF FILE
->

```

SCHEFFE'S TEST FOR HOMOGENEITY OF VARIANCE

```

10 C PROGRAM TO TEST FOR HOMOGENEITY OF VARIANCES.
20 C REF SCHEFFE (1959:83)
30     PARAMETER IPOP=4, ISMP=3
40     DIMENSION S(IPOP, ISMP), Y(IPOP, ISMP), NA(IPOP, ISMP), N(IPOP, ISMP)
50     DIMENSION X(IPOP), NI(IPOP)
60     CHARACTER IV*30
65     IV='INGROUP FAVOURITISM'
70 1   FORMAT(3(F6.4, 1X, I2, 2X))
80     DO 5 I=1, IPOP
90     READ(8, 1) (S(I, J), NA(I, J), J=1, ISMP)
100    DO 5 J=1, ISMP
110    Y(I, J)=ALOG(S(I, J)*S(I, J))
120    N(I, J)=NA(I, J)-1
130 5   CONTINUE
140    DO 10 I=1, IPOP
150    NI(I)=0
160    X(I)=0.
170    DO 15 J=1, ISMP
180 15  NI(I)=NI(I)+N(I, J)
190    DO 20 J=1, ISMP
200 20  X(I)=X(I)+(N(I, J)*Y(I, J)/NI(I))
210 10  CONTINUE
220    NE=IPOP*(ISMP-1)
230 C THE ABOVE LINE HOLDS ONLY FOR EQUAL SAMPLES PER POPULATION
240    NN=0
250    XM=0.
260    DO 25 I=1, IPOP
270 25  NN=NN+NI(I)
280    DO 30 I=1, IPOP
290 30  XM=XM+(X(I)*NI(I)/NN)
300    A=0.
310    B=0.
320    DO 35 I=1, IPOP
330    A=A+(NI(I)*X(I)*X(I))
340    DO 40 J=1, ISMP
350 40  B=B+(N(I, J)*Y(I, J)*Y(I, J))
360 35  CONTINUE
370    ANUM=NE*(A-(NN*XM*XM))
380    DEN=(IPOP-1)*(B-A)
390    F=ANUM/DEN
400    IDF1=(IPOP-1)
410    IDF2=NE
420    WRITE(5, 45) IV, (((S(I, J), NA(I, J)), J=1, ISMP), I=1, IPOP)
430 45  FORMAT(1H1, T30, A30//4(15X, 3(F6.4, 1X, I2, 2X)//)
440    WRITE(5, 50) F, IDF1, IDF2
450 50  FORMAT(///T20, F10.4, 5X, 'DF = ', I4, ', ', I4)
460    STOP
470    END
END OF FILE
->

```

CODING OF DATA FOR MULTIPLE LINEAR REGRESSION

```

10 C PROGRAMME TO CODE DATA FOR MLR.
20     PARAMETER N=114
30     DIMENSION Y(N),NA(N),NB(N),NAB(N),X(N)
35     K=0
40     DO 10 I=1,N
50     READ(8,1) IC,IP,X(I)
60     IF (IC .EQ. 0) GO TO 10
65     K=K+1
70     IF (IC .EQ. 1) THEN
80         IF (IP .EQ. 1) THEN
90             Y(K)=X(I)
100            NA(K)=1
110            NB(K)=1
120            NAB(K)=1
130            ELSE IF (IP .EQ. 2) THEN
140                Y(K)=X(I)
150                NA(K)=-1
160                NB(K)=-1
170                NAB(K)=1
180            END IF
185        END IF
190        IF (IC .EQ. 2) THEN
200            IF (IP .EQ. 1) THEN
210                Y(K)=X(I)
220                NA(K)=1
230                NB(K)=-1
240                NAB(K)=-1
250            ELSE IF (IP .EQ. 2) THEN
260                Y(K)=X(I)
270                NA(K)=-1
280                NB(K)=1
290                NAB(K)=-1
300            END IF
305        END IF
310 10    CONTINUE
320     DO 20 I=1,K
330     WRITE(5,2) Y(I),NA(I),NB(I),NAB(I)
335 20    WRITE(13,2) Y(I),NA(I),NB(I),NAB(I)
340 1     FORMAT(I6,I1,I1,I1,I20,F20.15)
350 2     FORMAT(1X,F10.4,3I10)
360     STOP
370     END
END OF FILE
->

```

2-WAY ANOVA SUMMARY TABLE FROM REGRESSION COEFFICIENTS

This programme uses the technique described in Kerlinger & Pedhuzer (1973: 188).

```

10 C PROGRAMME TO CONVERT RESULTS OF REGRESSION INTO ANOVA TABLE.
20     DIMENSION SS(5,4),AMS(5,4),F(5,4),IDF(5,4),Y(5)
21     DIMENSION R1(5),R2(5),R12(5),R123(5)
22     CHARACTER TABLE*8(5),IV*25(5),SRC*15(4)
23     HEAD='ANOVA SUMMARY TABLE'
24     DATA SRC/'A (AGREEMENT)', 'B (GROUP)', 'AB', 'RESIDUAL'/
25     DATA TABLE/'SOURCE', 'SS', 'DF', 'MS', 'F RATIO'
26     /
27     DATA IV/'INGROUP FAVOURITISM', 'PULL OF MD ON MIP+MJP',
28     &'PULL OF FAV ON FAIRNESS', 'PULL OF FAV ON MJP',
29     &'PRISONERS DILEMMA'/
30     DO 10 I=1,5
31     READ(8,1) Y(I),R12(I),R2(I),R1(I),R123(I)
32     SS(I,1)=Y(I)*(R12(I)-R1(I))
33     SS(I,2)=Y(I)*(R12(I)-R2(I))
34     SS(I,3)=Y(I)*(R123(I)-R12(I))
35     SS(I,4)=Y(I)*(1.-R123(I))
36     IDF(I,4)=102
37     AMS(I,4)=SS(I,4)/IDF(I,4)
38     DO 15 J=1,3
39     IDF(I,J)=1
40     AMS(I,J)=SS(I,J)
41     F(I,J)=AMS(I,J)/AMS(I,4)
42 200 15     CONTINUE
43 210     F(I,4)=0.
44 220 10     CONTINUE
45 230 1     FORMAT(5F10.5)
46 240     DO 30 I=1,5
47 250     WRITE(5,2) IV(I),HEAD,(TABLE(J),J=1,5)
48 260     DO 35 J=1,4
49 270 35     WRITE(5,3) SRC(J),SS(I,J),IDF(I,J),AMS(I,J),F(I,J)
50 280     WRITE(5,4)
51 290 30     CONTINUE
52 300 2     FORMAT(1H1,T30,A25/T30,25(' ')/T20,A20//T5,5A10//T2,60(' '))
53 )
54 310 3     FORMAT(/T2,A15,F10.4,I5,5X,2F10.4)
55 320 4     FORMAT(/T2,60(' '))
56 330     STOP
57 340     END
58 END OF FILE
59 ->

```

FREQUENCY COUNT OF GROUP CHOICES

```

10 C PROGRAM TO COUNT HOW MANY WERE PLACED AND CHOSE TO BE IN DELTA/GAMM
A.
20     PARAMETER NUM=114
30     DIMENSION IC(NUM) ,IP(NUM),N(2,2)
31     NBOTH=0
32     DO 2 I=1,2
33     DO 2 J=1,2
34 2   N(I,J)=0
40     DO 10 I=1,NUM
50     READ(8,5) IC(I),IP(I)
70     IF (IC(I) .EQ. 0) THEN
80         NBOTH =NBOTH+1
90         GO TO 10
100    END IF
110    IF (IC(I) .EQ. 1) THEN
120        IF (IP(I) .EQ. 1) THEN
130            N(1,1)=N(1,1)+1
140        ELSE IF (IP(I) .EQ. 2) THEN
150            N(1,2)=N(1,2)+1
160        ELSE
170            WRITE(5,8)
175        END IF
180    END IF
190    IF (IC(I) .EQ. 2) THEN
200        IF (IP(I) .EQ. 1) THEN
210            N(2,1)=N(2,1)+1
220        ELSE IF (IP(I) .EQ. 2) THEN
230            N(2,2)=N(2,2)+1
240        ELSE
250            WRITE(5,8)
255        END IF
260    END IF
270 10  CONTINUE
280 5   FORMAT(T6,I1,I9,I1)
290 8   FORMAT(1X,'ERROR')
300    WRITE(5,20) ((N(I,J),J=1,2),I=1,2)
310 20  FORMAT(1H1,T30,'PLACED'//T25,'DELTA',5X,'GAMMA'//T22,15('-')/
/
320    & T10,'DELTA',T20,2I10//1X,'CHOICE',T22,15('-')//,T10,'GAMMA',
330    & T20,2I10//T22,15('-'))
340    WRITE(5,25) NBOTH
350 25  FORMAT(/////T10,'NUMBER NOT DECIDING = ',I5)
360    STOP
370    END
END OF FILE
->

```

APPENDIX H

ANALYSES NOT PRESENTED IN THE RESULTS CHAPTER

SCHEFFÉ'S TEST FOR HOMOGENEITY OF VARIANCES

Using the programme given in Appendix G, each dependent variable was checked for violation of the homogeneity of variance function. In each case the I populations specified by Scheffe (1959; 83) were taken to be the four Status-Legitimacy combinations, and the J samples from each taken to be the Cooperation conditions.

The resulting F ratios are presented below:

Table 7-1. Scheffé's Test for Equality of Variances

Dependent Variable	F Ratio	df	
Fav	1.2740	3, 8	p>.10
Md on MJP+MIP	0.9738	3, 8	p>.10
Fav on F	0.4325	3, 8	p>.10
Fav on MJP	3.0468	3, 8	p>.05
Competitiveness	0.4338	3, 8	p>.10

None of the F ratios are significant at the 5% level, though the pull of Fav on MJP is at the 1% level.

TESTING Ho:  $\mu=0$  and Comparison with the Control Groups

Single sample t-tests were used to test whether the variables 'existed', and 2-sample t-tests were used in the comparison with the control groups. The results are summarized in the table below:

Table 7-2. Testing Ho:  $\mu=0$  and Comparison with Control Study

	Control Study	Main Study	t-test (Comparison)	t-test (Ho: $\mu=0$ )
<b>1. Fav</b>				
Mean	1.6250	0.6899	t=0.8346	t=3.7781 **
S.D.	(2.2900)	(3.8012)	df=124	df=113
<b>2. MD on MJP+MIP</b>				
Mean	2.7500	0.0381	t=0.5841	t=0.1017
S.D.	(4.5751)	(15.9637)	df=124	df=113
<b>3. Fav on F</b>				
Mean	2.4167	1.1167	t=0.2457	t=2.7925 **
S.D.	(3.7769)	(18.2291)	df=124	df=113
<b>4. Fav on MJP</b>				
Mean	2.4167	1.1226	t=0.2704	t=2.9498 **
S.D.	(5.4848)	(16.5092)	df=124	df=113
<b>5. Competitiveness</b>				
Mean	1.9167	2.0641	t=0.1573	
S.D.	(2.1088)	(3.1673)	df=124	

\*\*p<0.01 (2-tailed)

RATINGS

Rating: Self Assessment on the Maze.

This was seen as a possible indicator of how the group assignment may have affected the Subject's self-confidence. It was anticipated that the Subjects placed in the Low Status group would have a lower morale and assess themselves lower.

The scale points are:

- 5: Very well
- 4: Well
- 3: As well as anyone else
- 2: Badly
- 1: Very badly

Table 7-3. Self-Assessment: Means and Standard Deviations

	High Status		Low Status	
	Leg.	Illeg.	Leg.	Illeg.
A 1	3.0000 (0.8660) 9	2.8182 (1.1677) 11	2.7778 (0.6667) 9	3.1000 (0.3162) 10
A 2	3.2222 (0.6667) 9	3.6364 (0.9244) 11	3.5556 (0.8819) 9	3.7778 (0.9718) 9
A 3	3.5556 (1.1304) 9	3.5556 (0.7265) 9	3.0000 (0.8660) 9	3.6667 (0.7071) 9

Table 7-4. Self Assessment: ANOVA Summary Table

SOURCE	SS	DF	MS	F	
A (Cooperation)	8.3751	2	4.1876	5.6836	p<0.01
B (Status)	0.0064	1	0.0064	0.0086	
C (Legitimacy)	1.6255	1	1.6255	2.2062	
AB	0.9918	2	0.4959	0.6730	
AC	0.4086	2	0.2043	0.2773	
BC	0.7473	1	0.7473	1.0143	
ABC	0.9737	2	0.4868	0.6608	
ERROR	74.4152	101	0.7368		

The F ratio for Cooperation was significant (F=5.6836; p= ), so a test of pairwise comparisons was done, using Tukey's HSD statistic.

Table 7-5. Self-Assessment: Tukey's Test of Pairwise Comparisons

<u>Overall A Means</u>			
	A1	A2	A3
	2.9240	3.5480	3.4444
Difference between Means	DF	t'	
A1-A2	0.6240	3,101	4.4591 p<0.01
A1-A3	0.5204	3,101	3.7159 p<0.05
A2-A3	0.0036	3,101	0.7432

The results indicate that the Subjects in the No Cooperation groups rated themselves significantly lower than the Subjects in both Cooperations groups. There was no difference between the ratings of the subjects in the two Cooperation conditions.

Rating: Assessment of Self and Partner on the Maze

This assessment was a possible indicator of how the group membership of their partner would affect the Subjects' perception of their 'product'. It was expected that the teams where both members were in the same group would rate themselves higher than the teams of mixed group memberships. This was expected to apply to the Delta (High Status) Subjects, but not to the Gamma (Low Status) Subjects. Thus an AB interaction was anticipated.

The rating scale was the same as for the Self ratings.

Table 7-6. Team-Assessment: Means and Standard Deviations

	High Status		Low Status	
	Leg.	Illeg.	Leg.	Illeg.
A 2	3.4444 (0.5270) 9	3.5455 (0.5222) 11	3.3333 (0.7071) 9	3.3333 (0.7071) 9
A 3	3.2222 (0.6667) 9	3.4444 (0.7265) 9	3.1111 (0.6009) 9	3.4444 (0.8819) 9

Table 7-7. Team Assessment: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	0.2172	1	0.2172	0.4804
B (Status)	0.2172	1	0.2172	0.4804
C (Legitimacy)	0.4963	1	0.4963	1.0977
AB	0.0518	1	0.0518	0.1145
AC	0.2378	1	0.2378	0.5360
BC	0.0001	1	0.0001	0.0002
ABC	0.0518	1	0.0518	0.1146
ERROR	29.8384	66	0.4521	

None of the F ratios were significant.

Difference between Self Rating and Rating with Partner

This difference was given a positive sign if the rating of Self was higher than of the team, and a negative if the rating of the team was higher than that of the Self.

Table 7-8. Difference Self/Team: Means and Standard Deviations

	High Status		Low Status	
	Leg.	Illeg.	Leg.	Illeg.
A 2	-0.2222 (0.4410) 9	0.0909 (1.0445) 11	0.2222 (0.6667) 9	0.1250 (1.1260) 8
A 3	0.3333 (0.8660) 9	0.1111 (0.3333) 9	-0.1111 (0.6009) 9	0.2222 (0.4410) 9

Table 7-9. Difference Self/Team: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	0.1307	1	0.1307	0.2345
B (Status)	0.0239	1	0.0239	0.0429
C (Legitimacy)	0.1212	1	0.1212	0.2174
AB	0.7468	1	0.7468	1.3399
AC	0.0124	1	0.0124	0.0223
BC	0.0239	1	0.0239	0.0429
ABC	1.0571	1	1.0571	1.8966
ERROR	36.2285	65	0.5574	

Anticipated Rating with Another Partner

This was a measure of 'hostility' or otherwise the Subject felt towards their partner. It was anticipated that the Status of the partner would influence this assessment.

The scale used was

- 1 = Much better
- 2 = Better
- 3 = The same
- 4 = Worse
- 5 = Much worse

Table 7-10. Team-Assessment: Means and Standard Deviations

		High Status		Low Status	
		Leg.	Illeg.	Leg.	Illeg.
A 2		3.1111 (0.3333) 9	3.0000 (0.7746) 11	3.0000 (0.7559) 8	2.8750 (0.6409) 8
A 3		2.8889 (0.6009) 9	3.2222 (0.4410) 9	2.8750 (0.3536) 8	2.8889 (0.7817) 9

Table 7-11. Another Partner: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	0.0136	1	0.0136	0.0356
B (Status)	0.3738	1	0.3738	0.9823
C (Legitimacy)	0.0136	1	0.0136	0.0356
AB	0.0136	1	0.0136	0.0356
AC	0.3738	1	0.3738	0.9823
BC	0.1221	1	0.1221	0.3208
ABC	0.1026	1	0.1026	0.2695
ERROR	23.9722	63	0.3805	

None of the F ratios are significant.

Rating whether their previous partnership influenced responses on the Prisoner's Dilemma Game.

It was expected that Subjects who cooperated with members of their ingroup would be more influenced than those who did not. The scale used was

Table 7-12. Influenced in P.D.G.: Means and Standard Deviations

		High Status		Low Status	
		Leg.	Illeg.	Leg.	Illeg.
A	2	2.0000 (1.2247) 9	2.2727 (1.1909) 11	2.1111 (1.5366) 9	2.2000 (1.6193) 10
A	3	1.7778 (1.3017) 9	1.6667 (0.8660) 9	2.8889 (1.6159) 9	2.0000 (1.2247) 9

Table 7-13. Influenced on P.D.G.: ANOVA Summary Table

SOURCE	SS	DF	MS	F
A (Cooperation)	0.0732	1	0.0732	0.0405
B (Status)	2.5640	1	2.5640	1.4184
C (Legitimacy)	0.4752	1	0.4752	0.2629
AB	2.3053	1	2.3053	1.2753
AC	2.1619	1	2.1619	1.1960
BC	1.0783	1	1.0783	0.5965
ABC	0.4113	1	0.4113	0.2276
ERROR	121.1152	67	1.8077	

None of the F ratios reach significance.

FAIRNESS STRATEGY

A check was run to see whether Subjects who claimed to have used the fairness strategy had in fact done so. 55 Subjects stated unequivocally that they had been fair in their choices. A t-test was used to see whether the degree of ingroup bias was less for these Subjects, than for others.

Table 7-14. T-Test between Fair and Non-Fair Subjects

	Fair Ss	Non-Fair Ss	t
Mean	0.0409	1.2500	t=3.4643 p<0.001
St. Dev.	(0.6379)	(2.5133)	df=112

The difference between the sets of Subjects was highly significant (t=3.4643; p=0.00075), the Fair Subjects having a much smaller degree of ingroup favouritism than the others.

To check that some strong negative ingroup biases did not contaminate the results, a chi-squared test was also performed to check whether more of the Fair subjects actually gave fair responses than of the other set. For this test, an Ingroup Favouritism score of between -0.25 to +0.25 was taken as Fair responses.

Table 7-15. Frequency of Fair Responses

		Responses	
		Fair	Other
S t r a t e g y	Fair	32	23
	Other	13	46

The chi-squared statistic was significant ( $\chi^2=15.5677$ , df=1; p<.001) This and the pattern of frequencies indicate that the Subjects who claimed to have been fair had done so.