

AN INVESTIGATION OF THE  
DETERMINANTS OF THE SPATIAL  
CHARACTERISTICS OF FIGURE PLACEMENTS

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to francis and caroline

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## ABSTRACT

The doll placement technique is a projective instrument which yields objective measures from which inferences may be drawn. Subjects place pairs of dolls to represent social encounters described to them by the experimenter. When the dolls have been placed, the distance between them and the angles at which they stand can serve as a source of information either about the personality of the placer or about the way in which he perceives the relationship between the interactors represented. Most experimental work employing figure placements has used flat felt figures which subjects have mounted on a flannelgraph. This method limits an investigator to one dependent variable, the inter-figure distance. However if three dimensional dolls are placed three dependent measures can be derived from a placement, one of distance and two of orientation. It has been demonstrated that a reliable correlation exists between the spatial relations between figures placed by a person and the spatial relationships between real interactors. The theoretical analysis of the determinants of interpersonal distance and orientation in social encounters which has been worked out by students of non-verbal behaviour is therefore able to serve as a basis for the interpretation of the spatial characteristics of doll placements. Previous work with the doll placement technique has concentrated on the distance between dolls. The present study explored the determinants of figure orientations. Firstly an analysis was made of the types of orientation pattern that can occur when two persons are involved in a social encounter. Secondly, an experiment was

performed which was designed to explore whether asymmetry in an orientation pattern might act as a cue to determine how individual figures in a pair were perceived. Thirdly, two doll placement studies were performed which were designed to investigate the conditions giving rise to asymmetrical orientation patterns and the determinants of direct and indirect orientations. The confidence or anxiety attributed to an interactor represented by a figure proved to be a major determinant of its spatial position. The results of the study indicate that the use of the angle measures in the analysis of doll placements considerably enhances the value of the technique. It is argued that the doll placement method could be profitably employed both as a clinical instrument and as a research tool for cross-cultural psychology.

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## CHAPTER 1

### ORIENTATION AND DISTANCE REGULATION: A FEATURE OF HUMAN NON-VERBAL BEHAVIOUR

#### 1.1 INTRODUCTION

The practical context of the research to be reported here is the use of dolls as a projective technique both in the experimental laboratory and in the clinical setting. Two very different approaches to the use of dolls in psychological research have been employed, and it is towards the development of the more recent of these (Little 1965, 1968) that the present work aims to contribute.

In 1965, Little published the results of an experiment in which subjects had placed pairs of small doll figures to represent various kinds of social encounter. He showed that the distance between the dolls so placed varied according to the place in which the encounter was imagined to have taken place (office or university campus) and according to the degree of acquaintanceship between the imagined interactors (friends stood closer than strangers).

It is interesting to compare Little's use of dolls with that of Sears and his associates in the 1940's (e.g. Sears 1947, Pintler 1945). These investigators used doll play as a projective technique by means of which a child's fantasy life could be explored. Sears (1947) indicates that when a child has been playing with the dolls for a while

"the observer feels that the blinds have gone up and he is seeing the inner person of the child. It is as if the child were making him see this family world as the child himself sees it -- or perhaps would like to see it."

In this respect

"Doll play is like clay modeling, painting, Rorschach interpretation and all other varieties of projective tests; a child's performance carries an almost overwhelming aura of revelation to a sensitive observer."

The clinical application of doll play of this type may go beyond this. Pintler writes that

"Its usefulness has been demonstrated most frequently in revealing the area in which the child's main problems lie, in developing a satisfactory working relationship between therapist and child, and in providing for the release of aggressions and the abreaction of anxiety."  
(Pintler 1945).

Sears and his associates were well aware of the methodological problems attending the use of such a projective technique. Sears writes (op.cit. p. 191)

"the ambiguous character of children's play can be a dangerously fertile stimulus to the projection of our own interpretative predilections,"

and speaks of the need for validation and objectification of the measurement. A certain amount of work was in fact done in the isolating of variables which affect a child's doll play as a means towards the achievement of such objectification.

This projective use of dolls by Sears and his associates is very different from that of Little. Sears' technique yields a rich and stimulating set of data about the child for the use of the clinician, but runs the risk of sacrificing objectivity. Little's technique, on the other hand, derives a single measure from each doll placement, the distance between the dolls, and seems formal and dry by comparison. Little's experiment differs from those of Sears

in three ways:

i) the interest of the experimenter is in a single quantitative measure of the spatial relationships between the dolls derived from a single static configuration of a doll pair placed by the subject, whereas in Sears' studies the experimenter or clinician is interested in the verbal behaviour ascribed to the dolls, and in the ongoing sequence of interaction in which they are made to participate by the child;

ii) the context of the Little experiment was not a play situation, and the subjects were adults, not children;

iii) the theoretical background which gave rise to the experiment was that of the newly developing interest in non-verbal behaviour, and not that of the therapist attempting to gain insights into psychodynamic processes.

'Whereas doll play has proved its worth as a projective technique for use with children, the more formal doll placement technique has yet to be fully developed as an instrument with useful applications in the clinic or the research setting. The applications of the more formal placement technique will be limited by the extent to which the spatial relationships between two dolls placed to represent an interpersonal encounter can be shown to be a function of the nature of the encounter so represented or of aspects of the placer's personality.

The thesis which is to be developed in the following pages is that not only do distance measures derived from doll placements vary in a meaningful way in relation to specifiable variables, but that the orientations at which the dolls stand provide a second objective measure which varies in a meaningful way in relation to the type of encounter being represented and the personality of the

person representing it.

To this end it will be necessary to examine the regularities that have been observed by students of human spatial behaviour, and to set this data in its wider context, which is the general field of the study of human non-verbal behaviour. What is known of the determinants of interpersonal distance and particular orientation will be reviewed, an experiment will be described in which subjects were required to make interpretations of schematic orientation patterns, and two studies using the doll placement method will be reported.

## 1.2 THE STUDY OF HUMAN NON-VERBAL BEHAVIOUR

### 1.2.1 Non-verbal communication as a field of psychological enquiry

There has recently been an upsurge of interest in the field of study often called "non-verbal communication". Essentially, research in this area attempts to establish how inferences can be drawn from non-linguistic aspects of a person's behaviour about his intentions, anxieties or emotions or other aspects of his personality which are not directly observable. Facial expression, tone of voice, bodily posture and use of gesture are typical of the kinds of non-verbal behaviour which have been examined experimentally by psychologists (Argyle 1969).

Interest in non-verbal behaviour is not in itself a new phenomenon. Darwin's "The expression of the emotions in man and animals" in which the author examines the relationship between emotional activity and non-verbal, particularly facial movements, was published in 1872. In his review of the literature on the recognition of emotion from vocal and facial expression, Davitz (1964) cites several studies by experimental psychologists in the 1920's and

a few even earlier. La Barre's (1964) review of the contribution of anthropologists to the understanding of the meanings of postures and gestures in a wide variety of cultures shows that field data on many aspects of human non-verbal communication have been accumulating since the beginning of the century.

The scientific study by social psychologists of communication in human social interaction, however, has tended to concentrate on verbal interchanges (e.g. Bales 1950) and to ignore the contribution of non-verbal aspects of behaviour to the interaction and the exchange of information within it. In 1962, Krech, Crutchfield and Ballachey could write (p.4)

"The actions of the participants in an interpersonal behaviour event may be bodily movements. In the case of the lower animals, interaction consists largely of such movements. In the case of human beings, however, 'body language' has given way to verbal language. Man interacts primarily by using words."

These authors appear to underestimate the contribution of non-verbal behaviour to communication in interpersonal encounters, however. Although interactions based solely on verbal interchanges may occur (e.g. by typed letter), and in such cases words may be the only means of communication, in social encounters where the participants interact in each other's presence a good deal of information passes between the interactors without the use of words. Argyle (1972) points out that

"speech is accompanied by an intricate set of vocal and gestural signals, which affect meaning, emphasis and other aspects of utterances,"

and Kendon's work which is mentioned in the next section shows that

the smooth exchange of verbal signals in an encounter depends upon a complex interaction between the participants at the non-verbal level.

Furthermore, it has been shown that the non-verbal component of a set of signals passing between persons may override the verbal component if the two are contradictory. Argyle, Salter, Nicholson, Williams and Burgess (1970) asked subjects to rate verbal and non-verbal signals designed to communicate either an inferior or a superior attitude on the part of the speaker. Ten rating scales were used. Subjects watched video-tapes of a female experimenter addressing them. There were three speech messages, one designed to communicate a superior attitude, one a neutral attitude, and one an inferior attitude. Each speech message was delivered in each of three non-verbal styles designed to communicate superior, neutral and inferior attitudes respectively. There were thus nine types of film to be rated by subjects on scales such as "dominant-submissive". Although both verbal and non-verbal cues affected the subjects' perceptions of the video-tapes, the effect of the non-verbal cues was far stronger and over four times as much effect as the verbal message on the rating scales. When verbal and non-verbal signals were in conflict, subjects' perceptions of the video-tapes were based on the non-verbal component. A similar experiment (Argyle, Alkema and Gilmour 1972) found a similar result when the variable manipulated was friendly-hostile instead of superior-inferior.

The importance of non-verbal signals in interpersonal communication is now recognised, and no attempt to understand what Argyle (1972) has termed the "subtleties and intricacies of social interaction" can hope to succeed if it ignores the non-verbal components of the communication.

### 1.2.2 Non-verbal signals in human social interaction

A mode of signalling by means of which one person may obtain information from the behaviour of another may conveniently be called a channel, and Argyle (1972) lists 10 such channels. These are : bodily contact, proximity, orientation, appearance, posture, head-nods, facial expression, gestures and visual behaviour. Some of these headings could be subdivided, but the list is a convenient summary of the present state of knowledge. Three of these channels, proximity, orientation and visual behaviour, are directly relevant to the present research undertaking and will be discussed in more detail in later sections.

The experiments mentioned in the previous section have shown that under certain circumstances non-verbal signals have greater communicative power than verbal ones, and Argyle (1969) has suggested that whereas language is employed to communicate about events external to the speakers, non-verbal signals are used to establish, maintain and comment on the course of the interpersonal encounter itself. A similar view is put forward by Hall (1964) who refers to what he calls "adumbrative" signals. At the beginning of an utterance these set the mood and indicate the manner in which the words are to be understood; at the end they give information about the speaker's attitude to what he has just said, whether he feels strongly about it, and what sort of reply, if any, he expects.

Argyle (1967) suggests that the ability to maintain in being an interpersonal encounter by means of non-verbal signals is a skill which people possess in varying degrees. Interactors must adjust their non-verbal responses so that a smooth style of interaction is attained. If interactors are unable to attain a mutually agreeable style in which each person's non-verbal techniques mesh with those

of the other, the interaction will prove unsatisfactory, unrewarding, and probably break down. Kendon's (1967) work provides the basis for this theory. He made films of pairs of interactors engaging in informal conversations and analysed the patterns of non-verbal behaviour which maintained the flow of the encounter. Argyle (1967) summarises a typical finding of Kendon's as follows:

"When A is about to speak, he makes anticipatory movements such as looking away from B; while he is speaking, he will look up periodically at the end of phrases seeking some response such as a head-nod, specifying permission to continue." (p.94)

Kendon's work provides exact documentation of the theoretical analysis of Goffman (1963) who has also pointed out the importance of non-verbal behaviours for the successful initiation of encounters, their maintenance in being, and their smooth conclusion. Goffman instances the case of two strangers passing each other in the street and describes their use of mutual glances and minute movements of hands and body which signal how each intends to manage the situation so that collision is avoided. In such a limiting case of a social encounter, non-verbal interaction plays an important part. He also describes the non-verbal patterns of behaviour whereby two parties to an interaction mutually agree that an encounter shall be engaged in. The constant interchange of non-verbal signals he terms an "ecological huddle", a phrase which aptly points to the interdependence of the non-verbal activities of one interactor on those of the other.

### 1.2.3 Communication and intention

A terminological dispute over the meaning of the term "communication" besets workers in the field of non-verbal behaviour.

It is clear from the foregoing sections that a person may gain information from or about another via a variety of non-verbal channels, and the question arises as to whether all cases where a person gains such information are to be regarded as instances of communication. Two polar positions in the definition of communication can be distinguished, and the distinction which gives rise to these positions is made by Goffman (1959) in the following way:

"The expressiveness of the individual . . . appears to involve two radically different kinds of sign activity; the expression that he gives, and the expression that he gives off. The first involves verbal symbols or their substitutes which he uses admittedly and solely to convey the information that he and others are known to attach to these symbols. This is communication in the traditional and narrow sense. The second involves a wide range of action which others can treat as symptomatic of the actor, the expectation being that the action was performed for reasons other than the information conveyed in this way."

Some theorists have argued that the term "communication" should be reserved for the first of Goffman's two types of expressiveness. That is to say, they argue that for A to communicate something to B, A must intend to pass that information to B. There are two difficulties with this strict definition. The first is that for many instances in which information is exchanged, it is not easy to establish whether the source of the information intended to communicate it or unintentionally "gave it off" to use Goffman's phrase. Secondly, from the point of view of psychodynamic analysis it has often been argued that a person who does not consciously intend to convey some information may have an unconscious intention to do so. Even if it

could be established that in a particular instance a person's intention to convey a piece of information was unconscious, such an instance seems to fall between a case of information given and a case of information given off.

Because of these difficulties, Wiener and Mehrabian (1968) reject any definition of communication which includes the concept of intentionality on the grounds that

"... it is not apparent how the intention of a communicator can be known by an observer. If we assume that the communicator may not necessarily be conscious of his intentions, then there is no basis for distinguishing instances of "unaware" intentions from instances in which there is no intention. Since we have no epistemological basis for determining the "intentionality" of the communicator, we see no necessity for including this construct in our definitions of communication." (p.10)

If the concept of intention is excluded from the definition of communication, however, the difficulty that arises is that the meaning of the word "communication" may become stretched to cover any instance in which a person draws inferences about another from some aspect of his appearance or behaviour. Wiener, Devoe and Geller (1972) observe that

"Such diverse movements as body or head positions, lint picking, foot kicking, scratching, gross postural shifts and hand and arm movements such as palm up during a verbalisation have been considered equally cogent and relevant for an investigation of communication."

and Mackay (1972) mentions theorists who

"... will happily speak of a rock on a hill as communicating

with an observer if sunlight reflected from the rock reaches his eyes."

For the purpose of the present study, no formal definition of communication is in fact necessary, although Wiener et al. (1972) provide a usable definition in terms of "the making public of an experience by means of a shared code for encoding and decoding," and Mackay (1972) proposes an information flow model in terms of which the concept of intention may be objectively defined, so that it may be used in a definition of communication. It suffices to observe that there appears to be a continuum between instances, such as formal speech acts, which would count as communication under the strictest of definitions, and instances such as that in which a doctor infers the existence of a particular malady from the observation of a symptom that has not been noticed by the patient, where an inference is made about a person on the basis of something that he has not initiated and which could only be considered an instance of communication in a very loose sense.

The non-verbal behaviours which are of concern in the present study are the regulation of interpersonal distance, gaze direction and orientation. These are behaviours where intentionality would not always be easy for an observer to establish (even by Mackay's criteria), and which would be difficult to establish as channels of communication under any strict definition of the word. In a few instances these behaviours may become communications even in terms of a strict definition, however; for example, when A turns his back on B and walks away as a gesture of disgust. In most cases, however, they are simply controlled and ordered behaviours from which inferences may be drawn by an observer.

In practice, not all expressive movements from which inferences

can be drawn are used as a basis for such inferences in interpersonal encounters. Davitz and his colleagues (Davitz 1964) report that large individual differences exist in the ability to interpret emotion from facial and vocal expression. Although it is known that inferences about an interaction and the participants in it can be drawn from the size of the distance between them, it was found by Porter, Argyle and Salter (1970) that altering the distance at which an experimenter's confederate stood from a subject did not affect the way he was perceived by the subject. Argyle's (1967) view that behaviour in social encounters is a skilled activity implies that there are individual differences between persons in their degree of social skill and therefore differences in their sensitivity to and ability to draw inferences from non-verbal behaviours.

None of the three experimental studies to be reported in subsequent chapters need be regarded as investigations of communication in a formal sense. On the other hand, each is a study of whether and to what extent inferences can be drawn from the spatial positions of figures or dolls. In Experiment I, reported in Chapter 3, the opportunity was given to subjects to use the orientation pattern of a pair of figures as a basis for inference about the roles or personalities of the interactors represented by them. In Experiments II and III, reported in Chapters 4 and 5 subjects placed pairs of dolls to represent interactions specified by the experimenter in order that an assessment could be made of the inferences that might legitimately be drawn from the spatial characteristics of such doll placements.

### 1.3 PROXEMICS: AN AREA OF NON-VERBAL BEHAVIOUR

#### 1.3.1 Proxemics defined

Hall, an anthropologist who has studied cultural differences in many forms of non-verbal behaviour in social encounters noted that the distance apart that two people stood when engaged in interaction varied according to culture. In particular he noted that Arabs and South Americans stood closer to each other than North Americans (Hall 1955). This finding led him to an examination of the interaction between spatial relationships and human behaviour, particularly non-verbal behaviour. This area of enquiry he named "proxemics". He suggested that eight "proxemic" categories might be employed by an investigator studying dyadic interpersonal encounters in the field (Hall 1963). These were: 1) sex and posture (standing, seated, etc.), 2) orientation, 3) interpersonal distance, 4) amount of physical contact engaged in, 5) amount of eye-contact, 6) the extent to which one interactor can feel the other's body heat, 7) the extent to which one interactor detects odours arising from the other, 8) voice loudness.

These variables which Hall designated "proxemic" are not all necessarily related to interpersonal proximity, although the distance between interactors may set limitations upon their use. More important, however, is the assumption implicit in the derivation of the word "proxemic" that regulation of distance is the central behaviour upon which variations in the other categories depend. This is true to some extent. Argyle and Dean (1965) found that there was more eye-contact between English interactors when interpersonal distance was 10 feet than when it was two feet, for example, and Porter, Argyle and Salter (1970) observe that people tend to adopt a less direct orientation when they are closer together than when

they are further apart. 'Clearly too, the ability of an interactor to smell, touch or feel the body heat of another depends upon how close he is to him. Arabs, for example, may adopt close interpersonal distances because they like to touch one another and smell each other's breath (Hall 1959).

The term "proxemic" is a convenient one to denote the spatial behaviour which is of concern in the present context, and three of Hall's proxemic categories, orientation, distance and visual behaviour, are basic in the use of the doll placement technique and in the analysis of results obtained from it. In using the term to apply to these aspects of human non-verbal behaviour, however, it must be recognised that distance or proximity is not necessarily more fundamental than the others.

### 1.3.2 Spatial behaviour in animals

The importance of spatial relationships between individuals and their effect upon behaviour was studied by Hediger in animals. Hediger's work in the 1930's is published in German, but an account of his analysis of spatial relationships between animals is available in English translation (Hediger 1955). Hall's (1959) observation that people in some cultures stand closer for conversation than those in others, and his distinction between "contact" cultures in which people touch each other frequently and "non-contact" cultures in which physical contact is avoided except in a few formalised ways (e.g. the hand-shake) or in intimate relationships, is anticipated by Hediger's own distinction between "contact" and "distance" animals.

#### Contact animals

". . . when at rest arrange things so as to get into closest possible contact with other members of their species . . .

They are fond of being stroked," (Hediger 1955, p.66)

whereas distance animals

". . . avoid close contact with animals of the same species. Tame members of this group withdraw before the human hand and dislike being stroked." (op.cit.)

Hediger points out that each species has its own "individual distance" (a phrase first introduced by him in 1941) which is the closest it will go to another member of its species. He gives specific examples of individual distance in birds:

"In the black-headed gull it is some 12 in., in the flamingo at least twice that, in the swallow barely half the distance." (op.cit.)

A second important concept introduced by Hediger was that of "flight distance". This is the smallest distance to which an animal may be approached by an enemy without a flight response being initiated. On the basis of field measurements, Hediger observes that

"Every species of animal has its particular flight distance, varying, of course, within certain limits . . . the wall lizard can be approached within a couple of yards before it takes flight, while the crocodile makes off at fifty" (Hediger 1955 p. 51).

The study of proxemic behaviour in animals, therefore, preceded the study of it in man. It is concepts from the field observations of animals by Hediger and of man by Hall which have led to a considerable amount of controlled laboratory research into the determinants of human spatial behaviour recently. It is to the main findings of this research which we now turn.

### 1.3.3. Experimental studies of interpersonal distance

The two aspects of human spatial behaviour which are central to the present thesis are those of orientation and distance. No

A comprehensive review of recent work on interpersonal distance will be undertaken at this stage, but a number of studies will be described, which demonstrate the most important variables which are now known to determine interpersonal distance, since these have theoretical implications for the study of orientation and because they illustrate the potential for interpretation which a distance measure derived from a doll placement may have. Other experimental studies in which interpersonal distance has been a variable are discussed in Chapter 5.

Four main facts have been established about the determinants of interpersonal distance. The first is that there are cultural differences in the distances people find comfortable for conversation, the second is that people stand closer to those with whom they are better acquainted than to those with whom they are less acquainted or unacquainted; the third is that people stand further apart in anxiety provoking situations than in relaxed situations; the fourth is that distances are greater in formal than in intimate encounters. The experimental basis for this analysis will be outlined in the following paragraphs.

The effect of culture on interpersonal distances has been documented by Hall (1959) who found from field observations that Arabs and South Americans stood closer together than North Americans when engaged in conversation. Watson and Graves (1966) confirmed this, finding that Arabs sat closer together than North Americans in a study of interactions in a controlled laboratory setting. Little (1968), using the doll placement technique, showed that members of contact cultures (Greeks and Italians) placed dolls closer together than members of non-contact cultures (Swedes and Scots).

The effect of degree of acquaintance on interpersonal distance

has been shown by Willis (1966). In his study, male and female experimenters measured the initial speaking distance when someone engaged them in conversation, and distances were greater when conversation was with a stranger than when it was with an acquaintance. A similar finding has been reported by Edwards (1972a). Little (1965) has demonstrated the effect with the doll placement technique; dolls representing friends were placed closer than those representing strangers.

Two experiments have shown that a person stands further away from another in an anxiety-provoking or stressful situation. Kleck, Buck, Goller, Pfeiffer and Vukcevic (1968) showed that people placed their chairs further away from a stranger whom they had been told was an epileptic than from a neutral stranger. They suggested that subjects were anxious about conversing with an epileptic and therefore increased the distance. Dosey and Miesels (1969) stressed subjects by making them anxious about their social competence and sexual attractiveness. These subjects stood a greater distance from an experimenter's confederate than did unstressed subjects. Too close a degree of interpersonal proximity is itself stressful and disturbing and is avoided. This was demonstrated in a series of field studies by Felipe and Sommer (1966) in which experimenters sat very close to people in libraries or on park benches and observed how quickly the latter moved away. It was found that they got up and moved away more quickly than did controls who were approached either less closely or not at all.

The effect of formality on interpersonal distance is less well documented. Hall (1966) suggests on the basis of field observations that there are four categories of distance which he calls intimate, personal, socio-consultative and public, with distances in the intimate category being the closest, and increasing as formality

increases. However no systematic documentation of this analysis appears to have been published. However, in the doll placement experiment, it was found in Little's (1968) study that dolls were placed further apart in social-consultative encounters such as business discussions than in more personal encounters. This lends support to Hall's analysis.

#### 1.3.4 Experimental studies of orientation

The experiments on interpersonal distance described in the previous section indicate the effect of external variables upon the adjustments people make to their spatial relationships with each other. Experiments on orientation, in which the angle at which people stand or sit is measured illustrate a second aspect of spatial adjustment which is important in the context of the experiments to be reported in subsequent chapters.

The directness with which one person faces another varies from moment to moment as now he looks at the other's face and now he looks away (Kendon 1967) but it is possible to obtain a more stable measure of directness of orientation by observing the angles at which chairs are placed. For example, Rosenfeld (1965), whose subjects carried a chair and placed it in position before beginning a conversation with another interactor, found that chairs were not placed directly opposite the person to be interacted with, but at an angle of  $50^{\circ}$  (this figure is of course the mean of several subjects). This fact, that people tend to sit or stand at an angle, especially when close together, is also noted by Porter, Argyle and Salter (1970).

Watson and Graves (1966) also found that indirect orientations were adopted by interactors seated in friendly, casual conversation, but that this was true of Americans and not of Arabs. These investigators observed seated interacting dyads through a one-way mirror

and made measures of body orientation using Hall's (1963) "axis" measure. Watson (1970) replicated the above finding in a study of interacting dyads from several contact cultures (Arabs, Latin Americans and Southern Europeans) and non-contact cultures (Asians, Indians/Pakistanis, and Northern Europeans). He showed that all the contact groups interacted at direct orientations, whereas all the non-contact groups interacted at less direct orientations. Watson also reported a negative relationship between degree of acquaintance and directness of orientation in both contact and non-contact groups, although the correlation was not high. A further finding was a correlation of  $-.65$  ( $p < .01$ ) between orientation directness and interpersonal distance for the non-contact subjects; since, as will be argued in section 1.3.6, orientation is related to eye-contact, Watson's finding provides confirmation of Argyle and Dean's (1965) finding that interactors engage in more eye-contact as interpersonal distance increases (see section 1.3.5).<sup>1</sup>

Sommer's (1959 and 1965) studies of seating position also show that indirect orientations are regularly adopted for friendly conversations. He found that when seated at tables interactors regularly sat at right angles to each other, although sitting opposite was not uncommon.

Sommer employed two methods of studying seating position. The first was to make observations of natural encounters "in the field"; the second was by means of a seating position questionnaire. Subjects were shown schematic diagrams of rectangular tables (in some studies circular and square tables were also used). The positions of two chairs were marked by crosses and six arrangements of the two chairs were presented. Respondents were asked to indicate which of the arrangements they would expect to use if they were

involved with a friend of the same sex in various situations. The choice of right angle seating for friendly conversations was in line with the results of his field observations, although the choice of a face to face arrangement was again not uncommon in this situation. For working together on a common project, side by side positions were most frequently chosen; for studying separately, distant positions were preferred; in a competitive situation, face to face positions predominated.

The theory proposed by Sommer to account for the variation of seating position preference according to the type of social encounter being engaged in was that the seating arrangement chosen reflected the amount of need for eye-contact in the situation in question. A theory of human orientation behaviour must, therefore, if Sommer is correct, be based on a theory of the determinants of gaze direction. It is to studies which have contributed to the development of such a theory which we now turn.

#### 1.3.5 The determinants of visual behaviour

Approach versus avoidance of mutual gaze: 'The changing pattern of expression on a person's face during the course of a social encounter provides a source of information from which another who is interacting with him may draw inferences about his attitudes, intentions and motivations. Therefore it is in the interests of an interactor who wishes to play an active part in controlling the course of an encounter to look at the face of the other. This enables him to gain feedback about the way the encounter is progressing, and about the way his own behaviour is being evaluated by the other. On this basis, one might expect that people might look into each other's faces more or less continuously throughout the course of an encounter since the face is such a rich source of information. Arabs do appear

to do this (Watson and Graves 1966, Collett 1971), but in England the interactor only looks at the other's face for between 30 and 60 per cent of the total interaction time, and the time during which such glances are mutual and eye-contact occurs is much less -- between 10 and 30 per cent of the interaction time. (Argyle 1967). This is because a number of factors lead interactors to avoid direct eye-to-eye contact with each other. The control of gaze direction in social encounters can therefore be understood in terms of an approach-avoidance model (Argyle 1967) in terms of which a number of factors lead interactors to avoid direct eye-to-eye contact with each other, and these avoidance factors outweigh to some extent the advantages to be gained by looking continuously at another's face.

There are other approach factors in addition to that of information seeking. Kendon (1967) has shown that moment to moment changes in gaze direction have an information-giving function. If a person looks up at the end of an utterance, a fellow interactor takes this as a signal that it is now his turn to speak; if he fails to look up, even though he has finished speaking, the other interactor may assume that the first has more to say, and the transition from one speaker to another will not be smooth.

Gazing at another's face can also be a technique whereby one person may threaten another and thereby induce him to flee or make a gesture of submission. Mutual staring may therefore be a struggle for dominance, and the aversion of gaze, or an increase in distance on the part of one of the interactors may signal acceptance of defeat (Ellsworth, Carlsmith and Henson 1972). Strongman and Champness (1966) studied a group of subjects who engaged in separate two-person encounters with every other subject in the experiment.

They recorded which member of each dyad looked away first after the encounter had begun and discovered that the matrix of responses had a hierarchical structure. At the top of the hierarchy was a subject who never looked away first, at the bottom one who looked away first in every encounter. This was interpreted as a hierarchy of dominance by the experimenters.

Arousal and Gaze: The most important cause of avoidance of eye-contact or of gaze aversion is the fact that the sight of another's eyes is a physiologically arousing stimulus which can only be tolerated for short periods. Ellsworth, Carlsmith and Henson (1972) showed that if motorists waiting at traffic were stared at, they drove away faster when the lights changed than if they were not stared at. This illustrates the use of gaze as an aggressive threat. They suggest that the sight of eyes is arousing, and that the level of arousal may reach a point where it is unpleasant so that an escape response is initiated.

There is evidence to show that eye-contact is physiologically arousing. Wada (1961) recorded a marked increase of activity in the reticular formation of the rhesus monkey when it was looked at. The reticular formation is known to be a major determiner of the level of arousal of the cerebral cortex. McBride, King and James (1965) made GSR records of subjects who sat at various distances from an experimenter and stared either at his eyes or at his mouth. Arousal, as measured by the GSR record, was lower when the subject stared at the experimenter's mouth than when he stared at his eyes. In addition, arousal was greater at three feet than at nine feet.

This evidence that eye-contact is less arousing at greater distances accounts for the finding of Argyle and Dean (1965) and

Argyle and Ingham (1972) that more eye-contact is engaged in in encounters at large interpersonal distances than in encounters at small ones. The same effect was found by Goldberg, Kiesler and Collins (1969). If, as many writers have suggested (e.g. Eysenck 1967), people seek an optimal level of physiological arousal and avoid either too high or too low a level, the reduction of duration of eye-contact at close interpersonal distances can be understood as a technique for avoiding a degree of arousal which would be experienced as unpleasant.

Other findings which support this view are those of Mobbs (1968), Kendon and Cook (1969), and Hutt and Ounstead (1966). Mobbs found that pairs of extraverts engaged in more eye-contact than pairs of introverts, and Kendon and Cook that extraverted interactors looked directly at the person with whom they were interacting significantly more than introverted interactors did. This applied whether the interactor in question was speaking or listening. In Eysenck's (1967) view, extraverts have higher thresholds for arousal than introverts and are therefore comfortable in the presence of levels of stimulation which introverts would find unpleasant. They can thus endure a longer duration of eye-contact. Autistic children on the other hand avoid eye-contact at all times, and Hutt and Ounstead suggest that this is because these children are in a permanent state of high physiological arousal, and cannot therefore tolerate the arousing sight of human eyes.

Kendon (1967) found that people looked away when they were organising a complicated utterance, and suggested that they did this in order to reduce the amount of information received through the eyes in order to concentrate on the planning of what they were going to say. This finding might be subsumed under the arousal theory, and

may exemplify the Yerkes-Dodson law which states that a lower level of arousal is required for the effective performance of complex tasks than is the case for simple ones.

#### 1.3.6 Orientation and visual behaviour:

It can be concluded from the above discussion that people regulate their visual behaviour in such a way as to maintain a balance between the conflicting demands for the need for information, the need to give information, and the need to avoid too high or too low levels of arousal.

The directness with which one person faces another with his body affects the ease with which he can make or avoid eye-contact with him. A direct orientation of the body on the part of one interactor towards another makes it easy for him to look at the other's face, but in order to avoid seeing the other's eyes, he must either drop his own eyes or turn his neck. The choice of the 45° orientation by many interactors is probably due to the difficulty of averting gaze in the face to face position (see section 1.3.4). Therefore the orientation at which a person stands reflects his anticipation of the need for direct gaze during the course of the encounter. The study of orientation patterns is, in effect, the study of the different structures of approach and avoidance factors for direct gaze and eye-contact which pertain in different social encounters.

The indirect study of orientation by means of a seating position questionnaire which was first employed by Sommer (1965) has also been used by Lott and Sommer (1967), Ingham (1970) and Cook (1970).

Lott and Sommer found that when dyadic arrangements at square tables were studied, right angle positions tended to be chosen for

interactions between equal status pairs, but that face to face positions were more common for interactions between persons of unequal status. This latter arrangement allows the high status interactor to assert his dominance by gazing directly at the low status interactor without having to turn his neck.

Ingham found that whereas English respondents preferred corner to corner seatings as Sommer's American subjects had tended to do, Swedes had a strong preference for the face to face arrangement. He interpreted this in terms of the Swedes' high need for feedback about the evaluation of their social performance by their fellow interactors, a need which had been revealed by other research methods.

Cook found a very strong preference for corner to corner seating among English university students, whereas among a non-university sample the face to face position was chosen with the same frequency as the corner to corner arrangement. He interpreted this as indicating that English students try to keep the level of arousal low.

Cook also made field observations of seating position choices. In a restaurant where there were rectangular tables, Cook observed an overwhelming preference for the face to face position as opposed to the side by side one when pairs of friends sat down (no corner to corner seating was available). His theoretical account of this phenomenon illustrates clearly the hypothesised relationship between the eye-contact demands of an interaction and seating position preference. He writes

"Some subjects were asked why they sat opposite; they thought that etiquette required that they sat opposite. It is not hard to see why such a norm should exist. If a pair sit side by side on one side of a table, then anyone else who sits at

that table will have to do the same. There will then be two pairs of strangers sitting opposite each other. If it is uncomfortable to look at a friend too much, it is twice as uncomfortable to look at a stranger. Moreover it is impossible to avoid overhearing the other couple's conversation. Generally both couples are reduced to an embarrassed silence. Both these problems are avoided if the two people sit opposite each other; each pair can cut itself off from the other, visually and vocally." (Cook 1970 p.69).

Finally, in the same paper, Cook proposed a theory which related proximity and orientation to the degree to which interactors were motivated to engage in interaction. The theory states that the higher the motivation to engage in interaction, the higher the degree of arousal derived from proximity, eye-contact or other proxemic variables that can be tolerated. The second part of the theory is that where the interaction is an affiliative one, the tendency will be to increase proximity and opportunity for physical contact as motivation increases, but where the interaction is competitive or hostile the tendency will be to increase the opportunity for eye-contact as motivation increases because of the increased need for feedback in such a situation, and because of the use of staring as a threat.

Using a seating position questionnaire, he obtained support for this theory. When motivation to interact was low, distant seating arrangements were chosen. As it increased in friendly encounters, subjects preferred corner to corner seating if interacting with a same-sex friend, but for interactions with a boy/girl friend a side by side position (which maximises physical contact at the

expense of eye-contact) was most frequently chosen. As motivation increased in the competitive encounters, face to face arrangements were chosen, and the closest face to face position was chosen most often in the highest motivation condition used.

The use of these seating position questionnaires indicates that consistent relationships between orientation choices and the structure of social encounters can be shown. Sommer (1968) has also shown that seating positions can be meaningfully interpreted by subjects if they are asked to rate them on a scale of intimacy.

Two conclusions pertinent to the present study may therefore be drawn. Firstly, in a figure placement experiment such as that of Little (1965) a relationship between the angles at which dolls are placed and the type of encounter being represented ought to be demonstrable. Secondly, if a wider range of orientation patterns than those used in the studies reported here were to be employed, a more detailed knowledge of the relationship between orientation pattern and the structure of an interpersonal encounter should emerge which would increase the value of the doll placement technique or the seating position questionnaire as a projective method with applications both in clinical and social psychology.

#### 1.4 THE DOLL PLACEMENT EXPERIMENT

##### 1.4.1 Origins of the figure placement experiment

Little's use of the doll placement technique referred to in section 1.1 had its origins not in the doll-play work of Sears and his associates, but in the work of Kuethe. Kuethe's initial interest was not in proxemic behaviour at all, but he saw the use of figure placement as an indirect method of studying a person's perceptions of his personal relationships with other people. The technique he

used was to have his subjects place groups of silhouette figures on a flannelgraph, and he noted the regularities in the ways in which these were placed (Kuethé 1962a). His detailed findings are not directly relevant here. His approach may be illustrated, however, by an example: he found that when placing a three figure set consisting of man, woman and child, 68% of subjects placed the child closer to the woman than to the man, and this was interpreted to mean that people tend to perceive the mother-child relationship as stronger than that of father-child. He referred to the operation of "social schemata" as the determinants of the way figures were placed, implying <sup>that</sup> the placements were schematic representations of personal relationships.

It is likely, however, that responses in a figure placement task of the type employed by Kuethé are more or less accurate representations of how people typically stand in real life interactions. This interpretation is supported by another of Kuethé's findings which might be called the "social display reconstruction phenomenon" (Kuethé 1962a, 1962b). A subject was shown a display which consisted of two figures placed on a board 30 inches apart. The figures were removed by the experimenter and handed to the subject who was asked to replace them on the board in their original positions. The response of the first subject served as the display for the next, and his response for the next, and so on until thirty subjects had reconstructed the display. The basic finding was that subjects placed the figures closer together than the original display, so that the distance between the figures gradually decreased with each subject. After the eighteenth subject the figures were close together and the distance remained stable. Kuethé's explanation for this phenomenon was that subjects possessed the schema that people

belong together, and that this schema biased their responses (see also Kuethe 1964). It is more explicit to suppose that these schemata are truly perceptual in nature, however, and that subjects' responses were influenced by what they expected two people to look like when engaged in conversation.

Since Kuethe's first study a dozen or more others have been reported using the placement of felt figures on flannelgraph or related techniques. These will not be reviewed in detail here since their bearing on the study of proxemic behaviour is not generally direct, but several will be mentioned in Chapter 6. Three studies will however be mentioned whose results are strongly suggestive that figure distances reflect actual interaction distances.

Firstly, Kuethe and Weingartner (1964) found that when performing the display reconstruction task 70% of homosexual prisoners placed male-male figure pairs closer than male-female pairs, whereas only 28% of a control group of prisoners did so. Secondly, Fisher (1967) showed that emotionally disturbed children placed figure pairs further apart than a control group both when they placed figures on a flannelgraph and when they pasted figures into a book. The relationship between interpersonal distance and anxiety has already been pointed out in section 1.3.3. Fisher also found that children whose mothers scored high on an irritability scale placed figures further apart than those whose mothers scored low on this measure. Thirdly, Weinstein (1967) showed that children who felt accepted by their parents and their peers placed figures closer together in the display reconstruction task than those whose scores on acceptance were low. Figures were also placed closer together by first-born children than by later-born children. This finding

is in accord with the fact that first-borns tend to have a higher need for affiliation than later-borns.

#### 1.4.2 Figure placement as an indirect measure of personal space

Many of the experimenters who made these early placement studies did not interpret their findings in the light of the literature on human spatial behaviour, and it appears to be Little (1965) in the report of his doll placement study who first related the concept of social schema to that of personal space. He held that the way people placed dolls reflected the way they expected people to stand when in conversation and he supported his contention by showing that if subjects instructed human adult models to move together so as to represent human social encounters, the models were placed similarly to the dolls. The two variables which were found to effect inter-doll distances, namely degree of acquaintance and location of the encounter, were found to affect the distances between the human models in the same way.

A good deal of evidence has since accrued to suggest that a figure placement task is a reliable indirect measure of human spatial behaviour. Little's (1968) finding that members of contact cultures placed doll pairs closer together than members of non-contact cultures has already been mentioned in section 1.3.3. The effect of degree of acquaintance upon interpersonal distance, which was demonstrated by Little's 1965 study has been shown in "live" encounters by Willis (1966) and Edwards (1972b). Gottheil, Corey and Paredes (1968) measured the distance a subject sat from an interviewer and the distance between two metal cylinders placed by the subject to represent "self" and "interviewer". A significant correlation was found between the two measures. Similarly, Kleck et al. (1968) found that subjects not only stood further from a

person whom they had been told was an epileptic than from a neutral stranger, but that, if asked to glue pairs of rectangles into a book to represent pairs of people, they glued pairs representing "self" and "stranger" closer together than pairs representing "self" and "epileptic" or "mental patient". Finally, Rawls, Trego and McGaffey (1968a and b) compared several direct and indirect measures of personal space. Subjects were instructed to approach an experimental confederate until a distance felt to be comfortable for conversation was reached. Measures were made of approaches from several directions, and subjects also manipulated magnetised figures on a board to represent interactions. High correlations between all the personal space measures were found.

#### 1.4.3 Doll Placement and orientation

As the determinants of human spatial behaviour become more fully understood, so the value of the figure placement technique as a projective method of psychological investigation is enhanced and applications in the clinic and in the field of social research become possible. To date, however, investigators have used only one measure derived from figure placements and that is the inter-figure distance. (A single exception is found in a study by Levinger and Gunner (1967) who used a vertical as well as a horizontal measure using a flannel-graph type of technique.)

One value of using dolls instead of two-dimensional figures is that not only the distance between them but also the angles at which they stand can be measured. Studies reviewed in section 1.3.4 show that orientation, like distance, also varies as a function of a number of variables relating to the nature of the social encounter in which two persons are engaged. In providing a measure both of distance and orientation, the doll placement technique provides the

advantages of both the figure placement study and the seating position questionnaire combined.

Little (1968) in his cross-cultural doll placement study must have made records of the angles at which the dolls were placed, since he rejected a number of placements from his main analysis on the basis of their unusual orientation patterns. However no attempt to analyse his orientation data is mentioned in his paper. Similarly, in the only other study published to date in which three dimensional dolls were used (Little, Ulehla and Henderson 1968) doll orientations were not analysed. It appears, therefore, that the main advantage that the use of dolls instead of flat silhouettes can provide has not yet been exploited in experimental work.

#### 1.5 PLAN OF THE PRESENT RESEARCH PROJECT

The work reviewed above demonstrates that the spatial relations between groups of figures which are placed by subjects under controlled experimental conditions, are far from random. The distance between figures, whether they are flat felt silhouettes as in the Kuethe experiments, or three-dimensional dolls as in the Little studies, reflects the nature of the interpersonal relationship which the placer perceives to exist between the people represented by them. A clinician or a research worker who had a clear view of the most important determinants of the spatial arrangements in which figures were placed would therefore be in a position to draw inferences from a figure placement either about the personality of the placer or about the way in which the placer perceived the social relationship he was representing by means of the figures.

When the figure placement work of Kuethe, Little and others is taken in conjunction with the experimental literature on interpersonal distance which was referred to above in section 1.3.3, it

can be seen that already a substantial theoretical framework exists upon which an interpretation of the distance between the two figures in a placement may be based. However, as has been mentioned above, measurements of the angles at which figures are placed have not yet been submitted to experimental analysis. The literature on orientation and gaze direction referred to above in sections 1.3.4 to 1.3.6 gives grounds for supposing that figure angles would provide as valuable a source of data for clinical inference as inter-figure distances. The present project was therefore designed to discover whether there were systematic relationships between figure angles and the type of social encounter represented by a figure pair.

The work to be presented in the following chapters falls into three parts. Firstly, in Chapter 2, an analysis is made of the types of orientation pattern that can occur when two persons are involved in a social encounter. This analysis provides the basis for a simple method of analysing the orientations of figure pairs. Secondly, an experiment is described which was designed to explore whether asymmetry in an orientation pattern might act as a cue to determine how individual figures in a pair were perceived. Thirdly, in Chapters 4 and 5, two doll placement studies are described, each of which was designed to investigate variables that might affect doll orientations. These latter experiments also permit the effects of the independent variables upon inter-figure distances to be studied. In conclusion, some suggestions for further development of the technique are made in Chapter 6.

It is beyond the scope of the present experimental project to reach a complete system for the use of the doll placement technique as a research tool or as a clinical instrument, although it is hoped

that future work will achieve this. The present work is intended to clear the ground, and to isolate pitfalls which might attend the use of the method and to provide pointers towards a more extensive program for the development of the technique as an aid to psychological investigation in these and other fields.

## CHAPTER 2

## ORIENTATION PATTERNS AND THE STRUCTURE OF SOCIAL ENCOUNTERS

## 2.1 THE GEOMETRY OF INTERPERSONAL CONFRONTATION IN DYADS

2.1.1 Orientation diagrams and equations

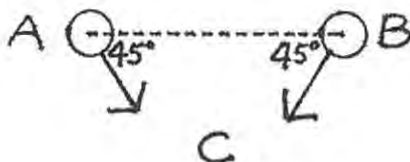
As a preface to the study of the meanings attributed by people to schematic orientation patterns, an analysis will be made of the nature of these patterns and the dimensions along which they vary. In contrast to the seating position work reviewed in the previous chapter, the present analysis will be of the orientations of standing interactors.

If a single interactor is considered, and if it is assumed that his trunk, shoulders, face and eyes are oriented in the same direction, there is only one dimension along which his orientation with respect to another can vary. He may face him directly, or he may be turned through a number of degrees away from him. This dimension of variation can be measured conveniently in degrees.

This will be clear from an inspection of figure 2.1. In this figure, the sign  $\bigcirc \rightarrow$  represents a standing interactor, and the arrow indicates the direction in which he is facing. In the figure, there are two interactors represented, one at A and one at B. The line AB which has been drawn between the two interactors is the axis

FIGURE 2.1

A SPECIMEN ORIENTATION DIAGRAM



of the orientation pattern or the "interpersonal axis". In the figure, both interactors are turned through  $45^{\circ}$  from the interpersonal axis. The orientation of the interactor A can be measured simply as the size of the angle  $\widehat{CAB}$ . This is the number of degrees through which A is turned from the interpersonal axis. This measure will be referred to as A's angle of diversion, or simply as A's angle. Similarly, the size of the angle  $\widehat{ABC}$  provides a measure of B's orientation relative to A. Since each interactor's angle may vary on a single dimension, there are two dimensions of variation in a dyadic orientation pattern.

Since the orientation pattern in Figure 2.1 can be described in this way, it is convenient to be able to express it by means of a shorthand notation. The following notation will be used:

$$\underline{Or} = \underline{x}, \underline{y}$$

where Or indicates that an orientation pattern is being described, x gives the value of the angle of the left hand interactor in degrees, and y gives the angle of the right hand interactor in degrees.

Using this notation, the pattern in Figure 2.1 can be defined as follows:

$$\underline{Or} = 45, 45 \quad .$$

Such a definition may be conveniently referred to as an orientation equation, and a dyadic orientation pattern may therefore be represented in two ways, either by use of an orientation equation, or by means of an orientation diagram like that in Figure 2.1.

### 2.1.2 Type 1 and Type 2 orientations

A distinction must be drawn between cases where the angles of the two interactors are both on the one side of the interpersonal axis, and those in which they fall on different sides. This distinction is illustrated in Figure 2.2. In terms of the notation



(a) and those of the type illustrated by pattern (b) without altering the values of the angle scores. To this end, orientations in which both interactors are turned to the same side of the interpersonal axis will be called Type 1 patterns, and defined by the orientation equation already illustrated. Patterns in which one or both figures have angles of  $0^{\circ}$  or  $180^{\circ}$  will also be counted as Type 1 patterns. On the other hand, orientation patterns in which the figures are turned towards different sides of the interpersonal axis like pattern (b) in Figure 2.2 will be called Type 2 patterns, and these will be specified in the orientation equation by the use of a minus sign (-) before the second angle. The orientation equation for a Type 2 orientation pattern therefore has the form

$$\underline{Or} = \underline{x} , -\underline{y}$$

where  $\underline{x}$  is the angle of the left hand figure, and  $\underline{y}$  the angle of the right hand figure. The orientation equation for pattern (b) in figure 2.2 will thus be

$$\underline{Or} = 45 , -45 \quad .$$

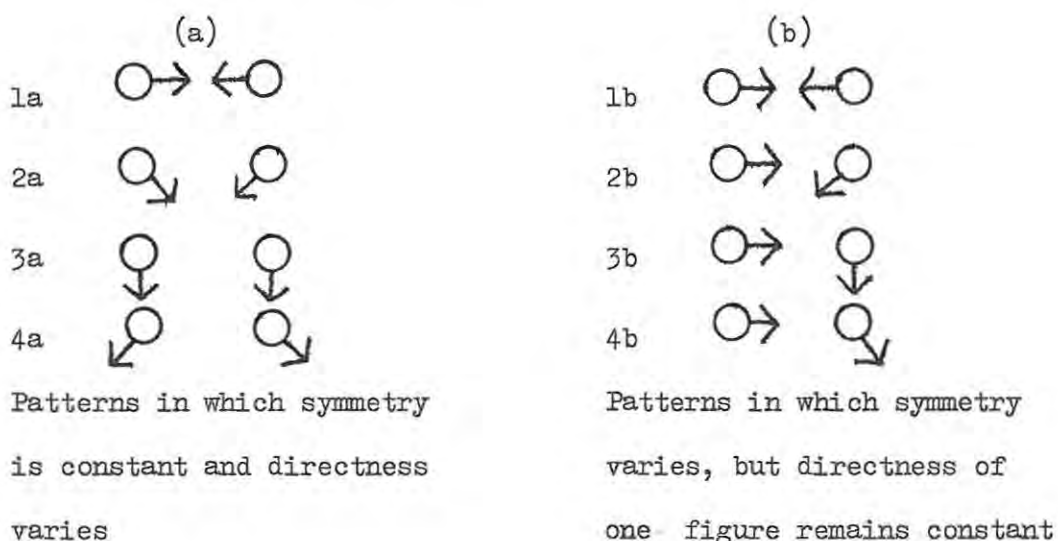
### 2.1.3 Symmetry and directness

Instead of treating an orientation pattern as something that varies along two dimensions, the angle of A and the angle of B, it is possible to regard the two dimensions of variation as those of symmetry and directness. The symmetry of an orientation pattern can be measured by subtracting the absolute value of the smaller angle of diversion from the larger. Therefore the larger the difference between the angles, the greater the degree of asymmetry in the pattern, for both Type 1 and Type 2 patterns.

The concepts of symmetry and directness are illustrated in Figure 2.3. The patterns illustrated in column (a) are all symmetrical, but directness varies. In column (b), however, the

FIGURE 2.3

## SYMMETRY AND DIRECTNESS IN ORIENTATION PATTERNS



orientation of the left hand interactor is in every case equally direct, but whereas pattern 1b is symmetrical, the remaining patterns in the column are asymmetrical.

The directness of a symmetrical orientation pattern can be measured simply by the number of degrees of the angle of diversion of one of the figures. Thus the directness of pattern 2a is  $45^\circ$  and the directness of pattern 3a is  $90^\circ$ . The concept of directness is less readily applicable to an asymmetrical pattern. One possible measure would be the mean of the two angles of diversion. If this procedure were adopted, the directness of pattern 3b in Figure 2.3 would thus be  $\frac{0 + 90}{2} = 45^\circ$ . However, except for symmetrical patterns, this measure is correlated with the asymmetry measure to some extent. In order to obtain two independent measures which describe the orientation pattern, therefore, it is best to regard an asymmetrical pattern as one in which there is a symmetrical pattern upon which a number of degrees of asymmetry have been imposed. If this latter procedure is adopted, pattern 2b in Figure 2.3 will be

analysed as an instance of the symmetrical pattern illustrated as 1b upon which  $45^{\circ}$  of asymmetry has been imposed.

For many purposes, it will not matter whether dyadic orientation patterns are regarded as varying along the two dimensions of angle of left hand figure and angle of right hand figure, or along the two dimensions of symmetry/asymmetry and directness. The latter form of analysis has the advantage that the symmetry measure is a measure of the geometrical relationship between the two figures. The degree of asymmetry in a pattern, which is the difference between the two angles in the pattern will be called the Angle Difference score: this can be expressed as

$$AD = \underline{x}$$

where AD indicates that the value of the asymmetry score of a placement is being given, and  $\underline{x}$  is the value of that measure in degrees. The directness of the pattern, which is, in effect, the lower of the two angles in the pattern will be termed the Least Angle measure and expressed by

$$LA = \underline{x}$$

where LA indicates that the value in degrees of the directness score of a placement is being given, and  $\underline{x}$  is the value of the measure.

The analysis of an orientation pattern by this method is illustrated in Figure 2.4. Here, the pattern to be analysed (a) can be defined by the orientation equation

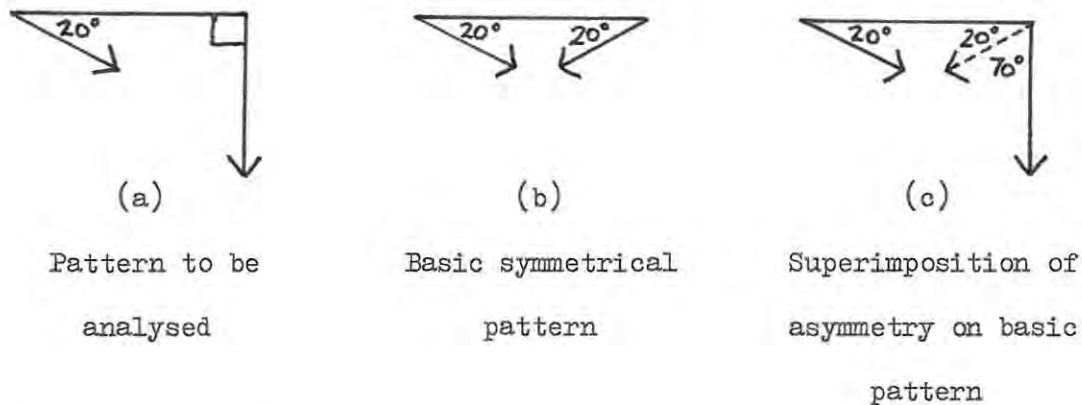
$$\underline{Or} = 20, 90.$$

When analysed on the dimensions of symmetry/asymmetry and directness, however, it is treated as a symmetrical pattern with an angle of  $20^{\circ}$  (b) upon which  $70^{\circ}$  of asymmetry has been imposed (c). The analysis of the pattern can thus be expressed by

$$LA = 20 \quad \text{and} \quad AD = 70 .$$

FIGURE 2.4

## SYMMETRY AND DIRECTNESS IN AN ORIENTATION PATTERN



The decision to analyse orientation patterns in this way is to some extent arbitrary. Other methods of extracting two angle scores which are not correlated could be suggested. For example, a pattern could be regarded as an instance of the symmetrical pattern having the larger of the two angles in the pattern being analysed, but with the modification that one of the figures was turned towards the other through a number of degrees. If this method were to be adopted, the pattern at (a) in Figure 2.4 would be scored as an instance of the symmetrical pattern defined by the equation

$$\underline{Or} = 90, 90$$

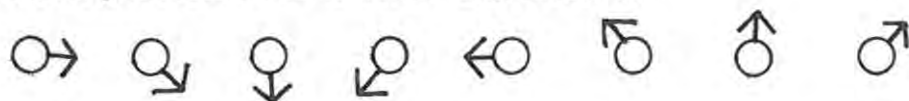
upon which  $70^\circ$  of asymmetry had been imposed by the turning of the left hand interactor through  $70^\circ$  towards the interpersonal axis.

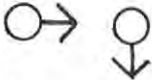
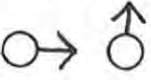
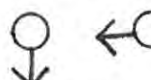
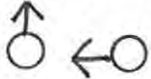
The decision to regard the symmetrical pattern with the smaller angle (in this case  $20^\circ$ ) as the basis of the analysis is based on the fact that a face to face ( $\underline{Or} = 0, 0$ ) pattern is more common than a back to back one ( $\underline{Or} = 180, 180$ ) in cases of human interaction. It is therefore more natural to treat the former rather than the latter as normative. In fact true face to face orientations are not the rule in social encounters; interactors often stand at  $45^\circ$  to each other

or at even larger angles (see section 1.3.4). For this reason, to treat the face to face position as normative is not quite true to the facts. However the simplicity of the method of scoring illustrated in Figure 2.4 recommends it for practical purposes, and the use of the method in Experiment II (Chapter 4) did not present any difficulties.

## 2.2 THE DYADIC ORIENTATION MATRIX

Since dyadic orientation patterns vary along two dimensions (if the distinction between Type 1 and Type 2 patterns is for the moment ignored), the range of possible patterns can be presented in the form of a matrix. Consider two interactors, on the left A, and on the right B. For convenience, let the positions of each interactor be limited to the eight which are obtained if a figure is rotated by  $45^\circ$  steps from a position in which he directly faces the other to a position in which he has his back to the other, and back again to the position where he directly faces the other. The eight orientation positions for A would therefore be



Since there are eight possible positions for A and eight for B, all possible combinations of A's positions with B's positions yield a total of  $8 \times 8 = 64$  orientation patterns. Of these 64, there will be several which have the same geometrical characteristics. For example (a)  (b)  (c)  and (d)  are all variations of the same pattern. However, given that the interactors A and B are differentiated, there are two types of variation.

The first of these is mirror variation. One pattern is a mirror variant of another if (1) it has the same angles, (2) it is

symmetrical or it is an asymmetrical pattern of the same type (Type 1 or Type 2) and (3) in the case of an asymmetrical pattern the figure which faces most directly in the first pattern faces most directly in the second. In terms of this definition, pattern (a) above is a mirror variant of pattern (b). In each case the patterns have the same geometrical characteristics, and A is the more directly facing interactor.

The second type of variation is complementary variation. A pattern is a complementary variant of another if (1) it has the same angles, (2) it is a pattern of the same type, and (3) the figure which faces more directly in the one pattern is the less directly facing figure in the variant. Symmetrical patterns have no complementary variants.

Among the 64 patterns that can be generated from the eight orientation positions as described above, there are thirty pairs of mirror variants since there are only four patterns which do not have distinguishable mirror variants. These four cases are:

$$\underline{Or} = 0, 0,$$

$$\underline{Or} = 0, 180,$$

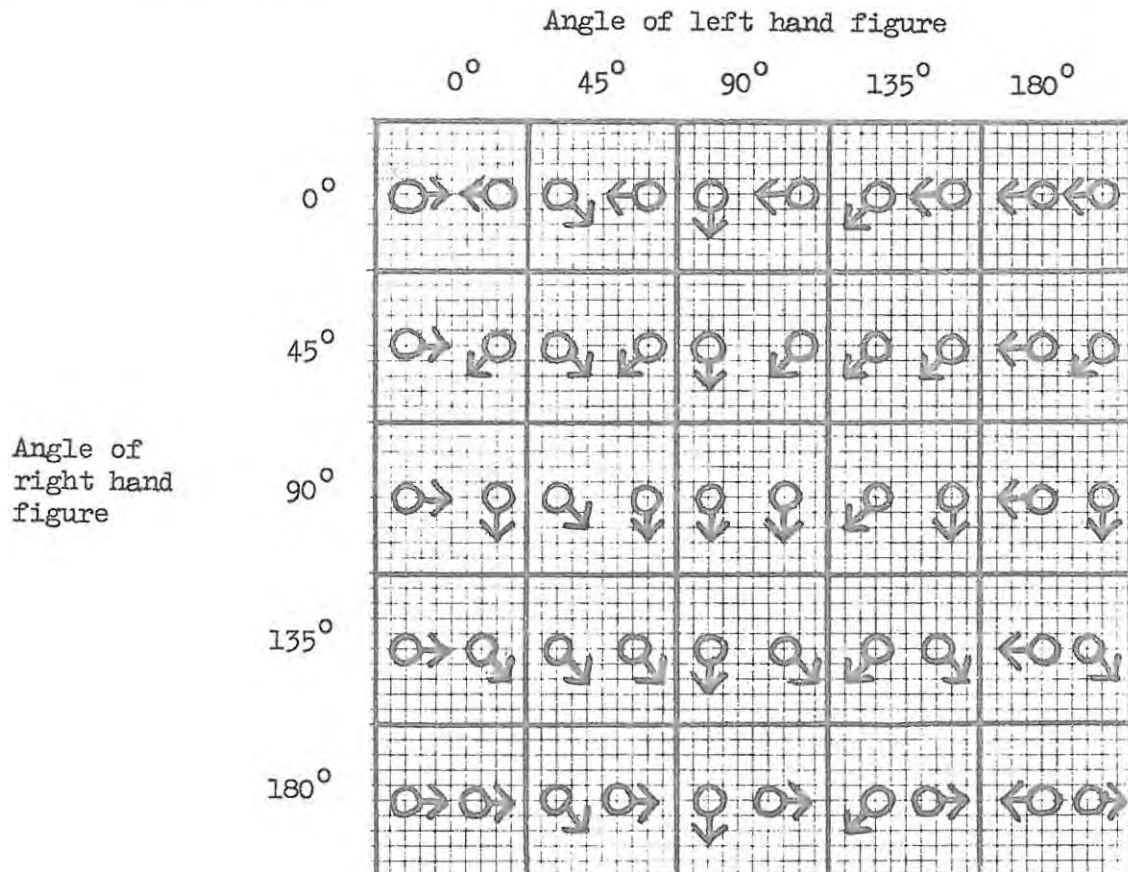
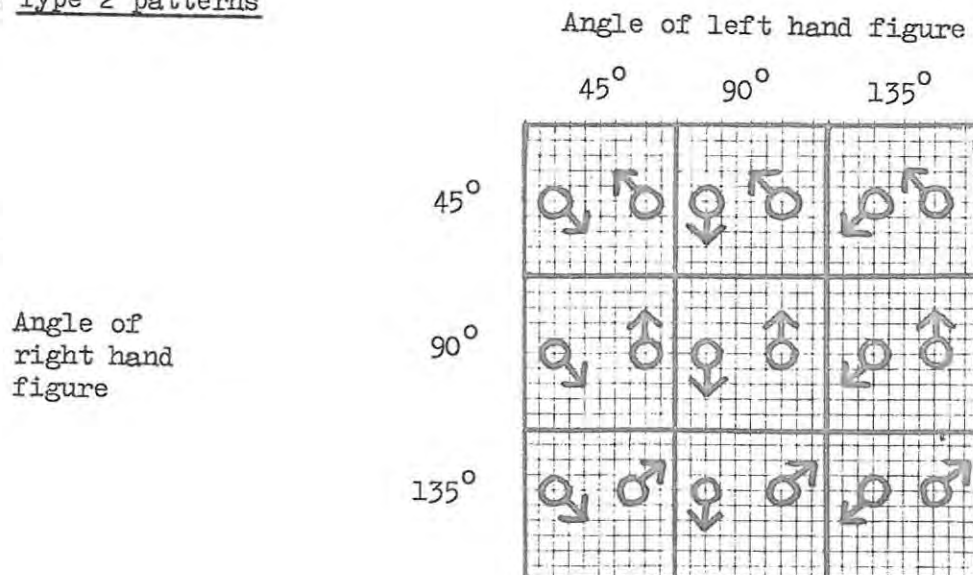
$$\underline{Or} = 180, 0,$$

$$\text{and } \underline{Or} = 180, 180.$$

If one of each pair of mirror variants is eliminated, thirty four patterns remain in the matrix. This matrix is presented in Figure 2.5. In the matrix there are 5 x 5 Type 1 patterns and 3 x 3 Type 2 patterns. Symmetrical patterns appear in the diagonal of the matrix. There are five symmetrical Type 1 patterns and three symmetrical Type 2 patterns. Although Type 1 and Type 2 versions of the same pattern could be placed in the same cell of the matrix, it was found convenient to illustrate the Type 2 patterns in a

FIGURE 2.5

## THE DYADIC ORIENTATION MATRIX

a) Type 1 patternsb) Type 2 patterns

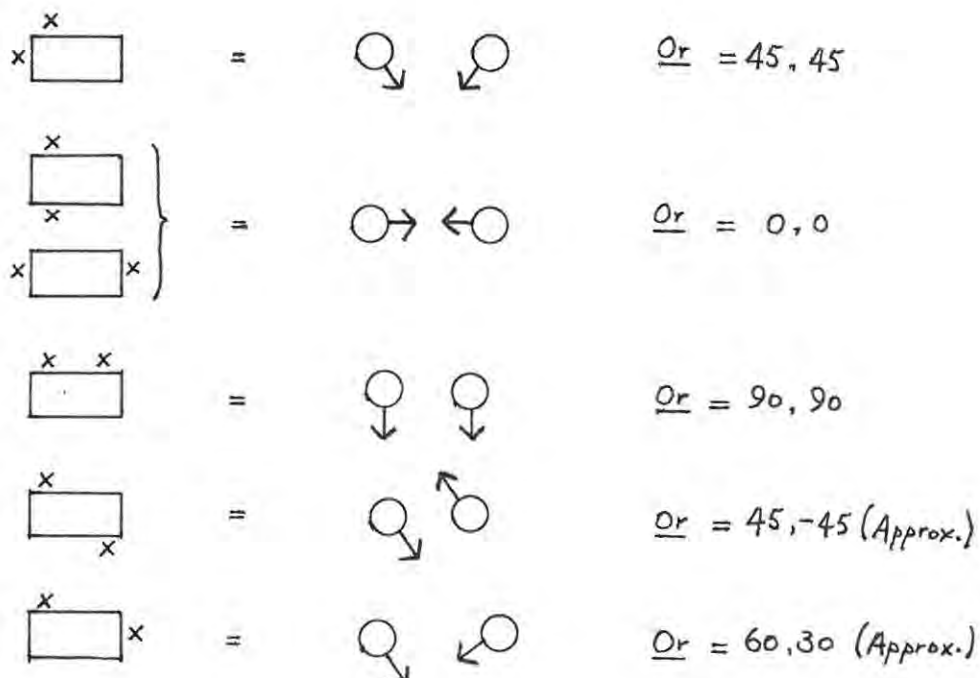
separate matrix. This matrix could, however, be superimposed upon the central 9 squares of the main matrix above it.

None of the patterns below the diagonal of the matrix are variants of each other. As has been mentioned, mirror variants are not shown, and complementary variants of the patterns below the diagonal appear in corresponding positions above the diagonal.

Only a few of the orientation patterns which appear in Figure 2.5 have been studied in the seating position work of Sommer and Cook. The seating arrangements at rectangular tables studied by these investigators are shown in Figure 2.6, together with their rough equivalents in terms of the orientation patterns and orientation equations described in this chapter. It can be seen that the first five seating positions are all equivalent to symmetrical orientation patterns. The sixth one, which is asymmetrical, was most often chosen by Cook's subjects in situations where people

FIGURE 2.6



SEATING POSITIONS STUDIED BY SOMMER AND COOK AND  
THEIR EQUIVALENTS AS ORIENTATION PATTERNS



wanted to avoid interaction. The reason the subjects chose it therefore was because of the distance between the chairs which is greater than in any of the other positions which could be selected, and not because of its asymmetry.

### 2.3 ASYMMETRY IN THE STRUCTURE OF SOCIAL ENCOUNTERS

The structure of approach and avoidance forces for eye-contact in a particular situation determines a person's orientation. If approach forces are strong and dominant, an interactor looks at his fellow interactor's eyes for long periods and is apt to adopt a direct orientation in order to facilitate this. Such an interactor will be said to have "high eye-contact demands". On the other hand, where the avoidance forces predominate, an interactor avoids looking at his fellow's face and is likely to adopt an indirect orientation. Such an interactor will be said to have "low eye-contact demands".

Because of the assumption underlying the study of schematic orientation patterns that orientation patterns reflect the eye-contact demands of the interactors supposed to be represented by them, it is assumed that direct patterns such as  will be associated with situations such as an argument where demand for eye-contact on the part of both participants is generally high, and less direct patterns, such as  with situations where there is less demand for eye-contact. This assumption is based on the results of Cook's work reviewed in section 1.2.6.

A cue on which a judge might base his interpretation of a pattern if given the opportunity to do so is the asymmetry in it. In an asymmetrical pattern, one figure faces more directly than the other, and this may function as a cue that one interactor has greater need for or greater ability to tolerate eye-contact than the other.

In this way, asymmetry in the geometry of the pattern may be interpreted as indicating asymmetry in the structure of the encounter.

An interaction in which the participants are undifferentiated in every respect is symmetrical in an exact sense of the term. In such an interaction, actions, attitudes, intentions, emotions and values attributed to one interactor are also attributed to the other. This type of interaction was typically used by Sommer and Cook in their seating position studies. For example, both these workers used the situations:

"Yourself and a friend of the same sex sitting  
chatting for a few minutes before a class."

and

"Yourself and a friend of the same sex competing  
in order to see who will be the first to solve  
a series of puzzles."

In both these situations, apart from the distinction between "yourself" and "a friend", the interactors are undifferentiated, and there is no reason to suppose that the two interactors should have different eye-contact demands. In one of Cook's experiments, the interactors were differentiated by sex in one of the conditions, and in the study of Lott and Sommer (1967) by status, but no opportunity was given for this asymmetry to manifest itself in the form of asymmetry of orientation pattern.

In an analysis of an interpersonal relationship or encounter, many dimensions of differentiation between two persons may be recognised. Interactors may differ in age, sex, status, confidence, warmth, attitudes, needs, etc. However, not all these modes of differentiation would necessarily be expected to lead to different eye-contact demands.

One type of asymmetry in interpersonal relationships that has been studied by the balance theorists (Heider 1958, Feather 1967) is that of like/dislike. A symmetrical relationship, where the interactors both like each other or both dislike each other is balanced, but an asymmetrical relationship, where A likes B but B dislikes A is unbalanced and may change towards a more symmetrical state. Balance theorists have also included value congruence or attitude symmetry in their models.

Although it might be tempting to make a prediction as to who would face most directly in an encounter between A and B where A liked B and B disliked A, it would probably be necessary to make assumptions about the social strategies being employed by each interactor in order to make the prediction. If A disliked B he might threaten him, and this would result in his facing directly; on the other hand, he might be frightened of him, and this might result in an indirect orientation. Like and dislike are not direct determiners of orientation and do not lead directly to predictions about directness of orientation. Therefore, if it is known that A likes B but B dislikes A, or that A and B hold different attitudes to some key issue they are discussing, this knowledge does not lead to a direct prediction that the orientation pattern in which they will be found to be standing will be asymmetrical. Not all types of asymmetry in the structure of social encounters result in asymmetry of eye-contact demands.

Symmetry and asymmetry in interpersonal relations have also been studied by De Soto and Kuethe (1959) and Peabody (1970). Although there is no reason to suppose that every kind of asymmetry will result in asymmetry of demands for eye-contact, the findings of these workers will be mentioned here, since there is one relationship

which both studies found to be perceived as asymmetrical by judges, namely "A is afraid of B" and which, because it might be expected to result in different eye-contact demands, was employed in the experiment to be described in Chapter 3.

De Soto and Kuethe investigated the subjective probabilities of the existence of particular interpersonal relations. Judges were asked such questions as "A likes B; does B like A?" or "A trusts B; does B trust A?" In such a case, if the subjective probability that B likes or trusts A is low, the relationship is subjectively asymmetrical. Judges perceived the following relationships as symmetrical : likes, trusts, confides in, lies to, dislikes, hates; the following were perceived as asymmetrical : is happier than, feels superior to, dominates, is afraid of.

Peabody's subjects had to imagine that an interactor A, in response to another interactor B, had a particular characteristic expressed by an adjective, such as aggressive, friendly, tense, dominating. Subjects had to select an adjective which would describe a probable attribute of B. If the characteristic attributed by the experimenter to A were perceived as symmetrical, subjects would also attribute it to B, Peabody argued. If it were perceived as asymmetrical, some other complementary attribute would be attributed to B. The following characteristics were perceived as symmetrical : aggressive, unfriendly, sexually aroused, friendly, relaxed, tense. The following were perceived as asymmetrical pairs : dominating-submissive, rebellious-dominating, dependent-dominating, protective-dominant, afraid-aggressive.

As has already been indicated, not all types of asymmetry in the structure of a relationship would necessarily be expected to be manifested in asymmetry of eye-contact demands. The work of

Heider, De Soto and Kuethé, and Peabody, is not therefore of central importance to the development of the present argument. However, it may serve as a source from which asymmetrical relations may be found which might be expected to produce asymmetry of eye-contact demands. In the experiments which will be reported in Chapters 3 and 4, social situations will be employed which enable the relationship between the geometrical asymmetry of an orientation pattern and asymmetry in the structure of an encounter to be explored further and to separate out some of the conditions of asymmetry that are perceived as producing asymmetrical eye-contact demands from other conditions of asymmetry where eye-contact demands remain the same for each interactor.

## CHAPTER 3

EXPERIMENT I : A STUDY OF THE USE OF ORIENTATION  
ASYMMETRY AS A CUE IN THE INTERPRETATION OF  
SOCIAL CONFIGURATIONS

## 3.1 METHOD

3.1.1 Introduction

It was observed in the previous chapter that a prominent feature of a dyadic orientation pattern is its symmetry or asymmetry. It was suggested that interactions in which asymmetrical orientation patterns occurred were those in which there was asymmetry in the approach and avoidance forces which determine eye-contact demands. If this is true, orientation asymmetry might provide a source from which inferences about a pair of interactors and their respective eye-contact demands might be drawn by an observer. In Experiment I to be described in this chapter, experimental conditions were created in which subjects could use the asymmetry of orientation patterns as a cue. An experimental task was designed which required the subject to make a simple decision, and predictions were made on the basis of what is known of the determinants of eye-contact as to how the asymmetry cue would determine responses.

Subjects were shown pairs of small figures mounted on cards in asymmetrical orientation patterns selected from the matrix of patterns in Figure 2.4. A description of a social encounter was read to them in which the two participating interactors were differentiated in some way. The differentiation was such that it was possible to predict that one interactor would have greater eye-contact demands than the other. The subject's task was to indicate



which of the two figures on the card played which role in the situation that had been described to him. The prediction was made that the person whose role in the interaction gave him greater eye-contact demands than the other would be identified by the subject as the figure who faced most directly.

### 3.1.2 Stimulus figures

Small plastic human figures manufactured by Airfix for use with 00 gauge model electric railways were employed in the construction of the stimulus cards. An assortment of these figures was used as a pool from which twelve pairs were drawn at random. If a pair consisted of two identical figures, it was discarded and a new pair drawn to replace it. Eleven figures were used in the experiment. All were standing, and the head, shoulders and body had similar orientations in each figure. Seven of the figures were of male characters, and four of females. A brief description of each figure, together with the code by which it will be referred to in subsequent sections, follows:

M1 : A bare-headed man wearing a duffle-coat, with his hands in his pockets.

M2 : A stout man wearing a suit and a hat; his jacket is open and he has one hand on his lapel.

M3 : A man wearing a hat and a heavy overcoat with his hands in his pockets.

M4 : A man wearing a double breasted jacket; he is holding his hat in one hand and the other arm is slightly raised.

M5 : A man wearing a short sheepskin coat with a high collar; he is bare headed and his right arm is slightly raised.

M6 : An old man with a bent back, leaning on a stick with one hand and with the other behind his back; he is bare-headed.

M7 : A schoolboy of about 15 years of age wearing a jacket, scarf and cap, and with his right hand in his pocket.

W1 : A large middle-aged woman in a heavy coat wearing a hat and carrying a hand-bag.

W2 : A slim young woman wearing a suit and without a hat.

W3 : A slim young woman wearing a coat; both her arms are slightly raised.

W4 : A middle-aged woman with a coat and a large floppy hat.

The figures were made of pale yellow plastic and were unpainted. They were approximately 23mm in height. Semantic differential profiles indicating how the figures were perceived by judges will be presented in section 4.3.

### 3.1.3 Stimulus cards

A series of orientation patterns was selected from the matrix in Figure 2.4. Only Type 1 patterns were employed. There are 25 of these in the matrix, but five of these were not used, so that 20 patterns were employed in all. The five patterns which were not used were all cases in which one interactor had an angle of  $180^{\circ}$ . Since such patterns are not common when two people are talking to each other, it was not thought to be important to include them. However not all patterns with angles of  $180^{\circ}$  were excluded. The patterns excluded were : the symmetrical pattern defined by

$$\underline{Or} = 180, 180$$

and two asymmetrical patterns defined by

$$\underline{Or} = 45, 180 \quad \text{and} \quad \underline{Or} = 135, 180$$

together with their complementary variants.

The orientation patterns that remained fell into three categories; these were (A) a set of 8 asymmetrical patterns in which the left hand figure faced more directly than the right hand figure;









































(B) a set of 8 asymmetrical patterns in which the right hand figure faced more directly than the left hand figure. These 8 patterns are the complementary variants of those in category A; (C) a set of four symmetrical patterns.

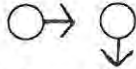
Patterns in category A were assigned numbers from 1A to 8A, and those in set B numbers between 1B and 8B. The symmetrical patterns in category C were assigned the numbers 9 - 12. The patterns and their numbers are illustrated in Figure 3.1.

The twelve pairs of stimulus figures that had been selected were assigned at random to the 8 patterns in category A and the 4 patterns in category C. Patterns in category B were assigned identical figure pairs to those assigned to their complementary variants in category A. For example, pattern 1B is the complementary variant of 1A. The figure pair W2 and M4, which was assigned to card 1A was also assigned to card 1B. W2 was the left hand figure both on card 1A and on card 1B; M4 was the right hand figure on these two cards. This arrangement meant that each figure pair that appeared on a card with an asymmetrical pattern appeared twice, once in the category A version of the pattern, once in its complementary variant in category B. Thus each figure pair appeared in two orientation patterns each of which had the same angle characteristics, but in the first of these one figure was the more directly facing, and in the second, which was the complementary variant, the other figure faced more directly.

The assignment of stimulus figures to orientation patterns is illustrated in Figure 3.1. In this figure, details of the construction of all twenty of the stimulus cards are given. Each card is numbered, and the orientation pattern on each card, and the figures mounted on it are indicated. The figure makes it clear, for

FIGURE 3.1  
ANALYSIS OF STIMULUS CARDS USED IN THE EXPERIMENT

Orientation Pattern		Figure on left (X)	Figure on right (Y)		
1A	 	1B	 	W2	M4
2A	 	2B	 	M1	M3
3A	 	3B	 	W2	M5
4A	 	4B	 	W1	M6
5A	 	5B	 	M2	M3
6A	 	6B	 	M2	W4
7A	 	7B	 	M7	M1
8A	 	8B	 	M6	W3
9	 			M4	W1
10	 			M7	M1
11	 			M1	W1
12	 			W3	W4

example, that on card 1A the pattern  appeared, with the figure W2 on the left, in the directly facing orientation, and the figure M4 on the right turned through  $90^\circ$  from the interpersonal axis. On card 1B, on the other hand, the same two figures appear with W2 on the left and M4 on the right but on this card it is M4 who is facing directly and W2 who is at  $90^\circ$ .

Each figure pair was mounted on an olive green card in the orientation pattern assigned to it. The cards were rectangles of size 30mm x 40mm and the distance between the centres of the figures was 15mm. In front of the left hand figure on each card was marked the letter X and in front of the right hand figure the letter Y. The result of this arrangement was that on the asymmetrical cards in set A the more directly facing figure was marked X, the other Y; on the cards in category B, however, the more directly facing figure was marked Y, the other X.

#### 3.1.4 The experimental task

The twenty stimulus cards described in the previous section were each assigned a number between 1 and 20. Numbers were assigned at random and bore no relation to the particular patterns or figures on the cards. This enabled the experimenter to identify each card quickly for recording purposes, but gave no hint to the subject of the structure of the experiment. A compartmented box was prepared with  $5 \times 4 = 20$  compartments in it into which the stimulus cards could be placed. Before each subject took part in the experiment the cards were randomly assigned to the twenty compartments.

The subject was told that he was taking part in a study of "How people perceive social situations", which was sufficiently vague to prevent him from knowing the structure of the experiment, but sufficiently true not to deceive him. He was shown the

compartmented box and instructed to take out the stimulus cards one by one, starting with the card in the top left hand corner and working towards the right. At the end of a row he was to proceed to the next row until all twenty cards had been judged.

Before taking the first card from the box, a description of a social encounter was read to him in which the two interactors were differentiated and he was asked to judge which of the two figures on the card was one of the interactors described. There were four judgement conditions, but each subject made judgements under only one of these for all twenty cards. For example, in condition 3 he was asked to identify which of the figures was afraid of the other. A full account of the four conditions of judgement is given in section 3.2.

The subject's task, therefore, was to tell the experimenter which of the two figures on the card he felt to be the one specified in the interaction question. Since the left hand figure was always X and the right hand figure always Y, he simply had to say "X" or "Y" to indicate which figure he had selected. He also told the experimenter the number of the card, and the experimenter recorded the response and the card number after each judgement.

After the subject had made the twenty judgements, he was interviewed briefly about his reactions to the experiment. During this interview he was asked to name those attributes of the stimulus cards which he felt had been most important in determining his judgements. No suggestions were made to the subject, and only those factors which the subject could articulate spontaneously were recorded.

The subject was encouraged to make his judgements on the basis of his general impression of the stimulus cards as a whole, and to proceed fairly quickly. The intention was to encourage a synthetic

as opposed to an analytic mode of perception (Vernon 1962 p. 222). The total time spent by the subject with the experimenter was about ten minutes, and this included the explanation of the task at the beginning and the interview at the end.

### 3.1.5 Subjects

Twenty subjects judged the complete set of stimulus cards under each of the four conditions of judgement which will be described in section 3.2. No subject made judgements in more than one condition. A total of 80 subjects therefore took part in the experiment.

In the first judgement condition (described in section 3.2.1), the subjects were 10 males and 10 females. They were friends of the author, most of them university lecturers or post-graduate students and their wives. The pattern of results of both males and females was found to be similar (see section 3.4.2), so that it was not necessary to require equal numbers of male and female subjects in the other judgement conditions. In order to obtain the remaining subjects, therefore, a notice was posted near the author's office asking for volunteers to participate in the experiment. No payment was offered since a steady stream of subjects presented themselves without this being necessary. The subjects were in nearly all cases undergraduate students who were enrolled in a variety of courses in different years. The first twenty of these volunteers were given the second judgement condition (see section 3.2.2) and consisted of 17 males and 3 females. The next twenty, who made judgements in condition 3 (section 3.2.3) consisted of 16 males and 4 females. The final twenty who made the judgements in condition 4 consisted of 10 males and 10 females; it was therefore possible to compare the responses of males and females

in this condition, and no difference was found (section 3.4.2).

## 3.2 CONDITIONS OF JUDGEMENT

### 3.2.1 Judgement condition 1

The interaction description read to the first group of subjects was as follows:

"Look at the two figures. One of them is begging a favour from the other, but the other does not wish to grant the request. Which one is asking the favour?"

It was predicted that subjects would perceive the person asking the favour as the one facing most directly and that the figure having the greater angle would be perceived as the one who had been asked, but did not wish to grant the request.

Pellegrini, Hicks and Gordon (1970) have shown that if a person is instructed to act in such a way as to obtain the approval of another they engage in more eye-contact than those not so instructed, or those instructed to avoid the other's approval. This finding provides a basis for the prediction that the figure facing more directly would be perceived as the one begging the favour.

Persons who are anxious, uncertain or engaged in the making of difficult decisions, on the other hand, have been found to avert their gaze by Kendon (1967) and by Exline, Gray and Schuette (1965). These findings provide a basis for the prediction that the figure facing less directly would be perceived as the one who had been asked the favour. It has been suggested by Goffman (1963 pp.104sq.) that a person placed in such a position as this may be anxious or uncertain of himself. He argues that individuals must be accessible to the approaches of others since others may have important or valuable information to give them; on the other hand, there are risks attached to this accessibility, for

" . . . when an individual opens himself up to talk with another, he opens himself up to pleadings, commands, threats, insult and false information . . ."

and it is difficult simply to terminate the encounter since

" . . . once an individual has extended to another individual enough consideration to hear him out for a moment, some kind of bond of mutual obligation is established."

(Goffman op.cit. p.105)

Goffman goes on to argue that because of the advantages and disadvantages of accessibility there is "an implicit communication contract" in society, an unwritten rule that states that one who takes advantage of the accessibility of another must have good grounds for doing so. Disagreement about what constitutes good grounds may occur, however, and these may result in "infractions of the rule of undesired overture". Such infractions

" . . . cause some anxiety, for the recipient (of the overture) must either accede to the request, or demonstrate . . . that his availability . . . was a false pose." (op.cit. p.106)

The situation described in the interaction description above might be regarded as a case of such an infraction. The character who "does not wish to grant the request" is in the position of one who feels that he ought not to have been asked, and is in the awkward position of having to choose between acceding to a request which he feels is unreasonable and refusing the request, thereby implicitly criticising the other's judgement that the request was reasonable.

### 3.2.2 Judgement condition 2

The interaction description read to the second group of subjects was as follows:

"One of these figures is angrily reprimanding the other for some fault. The other is ashamed and cannot think of anything to say. Which is the angry one?"

This might be considered an example of an asymmetrical relation such as "aggressive-afraid" or "dominant-submissive" noted by Peabody (1970). But as has been argued previously, asymmetry in a relationship will only be expressed in terms of asymmetry in the orientation pattern if it results in different eye-contact demands for the two interactors.

The use of the stare as a means of maintaining and establishing dominance has been discussed in section 1.3.5. It was therefore expected that the more directly facing of two figures on a stimulus card would be perceived as the angry one, since he is dominating and controlling the encounter. Looking away is a common response to an embarrassing situation (Exline, Thibaut, Brennan and Gumpert 1961) and may be a gesture of submission (Strongman and Champness 1968). It was expected, therefore, that the figure with the least direct orientation would be the one perceived as ashamed if judgements were based on the orientation cue.

### 3.2.3 Judgement condition 3

The interaction description read to the third group of subjects was as follows:

"These two people are having a conversation. One of them is afraid of the other; which one?"

In the study previously cited in section 2.4, De Soto and Kuethé (1959) found that the relation "A is afraid of B" was perceived as asymmetrical. This means that given that A was afraid of B, subjects did not expect B to be afraid of A. Peabody (1970) found that if subjects were told that one interactor of a pair was afraid

and asked to indicate a probable characteristic of the other, many of them checked the adjective "aggressive" from a list provided for them. Although the interaction description in this condition was short, therefore, and the relation between the interactors not explicitly asymmetrical, it was expected that the judges would perceive the encounter as an asymmetrical one in which the one interactor was afraid and the other aggressive or dominant.

If the interaction were perceived in this way, it would be very similar in structure to that used in condition 2, and might be expected to have similar characteristics as regards eye-contact demands. The aggressive figure would be expected to use eye-contact as a means of maintaining his dominance over the encounter, while the one who was afraid would be expected to look away. It has been pointed out by Gray (1971) that two patterns of emotional arousal can be discriminated both at the physiological and at the behavioural level; these are fear and anger. The hormone noradrenaline is associated with anger, adrenaline with fear. Gray writes (p.62)

"In states of high excitement in which the subject is able to do something (e.g. playing hockey, boxing), there are high levels of adrenaline and noradrenaline; in states of excitement in which the subject can only wait expectantly or is otherwise inactive (e.g. a stressful psychiatric interview) there are high levels of adrenaline only."

It has been shown in section 1.3.5 that eye-contact increases physiological arousal. It seems possible that in the active, angry person increased arousal can be tolerated since it can find its expression in aggressive, dominating behaviour, while in the fearful person it cannot, since there is no means of coping with the increased arousal. If this is true, there is a physiological basis

as well as a psychological one for the predictions made about eye-contact demands in judgement condition 3 if it is assumed that the presence of noradrenaline in the blood of an angry person permits greater degrees of arousal to be tolerated.

Since the subject was asked to choose the figure whom he thought was afraid, the prediction was that he would choose the one with the larger angle of diversion when judging asymmetrical orientation patterns.

#### 3.2.4 Judgement condition 4

The interaction description read to the final group of twenty subjects was as follows:

"One of these people enjoys the company of others, is warm and friendly, and likes to establish close personal relationships and to be popular; but the other is quiet and does not make friends easily. Which is the warm and friendly one?"

In this description nothing of the nature of the encounter was indicated, but the personalities of the interactors were described. The first description was intended to be of an extraverted personality, the second of an introverted one (Eysenck and Eysenck 1964). Extraverts can tolerate higher levels of stimulation than introverts; Mobbs (1968) and Kendon and Cook (1969) have shown that they engage in more eye-contact than introverts, and Cook (1970) has been able to demonstrate some differences in seating position preferences between introverts and extraverts. On the basis of this, it was expected that if subjects did use asymmetry in the orientation pattern as a cue when making their judgements, they would select the more directly facing of the two figures as the warm and friendly one.

The same prediction also follows if it is supposed that the more active participant in an encounter will look more directly than

the less active one. In the previous section, the active emotional response of anger was distinguished from the passive emotional response of fear, and it was argued that the more active, angry interactor would face more directly. In the present case, the extravert interactor is described as one likely to take an active part in the encounter, while the introvert is described as if he were likely to play a more passive one.

### 3.3 SUPPLEMENTARY QUESTIONNAIRE

#### 3.3.1 Introduction

Although the aim of the study was to investigate whether the asymmetry in an orientation pattern would be used as a cue in making the judgements, these orientation cues were not the only ones available to the subject to provide a basis of judgement. Competing with the orientation cue were the characteristics of the figures themselves. Posture, facial expression, manner of dress and sex may all affect the manner in which the stimulus cards appear to a judge, and his judgement in each case would be expected to be a result of his assessment of both figure characteristics and orientation characteristics of the card being judged. In order to assess how individual figures were perceived, a supplementary study using a semantic differential questionnaire was made.

#### 3.3.2 Method

Each of the eleven figures used on the stimulus cards in the main experiment was mounted individually on a card. A code number was assigned to each card, and the set of eleven figures was placed in a tray. Each subject who took part in this questionnaire study was asked to take the figures one at a time from the tray in random order and rate them on eight seven point scales.

The scales were in the form of semantic differential dimensions of the type developed by Osgood, Suci and Tannenbaum (1957). The following adjective pairs were used (in this order): casual-formal; active-passive; intelligent-stupid; warm-cold; closed-open; nervous-confident; strong-weak; rigid-relaxed. The scales were printed one below the other in the following form:

casual: \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : formal

and each subject made his rating by marking the appropriate space on the line with a cross. It was explained that it was the personality of the figures, and not their physical attributes, which was to be rated. Each subject filled out eleven sets of scales, one for each of the eleven figures, and indicated which figure was being rated by writing the code number of the figure at the top of the scales used for the rating of that figure.

Subjects were 10 male and 10 female students who volunteered either in response to a notice or in response to an announcement during a second-year psychology practical class. A number of these subjects had also taken part in the main experiment.

Subjects' responses were assigned scores ranging from 1 to 7, a score of 1 being allotted to the extreme left-hand segment of the line, and a score of 7 to the extreme right-hand segment. The mean rating of each figure on each scale was calculated for male and female subjects combined. The mean ratings of the two figures on each stimulus card were then compared to discover whether they were perceived differently. For each category, values of  $t$  were computed to assess whether differences between mean ratings were significant.

### 3.3.3 Results : Card 1

The figures on cards 1A and 1B were W2 and M4, and the results of a comparison between the ratings of these two figures are presented

in Table 3.1. It can be seen that only three of the categories used in the questionnaire discriminated significantly between the two figures. The woman, W2, was perceived as more casual than the man, M4, but as less intelligent and less strong.

TABLE 3.1<sup>a</sup>  
COMPARISON OF STIMULUS FIGURES ON CARD 1

Category	Mean rating		<u>t</u>
	W2	M4	
casual-formal	3,6	5,6	3,42**
active-passive	3,8	3,5	
intelligent-stupid	3,3	2,5	2,17**
warm-cold	3,8	3,6	
closed-open	3,9	4,2	1,35
nervous-confident	4,0	4,6	2,93**
strong-weak	4,3	3,4	2,93**
rigid-relaxed	3,9	3,4	

<sup>a</sup>The following note applies to Tables 3.1 to 3.11:

For all t-tests values below 1,00 are not given.

For all t-tests there are 19 degrees of freedom.

\*  $p < ,05$

\*\*  $p < ,01$

\*\*\*  $p < ,001$

#### 3.3.4 Results : Card 2

Two male figures, M1 and M3 appeared on cards 2A and 2B.

A comparison of the ratings of these figures appears in Table 3.2.

TABLE 3.2  
COMPARISON OF STIMULUS FIGURES ON CARD 2

Category	Mean rating		<u>t</u>
	M1	M3	
casual-formal	1,9	4,1	4,97**
active-passive	3,2	4,7	3,57*
intelligent-stupid	2,7	3,3	1,71
warm-cold	2,7	4,3	4,61**
closed-open	5,4	3,1	5,31**
nervous-confident	5,95	4,75	2,73*
strong-weak	2,7	3,5	2,16*
rigid-relaxed	5,5	3,5	3,94**

On all categories but one there is a significant difference in the way the figures are perceived. M1 is seen as more casual, active, warm, open, confident, strong and relaxed. M3 is evaluated much less positively.

### 3.3.5 Results : Card 3

On this card the figures W2 and M5 appeared. W2 previously appeared on card 1 with M4. The comparison of figures W2 and M5 is shown in Table 3.3. The figures are rated differently on all the categories except intelligent-stupid, although the difference between them on the category closed-open is just short of significance. The male figure M5 was evaluated more positively than W2, and was perceived as more casual, more active, more warm, more confident, stronger and more relaxed than the woman.

TABLE 3.3

## COMPARISON OF STIMULUS FIGURES ON CARD 3

Category	Mean rating		<u>t</u>
	W2	M5	
casual-formal	3,6	2,2	3,68*
active-passive	3,8	2,0	4,29**
intelligent-stupid	3,3	3,2	
warm-cold	3,8	2,5	3,45*
closed-open	3,9	5,1	2,03
nervous-confident	4,0	5,2	2,31*
strong-weak	4,3	2,4	5,47**
rigid-relaxed	3,9	5,3	2,3*

3.3.6 Results : Card 4

TABLE 3.4

## COMPARISON OF STIMULUS FIGURES ON CARD 4

Category	Mean rating		<u>t</u>
	W1	M6	
casual-formal	5,7	4,9	2,61*
active-passive	4,0	4,9	1,32
intelligent-stupid	4,5	3,4	2,46*
warm-cold	3,9	3,4	
closed-open	3,5	4,2	1,09
Nervous-confident	4,2	4,1	
strong-weak	3,3	5,1	4,15**
rigid-relaxed	2,6	4,0	2,54*

On this card the figures were W1 and M6. Ratings of the two figures are compared in Table 3.4. The old man, M6, was perceived as less formal and more relaxed than the woman. The fact that he was seen as considerably weaker probably reflects his physical weakness to a large extent. He was also perceived as more intelligent. On the whole, the old man seems to be evaluated more favourably than the woman, but he was not seen as significantly more warm or more open than her.

### 3.3.7 Results : Card 5

On card 5 appeared two middle-aged men, M2 and M3. Ratings were significantly different on only two categories, M2 being seen as warmer and more open than M3.

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TABLE 3.5  
COMPARISON OF STIMULUS FIGURES ON CARD 5

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Category	Mean rating		<u>t</u>
	M2	M3	
casual-formal	3,7	4,1	
active-passive	3,9	4,7	1,32
intelligent-stupid	3,6	3,3	
warm-cold	2,9	4,3	2,66*
closed-open	4,8	3,1	3,15*
nervous-confident	5,3	4,8	1,06
strong-weak	3,5	3,5	
rigid-relaxed	4,2	3,5	0,91

---

### 3.3.8 Results : Card 6

On card 6, M2, who also appeared on the previous card 5, was paired with W4. As with card 5, M2 was perceived as the more warm

and open of the two figures, but on card 6 he was also perceived as more casual and relaxed than the other figure W4.

TABLE 3.6  
COMPARISON OF STIMULUS FIGURES ON CARD 6

Category	Mean rating		<u>t</u>
	M2	W4	
casual-formal	3,7	5,5	3,2*
active-passive	3,9	4,2	
intelligent-stupid	3,6	4,4	1,47
warm-cold	2,9	4,5	2,72*
closed-open	4,8	3,0	3,52*
nervous-confident	5,3	4,5	1,41
strong-weak	3,5	4,0	1,01
rigid-relaxed	4,2	2,5	3,34*

### 3.3.9 Results : Cards 7 and 10

On the two asymmetrical cards 7A and 7B, and also on the symmetrical card 10, the two figures M7 and M1 appeared. Both these figures were perceived very positively and there were significant differences between ratings on only two categories. The schoolboy, M7, was perceived as less intelligent than the man and also as less confident, although both figures were rated well towards the confident end of the nervous-confident scale.

TABLE 3.7  
COMPARISON OF STIMULUS FIGURES ON CARDS 7 & 10

Category	Mean rating		<u>t</u>
	M7	M1	
casual-formal	1,6	1,9	1,1
active-passive	3,1	3,2	
intelligent-stupid	3,5	2,7	2,18*
warm-cold	2,9	2,7	
closed-open	5,2	5,4	
nervous-confident	5,1	6,0	2,33*
strong-weak	3,2	2,7	1,45
rigid-relaxed	5,5	5,5	

### 3.3.10 Results : Stimulus Card 8

On this card pair the old man, M6, appeared, with the woman W3. Ratings of the two figures are significantly different on only

TABLE 3.8  
COMPARISON OF STIMULUS FIGURES ON CARD 8

Category	Mean rating		<u>t</u>
	M6	W3	
casual-formal	4,2	4,5	
active-passive	4,9	2,2	5,48***
intelligent-stupid	3,4	3,2	
warm-cold	3,4	3,1	
closed-open	4,2	4,7	
nervous-confident	4,1	4,7	1,08
strong-weak	5,1	3,5	3,04**
rigid-relaxed	4,0	4,0	

two of the categories, active-passive and strong-weak. The woman is rated as stronger and more active than the old man. This appears to reflect the physical weakness of the old man whose back is bent and who is leaning on a stick.

### 3.3.11 Results : Card 9

The two figures on card 9 were M4 and W1. Ratings were very close on most categories, although there was a considerable difference on the intelligent-stupid dimension. The only other category on which there is a difference between the ratings of any size is that of rigid-relaxed, M4 being perceived as less rigid than W1; however the t-test indicates that the difference cannot be regarded as significant even at the 10 per cent level.

TABLE 3.9

COMPARISON OF STIMULUS FIGURES ON CARD 9

Category	Mean rating		<u>t</u>
	M4	W1	
casual-formal	5,6	5,7	
active-passive	3,5	4,0	
intelligent-stupid	2,5	4,5	6,33***
warm-cold	3,6	3,9	
closed-open	4,2	3,5	1,00
nervous-confident	4,6	4,2	
strong-weak	3,4	3,3	
rigid-relaxed	3,4	2,6	1,60

### 3.3.12 Results : Card 11

On card 11 the figures M1 and W1 appeared. There was a considerable difference in the way these figures were perceived, and only two categories, those of strong-weak and active-passive, failed to discriminate between them. On the casual-formal and rigid-relaxed categories, differences were particularly large. In general, the man is perceived far more positively than the woman.

TABLE 3.10

COMPARISON OF STIMULUS FIGURES ON CARD 11

Category	Mean rating		t
	M1	W1	
casual-formal	1,9	5,7	10,35***
active-passive	3,2	4,0	1,46
intelligent-stupid	2,7	4,5	5,00***
warm-cold	2,7	3,9	2,8*
closed-open	5,4	3,5	3,75**
nervous-confident	6,0	4,2	3,56**
strong-weak	2,7	3,3	1,35
rigid-relaxed	5,5	2,6	6,10***

### 3.3.13 Results : Card 12

On card 12 appeared the two female figures W3 and W4. The ratings indicate that W3 was perceived more positively than W4, being rated as the more active, intelligent, warm, open and relaxed of the two. W3 was also rated as less formal than W4, although the difference between the ratings is not quite significant at the 5 per cent level.

TABLE 3.11  
COMPARISON OF STIMULUS FIGURES ON CARD 12

Category	Mean rating		<u>t</u>
	W3	W4	
casual-formal	4,5	5,5	2,06
active-passive	2,2	4,2	3,68**
intelligent-stupid	3,2	4,4	2,41*
warm-cold	3,1	4,5	3,28**
closed-open	4,7	3,0	4,44***
nervous-confident	4,7	4,5	
strong-weak	3,5	4,0	1,29
rigid-relaxed	4,0	2,5	3,29**

### 3.3.14 Conclusions

The questionnaire study showed that the stimulus figures themselves, despite their small size, were perceived as having their own personality characteristics. On the basis of posture, clothing, gesture and facial features, subjects were able to rate the figures on the eight categories provided; they treated this task as a meaningful one, and no complaint was made that there was no basis on which to form their judgements.

When the figures on each stimulus card were compared, there were large differences in the way the figures were perceived, particularly in the cases of cards 2, 3, 6, 11 and 12. If to rate a figure as more casual, active, intelligent, warm, open, confident, strong and relaxed than another is to evaluate it more favourably, the results of comparisons between figures on these cards can be conveniently summarized by stating that on all cards one figure was

evaluated more favourably or perceived more positively than the other. A similar pattern was found on card 4, and, to a lesser extent, on card 5.

Although there was no card where figures were not discriminated by at least one category, however, differences between the ways the two figures were perceived were slight on several cards, particularly 7, 8, 9 and 10, at least so far as the eight categories used in the questionnaire are concerned.

### 3.4 ANALYSIS OF RESPONSES TO ASYMMETRICAL ORIENTATIONS

#### 3.4.1 Strategies of response

Every pair of figures that appeared in an asymmetrical orientation pattern appeared on two cards, on one of these the left hand figure had the most direct orientation, on the other it was the right hand figure which had the most direct orientation. For each of the two cards, the left hand and right hand figures were the same (See Table 3.1). The left hand figure always faced most directly on cards in set A, and the right hand figure on cards in set B. Since the left hand figure was always "X" and the right hand figure always "Y", an X response to a card in set A would indicate that the figure having the more direct orientation had been chosen, while on a card in set B, an X response would indicate that the figure having the less direct orientation had been chosen.

If a subject's response to a card in set A is combined with his response in set B, to provide a measure of his overall response, four types of response are possible, since there are two possible responses to each stimulus card. These four responses are as follows:

XX = chooses X on card A and X on card B.

XY = chooses X on card A and Y on card B.

YY = chooses Y on card A and Y on card B.

YX = chooses Y on card A and X on card B.

If a subject makes an XX or YY response, he chooses the same figure on each of the pair of cards, both when it is in the more direct orientation and when it is the less directly facing. An XX or a YY response suggests that the subject based his judgement on the characteristics of the figures on the stimulus card, and not on the orientation pattern in which they were standing, since he chose the same figure even when the orientation pattern was changed. A subject who makes an XX or a YY response will be said to have employed a "figure strategy" in making his judgement, since his judgement was based on the figure characteristics of the card. The use of the term "strategy" does not, however, imply that the subject was conscious that he based his decision on the figure characteristics rather than the orientation characteristics of the stimulus.

On the other hand, if an XY response is made, this means that the subject chose a different figure on card B to that chosen on card A, but that in each case he chose the figure having the lower angle of diversion. Such a response suggests that he chose on the basis of the orientation characteristics of the card, and is, therefore, an example of an "orientation strategy". There are, however, two possible orientation strategies; the first is to choose the figure with the lower angle of diversion on each card, the second to choose the figure with the higher angle of diversion on each card. An XY response, which indicates that the figure with the lower angle was chosen in each case may therefore be referred to as a "low orientation strategy".

The other orientation strategy is indicated by the presence of the YX response. This occurs if on each card the subject chose

the figure with the higher angle of diversion. This response can therefore be termed an example of a "high orientation strategy".

In section 3.2, predictions were made about which figure of a pair would be chosen if an orientation strategy was being used. For example, it was predicted that in condition 1, subjects would choose the figure having the lower angle of diversion. If the response to a single card is examined, however, it will not be clear whether a subject's judgement supports the prediction or not, since even if he chooses the figure with the lower angle, as predicted, there is no way of knowing whether his judgement was based on the orientation cue, or on the other characteristics of the figures themselves.

The use of matched pairs of cards, and the analysis of results based on responses to both cards in a pair allows the separation of the effects of the two types of cue. If an XX or a YY response is made, this suggests that the figure characteristics of the stimulus card pair were the main determiners of the judgement; if an XY or YX response is made, this suggests that the subject's judgements were based on the orientation cue.

#### 3.4.2 Predicted pattern of results

In section 3.2, predictions were made about how subjects would respond in each of the four judgement conditions. The specific predictions were that in conditions 1, 2 and 4 the figure with the more direct orientation would be selected, while in condition 3, the figure with the less direct orientation would be selected. These predictions can be restated in terms of the four types of response described in the previous section as follows:

- 1) In conditions 1, 2 and 4 there will be a predominance of

XY (low orientation choices) and few YX (high orientation choices)

2) In condition 3 there will be a predominance of YX (high orientation choices) and few XY (low orientation choices).

The predictions might be proved false in two ways. First, the predicted orientation strategy might not be the most frequent of the two possible orientation strategies; for example, where XY choices had been predicted, YX choices might prove to be the most frequent. Such a finding would show that although judgements had been based on the orientation cue, the prediction derived from the theory of the determination of orientation by eye-contact demands was invalid. Secondly, there might be a predominance of XX and YY choices indicating that judgements were not influenced by the orientation cue at all, but were determined by the characteristics of the stimulus figures. Such a predominance of figure strategies of judgement would not bear directly on the predictions made, since it would be impossible to assess the effects of the orientation cue at all in such a case; it would, however, indicate that the orientation cue was at best a very weak factor in the judgement, and suggest that orientations of figures placed in a doll placement task would be unlikely to be very meaningful.

At this point it may be noted that the experiment constitutes a fairly strict test of the theory that orientation would be used as a cue. First of all the presence of figure characteristics provides competition for the orientation cue in the determination of the responses. Secondly, any rigidity of response pattern on the part of subjects would not yield data that supported the hypothesis. For example, if a subject had a bias towards choosing figures marked "X" and chose these more frequently than figures marked "Y", the number of XX responses would be inflated, at the expense of the XY

or YX orientation responses. Similarly, if a subject were to feel that there was insufficient basis for judgement and chose X and Y at random, the predicted predominance of XY (or YX in condition 3) responses would not be obtained.

### 3.4.3 Comparison of male and female subjects

Equal numbers of male and female subjects acted as subjects in conditions 1 and 4. In the other conditions the majority of subjects were males (section 3.1.5). The frequency of response in each of the four categories was calculated separately for males and for females in conditions 1 and 4. The total number of responses for each group in each condition was 80, since 10 subjects each judged 8 card pairs. The distribution of these responses among the four categories is shown in Table 3.12.  $\chi^2$  values of 0,734 in condition 1 and 1,608 for condition 2 (with 3 degrees of freedom) are well below significance and permit retention of the null hypothesis that pattern of frequencies was the same for both male and female subjects. Male and female subjects were therefore treated as a single group for the purposes of subsequent analyses.

TABLE 3.12

FREQUENCY OF RESPONSE IN EACH OF THE FOUR CATEGORIES  
- MALE AND FEMALE SUBJECTS

	Condition 1				Condition 4			
	XX	YY	XY	YX	XX	YY	XY	YX
Male	8	19	46	7	20	22	34	4
Female	11	17	46	6	26	23	27	4

#### 3.4.4 Overall pattern of responses

The distribution of choices among the four response categories is shown in Table 3.13. In each condition, the frequency distribution was compared with that expected by chance (i.e. 40 responses in each category) and a value of  $\chi^2$  obtained in order to test whether results fitted the chance distribution. These values of  $\chi^2$  are also shown in Table 3.13. In each case, these values are significant well beyond the .001 level. The hypothesis that the results are consistent with chance can therefore be rejected with confidence.

Although there are four categories of response, there are only three strategies of response, namely the figure strategy (XX and YY choices), the low orientation strategy (XY choices), and the high orientation strategy (YX choices). Since XX and YY choices both represent the same response strategy, and since interest in the analysis is in the distribution of responses among the three strategies of choice, values of  $\chi^2$  were corrected for contributions made by the differential frequencies in the XX and YY categories. This was done by combining the frequencies in the XX and YY categories. Corrected  $\chi^2$  values were then obtained by comparing the three-category frequency distribution thus obtained with that expected by chance (i.e. 80 XX or YY, 40 XY, 40 YX). Corrected values of  $\chi^2$  are shown in Table 3.13. They are very close to the uncorrected values and in all cases are significant.

Both figure strategies and orientation strategies were common in all conditions, but in each condition the most frequent category of response is an orientation category (XY or YX) and one of the orientation strategies is considerably more frequent than the other. In accordance with prediction, low orientation choices (XY) were

the predominant responses in conditions 1, 2 and 4; high orientation choices (YX) predominated in condition 3.

TABLE 3.13

DISTRIBUTION OF CHOICES IN THE FOUR JUDGEMENT CONDITIONS

	XX	YY	XY	YX	$\chi^2$	df	$\chi^2$ (corrected)	df
Condition 1	19	36	92	13	97,25*	3	93,6*	2
Condition 2	31	51	61	17	29,3*	3	24,3*	2
Condition 3	33	30	24	73	37,35*	3	37,2*	2
Condition 4	46	45	61	8	38,15*	3	38,2*	2

\*  $p < ,001$

Altogether there were 291 responses in the figure strategy categories (XX and YY) and 349 responses in the orientation strategy categories (XY and YX). There are more responses in the orientation categories than would have been expected if both figure strategies and orientation strategies were equally likely ( $\chi^2 = 5,26$ ;  $df = 1$ ;  $p < ,025$ ). It can be concluded that orientation patterns were significant determinants of subjects' judgements, even though there was considerable competition from the figure characteristics of the stimulus cards.

#### 3.4.5 Comparisons between judgement conditions

The frequency of choices in each of three response strategy categories (i.e. figure strategy, low orientation strategy, high orientation strategy) in each condition was compared with that in every other condition in order to discover whether the pattern of responses could be regarded as the same in each condition. Since, in accordance with prediction, high orientation choices were most

common in condition 3, whereas low orientation choices were most common in other conditions, the frequencies of the XY and YX choices were exchanged in condition 3, so that the distribution is that which would have been obtained if the question to the subject had been "Which is the one who is not afraid?"

TABLE 3.14  
COMPARISONS BETWEEN JUDGEMENT CONDITIONS  
(A) Frequencies compared

Condition	Figure Strategy	Predicted orientation strategy	Other orientation strategy
1	55	92	13
2	82	61	17
3	63	73	24
4	91	61	8

(B) Values of  $\chi^2$

	condition 2	condition 3	condition 4
condition 1	12,14**	6,00*	16,36**
condition 2	-	4,78	3,7
condition 3	-	-	14,18**

$df = 3$       \*  $p < ,05$       \*\*  $p < ,001$

Table 3.14 shows the actual frequencies which were compared in this stage of the analysis (these frequencies are derived directly from Table 3.13), and the values of  $\chi^2$  obtained from each comparison. The frequency distribution in condition 1 is significantly different from that in the other conditions. It can be seen that this is due to the relative infrequency of figure strategy judgements in

this condition, and a corresponding high frequency of judgements reflecting the predicted orientation strategy. It can be concluded that orientation was a more salient cue in condition 1 than in the other conditions. The distribution of choices in condition 2 was not found to be different from that in conditions 3 and 4. There was a difference between conditions 3 and 4, however. It can be concluded that figure strategy choices were more common in condition 4 than in condition 3.

#### 3.4.6 Analysis of responses to individual card pairs

The next stage of the analysis was to study the distribution of responses to each card pair individually in each of the four conditions. These frequencies are shown in Table 3.15.

Since 20 subjects judged each card pair in any condition, by chance alone, 5 responses in each of the four response categories would be expected. Actual distributions on each card were compared with this chance distribution and values of  $\chi^2$  obtained. These values are shown in Table 3.15.  $\chi^2$  values are significant beyond the ,05 level in all cases except the following nine : card 2 in condition 1; cards 3, 4, 6 and 7 in condition 2; cards 1, 4, 5 and 6 in condition 3.

In order to assess whether a particular response was a dominant one for a particular card, a criterion value was needed such that if the frequency of responses in a category exceeded it, that category could be regarded as a dominant response. Since by chance 5 responses would be expected in a single category, the expected distribution of responses into a particular category and into a residual category (containing the other three types of response) would be in the ratio of 5:15. If 9 responses occur in a single category, and the remaining 11 occur in the other 3 categories, this distribution differs from

TABLE 3.15  
 DISTRIBUTION OF CHOICES FOR EACH STIMULUS CARD  
 IN EACH CONDITION OF JUDGEMENT<sup>a</sup>

	Condition 1					Condition 2				
Card Pair No.	XX	YY	XY	YX	$\chi^2$	XX	YY	XY	YX	$\chi^2$
1	0	6	12	2	12,3**	5	10	4	1	8,4*
2	7	3	7	3	3,2	1	4	12	3	13,0**
3	0	11	9	0	20,4***	3	9	6	2	6,0
4	0	4	13	3	18,8***	3	6	9	2	6,0
5	2	2	14	2	21,6***	5	1	12	2	14,8**
6	1	5	13	1	19,2***	8	4	5	3	2,8
7	5	2	12	1	14,8**	4	7	5	4	1,2
8	4	3	12	1	14,0**	2	10	8	0	13,6**
	Condition 3					Condition 4				
Card Pair No.	XX	YY	XY	YX	$\chi^2$	XX	YY	XY	YX	$\chi^2$
1	3	4	4	9	4,4	1	8	10	1	8,7*
2	5	1	3	11	11,2*	10	3	7	0	11,6**
3	1	6	3	10	9,2*	0	14	6	0	17,4***
4	4	5	4	7	1,2	2	10	8	0	13,6**
5	4	4	3	9	4,4	14	1	4	1	22,8***
6	3	5	5	7	1,6	13	1	4	2	18,0***
7	9	1	2	8	9,0*	2	4	11	3	10,0*
8	4	4	0	12	10,7*	4	4	11	1	10,8*

<sup>a</sup>For  $\chi^2$ ,  $df = 3$

\*  $p < ,05$

\*\*  $p < ,01$

\*\*\*  $p < ,001$

the chance distribution of 5:15 at the ,05 level ( $\chi^2 = 4,27$ ;  $df = 1$ ). This provides a basis for setting a criterion of 9 responses in a single category. If there are 9 or more responses in a particular category (out of the total 20) this category of response can be regarded as a dominant one for that card.

TABLE 3.16

## SUMMARY OF DOMINANT RESPONSE STRATEGIES

Card Pair No.	1	2	3	4	5	6	7	8	Totals		
									XX/YY	XY	YX
Condition 1	XY	-	YY XY	XY	XY	XY	XY	XY	1	7	0
Condition 2	YY	XY	YY	XY	XY	-	-	YY	3	3	0
Condition 3	YX	YX	YX	-	YX	-	XX	YX	1	0	5
Condition 4	XY	XX	YY	YY	XX	XX	XY	XY	5	3	0

A summary of the dominant strategies on each of the stimulus card pairs in each condition is shown in Table 3.16. All responses which have a frequency of 9 or more are recorded. This analysis shows that orientation strategies were strongest in condition 1 and figure strategies in condition 4. This point was also noted in the previous section. Secondly, it can be seen that in no condition was more than one orientation strategy dominant. In every condition, one of the two orientation strategies does not occur with frequency on any card. In conditions 1, 2 and 4, there is no card with a dominant YX response; in condition 3 there is no card with a dominant XY response. Thirdly, each of the stimulus cards was affected differently in different judgement conditions. In the case of every card pair there is one condition in which the dominant response is a figure strategy and another condition in which the dominant response is an orientation strategy. This indicates that the salience of the

various figure cues and the orientation cue varied from one condition to another.

### 3.5 ANALYSIS OF RESPONSES TO CARDS WITH SYMMETRICAL ORIENTATIONS

Although not directly relevant to the theory about orientation asymmetry, the results of subjects' judgements of the four stimulus cards with symmetrical orientation patterns provide a source of data about the role of figure characteristics in determining choices in addition to that provided by the questionnaire study. The symmetrical patterns appeared on cards 9, 10, 11 and 12 (see Table 3.1) and in judging these, subjects only had the figure characteristics of the cards to use as a basis for choice since the orientation of both figures were the same.

TABLE 3.17  
ANALYSIS OF CHOICES ON CARDS 9, 10, 11 AND 12

	Stimulus card number							
	9		10		11		12	
	M4	W1	M7	M1	M1	W1	W3	W4
Condition 1	18	2*	14	6	14	6	13	7
Condition 2	11	9	4	16*	14	6	14	6
Condition 3	14	6	14	6	6	14	14	6
Condition 4	17	3*	11	9	15	5*	17	3*

\* Distribution differs from that expected by chance beyond the ,05 level.

The frequency choices for each figure in each condition is shown in Table 3.17. By chance, it would be expected that each figure would be chosen 10 times. In most cases, however, the results

seem to indicate a preference for one of the two figures. However, in order to differ from the expected chance distribution significantly, one figure must be chosen by at least 15 subjects (in which case  $\chi^2 = 5,0$ ;  $df = 1$ ;  $p < ,05$ ). In many cases the most preferred figure was only chosen by 14 subjects, and in these cases the deviation from chance is not quite significant.

### 3.6 DISCUSSION

#### 3.6.1 Introduction

In section 3.2 predictions were made about how orientation asymmetry would be used as a cue by subjects in making their judgements. The data presented in section 3.4 has generally borne out these predictions. Figure characteristics also played a part in determining choices, however, and appear to have been more powerful determinants of judgements in some conditions than in others (section 3.4.5). It is therefore of interest to try to discover what characteristics of the figures were most important in determining choices and whether different characteristics were salient in different conditions.

Three types of data were obtained in the experiment and have been reported in the previous section. These are: 1) responses to the asymmetrical card pairs; 2) responses to the symmetrical card pairs; 3) responses to the semantic differential questionnaire. It is possible, by collating these three data sources to examine the interaction of figure cues and orientation cues in the determination of subjects' responses. In the sections that follow, the responses to all cards in each judgement condition will be examined in more detail.

### 3.6.2 Judgement condition 1

In condition 1, subjects were told that one of the figures was begging a favour from the other, but that the other did not want to grant it, and they were asked to judge which one was asking the favour. The prediction was made that when judging asymmetrical orientations they would select the figure with the lower angle of diversion (i.e. that they would make XY responses) (see section 3.2.1).

This prediction was confirmed. Although there were four categories of response (XX, YY, XY, YX), nearly 60% of responses fell into the XY category (see Table 3.13). Of the remaining responses, very few (less than 10%) fell into the other category of orientation response (i.e. YX). On six out of the eight asymmetrical card pairs, the low orientation strategy was dominant. Of the remaining two cards (2 and 3), on one there was no dominant strategy (card 2), and on the other (card 3) the expected low orientation strategy was dominant, but a figure strategy was also dominant. Responses to cards 2 and 3 therefore merit special discussion.

Card 2: On card 2 the distribution of choices is not significantly different to that which would be expected by chance (see Table 3.15). The two most frequent responses were the low orientation strategy (XY) and the choice of the figure M1 (XX); there were 7 choices in each of these categories. There were 3 responses in each of the two remaining categories, YX (high orientation choice) and YY (choice of the other figure M3).

Ratings of the two figures on this card were significantly different on almost all categories (section 3.3.4). M1 was rated as more casual, active, warm, open, confident, strong and relaxed than M3. There are three other stimulus cards where a similar

difference between the figures is indicated by the questionnaire study. These are cards 3, 6, 11 and 12. On all of these, one figure is perceived far more favourably than the other. (See Tables 3.3, 3.10 and 3.11). The results suggest the hypothesis that there was a tendency for the more positively evaluated figure to be chosen as the one who was asking the favour. This is certainly true on card 3, where there is a dominant figure strategy in favour of the favourably evaluated figure M5. On cards 11 and 12, the more favourably evaluated figures, M1 and W3 respectively, were the most frequently chosen, although these preferences were not significant: on card 11, 14 of the 20 subjects selected M1; on card 12, 13 of the 20 subjects selected W3. Only on card 6 does the pattern of responses run counter to the hypothesis; there were 6 figure strategy responses to this card pair, and of these, one was an XX response, which means that the more favourably evaluated figure M5 was chosen, whereas there were five YY responses where the less favourably evaluated figure W4 was chosen.

TABLE 3.18  
FIGURE PREFERENCES ON CARDS 2, 3, 6, 11 AND 12  
IN CONDITION 1

Card no.	2	3	6	11	12	
More highly evaluated figure	M1	M5	M2	M1	W3	Total
Choices of more highly evaluated figure	7	11	1	14	13	46
Choices of less highly evaluated figure	3	0	5	6	7	21
Less highly evaluated figure	M3	W2	W4	W1	W4	

A summary of these responses to the figures on cards 2, 3, 6, 11 and 12 is given in Table 3.18. In the cases of asymmetrical card pairs, the frequencies tabulated are of figure responses (XX or YY) made in favour of the figures in question. All responses which took the form of orientation strategies are ignored for the purpose of this analysis. In the case of the symmetrical cards, 11 and 12, frequencies tabulated represent the number of choices of each figure made by the twenty subjects. It can be seen that there is a total of 46 figure responses in favour of the more highly evaluated figure, and a total of 21 in favour of the less highly evaluated figure. There are more choices of the more highly evaluated figure than would be expected by chance ( $\chi^2 = 9,33$ ;  $df = 1$ ;  $p < ,005$ ). This analysis therefore supports the hypothesis that there was a tendency for the more positively evaluated of two figures to be chosen as the one who was asking the favour.

A possible reason for this is that subjects perceived the less favourably evaluated figure as anxious or unwilling to cooperate, and therefore selected the other as the one who was asking the favour.

It is now possible to throw some light upon the pattern of responses to card 2. Although the frequency distribution of choices is not significantly different from chance, the two most frequent responses (each with 7 cases) were the low orientation strategy (XY) which is in accordance with the predictions made for responses in this condition, and the choice of the more positively evaluated figure (XX), which has just been shown to be a significant determiner of responses.

Card 3: On card 3 there was a dominant orientation strategy as predicted, but in addition, 11 subjects made YY responses, that is to say, a large number of figure responses occurred with the figure

M5 being chosen. This card is unusual, since it is the only one for which a significant figure strategy was found in this judgement condition. There appear to be two reasons for the strength of the tendency to choose M5. Firstly, M5 is evaluated much more favourably than the other figure W2. As was shown in the previous paragraph, a significant tendency to select the figure which is evaluated most favourably can be detected. Nonetheless, on other individual cards where one figure is evaluated more favourably than the other, there is only a fairly weak tendency for the more favourably evaluated figure to be chosen. The second determinant of the tendency to choose M5 is that the right arm is slightly raised. Like positive evaluation, this cue can be shown to have been used by subjects in a consistent way.

There are three figures which furnish the raised arm cue. These are M4 and M5, each of which have one arm raised, and W3 who has both arms raised. The hypothesis may therefore be tested that there was a significant tendency to select the figure with the raised arm on cards where one of these occurred. The hypothesis can be tested by examining responses to the following cards: 1, 3, 8, 9 and 12. These are summarised in Table 3.19. In the case of the asymmetrical card pairs, frequencies tabulated are of figure responses (XX or YY) in favour of the respective figures. In the case of symmetrical cards 9 and 12, frequencies are simply of number of subjects who chose each figure.

The total number of choices for the figure with arm raised is 51, the total for the other figure is only 13. This is significantly different from what would be expected by chance ( $\chi^2 = 22.6$ ;  $df = 1$ ;  $p < .001$ ). The hypothesis that subjects tended to choose the figure with a raised arm if it appeared on a stimulus card can therefore be accepted.

TABLE 3.19  
 FIGURE PREFERENCES ON CARDS 1, 3, 8, 9 AND 12  
 IN CONDITION 1

Card number	1	3	8	9	12	
Figure with arm raised	M4	M5	W3	M4	W3	Total
Choices of figure with arm raised	6	11	3	18	13	51
Choices of other figure	0	0	4	2	7	13
Other figure	W2	W2	M6	W1	W4	

The fact that one figure had its arm raised did not result in a dominant figure strategy on cards 1 and 8. Similarly, the fact that one figure was perceived more favourably than the other did not result in a dominant figure strategy on cards 2 and 6. On card 3, however, these two cues occur together. M5 is evaluated more favourably than the other figure, and he has a raised arm. The combination of these two cues accounts for the strength of the figure strategy on this card.

Symmetrical cards: On the symmetrical cards 9 - 12, subjects only had figure cues on which to base their decisions. It might therefore be expected that on those cards where one figure was evaluated more favourably than the other, that figure would be chosen, and on those cards where one figure had an arm raised that figure would be chosen.

On card 9, this is the case. M4, who has his arm raised was chosen by 18 of the 20 subjects. It will also be noticed, if Table 3.9 is inspected that M4 is the more favourably evaluated of the figures on this card, even though the differences between ratings are not significant.

On card 10, neither figure has a raised arm, and neither is more

favourably evaluated than the other. There is however a tendency for the schoolboy M7 to be selected as the one asking the favour. This is probably because it is more common for a low status person to make a request to a high status person than vice versa.

On card 11, where M1 is more favourably evaluated than W1, there are more choices of M1 than of W1, but frequency split of 14:6 is not significantly different from chance ( $\chi^2 = 3,2$ ;  $df = 1$ ;  $,05 < p < ,1$ ).

On card 12, W3 is the more favourably evaluated of the two figures and also has an arm raised. It might therefore be expected that W3 would be chosen much more frequently than the other figure W4. This expectation was not fulfilled: W3 was chosen more frequently (by 13 subjects as opposed to 7 who selected W4) but this is not a significant departure from what would be expected by chance. A possible reason for this result, however, is that the orientation pattern in which these two figures stood was such that they were practically back to back. It may be that to work effectively in this judgement situation the two cues of favourable evaluation and raised arm need to occur in a figure with a fairly direct orientation (as on card 9 where both figures face each other directly).

Conclusions: Analysis of the results of responses to judgement condition 1 indicates that three cues in particular were important in determining subjects' choices, these were the raised arm, favourable evaluation and a direct orientation.

The orientation asymmetry cue was a strong determiner of choices even for orientation patterns like those on cards 6 and 7 where neither figure faces very directly. The figures cues were less effective, unless they occurred together.

### 3.6.3 Judgement condition 2

In this condition, subjects were told that one of the figures was reprimanding the other, and that the other was ashamed and did not know what to say. They were asked to indicate which of the two figures was doing the reprimanding. The prediction was made that they would choose the figure with the lower angle of diversion (i.e. they would make XY choices) (see section 3.2.2).

38% of responses to asymmetrical card pairs fell into the XY category, which is more than would have been expected by chance, and only about 10% of responses were choices of the figure with the higher angle (i.e. YX choices). 50% of responses were figure choices, however, which is considerably more than in condition 1. In condition 2, therefore, the orientation cue determined choices in the manner predicted in section 3.2.2, but it was a relatively less strong cue than in condition 1, because of the greater determination of choices in condition 2 by figure characteristics.

When responses to individual cards are examined, it can be seen that a significant XY strategy only occurs on cards 2, 4 and 5. Significant figure strategies occur on cards 1, 3 and 8 (see Table 3.15). On only one of the symmetrical cards is there a preference for one of the figures that reaches significance (section 3.5).

Salient figure characteristics: On the three cards where dominant figure strategies occur, the preferred figures each have two things in common. Firstly, he/she is rated as stronger than the other figure: on card 1, M4 is stronger than W2, on card 3, M5 is stronger than W2, and on card 8, W3 is stronger than M6 (see Tables 3.1, 3.3 and 3.8). Secondly, the preferred figures on these cards also have their arms raised. This combination of raised arm and greater perceived strength may, therefore, be responsible for the

strength of the figure strategies on these cards.

The data do not provide evidence that perceived strength alone is sufficient to affect a subject's response. There were five cards on which one figure was perceived as significantly stronger than the other. These were 1, 2, 3, 4 and 8. An analysis of figure responses (XX or YY) to these cards is presented in Table 3.20. Although there are more cases of figure responses to the stronger of the two figures, the distribution of 33:20 is not significantly different from what would be expected by chance alone ( $\chi^2 = 3,1$ ;  $df = 1$ ;  $,1 > p > ,05$ ).

Analysis of cards in which the raised arm cue occurs, however, does indicate that this cue acted to determine responses in a consistent way. This cue occurs on cards 1, 3, 8, 9 and 12. Frequencies of figure responses to figures on these cards are shown in Table 3.21. There is a significant tendency to select the figure with the arm raised ( $\chi^2 = 10,4$ ;  $df = 1$ ;  $p < ,005$ ).

TABLE 3.20  
FIGURE PREFERENCES ON CARDS 1, 2, 3, 4 AND 8  
IN CONDITION 2

Card number	1	2	3	4	8	
Figure rated as stronger	M4	M1	M5	W1	W3	Total
Choices of figure rated as stronger	10	1	9	3	10	33
Choices of figure rated as weaker	5	4	3	6	2	20
Figure rated as weaker	W2	M3	W2	M6	M6	

TABLE 3.21  
 FIGURE PREFERENCES ON CARDS 1, 3, 8, 9 AND 12  
 IN CONDITION 2

Card number	1	3	8	9	12	
Figure with arm raised	M4	M5	W3	M4	W3	Total
Choices of figure with arm raised	10	9	10	11	14	54
Choices of other figure	5	3	2	9	6	25
Other figure	W2	W2	M6	W1	W4	

TABLE 3.22  
 FIGURE PREFERENCES ON CARDS 2, 3, 6, 11 AND 12  
 IN CONDITION 2

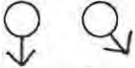
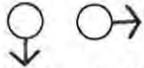
Card number	2	3	6	11	12	
More highly evaluated figure	M1	M5	M2	M1	W3	Total
Choices of more highly evaluated figure	1	9	8	14	14	46
Choices of less highly evaluated figure	4	3	4	6	6	23
Less highly evaluated figure	M3	W2	W4	W1	W4	

A third factor that was investigated was whether the degree of favourable evaluation of a figure caused it to be judged in a particular way. As was pointed out in the previous section, there were 5 stimulus cards where one figure was perceived much more

favourably than the other. A priori it was thought that subjects might perceive the less favourably evaluated figure as the one who was delivering the reprimand. Quite the opposite is the case, however. Responses to the five cards on which there is a large difference in favourable evaluation of the figures are shown in Table 3.22. Figure choices of the more favourably evaluated figure are more frequent than choices of the less favourably evaluated figure, and this would not have been expected by chance ( $\chi^2 = 8,6$ ;  $df = 1$ ;  $p < ,005$ ).

Figures which were perceived more favourably were generally perceived as more casual, warm, open, confident and relaxed than the other figure on the card. Provisionally, it had been thought that the less favourably evaluated figure would be perceived as delivering the reprimand because such behaviour would be more appropriate in a formal and cold figure, rather than in a casual and warm one. It is possible in the present instance that the crucial adjective pairs are closed-open and nervous-confident. If a figure was perceived as closed, he might, in this judgement condition, be seen as quiet, turned in upon himself, introverted. A figure so perceived would be suitable in the role of the one who was being reprimanded and who did not know what to say in reply. Similarly, a confident person might be more likely to be perceived as delivering a reprimand than a nervous one. Extraverts tend to be more actively aggressive than introverts (Eysenck 1964). This may account for the tendency to perceive the more outgoing of the two figures as the one delivering the reprimand in this situation.

Cards 6 and 7: On cards 6 and 7 there was no dominant response category. It is possible that the orientations in which the figures stood on these cards contributed to this lack of pattern by preventing

subjects from making any meaningful interpretation of the stimulus. The orientation patterns were  on card 6, and  on card 7, and both figures have angles of  $90^\circ$  or more. Orientation strategies were used for these cards in other conditions, however; on card 6 there was a significant orientation strategy in condition 1, and on card 7 in conditions 1 and 4, so it is clear that these orientation patterns can be used as a cue. However, the possibility that these orientation patterns disrupt meaning on these cards cannot be dismissed, for the two figures which appear on card 7 also appear on card 10, and here there is a significant tendency for M1 to be chosen more frequently than M7 (the frequencies are 16 and 4). It is not difficult to see why M1 was most frequently selected, since he is an adult male, whereas M7 is a schoolboy. It is more likely that the higher status person would reprimand the lower status person than vice versa. It is all the more surprising that no figure strategy emerged in responses to card 7, therefore, and it is possible that this is due to the nature of the orientation pattern.

Cards 9 - 12: On card 9, the figure M4 has an arm raised. He is also evaluated as more open than the other figure W1 although not significantly so (see Table 3.9). It was suggested above that there was a tendency to select a figure with a raised arm or a figure perceived as more open, as the one who was reprimanding the other. It might be expected that M4 would have been chosen significantly more often than W1 therefore. In fact, however, M4 was chosen 11 times, W1 9 times; there was no clear preference for either figure. This suggests that other figure cues, apart from the ones discussed above played a part in determining subjects' choices.

On card 10, there is a significant tendency for the man M1 to be selected. It has been suggested above that this is due to his

being of higher status than the schoolboy M7.

On card 11, M1 is chosen 14 times, W1 6 times, although the difference is not statistically significant. The tendency to favour M1 may be due to the fact that he is rated as considerably more confident and open than W1 (Table 3.10).

On card 12, W3 is chosen by 14 subjects and W4 by only 6; again this difference is not statistically significant. It will be seen from Table 3.11 that W3 is rated as more open than W4, although there is no difference in the ratings on the nervous-confident dimension. In addition, however, W3 has a raised arm. It is perhaps surprising, therefore, that the tendency to select W3 in this condition is not rather stronger.

Conclusions: Although the prediction about the manner in which the orientation cue would be used in this judgement condition was confirmed, this effect was to some extent submerged by the strength of figure characteristics in determining choices. Although it was possible to isolate three specific features of the figures, perceived strength, raised arm, and perceived openness and confidence, which appear to have effected choices, these do not appear to have been the only figure characteristics that were important. It is interesting to note that the raised arm cue, which was perceived as supplicatory in condition 1 was perceived as an aggressive gesture in this condition; the cue clearly derives its meaning from the context in which it occurs.

#### 3.6.4 Judgement condition 3

In this condition, judges were asked to decide which figure was afraid of the other. The prediction was made that the figure with the higher angle of diversion would be chosen (i.e. that YX responses would be made) (see section 3.2.3).

46% of the responses to the asymmetrical card pairs fell into the predicted YX category, which is more than would have been expected by chance (see Table 3.13). The prediction made in section 3.2.3 was thus confirmed. 15% of responses were in the other orientation category, i.e. XY, however, which is rather more than in the other judgement conditions. There were slightly more figure responses and slightly fewer orientation responses in the dominant category than in condition 1, but the number of figure responses was considerably less than in condition 4 (see Table 3.14).

On cards 1, 2, 3, 5 and 8, there was a dominant YX orientation strategy, in accordance with prediction. On card 7 there was a dominant figure strategy, and on cards 4 and 6, there was no dominant strategy at all.

Card 7: On card 7 the man M1 appears with the schoolboy M7. Although there were 8 YX responses to this card, there were 9 figure responses where judges selected the schoolboy as being the one who was afraid. This response is no doubt due to the age/status difference between the two figures, since it is more likely that a boy would be afraid of a man than vice versa. On card 10, where the same two figures occur, there is also a larger number of choices of the schoolboy M7, although the frequency is only 14 (out of the total of 20) which is not large enough to be significant at the ,05 level. The pattern of results on card 7 seems clear, therefore. Two types of response are most common, YX choices and choices of the schoolboy. These are chosen with more or less equal frequency.

Figure characteristics: Some exploratory analyses were made in an attempt to identify specific figure characteristics which determined responses. Cards where figures differed on the nervous-confident and strong-weak dimensions were examined, and also those

where there was a large difference in the favourability of evaluation of the figures. The data provided no evidence that any of these factors determined figure choices in a consistent way.

The "arm-up" cue was also examined. It was pointed out in the previous section that this cue could be seen as supplicatory or aggressive according to the context. Since judgement condition 3 is very similar in many respects to judgement condition 2 (see section 3.2.3), however, it might have been expected that the raised arm would be perceived as an aggressive gesture in this condition as it was in the previous one. This expectation was not fulfilled, however. Frequencies of figure responses to the figures on cards where a figure with a raised arm occurred are shown in Table 3.23. In all there are 42 choices of the figure with the raised arm, and 20 of the other figure. This would not have been expected by chance ( $\chi^2 = 7.7; df = 1; p < .01$ ). It must be concluded that there was a tendency for the raised arm cue not to be perceived as aggressive in this condition.

TABLE 3.23  
FIGURE PREFERENCES ON CARDS 1, 3, 8, 9 AND 12  
IN CONDITION 3

Card number	1	3	8	9	12	
Figure with arm raised	M4	M5	W3	M4	W3	Total
Choices of figure with arm raised	4	6	4	14	14	42
Choices of other figure	3	1	4	6	6	20
Other figure	W2	W2	M6	W1	W4	

Cards 9 - 12: On all four of the cards with symmetrical orientation patterns one figure was chosen 14 times, the other 6; this frequency distribution is not significantly different from chance at the 5 per cent level. On cards 9 and 12 the figure which is chosen most frequently is the one with its arm raised. On card 10, the greater frequency of choice of the schoolboy may be due to the age/status difference as suggested above. On card 11, W1 is selected more frequently as the one who is afraid; it will be seen from Table 3.10 that this figure is perceived as far less confident and relaxed than the man, and this may account for this finding, although a detailed examination of the other cards does not indicate a clear relationship between these factors and figure preferences.

Since the frequency distributions of choices on these four cards are not significantly different from chance, however, the above observations are speculative and no more than suggestive.

Conclusions: Responses in this condition were in accordance with prediction in that the figure with the higher angle of diversion was the most often selected. Other characteristics of the stimulus cards clearly played a part in determining subjects' judgements, however, but no clear pattern could be detected as to which figure cues were the most important.

#### 3.6.5 Judgement condition 4

In this condition the subject was told that one of the figures was warm and friendly, the other quiet and shy, and they were asked to select the warm and friendly one. The prediction was made that the more directly facing figure would be chosen (i.e. that XY choices would be made) (see section 3.2.4).

The category with the highest number of responses was the XY category in accordance with prediction; 38% of responses were in this

category. The number of responses in the other orientation category was extremely low -- only 5%; in fact, 16 out of the twenty subjects made no YX choices at all. Figure responses were more common in this condition than in any other and 57% of responses were XX or YY choices (see Tables 3.13 and 3.14).

The main determiners of responses in this judgement condition are easily identified. They were the degree of positive evaluation of figures, the raised arm, and the orientation cue. These are discussed in turn below.

Figure evaluation: Since subjects were asked to select the figure who was "warm and friendly", it is to be expected that figures evaluated positively in the questionnaire study would frequently be chosen. In section 3.3.14, it was remarked that on cards 2, 3, 6, 11 and 12 there was a strong tendency to evaluate one figure as more warm, open, confident, relaxed than the other; this tendency occurred to a lesser extent on cards 4 and 5. If Tables 3.15 and 3.17 are referred to, it will be seen that on all these cards there is a significant figure strategy of response, and in every case it is the more positively evaluated figure that was chosen. Subjects' choices were therefore determined by which figure they perceived as the more warm and friendly.

Raised arm cue: There also appears to have been a strong tendency to select a figure with its arm raised, when one of these occurred on a card, as the warm and friendly one. An analysis of figure responses on cards where one of these figures occurred is presented in Table 3.24. In 62 cases, the figure with the raised arm was chosen; in 11 the other figure. This indicates a significant tendency for the raised arm to be used as a cue, and for the figure with this characteristic to be selected as the warm and friendly

one ( $\chi^2 = 35,5; \text{df} = 1; p < ,001$ ).

TABLE 3.24  
FIGURE RESPONSES ON CARDS 1, 3, 8, 9 AND 12  
IN CONDITION 4

Card number	1	3	8	9	12	
Figure with arm raised	M4	M5	W3	M4	W3	Total
Choice of figure with arm raised	8	14	14	17	17	62
Choices of other figure	1	0	4	3	3	11
Other figure	W2	W2	M6	W1	W4	

On cards 3 and 12, the raised arm cue acted in conjunction with the figure evaluation cue to produce a dominant figure strategy. On cards 1 and 9, however, the raised arm cue occurs, but there is no significant difference in the way the figures were evaluated. On card 1, there are 8 figure responses where the raised arm figure M4 was selected, and only one where the other figure W2 was selected. Eight responses is one less than the criterion value set for a dominant response strategy in section 3.4.6; it is probably safe to say that the relatively high frequency of YY (M4) choices on this card is due to the raised arm cue. The other card on which the raised arm cue occurs without the figure evaluation cue is card 9. Here 17 subjects chose the raised arm figure M4, and only 3 the other figure W1; this would not have been expected by chance ( $\chi^2 = 8,1; \text{df} = 1; p < ,005$ ).

Orientation cue: The choice of the figure with the lower angle of diversion was a dominant response strategy only in the case

of cards where there was no difference in the positive evaluation of the two figures. This applies to cards 1, 7 and 8; it can be seen from Tables 3.1, 3.7 and 3.8 that on these cards there is no difference between the evaluation of the figures on the warm-cold, open-closed, nervous-confident and rigid-relaxed dimensions. These three were the only cards where a dominant orientation strategy was elicited.

Card 10: On card 10, neither figure is evaluated more positively than the other, neither figure has a raised arm, and there is no orientation cue, since the orientation pattern is symmetrical. Since these three cues have been shown to be the determiners of choices in this judgement condition, their absence on this card explains the absence of any significant figure strategy. Eleven subjects chose one figure, 9 chose the other, a result consistent with chance.

Conclusions: The orientation cue was used in this judgement condition in the manner predicted, but on cards where one figure was perceived as more warm, open, confident and relaxed than the other, there was a stronger tendency to choose that figure than to use the orientation cue. There was also a tendency to perceive a figure with a raised arm as the more friendly. Responses in this condition form a much clearer pattern than in conditions 2 and 3, and practically all the results can be understood in terms of the three cues isolated in the analysis.

### 3.6.6 Awareness and the judgement process

After the twenty stimulus cards had been judged by a subject, a brief interview took place in which he was asked which features of the cards had been important in helping him to decide which figure to choose. The interview was non-directive: no suggestions

were made to him about cues which might have been important; he was however able to pick up the stimulus cards and examine them and comment on them if he wished.

A large number of features of the cards and figures were mentioned by subjects: these included sex, age, size, foot position, arm position, hand position, facial expression (which was very indeterminate on such small figures) and clothing. Only three cues, however, were mentioned regularly and seem to have played a consistent part in determining choices; these were orientation, posture and arm-gesture. The number of subjects in each condition who mentioned these cues during the post-experimental interview is shown in Table 3.25. Orientation was mentioned least frequently in condition 4, and this reflects the weakness of the orientation cue relative to other cues as a determiner of choices in this condition. The aspect of posture which was important was the degree of relaxation versus rigidity. This probably provided a basis for the perception of a figure as warm and friendly as opposed to cold and formal. This figure characteristic has been shown to be most salient in condition 4 and was mentioned most frequently by subjects in that condition.

TABLE 3.25  
NUMBER OF SUBJECTS IN EACH CONDITION WHO MENTIONED  
THAT PARTICULAR CUES GUIDED CHOICES

	Orientation	Posture	Arm gesture
Condition 1	18	15	16
Condition 2	17	13	18
Condition 3	17	11	6
Condition 4	9	18	8

The raised arm cue, which has been shown above to have been a determinant of choices in all conditions to some extent was mentioned most frequently by subjects in conditions 1 and 2.

This data may reflect the true importance of particular cues as determinants of choices in the different conditions, but the observations of the experimenter suggest that a subject's account of the cues that determined particular decisions is frequently incorrect. The judgement process involves the assessment of a multitude of cues and the subjects themselves did not generally appear to be aware which cues had actually determined choices, and which ones, though apparently meaningful did not determine the choice.

The reason for this is that cues may be ambiguous, and acquire different meanings depending upon the general interpretation given to a card. This point was often made by subjects themselves. Thus the raised arm cue which appeared on several stimulus cards could be interpreted either as a supplicatory or as an aggressive gesture. It has been pointed out above that it appeared to be treated as supplicatory in condition 1, but as aggressive in condition 2. Similarly the orientation cue could be ambiguous. In condition 1, four subjects noted that the orientation cue was ambiguous; one subject mentioned that the figure asking the favour might be turned away because he is sulking at being refused. In condition 2, seven subjects mentioned the ambiguity of the orientation cue during the interview. Although the figure facing was generally seen as the angry one, these subjects pointed out that a person may turn away in anger as a sign that he is rejecting the other. In condition 3, four subjects pointed out that orientation could be ambiguous; the one who was afraid might turn away in order to reduce the intensity of the situation, or may face the other more directly because he

cannot afford to let the other move without his knowledge. In condition 4, no subject mentioned that orientation was ambiguous; in this condition this cue was particularly lacking in salience, however.

Because of the ambiguity of cues, it appears that when a subject judges a card, the choice is made by processes of decision of which he is not aware, but that once the choice has been made cues are given meanings that fit the chosen interpretation. This was illustrated frequently during the interviews. It would not be unusual, for example, for a subject who had made 7 XY (i.e. low orientation) choices in condition 1 or 2 to explain to the experimenter how the figure characteristics of a card had influenced their decisions. Such a subject would select a card as an illustration and explain that he chose X (the most directly facing figure) because of his casual posture, his clothing or the position of his arms and feet. The experimenter would then select the twin card and ask the subject which figure was selected here. The subject would now select the other figure, Y. In so doing he would be choosing the figure with the more direct orientation, as he had done with the twin card, but would give the explanation of his choice in terms of the figure characteristics of the card. Such a case, where orientation was clearly the main determiner of choice, illustrates the lack of insight on the part of subjects into the decision process.

A particularly good example of this lack of insight on the part of subjects was provided by a female subject in condition 4. She made 8 XY choices (the maximum possible). During the interview she stated that when judging a card she looked for the figure which was more relaxed and chose that as the warm and friendly one. She

did also mention that the orientation cue had helped her decisions, but this cue was mentioned second, and given no emphasis that would have led one to guess the importance which orientation actually did have for her.

Of course, on cards 9 - 12, there was no orientation cue, and subjects' choices on these cards could only be based on figure characteristics, but although during the interview some subjects indicated that these cards were particularly difficult to decide about, they were not picked out for special mention as the cards where figure characteristics had been most important.

To summarize, therefore, subjects appeared to perceive the cards synthetically; this mode of perception had been encouraged in the instructions to the subject. Judgements appeared to be based on a global interpretation of the stimulus cards, and judges were not always able to articulate clearly or even correctly what factors had determined their decisions. It seems probable that subjects' explanations of how a decision was arrived at were rationalisations of decisions made by processes they could not analyse.

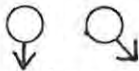
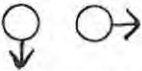
### 3.7 CONCLUSIONS

#### 3.7.1 Orientation as a cue

The experiment was designed to test a specific hypothesis that arose on the bases of two premises. These premises were 1) that a person's orientation relative to another reflects the eye-contact demands of the situation for him, and 2) that a person's orientation can be used as the basis for an inference about the eye-contact demands of the situation for him. Both premises were based on the findings of Sommer and Cook reviewed in section 1.3.6. The specific hypothesis tested was that asymmetry in an orientation pattern would

be used as a basis for an inference about asymmetry of eye-contact demands on the part of two interactors, and that the inference that would be drawn would be predictable from a theory of the determinants of eye-contact and gaze direction that was described in section 1.3.5.

Predictions made about judgements in each of the four experimental conditions on the basis of the theory of the determinants of gaze direction were confirmed. Orientation asymmetry was used as a cue in all four judgement conditions in the manner that had been predicted.

Although eight different asymmetrical orientation patterns were used in the experiment, the design does not provide any means of comparing the responses to one asymmetrical pattern with those to another, since different stimulus figures appeared in each orientation pattern. However, the results do show that all the asymmetrical patterns employed were used consistently as cues to determine judgement in at least one judgement condition (section 3.4.6) and that this applied even in the case of two orientation patterns  and  which appeared on cards 6 and 7 where neither figure had a very direct orientation at all.

### 3.7.2 Interaction of orientation and figure cues

Other cues were available to subjects in addition to that of orientation asymmetry; these were the characteristics of the stimulus figures. It has been shown that in all conditions the manner in which the individual figures were perceived and the arm gesture cue played a part in determining choices in a consistent manner. These figure characteristics therefore provided competition for the orientation cue. The relative weights given to figure cues and orientation cues differed from condition to condition. The orientation cue was

most strongly weighted in conditions 1 and 3. Figure characteristics were the most prominent determiners of choice in condition 4, and the orientation cue was only used consistently in this condition when figure characteristics failed to discriminate the figures.

Figure characteristics were not experimentally controlled, since the figures were distributed at random to the stimulus cards. The data do not therefore provide the basis for an exact analysis of the interaction between figure characteristics and the orientation cue. Interpretations of the effects of figure characteristics on choices which were carried out in section 3.6 are therefore to some extent speculative. These interpretations do suggest, however, that figure characteristics did act in a consistent way to determine judgements. In the present context, where figure characteristics are not of themselves of interest, the important point is that the orientation cue emerged as a significant determiner of choices even in the presence of meaningful figure characteristics. In the orientation work of Sommer and Cook there were no figure characteristics to effect subjects' choices, and in the use of the doll placement technique figure characteristics can be controlled, so that it is particularly significant that even when in competition with figure characteristics the orientation cue is a dominant feature of the stimulus.

### 3.7.3 Implications for social perception

The use of "stripped down" schematic material in experimental studies of social perception has been rightly criticised by Argyle (1969). The effects of a particular cue on a person's judgement may be exaggerated if no other cues are available to the judge. For example, Thornton in 1944 showed that if a person was seen briefly, he was judged to be more intelligent if he was wearing his glasses

than if he was not wearing them; Argyle and McHenry (1970) have shown, however, that this effect is found only if the person is seen for a short period (15 seconds); if he is observed in conversation over a period of five minutes, there is no difference in judges' ratings of his intelligence whether he is wearing glasses or not. The weight assigned to a particular cue in the determination of a perceptual judgement of this sort clearly depends on the availability of other cues.

Conclusions from the present experiment about how people make judgements about interacting dyads whom they are observing must therefore be made with caution. The experiment does show that inferences can be drawn from orientation and orientation asymmetry (as well as from bodily posture and gesture) about the nature of a social encounter and of the role in the encounter which each interactor is playing. It does not show that these are in fact the most important cues upon which inferences are based, in real life situations.

#### 3.7.4 Implications for the figure placement experiment

The aim of the present study, however, was not to assess the relative importance of the orientation pattern as a determinant of the observer's judgement about a social encounter, but to discover whether in such a "stripped down" situation orientation functions as a cue in a consistent manner. This was found to be the case. This finding does have implications for the doll placement technique.

In Chapter 1 (section 1.4.3) it was suggested that orientation data derived from doll placements of the type studied by Little (1965 and 1968) might be able to be shown to vary in a consistent manner as a function of the type of social encounter represented by

the placement. It was argued that orientations should be predictable from a knowledge of the determinants of gaze direction in social encounters. The results of Experiment I, described above, make it even more likely that this suggestion is correct, since they show that subjects under appropriate experimental conditions do make inferences about the roles being played in an encounter by two interactors on the basis of orientation asymmetry.

Experiment I employed what Mehrabian (1969b) has termed a decoding methodology. In an experiment employing this methodology subjects are presented with cues which the experimental task requires them to interpret in some way. The doll placement technique, on the other hand, is an instance of an encoding method. In an encoding method, the subject is required not to interpret a cue, but to express an emotion or attitude in some non-verbal or verbal manner. In the decoding experiment described above, the orientation patterns were supplied by the experimenter. In the encoding type of experiment, the subject must be allowed to make his own orientation patterns. The next step in the present research program, therefore, was to study the actual orientation patterns of dolls placed to represent conversations by subjects. The first of two such experiments is reported in the next chapter.

## CHAPTER 4

EXPERIMENT II: A STUDY OF THE EFFECTS OF AN ASYMMETRICAL  
INTERACTION STRUCTURE ON THE SPATIAL CHARACTERISTICS  
OF DYADIC DOLL PLACEMENTS

## 4.1 INTRODUCTION

4.1.1 Orientation and the doll placement technique

The experiment reported in Chapter 3 demonstrated that figure orientation was a meaningful aspect of the spatial characteristics of a pair of standing figures. In particular, it was found that orientation asymmetry was used as a cue in a predictable manner. The experiment employed a decoding methodology; that is, subjects were presented with a cue and conditions were created in which they were required to interpret it. The question remains, however, as to whether orientation would be used in the same way if an encoding method were to be adopted; that is, would orientation asymmetry be a feature of figure positions when the subject placed the figures himself, and would this asymmetry be predictable from the theory of the determinants of eye-contact and gaze direction?

A few studies have employed encoding methodologies in the investigation of orientations in live interactions, for example those of Rosenfeld (1965), Watson and Graves (1966) and Watson (1970) mentioned in section 1.3.4, and the field observations of seating position made by Sommer (1959 and 1965) and Cook (1970). Similarly, studies of gaze-direction and eye-contact (reviewed in section 1.3.5) have also employed an encoding approach. Subjects have been free to adjust their gaze direction and a record of the pattern made by the experimenter.

The seating position questionnaire technique (section 1.3.6)

studies orientation by means of a methodology which is neither a purely encoding nor a purely decoding one. When subjects are asked to select a seating position for a particular type of encounter, they are required to encode to the extent that their response singles out a particular orientation pattern, as appropriate for that situation; to the extent that their choice is limited to the particular seating positions chosen by the experimenter, however, the approach might be regarded as a decoding one, since the subject is asked to interpret (decode) all the patterns, and select the one which he considers most appropriate.

Since, as both Sommer and Cook have argued, a person's orientation with respect to another is the product of the eye-contact demands of the situation for him, it is to be expected that a subject who performs a doll placement task will adjust the orientations of the dolls in accordance with the eye-contact demands of those situations which he is asked to imagine them to be involved in. Since orientation can be predicted if the forces leading either to engagement in or avoidance of eye-contact are known, it ought to be possible to predict the angles at which dolls will be placed so long as the eye-contact demands of the interactor represented by the doll are known. If a reliable relationship between interaction description and doll orientation can be demonstrated, the value of the doll placement method as a projective technique will be considerably enhanced.

#### 4.1.2 Construction of interaction descriptions

The results of Experiment I showed that orientation asymmetry is an important feature of the spatial relationship between two figures. A series of three interaction descriptions was therefore prepared which were expected, on the basis of the theory of the determinants of gaze direction, to elicit asymmetrical orientations.

In order to ascertain to what extent orientation asymmetry in placements representing these interactions was a result of asymmetry of eye-contact demands, a control series of three similar interaction descriptions was prepared in which, on theoretical grounds, the eye-contact demands of the two interactors were expected to be equal. Three social encounters were therefore described in each of two versions (symmetry versus asymmetry of eye-contact demands). The experiment was therefore a 2 x 3 factorial design, in which each subject made six placements of a pair of dolls. The three social encounters will be referred to by the numbers 1 - 3; those in the symmetrical eye-contact demands condition will be assigned the code letter A, and those in the asymmetrical eye-contact demands condition will be assigned the code letter B.

The six interaction descriptions are set out and discussed immediately below. Details of the experimental method and procedure will be presented in section 4.2.

#### 4.1.3 Interaction descriptions 1A and 1B

The interaction description in the symmetry condition for situation 1 was as follows:

1A: "These two men are both warm and friendly people.

They are talking together about their wives and children and other domestic matters. They get on well with each other."

This was intended to describe two persons engaged in a relaxed and friendly encounter. Since the two interactors are undifferentiated, each was expected to be perceived as having the same eye-contact demands.

In the asymmetry condition of situation 1, the following

interaction description was used:

1B: "One of these men is warm and friendly. He is eager to talk to the other about his family and other domestic matters, as he enjoys chatting. The other is a quiet and shy person who does not at the moment want to talk. There are some problems he wants to think about and he wants to be alone. However, at the moment he is listening to the other's conversation because he is too polite to go."

In this situation, the first interactor is described in the same manner as those in situation 1A. The second interactor, however, is described quite differently, as a quiet person who wants to be alone. There are two reasons why it might be expected that the first interactor would have greater eye-contact demands than the second. Firstly, as was suggested in section 3.2.4, in the previous chapter, a more outgoing, extraverted person engages in more eye-contact than a less outgoing, introverted person. In the experiment reported in Chapter 3, it was found that orientation asymmetry was used as a cue when subjects had to judge which was the more outgoing of a pair of figures: in cases where there was no great difference in the evaluation of the figures, the more directly facing was selected as the more warm and friendly (see section 3.6.5). The second reason for supposing that the second interactor would have low eye-contact demands is that since he does not want to prolong the encounter, but does not want to make a move to terminate it either, he will be perceived as anxious. It was argued in section 3.2.1 that anxiety leads to lowered eye-contact demands.

#### 4.1.4 Interaction descriptions 2A and 2B

In situation 2 a quarrel or argument was described. The

symmetrical version was as follows:

2A: "These two men are in disagreement about something. They are both very angry and they are arguing. Each is determined to bring the other round to his point of view."

This interaction description describes an encounter which, though quite different from 1A, since it is a hostile quarrel rather than a friendly conversation, is like 1A in that the interactors are undifferentiated. As was the case with 1A, therefore, the description itself gives no cause to suppose that the interactors participating in the encounter would have different eye-contact demands.

The asymmetrical version of situation 2 was as follows:

2B: "These two people are in disagreement about something. One is determined to change the mind of the other and to make him agree with him. The other cannot accept the arguments of the first man, but he is shy and confused and does not know what to say in reply. He feels threatened by the first man and does not answer very much."

The first interactor in this encounter is, like those in 2A, actively aggressive. The second, on the other hand, while he would like to counter the arguments of the first is unable to do so. He would be expected to have lower eye-contact demands than the other for two reasons : firstly, he is not engaged in active threatening behaviour, a mode of activity which is associated with directness of gaze (cf. section 1.3.5), whereas the other is; the actively aggressive interactor might for this reason alone be expected to face more directly. Secondly, however, the second interactor is described as confused and

shy. Since shyness and uncertainty are associated with avoidance of eye-contact, this interactor would be expected to have an indirect orientation.

#### 4.1.5 Interaction descriptions 3A and 3B

In situation 3, a similar type of interaction to that used in judgement condition 1 in the decoding experiment reported in the previous chapter was employed: the situation was that <sup>of</sup> one person asking a favour of another. The symmetrical version was:

3A: "One man is asking a request of the other. The other is very pleased to help him."

This encounter differs from the other two symmetrical ones 1A and 2A, in that the two participants are differentiated. Since the two interactors have different roles in the encounter, it is in one sense an asymmetrical situation. However, as was argued in Chapter 2 (section 2.3), not all social encounters where the participants are in an asymmetrical relationship or where the participants have different roles will be encounters where there is asymmetry of eye-contact demands. Situation 3A is a case where the theory of the determinants of gaze direction does not predict different eye-contact demands for the two interactors. In discussing the situation employed in the previous experiment (section 3.2.1) it was argued that the one being asked would not face directly since he was anxious and uncertain how to act. In the present situation, however, the one being asked is not described as uncertain how to act. He is described as agreeing to the request of the other without misgivings.

In situation 3B, on the other hand, the interaction description was very similar to that used in the previous experiment in which the person being asked is uncertain whether to grant or refuse the request. The description was as follows:

3B: "One man is asking a request of the other. It is very important that the request be granted. The other does not want to grant the request, but he is a kind person and does not really want to refuse either. He is uncertain what to do."

In this case, the analysis is the same as that presented in section 3.2.1 for the same situation. The person asking the favour would be expected to face more directly, while the person being asked would be expected to have an indirect orientation.

## 4.2 METHOD

### 4.2.1 Materials

Two dolls were employed in the experiment. They were constructed from a medium of papier maché mixed with clay, plaster of Paris, size and flour and water paste. This modelling material was built up over wire frames and modelled to make fairly realistic representations of standing male figures clothed in jacket, tie and long trousers. Head, shoulders and body were all in the same orientation. The figures were made to a scale of 1:10 and mounted on circular perspex bases of diameter 60mm. The height of each figure (including the base) was 182mm. Each figure was painted a homogeneous pink all over.

Subjects placed the doll pairs on sheets of clean newsprint of size 320mm x 510mm. A separate sheet was used for each placement and a record was made of the placement after it had been made; this involved drawing a circle on the newsprint round the base of each doll and marking the direction in which it was facing.

The six interaction descriptions were typed on separate cards which were handed to the subject before he made each placement.

The subject read the description to himself.

#### 4.2.2 Subjects

Subjects were thirty male English-speaking students at Rhodes University who volunteered to participate in the experiment in response to a notice and an offer of payment of 75c. Their ages ranged from 17 - 26 with a mean of 20 and a standard deviation of 2,3. None of them were Psychology students.

#### 4.2.3 Procedure

Little, in his use of the doll placement technique (Little 1965 and 1968) distracted subjects from his interest in the spatial positions in which the dolls were placed by asking them to attribute a conversation to the dolls they had placed. Pilot studies, however, suggested that this was not necessary since the recording of the figure positions is in itself enough to draw the subject's attention to this factor, even if he is not aware of it anyway. No attempt was made, therefore, to hide the experimenter's interest in the positions of the figures, and subjects were told that they were participating in a study of how people stand when engaged in various types of conversation. However they were not encouraged to adopt an analytic attitude to the task. They were simply asked to place the dolls so that they "looked right" for the situation they were representing. No difficulty with this method was encountered.

Before making the six placements to be reported here, the subjects made six other placements. The results of these other placements are described elsewhere (Edwards 1973). All the six other placements were completed before the present six placements were made.

The subject was given the two dolls, and handed the card on which was typed the description of the interaction he was to represent.

He then placed the dolls on the newspaper. Before recording the placement, the experimenter sometimes asked the subject a few questions. These served the purpose of checking that the interaction description had been understood. Generally the subject was asked what one of the figures was saying to the other. Since the interaction descriptions were straightforward, this check was scarcely necessary and no occasions of serious misunderstanding were detected. A second purpose of the questions was to eliminate kinetic projections. A kinetic projection occurs when the subject projects movement on to one or both of the dolls. For example, he may represent one figure walking away from the other, or may see the two figures as walking along in conversation. Kinetic projections have been found by the present writer to occur from time to time with Xhosa-speaking subjects, but they were not common with the present group. However, a check for kinetic projections ought to be a standard part of the procedure in doll placement studies since their occurrence can bias the results if they are at all frequent.

Care was taken, when questioning a subject about a placement to prevent his feeling that his placement was either being criticised or was not one that fitted in with the experimenter's expectations. The experimenter therefore attempted to maintain a quiet, friendly, but non-directive style throughout each experimental session.

The order in which the six interaction descriptions were given was randomised for each subject.

#### 4.2.4 Dependent variables

It was argued in Chapter 2 (section 2.1.3) that a dyadic orientation pattern can be regarded as varying along the two dimensions

of symmetry/asymmetry and directness, and that any pattern can be regarded as an instance of a symmetrical pattern upon which a certain degree of asymmetry has been imposed. It was suggested that the asymmetry of the pattern could be measured by taking the difference of the two angles of diversion (the Angle Difference or AD score) and that the directness be measured as the number of degrees through which the more directly facing of the two interactors is turned from the interpersonal axis (the Least Angle or LA score). These two scores were therefore employed in the present study to measure the orientations of the dolls.

In those encounters where the two interactors are differentiated (i.e. all except 1A and 2A) a record was made of which figure was the more directly facing. This record can conveniently be made by means of the Signed AD score. This score is obtained by subtracting the angle of a specified figure from that of the other. In the present case, in the encounters in series B, the angle of the figure expected to face more directly was subtracted from that of the other figure. Thus if the prediction that the figure having the greater eye-contact demands would be the more directly facing was fulfilled, the Signed AD score would be positive; if the prediction was not fulfilled, and the other figure faced more directly, it would be negative. In the case of situation 3A, where the figures are differentiated, but eye-contact demands were expected to be symmetrical, the angle of the figure asking the favour was subtracted from that of the figure being asked in order to bring analysis into line with that employed for situation 3B.

In Chapter 2 (section 2.1.2) the distinction between orientation patterns in which both figures were turned to the same side of the interpersonal axis and those in which they were turned to different

sides was noted. The former were termed Type 1 patterns, the latter Type 2 patterns. In the placements obtained in the present study, Type 2 patterns were not frequent and all patterns were therefore scored in the same way, the distinction between the two types of pattern being ignored.

Apart from the orientation measures just described, a third measure of the spatial characteristics of the placements was the distance between the dolls. Although it has been normal to measure nose to nose distance when taking measures of interpersonal distance both in live encounters (Willis 1966) and when using the doll placement technique (Little 1965 and 1968), the simplest measurement to take with the present procedure is that of the distance between the centres of the circular bases on which the dolls are mounted. This was therefore used as the distance score (in millimeters) in the present study.

Scoring of a placement is therefore a simple matter. The centres of the circles representing the positions of the dolls can be located and marked by means of a stencil. The centres are joined. A line is then drawn from each centre through the point on the circumference marking the direction in which each doll was facing. The length of the line joining the two centres is the distance score of the placement, and the angles of each doll can be measured with a protractor and the angle measures derived from these.

### 4.3 A PRIORI PREDICTIONS

#### 4.3.1 Distance scores

Although the experiment was designed primarily as a test of hypotheses about the orientations of the dolls, a prediction about the inter-doll distances can also be made. In section 1.3.3, experiments were reviewed which indicate that a person in whom anxiety is

provoked adopts a greater interpersonal distance than an unanxious person. Although it might be argued that the quarrel depicted in situation 2A is an anxiety provoking situation, many writers distinguish states of high arousal in which a person can act from those in which he cannot. This distinction was made earlier in section 3.2.3. In that section Gray's (1971) suggestion that the distinction has a physiological basis at the hormonal level was noted.

A similar distinction, in psychological terms, is made by Kelly (1955) in his elaboration of his theory of personal constructs. Kelly defines anxiety as "the recognition that the events with which one is confronted lie outside the range of convenience of ones construct system." Since, for Kelly, to construe something is to be able to make a prediction about it and to know how to act in the face of it, his definition might be paraphrased as "being confronted with a situation in which one does not know how to act." Anxiety is distinguished from "hostility" and "aggression" in Kelly's theory; both of these are specially defined and are cases of a person's actively attempting to gain or maintain control of a situation in which he is involved.

In each of the encounters described in series B above, the interactor who is predicted to have low eye-contact demands could be described as anxious in the Kellian sense that he does not know how to act in order to achieve an end which he is motivated to attain. He is therefore passive and lacking in confidence. In situation 1B, the interactor who is quiet and not interested in continuing the encounter is motivated to terminate it, but does not know how to. In situation 2B, the participant in the quarrel who does not know what to say is similarly passive and anxious since he is confronted with a situation which he cannot handle. In situation 3B, the person

of whom the request has been asked is also in a position where he does not know how to act; he has to make a decision, but has difficulty in so doing and is unsure of himself.

In situations in the A series, on the other hand, there are no cases of interactors who are anxious in the Kellian sense. In situation 1A, both participants are participating equally in the encounter; in 2A, although both are hostile, each is actively attempting to gain or maintain control of the encounter in a confident manner. In 3A, each interactor acts out his role as asker or giver without uncertainty.

Situations in the B series differ from those in the A series in that in the former there is one interactor who is subjected to anxiety. Since, as has been suggested, anxiety gives rise to greater interpersonal distances, it was expected that distances between figures in placements representing encounters in series A would be closer than those for encounters in series B.

There is, however, one reason why this predicted effect might not occur. Argyle (1969) has argued that a person reduces the intensity of another's presence either by reducing eye-contact or by increasing distance. This theory accounts for the increase in the amount of eye-contact engaged in as interpersonal distance increases (Argyle and Dean 1965, Argyle and Ingham 1972). In the present experiment it was expected that encounters in series B would be characterised by greater orientation asymmetry; it might be supposed that no increase in distance would in fact occur, therefore. An example of an instance where live interactors were found to alter one aspect of their proxemic behaviour but not another when placed in a stressful situation is the study of Kleck et al. (1968). These investigators predicted that subjects would

(a) stand further away from and (b) engage in less eye-contact with a person whom they had been told was an epileptic than with a neutral person. Only the first prediction was confirmed: subjects stood further from the supposed epileptic, but did not engage in less eye-contact with him. In the present study, however, it was thought probable that while subjects might make placements with greater distances in the B conditions others would make placements with greater orientation asymmetry so that both effects would be found.

No predictions were made about the effect of the different types of situation upon distances. Close distances are associated both with friendly and with hostile encounters according to Cook's theory in terms of which closeness is determined by the degree of motivation to interact. It is with respect to the orientation patterns that friendly and hostile encounters are expected to differ. Since motivation to interact is not exactly quantified in the interaction descriptions, the possibility remained open that subjects would see motivation to interact as greater in one situation than in another, and that this would be expressed in terms of closer distances in that condition, but no specific prediction was made.

#### 4.3.2 Least Angle scores

The LA score gives a measure of the directness of the orientation pattern (section 2.1.3). The work of Sommer and Cook has shown that indirect orientations are regularly associated with friendly encounters, although direct orientations also occur. In hostile encounters, however, Cook found a strong preference for direct orientations. This is expected since direct gaze is used as a signal of confident threat (see section 1.3.5). It was therefore predicted that orientations would be more direct, and that the LA

score would therefore be lower, in situation 2A than in situations 1A and 3A.

A similar prediction was made in the B condition, that the IA score would be lower in 2B than in 1B and 3B; but the prediction was made with less confidence, since it was not known what effect the anxiety of the one interactor would have on the proxemic behaviour of the other.

#### 4.3.3 Angle Difference scores

The prediction with regard to the AD scores was straightforward, since it provided the basis for the design of the experiment. Since situations in the B series were prepared so that there would be asymmetrical eye-contact demands on the part of the two interactors, AD scores were expected to be high in these situations, but low in encounters in series A.

Although it was thought possible that there would be different degrees of asymmetry from one condition to another within a single series, no specific predictions were made.

#### 4.3.4 Signed Angle Difference scores

Since Signed AD scores can only be obtained from interactions in which the participants are differentiated, these were not available in situations 1A and 2A. Since these scores indicate which of two figures is the most directly facing, analysis of them plays an important part in testing the general theory of the effect of eye-contact demands on orientation. The theory predicts that neither interactor will tend to face more directly in situation 3A and that therefore the mean Signed AD score in this situation will be zero. In the encounters in series B, however, it predicts that the figure with the higher eye-contact demands will face more directly, and that

therefore the mean Signed AD score will be positive (since the angle of the high eye-contact interactor is subtracted from that of the low eye-contact interactor).

#### 4.4 STATISTICAL PROCEDURES

##### 4.4.1 Analysis of variance design

A repeated measures factorial analysis of variance design was employed in the analysis of the dependent measures (Kirk 1968 pp. 237sq.). The design extracts variance due to individual differences (subjects) in addition to that associated with the two independent variables and the interaction between them.

##### 4.4.2 Symmetry of the variance/covariance matrices

A repeated measures design requires that the variance/covariance matrix obtained from the data be symmetrical. In a perfectly symmetrical matrix, the column variances are equal and the between-column covariances are equal. Box's test for the symmetry of a variance/covariance matrix (Kirk 1968 p.140) was employed to test whether this assumption was tenable for the present data. The test yields a value of  $\chi^2$  which, if significant, indicates that the assumption of symmetry is violated. In previous analysis of doll placement data, both when distance and orientation measures are involved, the writer has often found that the variance/covariance lacks this required symmetry.

For each of the three dependent measures submitted to analysis of variance, the variance/covariance matrices were calculated and the assumption of symmetry tested. These matrices, together with associated values of  $\chi^2$  appear as Tables 4.1, 4.2 and 4.3 for the Distance, Least Angle and Angle Difference data respectively. Column variances appear on the diagonal of the matrix, and covariances

TABLE 4.1

VARIANCE/COVARIANCE MATRIX OBTAINED FROM DISTANCE SCORES

	1A	2A	3A	1B	2B	3B
1A	152,447					
2A	67,954	591,471				
3A	65,754	32,437	351,706			
1B	-8,633	-149,920	210,191	824,792		
2B	87,910	306,172	152,538	14,531	757,007	
3B	84,169	286,000	195,917	206,272	418,283	641,541

$$\chi^2 = 46,57; \quad p < ,001 \quad (\underline{df} = 19)$$

TABLE 4.2

VARIANCE/COVARIANCE MATRIX OBTAINED FROM LEAST ANGLE SCORES

	1A	2A	3A	1B	2B	3B
1A	307,679					
2A	4,497	89,913				
3A	59,569	-11,586	91,638			
1 <sub>B</sub>	1,466	48,805	-3,293	70,006		
2B	27,000	28,345	14,897	18,414	72,207	
3B	-9,707	-1,805	-0,328	-10,799	7,310	35,454

$$\chi^2 = 60,22; \quad p < ,001 \quad (\underline{df} = 19)$$

TABLE 4.3

VARIANCE/COVARIANCE MATRIX OBTAINED FROM ANGLE DIFFERENCE SCORES

	1A	2A	3A	1B	2B	3B
1A	78,259					
2A	-2,879	14,102				
3A	-4,621	31,657	172,685			
1B	43,483	4,885	77,782	727,747		
2B	58,328	21,946	81,763	376,839	808,047	
3B	32,431	-25,638	33,483	341,138	404,569	831,707

$$\chi^2 = 144,55; \quad p < ,001 \quad (\text{df} = 19)$$

between columns below the diagonals. In each case the assumption of symmetry is untenable and the value of  $\chi^2$  is significant beyond the ,001 level.

Visual inspection of the matrices does not cast any doubt on this conclusion. In all three matrices heterogeneity of both variances and covariances is apparent. However, some reservations about the uncritical use of Box's test may be noted. Computation of Box's  $\chi^2$  involves the computation of the determinant of the matrix. In the present case, computation of the matrix, its determinant and the remaining parts of the test was carried out on an ICL 1900 computer by means of a Fortran program prepared by the writer. The ICL subroutine F4DET was used to compute the determinant. The value of the determinant was found to be very sensitive to the number of decimal places to which the variances and covariances in the matrix were rounded. If the computer program computed the matrix from the raw scores and then passed the matrix to F4DET for

computation of the determinant, a different value of the determinant was obtained from that which arose if the values in the matrix were rounded to three decimal places and then read into F4DET. Differences in the values of determinants obtained by these two procedures were often considerable. In order to eliminate the possibility that the discrepancy arose due to some error in the structure of the original program, a special program was prepared\* which computed a series of determinants for a basic matrix successively rounded to different numbers of decimal places from 12 to zero. This investigation confirmed the sensitivity of the determinant to the number of decimal places to which the values of a matrix were rounded.

These differences in the value of the determinant were found to affect the size of  $\chi^2$ . In Kirk's example (p.141) where the values in the matrix are rounded to three places of decimals, the value of  $\chi^2$  is not significant. However, if  $\chi^2$  is computed for the same matrix computed from Kirk's raw data, but not rounded to three decimal places, a value of  $\chi^2$  significant at the .05 level was obtained by the present writer.

In the case of the present data, however, values of Box's  $\chi^2$  are sufficiently large for it to be stated with some certainty that the assumption of the symmetry of the matrices obtained from the present data is not tenable, and since this conclusion is supported by visual inspection of the matrices, the reservations about the use of Box's  $\chi^2$  which have just been discussed do not provide sufficient grounds for rejecting it.

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\*I am indebted to Mr. M. Lawrie, manager of the Rhodes computer centre for preparing this program and for assisting in clearing up this point.

Three procedures may be adopted when the variance/covariance matrix is asymmetrical : a transformation of the data may be employed, F tests may be carried out with reduced degrees of freedom, or the violation of the assumption may be ignored. None of these is an entirely satisfactory course, and the advantages and disadvantages of each are discussed below.

#### 4.4.3 Transformations

A transformation of the raw scores may be found which gives a symmetrical variance/covariance matrix. This is a convenient procedure, in that if a suitable transformation can be found which removes the asymmetry of the variance/covariance matrix, the reliability of the F test is increased. The procedure has three practical disadvantages, however. Firstly, the search for a suitable transformation may be a long and time consuming process even when an electronic computer is used, and when several transformations have been tried, none may be found which yields the required symmetry. Secondly, whereas a logarithmic transformation may be suitable for, for example, the distance data in one experiment, a reciprocal transformation may be required in another; comparison of the results of one experiment with another then becomes difficult. Thirdly, in practice the present writer has found that even when a suitable transformation is discovered which gives rise to a symmetrical variance/covariance matrix when applied to the data, the results of F tests based on the transformed data are very similar to the results of those based on the untransformed data except in a very few instances.

The transformations which have been found most effective in reducing, if not actually removing, the heterogeneity of variances and covariances in doll placement data are a logarithmic transformation

in the case of the orientation measures and a reciprocal transformation in the case of the distance scores.

#### 4.4.4 Conservative degrees of freedom

As a safeguard against a rejection of the null hypothesis which is unjustified because of the asymmetry of the variance/covariance matrix, the  $F$  ratio may be evaluated by means of the Geisser-Greenhouse method (Kirk 1968 p.142). If this procedure is employed, the  $F$  ratio is calculated in the normal way, but the significance level is obtained by entering the tables with reduced degrees of freedom. This procedure is extremely conservative since the reduced degrees of freedom are computed on the assumption of a large degree of variance and covariance heterogeneity. When heterogeneity is not great, such a conservative procedure will often result in a failure to reject the null hypothesis when this is in fact justified by the data. An  $F$  ratio, which, when evaluated with conservative degrees of freedom, is significantly greater than would have been expected by chance provides a basis for the confident rejection of the null hypothesis. However, the failure of a conservative  $F$  test to indicate a significant effect does not necessarily imply that no significant effect would be detected in the data if a less conservative approach were adopted.

#### 4.4.5 Ignoring violation of assumptions

Since the violation of assumptions is known to bias the  $F$  test, simply to ignore violations of assumptions may appear to be unwarranted. Nevertheless this is the procedure which was adopted in the present case. It is necessary, therefore, to justify this decision.

The effect of the violation of an assumption of the mathematical

model for the analysis of variance may be either to change the significance level of the  $F$  test, or to reduce the sensitivity of the test (Kirk 1968 p.60). Loss of sensitivity occurs, because a test could be constructed that would be more powerful than the  $F$  test for analysing data having the specific characteristics of a particular set. However, for most research purposes the expenditure of time and effort required to construct a new statistical test that is appropriate to the characteristics of the experimental data is unlikely to be justified. The significance level may be effected by violation of assumptions since, for example, an  $F$  ratio found to be significant at the 5% level may only be significant at the 7% level, or conversely it may be significant at the 4% level (Kirk op.cit.). When assumptions are violated, therefore, the regular  $F$  test may be positively or negatively biased.

In practice, however, the  $F$  test is only slightly affected by violations of assumptions unless the violations are very great (Kirk 1968 pp. 60-63 and pp. 139-143). This provides the first justification for ignoring the fact that variance/covariance matrix may be relatively asymmetrical. Secondly, if an attempt is made to see that all assumptions are met, the practical problems involved in making each specific statistical test that may be required from a single set of data may become enormous; especially in cases where there is interaction between the main independent variables and a series of separate tests must be made, since it may be found that a transformation which removes variance/covariance heterogeneity from the columns involved in one test may not remove it from those employed in another. The third and most important justification for the ignoring of the possibility that the variance/covariance matrices might be asymmetrical has been mentioned above; this is that in

practice it has been found that when the matrix is asymmetrical and a transformation is found which gives a symmetrical matrix, F ratios from analysis of variance of the transformed and of the untransformed scores are generally similar.

It will be seen in the results presented below that there is a tendency for a positive linear relationship to exist between means and standard deviations both in the case of the distance and of the orientation measures. While this variance heterogeneity might give rise to a cautious attitude towards effects significant only at the 5% level, such caution is probably inappropriate when F ratios are significant at the 1% or .1% levels.

In the analysis of results that follows, therefore, the raw scores have been submitted to analysis of variance without use of a transformation. The number of degrees of freedom for the Geisser-Greenhouse conservative F test will be indicated in the analysis of variance tables for the benefit of those who might wish to adopt a cautious approach to conclusions drawn from the data.

#### 4.4.6 Pairwise comparisons

Several procedures are available for the comparison of pairs of means. When a prediction has been made a priori, a t-test is appropriate, however for a posteriori comparisons a test which sets the significance level on the basis of the number of means being compared is required. For this purpose, Tukey's HSD test is the most appropriate. This test provides a statistic, q, which is evaluated with reference to the studentised range. Both q-tests and t-tests were employed where appropriate. Comparisons for which t-tests are appropriate are those which specific hypotheses made in section 4.3. Otherwise q-tests were used. For both t- and q-tests, the error term was the residual mean square obtained in

computation of the analysis of variance, and the degrees of freedom are those for this term. For  $q$ -tests the ,01 level of significance was the highest for which tables were available. Some  $q$  values indicated as significant at the ,01 level may therefore be significant at the ,001 level.

#### 4.5 RESULTS

##### 4.5.1 Distance scores

TABLE 4.4  
MEANS (IN MILLIMETERS) AND STANDARD DEVIATIONS  
OF DISTANCE SCORES

Condition	1A	2A	3A	1B	2B	3B
Mean	74,6	85,3	80,5	94,0	90,4	90,9
SD	12,3	24,3	18,8	28,7	27,5	25,3

Means and standard deviations of the distance scores are given in Table 4.4. A summary of the analysis of variance is presented in Table 4.5. Mean distances are presented graphically in Figure 4.1.

The prediction made in section 4.3.1, that distances would be greater in the asymmetry condition than in the symmetry condition was confirmed. Although the Symmetry x Situation interaction was not significant, detailed analysis showed that in situation 2 the effect of symmetry on distance was not strong enough to be significant. In situation 1 the distance in 1B was greater than that at 1A beyond the ,001 level ( $t = 3,65$ ;  $df = 145$ ). The distance in 2B was not significantly greater than that in 2A ( $t = 0,96$ ;  $df = 145$ ). The distance in 3B was greater than that in 3A well beyond the ,05 level (one-tailed) ( $t = 1,96$ ;  $df = 145$ ). Since the effect of symmetry was not significant in situation 2, it might have been expected that

the F ratio associated with the interaction effect would have been significant. Two reasons for the low F ratio may be suggested; firstly, the effect of symmetry on distance is in the same direction in situation 2 as in the other situations; secondly, variance heterogeneity may have masked the effect to some extent.

TABLE 4.5  
SUMMARY OF ANALYSIS OF VARIANCE OF DISTANCE SCORES

Source	Sum of squares	<u>df</u>	Mean square	<u>F</u>
Subjects	35080,89	29	1209,68	2,868*
Symmetry	6043,60	1	6043,60	14,326*
Situation	387,01	2	193,50	0,459
Symmetry x Situation	1560,14	2	780,07	1,849
Residual	61169,07	145	421,85	
Total	104240,72	179		

For conservative F test, df = 1/29

\*  $p < ,001$

#### 4.5.2 Least Angle scores

Means and standard deviations of the LA scores are presented in Table 4.6, and a summary of the analysis of variance in Table 4.7. The means are presented in graphical form in Figure 4.2. It can be seen that direct orientation patterns characterised all conditions except 1A, the friendly conversation. As was predicted, mean LA was significantly greater in 1A than in 2A ( $t = 7,67$ ;  $df = 145$ ;  $p < ,001$ ). Although orientations were considerably more direct in 3A than in 2A, the prediction that LA's would be greater in 3A than in 2A was also confirmed ( $t = 2,082$ ;  $df = 145$ ; one tailed  $p < ,025$ ).

GRAPHICAL PRESENTATION OF RESULTS OF  
EXPERIMENT II

Figure 1

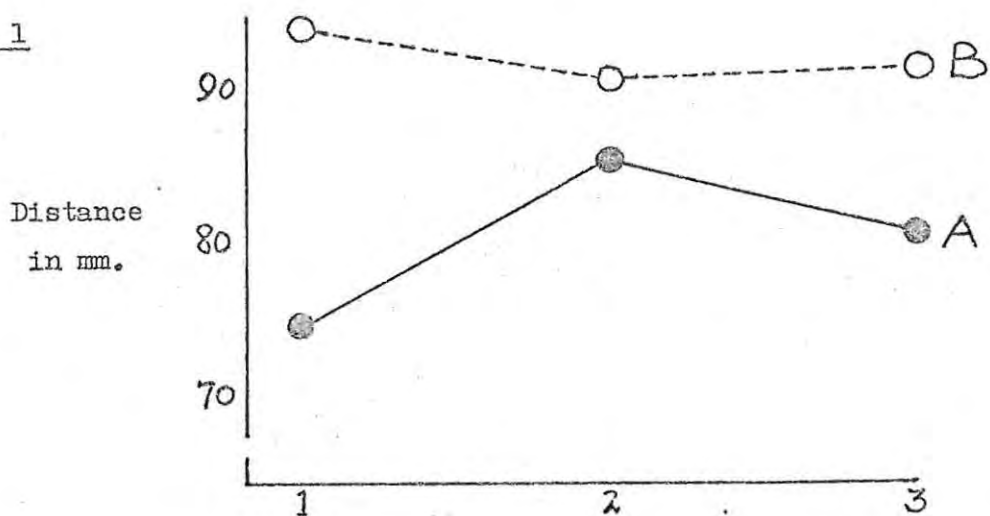


Figure 2

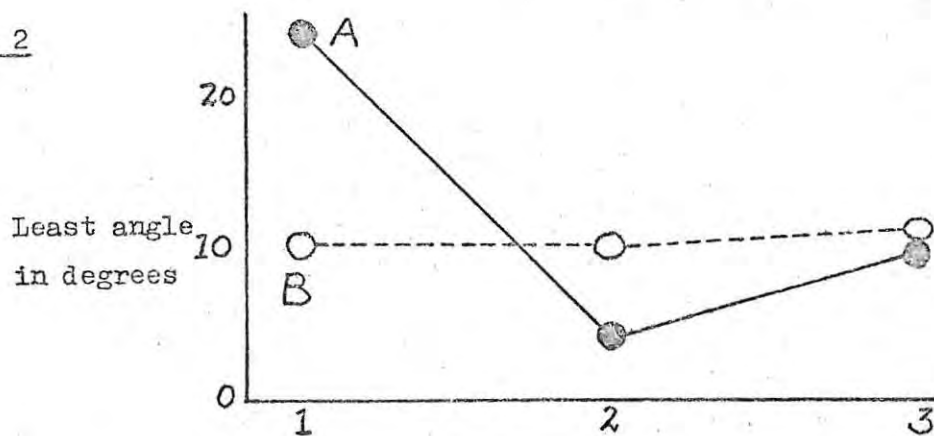


Figure 3

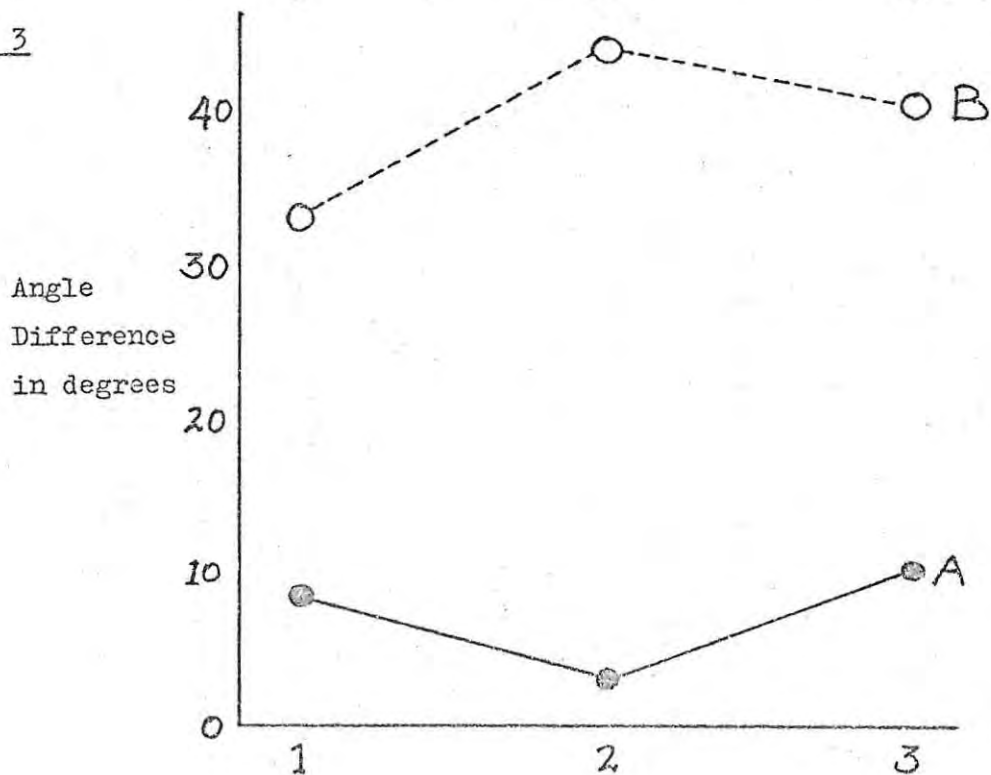


TABLE 4.6

MEANS AND STANDARD DEVIATIONS OF THE LEAST ANGLE SCORES

Condition	1A	2A	3A	1B	2B	3B
Mean	23,9	4,1	9,5	10,2	10,0	10,8
SD	17,6	9,5	9,6	8,4	8,5	6,0

TABLE 4.7

SUMMARY OF ANALYSIS OF VARIANCE OF LEAST ANGLE SCORES

Source	Sum of squares	<u>df</u>	Mean square	<u>F</u>
Subjects	4893,58	29	168,74	1,694*
Treatments	6493,91	5	1298,78	13,036**
Symmetry	213,42	1	213,42	2,142
Situation	3121,91	2	1560,95	15,667**
Symmetry x Situation	3158,58	2	1579,29	15,851**
Residual	14446,42	145	99,63	
Total	25833,91	179		

For conservative F test, df = 1/29

\* p &lt; ,05

\*\* p &lt; ,001

Because of the significant interaction effect, the F ratio for the overall effect of treatments has been included in the summary in Table 4.7. Since the effect is significant beyond the ,001 level, the analysis was concluded by preparing a table of q-values to discover where differences between means were significant. These q-values are shown in Table 4.8. It can be seen that

the mean IA in situation 1A is significantly greater than that in any other condition, but that no other differences between means are significant.

TABLE 4.8  
VALUES OF TUKEY'S  $q$  FOR PAIRWISE COMPARISONS  
BETWEEN MEAN IA SCORES

Situation	1A	2A	3A	1B	2B
2A	10,85				
3A	7,90	2,95			
1B	7,54	3,31	0,37		
2B	7,63	3,22	0,27	0,09	
3B	7,17	3,68	0,73	0,36	0,46

$q$  must exceed 4,1 to be significant at the ,05 level, and 4,87 to be significant at the ,01 level.

#### 4.5.3 Angle Difference scores

Means and standard deviations of the Angle Differences are shown in Table 4.9 and the analysis of variance is summarised in Table 4.10. The means are presented in graphical form in Figure 4.3. The prediction that orientation asymmetry would be greater in the B situations than in the A situations was confirmed; from the size of the  $F$  ratio associated with this effect, it can be seen that the effect was very strong. The analysis also indicated the presence of a fairly weak interaction effect. Inspection of the means suggests that this effect is due to the fact that whereas in condition A the greatest symmetry is in situation 2, in condition B the greatest asymmetry is in this condition. When the three means in condition A were compared with each other by  $q$  test, no significant differences

were found; the same applied to the three means in condition B. However, because variances were considerably greater in condition B than in condition A, it was considered that the  $q$ -tests between means in this condition were negatively biased. If a one way analysis of variance is employed to test the simple main effect of situations on AD scores in the A condition, an  $F$  ratio of 4,95 ( $df = 2/58$ ) is obtained which is significant beyond the ,025 level.

TABLE 4.9

MEANS AND STANDARD DEVIATIONS OF THE ANGLE DIFFERENCE SCORES

Situation	1A	2A	3A	1B	2B	3B
Mean	8,5	3,0	9,9	33,3	44,6	40,5
SD	8,9	3,8	13,1	27,0	28,4	28,8

TABLE 4.10

SUMMARY OF ANALYSIS OF VARIANCE OF ANGLE DIFFERENCE SCORES

Source	Sum of squares	$df$	Mean square	$F$
Subjects	26983,91	29	930,48	2,733**
Symmetry	46980,35	1	46980,35	138,010**
Situation	576,21	2	288,11	0,846
Symmetry x Situation	2160,14	2	1080,07	3,173*
Residual	46359,96	145	340,41	
Total	126060,57	179		

For conservative  $F$  test,  $df = 1/29$

\*  $p < ,05$

\*\*  $p < ,001$

If  $q$  values are computed for comparisons in condition A on the basis of the error term derived from condition A only, it is found that AD is less in 2A than in 3A ( $q = 4,21$ ; error  $df = 58$ ;  $p < ,05$ ). The difference between the means in 1A and 2A is not, however, significant ( $q = 3,34$ ; error  $df = 58$ ;  $q_{,05} = 4,16$ ).

#### 4.5.4 Signed Angle Difference scores

TABLE 4.11  
MEANS AND STANDARD DEVIATIONS OF SIGNED ANGLE  
DIFFERENCE SCORES

Situation	Mean	Standard deviation	$t$
3A	-0,80	16,6	-0,265
1B	33,33	29,9	6,768*
2B	42,63	31,3	7,450*
3B	40,37	29,0	7,616*

\*  $p < ,001$

Means and standard deviations of the Signed AD scores are shown in Table 4.11.  $t$  values, which provide a test of the hypothesis that the mean is greater than zero, are also shown.

The results are in accordance with the predictions made in section 4.3.4. In situation 3A, where it was predicted that there would be symmetry of eye-contact demands, and therefore no tendency for either interactor to face more directly than the other, the mean Signed AD was not significantly different from zero.

In the three situations in condition B, on the other hand, there is a strong tendency for the figure for whom the higher eye-contact demands were predicted to face more directly. In fact,

when making the placement in situation 1B, no subject placed the figure representing the more talkative interactor so that it was the less directly facing (it can be seen that the mean AD is the same as the mean Signed AD). In situation 2B, there were three subjects who placed the quiet and confused interactor so that he faced more directly, but in two cases the AD's were under  $10^{\circ}$ ; in the third the AD score was  $19^{\circ}$ . In situation 3B, there was only instance of the figure representing the interactor who had been asked the favour facing more directly, and then the AD was only  $2^{\circ}$ .

## 4.6 DISCUSSION

### 4.6.1 Orientation asymmetry

The main hypothesis tested by the experiment received overwhelming confirmation. In situations which had been designed so that one interactor had high eye-contact demands, the other low eye-contact demands, in all but a few placements the figure representing the character for whom low eye-contact demands were predicted was placed so that he faced less directly than the other. In addition, asymmetry of orientation in those situations where there was asymmetry of eye-contact demands was considerably greater than situations where eye-contact demands were symmetrical.

It should be noted, however, that in the symmetrical encounters eye-contact demands were high (2A and 3A) or intermediate (1A). It remains to be shown that symmetry of eye-contact demands gives rise to symmetry of orientation when the eye-contact demands of both interactors are low (e.g. when both interactors are described as anxious, confused or engaged in making a difficult decision).

An interesting though rather weak effect was that orientation asymmetry in situation 3A, though low, was significantly greater than

in situation 2A (see section 4.5.3). This may reflect perception on the part of the subjects of a different balance of approach and avoidance factors for eye-contact in the two situations. While the direct orientation patterns in both these situations (indicated by the low IA and AD scores) suggest that subjects perceived both situations as ones in which there were strong approach factors operating to give a high level of direct gaze, the greater asymmetry in 3A may be due to a tendency for some subjects to give interpretations of this situation which gave rise to perceived asymmetry of eye-contact demands.

Whereas in situation 2A only one subject made a placement with an AD score above  $10^{\circ}$ , and none with AD scores above  $20^{\circ}$ , in situation 3A eight subjects made placements with AD scores above  $10^{\circ}$ , of which five had AD's above  $20^{\circ}$ . Of these latter five, two subjects placed the dolls so that the one who was making the request faced more directly; it is possible that they were representing a situation where the person who had been asked was either (a) deciding how to frame his reply, since the planning of an utterance results in a reduction of gaze directness (Kendon 1967), or (b) embarrassed at having been asked, even though glad to help.

Similarly, it is possible that the three subjects who placed the figures so that the one of whom the request had been asked faced more directly by over  $20^{\circ}$  were representing a situation in which they perceived the person asking as embarrassed about asking. If these interpretations are correct, they confirm the theory that a subject's placement of dolls in an asymmetrical orientation indicates that he perceives the eye-contact demands of the two interactors to be symmetrical. Since this theory received such strong support from the experiment as a whole, the interpretations can be regarded as more than merely speculative.

#### 4.6.2 Orientation directness

The present set of results echoed the findings of Sommer and Cook in America and Britain respectively that for friendly conversations a fairly indirect orientation is preferred by interactors. Least Angle scores were higher in the friendly encounter 1A than in any other.

An interesting finding was that direct orientations characterised placements in situation 3A even though this too was a friendly encounter. A possible explanation lies in the relative riskiness of the two situations 1A and 3A for the two interactors involved. In 1A the two interactors are described as warm and friendly and as engaged in an encounter whose purpose is to provide social rewards to each interactor, perhaps in the form of approval from the other of his behaviour. Since the description "warm and friendly" suggests that neither interactor lacks the social skill required for successful participation in such an encounter, the risk that the course of the encounter might prove painful or unpleasant to either interactor is small.

On the other hand, in 3A, where one man is asking a request of the other, there is present a definite risk, once the encounter has been initiated, that it will be unsatisfactory for one or both participants. The person asking runs the risk that he will be refused. This would imply that he had miscalculated in making the request in the first place (see Chapter 3, section 3.2.1). The person being asked runs the risk that he will either acquiesce in something about which he in fact has misgivings, or refuse the other's request, and thus either implicitly challenge his right to have asked, or make himself to appear unreasonable. Even though, as described in the interaction description given to the subjects,

situation 3A has a satisfactory outcome for both participants since the request is granted and the person granting it has no misgivings about having done so, it is probable that the direct orientations in this condition reflect the risky nature of the encounter.

There are two reasons why direct orientations might be expected to characterise more socially risky encounters. Firstly, if a person is running a risk, and is in a position to exercise some control over the outcome, he needs to gather as much information as possible upon which to base his decisions about how to act from moment to moment. He can obtain information about the other's evaluation of him and possibly draw inferences about his intention by looking at his face. Ingham (1970) proposed a similar theory to account for the strong preference on the part of Swedes for face to face positions even for friendly encounters; he suggested that Sweden is a "shame culture" where an interactor is relatively more concerned about another's evaluation of him and more afraid of loss of face than he is in Britain; a friendly encounter is on this view, relatively more risky for a Swede than for a Briton.

Secondly, it has been suggested by Pellegrini et al. (1970) that direct gaze at another's face can be an "instrumental affiliative behaviour"; that is, when accompanied by the appropriate non-verbal signals in other channels, it acts as a means of gaining the approval and good will of another. Since an interactor in a risky encounter like 3A is more likely to lose the favour of the other than one in a less risky encounter like 1A, subjects may have placed the figures in 3A in direct orientations because they perceived them as looking at the other as a means of gaining or keeping his approval.

Looking at another's face is not only a means of monitoring

the other's evaluation of one's conduct and of seeking to gain his approval; accompanied by other appropriate non-verbal behaviour it is also a means of threatening another and of attempting to dominate him. This accounts for the direct orientations in situation 2A which were in accordance with the predictions made in section 4.3.2.

This discussion of the directness of orientation patterns in the experiment leaves one final point to be considered, and this is the finding that IA's were greater in 1A than in 1B. Whereas in situation 1A, the friendly conversation, orientation patterns tended to be fairly symmetrical and indirect, in situation 1B, where one of the interactors is talkative and friendly while the other is quiet and reserved, the talkative interactor, unlike his counterparts in 1A, is placed in a more directly facing orientation. Whereas the mean IA in 1A was  $23,9^{\circ}$ , in 1B it was only  $10,2^{\circ}$ , and the difference was significant at a high level of confidence (Table 4.8). Compared to placements in 1A, then, placements in 1B are characterised by (a) relatively direct orientation on the part of the talkative interactor, and (b) very indirect orientation on the part of the other (the mean AD was  $33,3$ ).

The relatively large orientation of the second interactor was predicted, but the relatively direct orientation of the former requires comment. Three possible factors may be responsible for the effect. Firstly, the talkative interactor may face more directly as a means of gaining the approval and interest of the other. Secondly, he may face more directly in order to monitor the other's behaviour so that he may more effectively be able to see what aspects of his own behaviour are successful in interesting the other. Thirdly, the effect may simply be due to the fact that he can tolerate a more direct gaze than in situation 1A because, since the other's

orientation is so indirect, in looking at him he does not engage him in eye-contact. This third explanation seems less likely than the other two, however, since it does not appear to be due to the presence of strong avoidance factors that orientations are indirect in friendly encounters like 1A, but rather due to the lack of strong approach factors.

#### 4.6.3 Distance

Two points of interest arise from the distance scores in this study and from their relationship to the orientations in which the dolls were placed.

Firstly, those situations in which one interactor was described as anxious, shy or uncertain how to act (the B situations) gave rise not only to large Angle Differences, but also to larger distances than in the control situations where neither interactor was uncertain of himself. The uncertainty of the interactor was expressed both in his greater angle of diversion, but also to a lesser extent by his greater distance from the other.

Secondly, if the responses to 1A and 2A are compared it will be seen that responses in 1A were characterised by close distances and indirect orientations, the responses to 2A by greater distances and direct orientations. This finding accords with the theory of Cook (1970) that friendly encounters are characterised by increased proximity, but not necessarily by a large amount of eye-contact, whereas hostile encounters are characterised by increased eye-contact, but not necessarily by increased proximity. Cook's finding of increased proximity for encounters with a high level of affiliative motivation was demonstrated by his asking subjects to choose a seating position suitable for "sitting with your boy/girl friend." Because of the cultural taboo on physical contact between men

(except under special conditions such as in the handshake), it might be expected that this effect would be less easy to demonstrate when interactions involving two men were involved. This appears to be so in the present case. Whereas the difference in IA's between 1A and 2A is highly significant, the difference between the Distances is not large enough to be significant by Tukey's q-test. If a t-test is made, however, a significant difference is indicated ( $\underline{t} = 2,02$ ;  $\underline{df} = 145$ ;  $p < ,05$ ). Unfortunately for the argument, however, such an application of the t-test a posteriori is not a legitimate procedure. However, if the effect is genuine, it ought to be replicable in future experiments.

#### 4.6.4 Individual differences

Particularly in the case of the inter-doll distances and the AD scores, but to a lesser extent in the case of the IA scores, significant differences between subjects were indicated by the analysis of variance. Individual differences between subjects in the distances at which figures were placed were also found by Little (1965). Both distance and angle measures revealed individual differences in a study by Edwards (1972a). The results of the present study therefore fit in with previous findings.

Individual differences may be a function of the different personalities of the placers. Cook (1970) was able to demonstrate differences in seating position preferences between introverts and extraverts, and several studies linking inter-figure distances with emotional disturbance and other personality factors are discussed in Chapter 6 (section 6.2.1) (e.g. Fisher 1967; Weinstein 1965 and 1967; Kuethe and Weingartner 1964).

It is possible that individual differences are also due to the fact that different people fill out the interaction descriptions

imaginatively in different ways. Thus one subject might project a status difference on the imagined interactors while another does not; one might imagine the encounter taking place in a formal setting (e.g. at work) another in an informal setting (e.g. at home). The location at which an interaction was imagined to occur was found to affect the distance between dolls in Little's (1965) study.

The existence of individual differences between subjects is of interest and merits experimental attention. However pilot work by the writer has failed to find any appreciable relationship between personality as measured by the EPI (Eysenck and Eysenck 1964) and doll position. Isolating the causes of individual differences will probably not be a simple matter, and the task lies outside the scope of the present project.

#### 4.6.5 Conclusions

It is apparent from this study that the spatial characteristics of doll placements follow the same pattern as those of real interactors not only with respect to distance (see section 1.4.2) but also to orientation. The orientations in which dolls were placed were predictable and explicable in terms of present knowledge about the determinants of visual behaviour and gaze direction. It seems probable that the orientation in which a figure is placed provides a summary of the eye-contact demands that the person placing it perceives the interactor represented by it to have. This predictability of orientation from eye-contact demands supports the earlier conclusions of Sommer and Cook.

In each of three B situations used in the experiment, the same pattern of responses occurred. In each case the mean distance was just over 90mm, the mean IA was  $10^{\circ}$  and the mean AD greater than  $30^{\circ}$ .

No significant differences between the patterns of placement in these three situations were detected by the analysis.

On the other hand there are interesting differences between the patterns of response to the three A situations. In the friendly encounter 1A, responses were characterised by close distances and orientations were symmetrical but not direct. In the friendly encounter 3A, in which one interactor was described as being granted a favour by the other, distances tended to be greater (but not significantly) while orientations were generally symmetrical and direct. In the argument, situation 2A, responses were more like those to 3A than those to 1A. Orientations were strikingly symmetrical, significantly more so than in 3A where a few asymmetrical placements occurred; they were also very direct, although not significantly more so than 3A. There are indications that distances in 2A were in fact greater than those in 1A, but this requires confirmation.

These different patterns of response to the three A situations are important for two reasons. Firstly, they are explicable in terms of an analysis of the approach and avoidance forces determining eye-contact demands in each situation, as has been made clear in the discussion above. Secondly, they demonstrate an encouraging measure of sensitivity of the spatial characteristics of doll placements to the structure of these approach and avoidance forces as perceived by the subject.

## CHAPTER 5

EXPERIMENT III: A STUDY OF THE EFFECTS OF CONFIDENCE,  
INTENSITY OF MOTIVATION, AND TYPE OF MOTIVATION UPON  
THE SPATIAL CHARACTERISTICS OF FIGURE PLACEMENTS

## 5.1 INTRODUCTION

In Experiment II it was found that doll placements in each of the three situations of condition B were similar. In each case orientation patterns were common in which one figure faced directly and the other had an indirect orientation, and distances were the same in each situation. In each case the interactor who faced directly was one who was described as actively participating in the encounter and striving to gain or maintain control over the course the interaction took. The other figure, which had an indirect orientation, was described to the subject as passive, indecisive or uncertain. Although these three social situations were quite different in many respects from each other, they all had in common the fact that one interactor was active, the other passive, that one interactor was confident, the other anxious.

This analysis suggests that a major determinant of doll position might be the degree of confidence or anxiety attributed to the doll by the subject making the placement. If a figure is perceived as confident, it is placed in a direct orientation, if it is perceived as anxious it is placed so that it does not face the other directly.

Experiment III was designed as a direct test of this hypothesis, and interaction descriptions were prepared in which it was explicitly stated that an interactor was either confident or anxious.

In addition, the effects of two other variables upon doll position were studied. These were affiliative versus aggressive

motivation, and intensity of motivation to interact.

Experiment III is thus a factorial study with three independent variables. Specific predictions about the effects of these variables upon doll positions were made on the basis of the results of Experiment II and on the basis of work by other experimenters. The three variables, and the predictions made about them are discussed in detail below.

## 5.2 CONFIDENCE AND ANXIETY

### 5.2.1 Anxiety and physiological arousal

In section 1.3.5, where experimental investigations of the determinants of eye-contact were reviewed, evidence was presented that a person regulates his gaze direction in order to manage the degree to which he is physiologically aroused. It was suggested that aversion of gaze was a means of reducing physiological arousal in situations in which it had reached such a high level as to become aversive. Evidence was also cited which suggested that eye-contact was less arousing at large distances than at small ones; another means of reducing arousal is therefore to increase interpersonal distance, while maintaining the same level of eye-contact.

However the concept of arousal is a general one. There is experimental evidence that there is not a single dimension of arousal. If the concept is to be of use in the analysis of encounters and the prediction of proxemic behaviour, a more precise account of the nature of arousal is required.

Eysenck's extensive work on the factor analysis of personality inventory items has demonstrated the existence of two fundamental personality factors, introversion/extraversion and neuroticism/stability. These factors have been replicated in many studies in many different

age groups and in many different cultures (Eysenck and Eysenck 1969). Because of their pervasiveness, Eysenck (1967) has argued that the two factors have a biological basis and are dimensions of physiological arousal or arousability. Introversion, he argues, is a dimension of arousal of the cerebral cortex which is mediated by the ascending reticular afferent system in the brain stem. Neuroticism, on the other hand, is a dimension of arousal of the limbic system which is a set of brain structures which underlie emotionality.

Recently an alternative theory as to the nature of the two dimensions isolated by Eysenck has been offered by Gray (1971). He proposes that the components of the midbrain limbic system have the function of monitoring events in the environment or in the organism itself which are either positively reinforcing or negatively reinforcing and of adjusting an organism's approach or avoidance of stimuli on the basis of their rewarding or aversive properties. He therefore interprets Eysenck's neuroticism factor not simply as a dimension of emotionality, but as a dimension of "general sensitivity to all reinforcing events, whether rewarding or punishing" (p.227). While Gray's account of the neuroticism dimension is, in practice, similar to that of Eysenck, his account of the introversion factor is different in that it cites a different physiological mechanism to that proposed by Eysenck. Whereas Eysenck has proposed the arousability or sensitivity of the midbrain reticular system as the basis of introversion, Gray suggests that its true basis is the sensitivity of the septo-hippocampal system; this system, Gray argues, monitors negative reinforcement (and therefore underlies unpleasant emotional experiences), and is more sensitive in introverts than in extraverts. On Gray's thesis the introvert is more sensitive to punishment than to reward, the extravert more sensitive to reward than to punishment.

Although introversion and neuroticism appear to be independent dimensions of physiological arousability, many theorists have found it convenient to think of arousal as unidimensional. These theorists generally term this dimension "anxiety", and treat it as a dimension of sensitivity of the sympathetic nervous system (e.g. Gellhorn, cited by Lynn 1971). Lynn (1971) for example, argues that although arousal may be able to be broken down into sub-factors it is convenient for many research purposes to treat anxiety as a single superordinate dimension of arousal or sensitivity.

Eysenck (1967) argues that anxiety is primarily a function of neuroticism, but is also correlated with introversion. Thus a questionnaire measure of anxiety, the Taylor Manifest Anxiety scale, has been shown to be correlated with both neuroticism and introversion. Since introversion and neuroticism appear to be independent dimensions of arousal and can therefore be represented by two orthogonal axes, the anxiety dimension can be represented as an axis rotated through 10 or 15 degrees towards the introversion axis from the neuroticism axis. Gray (1971 p.233) has suggested that both introversion and neuroticism may contribute equally to the anxiety dimension, however.

Although such theorists as Eysenck, Lynn and Gray differ in their exact analyses of the dimensions of arousal, these differences may be regarded merely as "differences within the family" as Lynn has termed them, since they arise within a theoretical framework which is accepted by them all. This common ground may be summarised as follows:

- a) Anxiety is a dimension of physiological arousal.
- b) There are individual differences in sensitivity to this arousal.
- c) When the level of arousal is moderate, anxiety manifests

itself as motivation, keenness to act or "solicitous desire" (Lynn *op.cit.* p.17).

d) A high level of arousal of anxiety interferes with efficient performance of skilled tasks (the Yerkes-Dodson law).

e) A high level of anxiety is aversive.

### 5.2.2 Arousal, activity and passivity

A distinction which is more important, for the present purpose, than that between the introversion and neuroticism components of arousal is that between a state of arousal accompanied by active behaviour and a state of arousal accompanied by passivity. Traditionally there are two types of behaviour elicited when the sympathetic nervous system is aroused by aversive stimulation, these are the responses of fight and flight. Confronted by an aggressor or predator, an animal will either run away or fight it, and the activity of the sympathetic nervous system is to mobilise bodily resources to meet the demands (e.g. for sugars) which such responses impose on the body. A third type of behaviour is also characteristic of organisms placed in stressful situations, and this is passivity; in rats, for example, the response is generally termed "freezing". In the case of the first two responses, flight and fight, the organism becomes physiologically aroused and actively engages in an organised behaviour which is aimed at removing it from the presence of the stressful, aversive situation. In the latter case, freezing in the rat, the organism also becomes physiologically aroused, but remains passive and does not attempt to remove or to escape the aversive situation.

The distinction between situations in which there is sympathetic arousal accompanied by activity and those in which there is behavioural passivity has been shown to have a physiological basis (this point has already been mentioned briefly in section 3.2.3). Gray (1971 pp.61-64)

has summarised evidence that shows that states of high arousal in which an organism is active are characterised by high levels of noradrenaline in the blood, but that states of high arousal accompanied by behavioural passivity are characterised by high adrenaline levels. The distinction between passivity and activity is also seen in the response of the stomach to emotional arousal. Gray writes:

" . . . the stomach has two basic and opposing patterns of reaction under different emotional conditions. One could be described as a pattern of increased function, with increased blood supply, engorgement of the mucosa, increased secretion of hydrochloric acid, and increased activity of the stomach muscles. The other is a pattern of decreased function, the mucosa going pale as blood is withdrawn, and both acid secretion and muscular activity undergoing diminution. There is a parallel between these reactions and those seen in the rest of the body: when the face goes red, as in rage, so does the stomach lining; and the pallor of fear occurs in the stomach as well as in the face." (p.64)

### 5.2.3 Kelly's definition of anxiety

In contrast to those theorists whose work is discussed above and who have approached the concept of anxiety through the physiological concept of arousal, Kelly (1955) defines anxiety at the cognitive level in elaborating his theory of personal constructs. His formal definition in terms of his theory is:

"Anxiety is the recognition that the events with which one is confronted lie outside the range of convenience of one's construct system." (p.495)

In Kelly's view, each person makes for himself a construct system which is his own model of the external world, and which he refers to in planning his behaviour. An important function of the construct system is that it enables him to know what to expect of any external stimulus that he has construed. To construe something is to know how it will behave and to know the consequences that one's own actions towards it will have. If an event lies outside the range of convenience of a person's constructs, this means that he cannot construe it, and that therefore he cannot anticipate how it will develop or what will be the consequences of his own actions towards it.

The solution to the problem which arises when one is confronted with an event which <sup>one</sup> cannot adequately construe is, Kelly argues, to make an active attempt to experiment with possible ways of construing it. Kelly formally denotes such an attempt as "aggressiveness" and defines it as "the active elaboration of one's perceptual field." He distinguishes this active response to anxiety from failure to make the attempt to find a solution to the failure of construction. Aggression occurs in a situation in which one is prepared to act in the face of uncertainty. As Kelly puts it, "one might say that the areas of one's aggression are those in which there are anxieties he (sic) can face". On the other hand if a person fails to act in the face of anxiety, he loses control of his situation. Kelly writes, "The man who had anxieties, but was unwilling to attempt to replace confusion with untried structures, would soon find himself an unwitting 'victim of circumstances'" (p.509).

Kelly's system has been criticised (e.g. by Bruner 1956) for its failure to incorporate emotions. It can be seen from the discussion of anxiety above that this concept, which is often understood as denoting an emotional state by other theorists, is defined by

Kelly purely in cognitive terms. It is instructive therefore, that two approaches to anxiety which are so different as those of Gray and Kelly both point to the distinction between the active and the passive response to it.

#### 5.2.4 Cognitive and physiological definitions of anxiety: a synthesis

The two approaches to the analysis of anxiety, the physiological and the cognitive, are not to be regarded as incompatible; rather a full account of anxiety requires a synthesis between the two approaches. The view that the different emotions, fear, anger, anxiety, etc. could be discriminated solely in terms of the different patterns of autonomic nervous system reactivity which characterised each is the classical James-Lange theory, formulated independently by William James and Carl Lange at the beginning of the present century. Gray (op.cit. p.54) summarises the view succinctly:

"According to the James-Lange theory, emotional feelings consists of the perception of the physiological changes initiated by the emotional stimulus. To feel afraid, on this view, is to feel one's heart pound, one's hair stand on end, one's breathing become faster and so on -- and nothing more."

As has been mentioned above, different patterns of sympathetic responses do characterise anger and fear, but although active emotional states can be discriminated from passive ones at the level of autonomic functioning, Gray reviews work which indicates only a "rather limited degree of correlation between particular emotions and events in the autonomic nervous system and endocrine system" (op.cit. p.65). Gray concludes that although autonomic responses are certainly a part of the experience of emotional states, an individual distinguishes between emotional states through his knowledge of the context of

their occurrence.

Although Gray indicates that a clear distinction can be drawn between active and passive emotional states, those theorists who have approached anxiety from the physiological level (see section 5.1.1) include both activity and passivity in the pattern of arousal which they call anxiety. Lynn, for example, argues that anxiety only leads to passivity when arousal is at a very high level:

"In its middle range, anxiety manifests itself as nervous energy . . . and . . . the chief implication is one of strong motivation. It is only when anxiety becomes intense that it takes on the Freudian associations of angst and becomes a neurotic condition which both induces unhappiness and interferes with endeavour." (Lynn 1971 p.18)

It was pointed out above that Kelly's cognitive analysis of anxiety also allows the person experiencing anxiety to respond actively or passively. If he responds actively in an attempt to gain control over the event with which he is confronted he makes what Kelly calls an "aggressive" response. If he fails to respond actively, but remains passive, he is bound to fail to gain control of the situation and will become "a victim of circumstances"; this phrase implies that he ceases to act in such a way as to attempt to gain or maintain control over the course of events and simply allows events to take him with them.

It will be clear from the foregoing discussion that conceptual confusion may easily be encountered in discussions of anxiety because of the different meanings the term may have. A synthesis of the physiological and cognitive approaches is required, if a full account of anxiety, suitable for the present purpose, is to be arrived at. Those who have approached the concept of anxiety from the physiological

viewpoint seem to be correct in asserting that physiological arousal is a necessary condition for anxiety. But it is not in itself a sufficient condition. A person whose sympathetic nervous system is active is not necessarily the sort of person who would be described as anxious according to the everyday use of the term. A person engaged in an active sport such as boxing or football is in a state of sympathetic arousal as Gray points out, but an observer might accurately describe his behaviour as confident, nevertheless.

The boxer who fights confidently acts as if he knows he will win, and as if he knows how to win. The fight in which he is engaged is a situation which he knows how to handle. He knows how to hit, he knows where to hit, and he knows that his opponent has no effective means of stopping him. The fight is a situation which lies within the range of convenience of his constructs. He is able to anticipate the actions of his opponent and the consequences of his own actions. The boxer would only be anxious, from the cognitive point of view, if he did not know how to win, or if he suspected that his opponent had moves to make which he would not know how to deal with.

If the physiological and cognitive definitions of anxiety are combined, there are two necessary conditions for anxiety. A person is anxious if a) he is physiologically aroused, and b) if he is faced with a situation he cannot handle. However, even this synthetic account of anxiety is insufficient from the present point of view, since a person who is faced with a situation which is outside the range of convenience of his constructs may nevertheless act confident. That is he may act as if he had a clear plan for the attainment of his goals and as if he could clearly anticipate the consequences of his actions. That is what Kelly described as aggressive

behaviour and is an active rather than a passive solution to the anxiety provoking-situation.

A third necessary condition for anxiety must therefore be added in order to distinguish the active from the passive type of response. This condition is that a person is anxious when he is passive and fails to put into motion a sequence of responses designed to remove him from the anxiety-provoking situation. He may fail to act either because he cannot envisage any action which is appropriate, or because he regards such actions as he can envisage as solutions to his problem as too risky. Thus a person who is accused of lying may be anxious (and avoid eye-contact as in the experiment of Exline et al. 1961) either because he simply cannot think of any way out of the situation or because although he can envisage either flat denial or insulting his accuser as possible solutions, these courses of action involve his running risks which he is not prepared to take. If he denies that he lied (when in fact he did) he runs the risk of reinforcing his accuser's view of him as a liar, if he insults his accuser, he runs the risk of being perceived as unreasonable and vindictive.

The three-fold definition of anxiety proposed here does not imply that it is wrong to use the terms "anxious" and "anxiety" for cases which do not satisfy all three conditions of the definition. Both in ordinary language, and in scientific usage, anxiety is the term employed for cases which satisfy only one or two of the conditions. This will be clear from the discussion of the concept in the preceding sections. The three-fold definition does, however, alert one to the necessity for knowing in exactly what sense the term anxiety is being used in particular contexts.

In the context of Experiment III, in which the effects of anxiety or confidence on doll placements is discussed and examined, the type

of anxiety studied is one which meets all three of the conditions mentioned above. When an interactor is described as anxious, it will be intended that he be perceived as physiologically aroused, faced with a situation in which he does not know how to act, and passive. The latter two components of the definition will be most important, however, since no attempt is made to persuade the subjects to imagine symptoms of physiological arousal in the interactors represented by the dolls.

#### 5.2.5 Anxiety and proxemic behaviour

Experimental evidence exists to show that anxiety is an important factor in the determination of non-verbal behaviour. Kasl and Mahl (1965) showed that speech disfluencies and disturbances were characteristic of a person in whom anxiety was induced, for example, and Wiener and Mehrabian (1968) that a person chooses different linguistic forms when he is talking about areas of his experience about which he is anxious, for example, qualifiers like "obviously" or "it is possible" are more frequent, as are imprecise formulations such as "bring your wife" instead of "bring Mary".

The work of Kleck et al. (1968) and of Dosey and Miesels (1969) indicates that anxiety affects proxemic behaviour. Both studies showed an increase in interpersonal distance in an anxiety-provoking situation. Kendon and Cook (1969) found that the visual behaviour in persons scoring high on Eysenck's N (neuroticism) scale was characterised by frequent brief engagements of eye-contact which was part of a general pattern of lack of smoothness of flow in the interaction in which they were engaged. Exline, Thibaut, Brennan and Gumpert (1961) induced subjects to tell a lie and later accused them of having lied. This induction of anxiety by confronting subjects with a situation in which it was difficult to decide whether to admit

to the lie or to aggressively deny it resulted in subjects reducing directness of gaze at the experimenter with the exception of Machiavellian subjects who chose to confidently deny that they had lied. Exline, Gray and Schuette (1965) demonstrated that subjects engaged in less eye-contact when interviewed about personal topics rather than casual ones. It is anxiety-provoking for a person to discuss a personal topic with an interviewer since in doing so he exposes his behaviour or attitudes for evaluation by him, but it is not easy to predict whether the evaluation will be positive or negative.

On the other hand, when physiological arousal or motivation is associated with an active, confident behaviour towards another, close distances and/or high levels of eye-contact occur (Cook 1970). This is true whether the active behaviour is aggressive (Ellsworth *et al.* 1972) or affiliative (Pellegrini *et al.* 1970; Rosenfeld 1965). Thus in the experiment reported in the previous chapter, direct figure orientations were associated with the interaction in which both participants were actively aggressive (2A) and the interaction in which both participants were motivated to gain or maintain the other's approval (3A: the difference between the structure of 1A and 3A is discussed in detail in section 4.6.2).

#### 5.2.6 Predicted effect of anxiety versus confidence on doll position

The prediction can be made that an interactor who is confidently and actively participating in a social encounter will tend to face directly and stand close, and an interactor who is anxious, indecisive and has allowed control of the course of the encounter to be taken from him will stand farther away and not face directly. This prediction applies both to real interactors, and to interactors represented by dolls.

In Experiment III, a series of interactions were described to subjects in each of which one of the interactors was described either as confident or as anxious. The prediction was therefore made that in cases where the interactor was described as confident, the doll representing him would be placed in a direct orientation relatively close to the second figure, whereas in cases where he was described as anxious, the doll representing him would be placed in an indirect orientation and at a greater distance.

### 5.3 AFFILIATIVE VERSUS AGGRESSIVE MOTIVATION

#### 5.3.1 Like versus dislike

Mehrabian (1969b) has suggested that the degree of like or dislike an interactor has for another is a determinant of his proxemic behaviour. He instructed subjects to stand near a hat-rack which represented an interactor and found that when they were told that the imaginary interactor was someone they liked they stood closer to it than if it represented someone they disliked (Mehrabian 1968a). In a similar experiment (Mehrabian 1968b), he found that subjects faced the hat-rack more directly when it represented a liked person than when it represented a disliked one.

Surveying his experimental studies of non-verbal behaviour, Mehrabian (1969a) has suggested that many non-verbal behaviours, including proximity, eye-contact and orientation communicate what he terms "immediacy". He argues that if a person's non-verbal behaviour is immediate when he is talking about a certain topic or conversing with a certain person, the inference can be drawn that he experiences favourably or likes the topic or person in question. Mehrabian argues that direct orientations, large amounts of eye-contact and close interpersonal distances are immediate forms of behaviour, and

that indirect orientations, small amounts of eye-contact and large distances are non-immediate forms of behaviour.

Mehrabian's analysis leads to the prediction that if a subject were to place a doll to represent a conversation with another doll, he would place it relatively close and in a direct orientation if it was described as liking the other doll, but would place it farther away and in a less direct orientation if it was described as disliking it.

Apart from the evidence of the experimental findings reviewed by Mehrabian, there is no direct reason for expecting a person to stand closer to another they liked than to one they disliked. Proximity and eye-contact must depend on the goals and intentions of the interactors. Situations in which a person stands close to someone they dislike are not difficult to envisage. For example, if A dislikes B, he may threaten him or even attack him physically, in which case he would stand close to B.

A person is generally disliked by another because he poses a threat to him. A may dislike B because B holds different political or religious views, or has different manners. In this case A may feel that his values and way of life are being threatened by B's attitudes and behaviour. There are two responses possible for A if he dislikes B. On the one hand he may be anxious because of the threat posed by B and therefore be uneasy in B's presence because he does not know how to handle the situation. On the other hand, he may actively attack and threaten B and attempt to force him to change his attitudes or to act in a manner which he considers more polite.

These two responses to B on the part of A would result in quite different patterns of proxemic behaviour by A. If A felt anxious and unsure of himself in the presence of B, he would be

expected to keep his distance and to face indirectly. This follows from the discussion of anxiety in section 5.2. On the other hand if A actively threatened B and attempted to change him, close distances and direct orientations would be expected since immediate behaviour is associated with aggression and threat.

This argument suggests that liking was not a direct determiner of distance and eye-contact in Mehrabian's experiments. The direct cause of the larger distances and less direct orientations assumed by subjects representing encounters with disliked persons was that the subjects were indicating that they were anxious and did not know how to handle an encounter with a disliked person as effectively as an encounter with a liked person.

This view receives support if Wiener and Mehrabian's (1968) work on the expression of immediacy through non-linguistic aspects of speech is examined. These authors have demonstrated that certain forms of speech are more frequent when a person is talking about a "negatively experienced content area" than when talking about a "positively experienced content area". The use of "that" instead of "this" in certain contexts, and the use of evasive references are examples of non-immediate speech forms. If clinical interview material presented by Wiener and Mehrabian is examined, it seems clear that the client uses these non-immediate speech forms when talking about topics which he does not know how to handle. In other words non-immediate forms reflect anxiety about the topic being spoken of, when anxiety is understood in the way outlined in section 5.2 above. Although Wiener and Mehrabian seem to go out of their way to avoid the term "anxiety", perhaps because of the ambiguity of the term in so much psychological writing, they do use it from time to time. For example, they comment (p.170) that one particularly non-immediate utterance from the client enables them to "infer a

diffuse and generalised negative experience (i.e. anxiety) in the client." Unfortunately the use of the term "negative experience" seems to be no less ambiguous than "anxiety", since "negative" can mean "unpleasant" or "hostile", depending on the context.

It is suggested therefore, that the effect of the like/dislike variable on proxemic (and other non-verbal) behaviour can be subsumed under the effect of anxiety. If this is the case, the prediction can be made that a person who dislikes another will stand at the same distance and in the same orientation as someone who likes another provided that the level of confidence is the same in each case.

### 5.3.2 Liking, affiliation and proxemic behaviour

If A likes B, he wants B to like him (Heider 1958). It is therefore natural for him to embark on a social strategy designed to secure B's favour. If a person is seeking the approval of another, he approaches fairly close (Rosenfeld 1965) and engages in more eye-contact (Pellegrini et al. 1970) than if he is not trying to win approval.

One reason for this is probably that this is a means of communicating warmth. It was shown by Kleck and Nuessle (1968) that a person who engaged in a high level of eye-contact was perceived as more sincere, natural and mature than a person who engaged in a low level of eye-contact.

A second reason for the high levels of eye-contact in approval-seeking persons is that they need feedback about whether they are being evaluated favourably. Thus Exline and Messick (1967) showed that persons who were highly dependent on another's approval looked at his face more than those who were low on this dependency in a situation where the other was administering low levels of social

reinforcement in the form of smiles and approving vocalisations. These authors argued that the dependent subjects looked for the approval which they were failing to obtain by engaging in eye-contact. It seems probable that engaging in eye-contact may act as a signal to another that one would like to be approved.

In Experiment III the prediction was made that if subjects were told that a figure represented by a doll which they were asked to place liked another figure and was attempting to win the other's approval, they would place the figure fairly close to the other and in a direct orientation. However this prediction would only be expected to hold if the interactor was confident, and not if he was anxious and unsure of himself.

### 5.3.3 Dislike, aggression and proxemic behaviour

If B holds different attitudes to those of A, and A perceives this as a threat to him, a solution for A is to dominate and subdue B.

One means of gaining or asserting dominance is to stare at the other until the arousal induced by the prolonged eye-contact becomes so aversive that he looks away. A second means of signalling threat is to approach the other closely. This is because in order to attack someone physically an interactor must first move into close proximity. Closing the distance and staring are the preliminary stages of a physical attack and may be used as symbolic means of conflict, even when no physical attack is intended.

Although there is very inadequate documentation in the literature of the use of proximity and eye-contact as means of threat in humans, the recent work of Ellsworth et al. (1972) in which motorists who were stared at drove away faster from traffic lights than those

who were not, and the finding of Cook (1970) that face to face seating positions are preferred for arguments both confirm what is a common observation in everyday experience.

In Experiment III, the prediction was made that a doll which represented an interactor who disliked another and who was attempting to dominate and humiliate him would be placed close to another doll and in a direct orientation. Again this prediction assumes that the interactor is confident in his ability to effect his aims.

#### 5.3.4 Conclusions

It has been suggested that contrary to the view of Mehrabian (1969b) like and dislike do not affect proxemic behaviour directly. In order to test this proposition, subjects in Experiment III placed a doll both to represent an interactor who disliked another and to represent an interactor who liked another. It was predicted that distances and angles would not be different in the two conditions since interaction descriptions were designed to hold the degree of confidence or anxiety constant (see section 5.5.4). It was expected that confident dislike with aggressive behaviour and confident liking with affiliative behaviour would both yield close distances and direct orientations.

#### 5.4 INTENSITY OF MOTIVATION

A third variable studied in Experiment III was that of intensity of motivation to interact. Cook (1970) has argued that as this increases interpersonal distance decreases and more eye-contact takes place. If persons engage each other in conversation they must first approach each other, and eye-contact begins to take place. At one level, therefore, Cook's hypothesis is indisputable: people not motivated to interact do not approach each other or engage in eye-

contact, while those who are motivated to interact do. However, Cook obtained some support for his theory from his seating position questionnaire study. He found that more distant seating positions were chosen for a low motivation competitive condition (racing to finish a series of puzzles) than for a high motivation competitive item (expecting to have an argument).

The variable was included in Experiment III in order to discover whether it affected the placements of dolls in the manner predicted by Cook's theory. A second reason for including it was in order to discover the extent of its effect on doll position when compared with that of the anxiety/confidence variable.

## 5.5. METHOD

### 5.5.1 Procedure

The same two dolls that were employed in Experiment II were employed, but a slightly different task was assigned the subject. Instead of placing both dolls freely, one of the dolls was fixed in such a way that its angle relative to the other was the same for each placement, and the subject only placed the remaining doll. Eight interaction descriptions were prepared (see next section) which were designed to test the three hypotheses outlined above in a factorial experiment. In these descriptions, only one interactor was described and this was the interactor represented by the doll which the subject placed.

When a subject entered the experimenter's room, he was invited to sit on a stool in front of a shelf which was against the wall just below his eye level. One of the dolls (the fixed doll) stood on the shelf with its base touching the wall at the back of the shelf. This doll was turned towards the subject through  $15^{\circ}$  from a line

drawn through the centre of the doll's base parallel to the back wall and stood at the end of a sheet of paper 330mm in length upon which its position was marked. The fixed doll was placed at an angle because it had been found in Experiment II (reported in Chapter 4) that dolls were not generally placed in completely direct orientations (see Table 4.6).

The subject's task was to place the second doll (the variable doll) on the shelf in relation to the fixed doll in order to represent the encounter whose description he had just read from a typed card. The variable doll had to be placed so that its base, like that of the fixed doll, touched the wall at the back of the shelf. This meant that the fixed doll, which was already in position, faced the variable doll, when the subject had placed it, at an angle of  $15^{\circ}$ . Thus the subject could only vary the inter-doll distance and the angle of the variable doll.

The subject was told that the experiment was a study of how people stand when in conversation, and he was allowed to make practice placements of the variable doll so that he could see the effects of varying the distance and orientation before the experiment began.

Eight placements were made by each subject, the order being randomised independently for each subject. In successive trials, each of the two figures was alternately the fixed doll and the variable doll. After each placement had been made, the experimenter marked the position and orientation of the variable doll on the recording paper, removed the paper and substituted a clean sheet, and placed the fixed doll in position for the next trial. The fixed doll was always on the left and was referred to as "B" in the interaction description. The variable doll, which was placed to the right of the fixed doll was referred to as "A". The recording paper and the bases of the dolls were concealed from the subject by a low

ridge at the front of the shelf.

#### 5.5.2 Subjects

Subjects were twenty male undergraduate students at Rhodes University who volunteered to participate in the study in response to a notice posted in a public corridor. No payment was made, since the experiment generally only occupied a subject for about ten minutes.

#### 5.5.3 Dependent variables

The distance measure of a placement was the distance in millimeters of a line drawn between the centres of the bases of the two dolls. It was thus measured in the same way as in the previous experiment. Since the subject could only vary one of the angles, only one angle measure was needed, and not two as in the previous experiment; this was simply the angle of diversion of the variable doll. A few cases of Type 2 orientation patterns occurred (see section 2.1.2) but as they were infrequent, and generally involved angles of less than  $10^{\circ}$  on the part of the variable doll, the distinction between Type 1 and Type 2 patterns was again ignored.

#### 5.5.4 Interaction descriptions

Three independent variables designed to test the three predictions made in section 5.1.6 were incorporated in the interaction descriptions. There were two levels of each variable combined in a  $2 \times 2 \times 2$  factorial design; there were thus eight interaction descriptions.

In order to test the first prediction, that a figure representing a confident interactor would be placed closer and in a more direct orientation than one representing an anxious one, each interaction description was either in the anxious (A) or the confident (C)

condition.

In order to test the prediction that distances would be the same whether an interactor was motivated to aggress or whether he was motivated to affiliate, each interaction was either in the positive (P) form or the negative (N) form. It should be made clear that there is often ambiguity in the literature when the term "negative" is employed to refer to motivation or emotion. Sometimes the term is used to refer to an attitude such as dislike, sometimes to an emotional state such as anxiety, accompanied by behavioural passivity, sometimes to an emotional state such as anger or rage accompanied by active aggressive behaviour. It might therefore be thought unwise to use such an ambiguous term as "negative" in the present context. However, the term with its opposite, "positive", is a convenient one for the present purpose to express the distinction between motivation to dominate and motivation to affiliate and the terms of reference for the words "positive" and "negative" are clearly defined by the interaction descriptions below.

In order to test the third prediction, that figures representing interactors in an intense motivational state, would be placed more closely and in more direct orientations than those representing interactors less strongly motivated, each interaction description was in either a high intensity (H) or a low intensity (L) version.

Combining the motivation and intensity variables, the following four interaction descriptions were generated:

High Positive : A very much admires and respects B. He wants to act in such a way that B will like and respect him and not reject him.

High Negative : A hates and despises B. He wants to dominate and humiliate him.

Low Positive : A quite likes B. He wants to act in such a way that B will be agreeable and like him.

Low Negative : A rather dislikes B. He wants to get the better of B.

Each of these four descriptions was prepared in both a "confident" version and an "anxious" version by the addition of the following:

Confident : He is sure of himself and confident that he can achieve this.

Anxious : But he is unsure of himself, anxious and uncertain how to achieve this.

## 5.6 RESULTS

### 5.6.1 Statistical procedures

A randomised block factorial analysis of variance design was employed in the analysis of both the distance and angle measures. Since Kirk's (1968 pp. 238 sq.) computational procedures are for an experimental design with two factors, these procedures were adapted to cater for the three factors in the present design.

Variance/covariance matrices for both distance and angle measures were computed and the assumption underlying the analysis of variance that these matrices were symmetrical was tested (this procedure is discussed more fully in section 4.4.2). The matrices appear as Tables 5.1 and 5.2 below. In the case of the distance scores, the matrix was symmetrical, since the value of Box's  $\chi^2$  was not significant. In the case of the angle scores there was a departure from symmetry, but it was not as great as was encountered in Experiment II (see Tables 4.1, 4.2 and 4.3). It was argued in section 4.4.5 that the best procedure in cases where the matrix is

TABLE 5.1  
 VARIANCE/COVARIANCE MATRIX OF DISTANCE SCORES

	HPC	HPA	HNC	HNA	LPC	LPA	LNC	LNA
HPC	382,345							
HPA	16,637	758,642						
HNC	-54,761	115,584	829,713					
HNA	13,942	60,937	184,574	1006,747				
LPC	309,887	427,668	105,466	35,963	671,734			
LPA	306,042	709,926	-151,116	-139,032	697,400	1533,726		
LNC	-59,505	116,884	236,284	245,537	38,989	116,758	468,274	
LNA	111,113	285,226	-20,571	415,563	251,003	457,916	279,905	780,050

$$\chi^2 = 13,6; \quad \underline{df} = 34; \quad \text{n.s.}$$

TABLE 5.2  
 VARIANCE/COVARIANCE MATRIX OF ANGLE SCORES

	HPC	HPA	HNC	HNA	LPC	LPA	LNC	INA
HPC	104,366							
HPA	53,826	408,747						
HNC	-1,163	-156,189	683,989					
HNA	27,039	242,184	76,921	500,408				
LPC	-5,687	39,405	-80,163	1,671	225,103			
LPA	36,968	131,863	42,411	130,158	156,653	254,779		
LNC	36,668	9,011	197,442	71,447	-37,489	51,021	126,326	
INA	120,326	317,011	202,284	258,474	101,116	294,021	261,853	1174,063

$$\chi^2 = 52,0; \text{ df} = 34; p < ,025.$$

asymmetrical is to ignore it, provided that  $F$  ratios which are marginally significant (e.g. close to the critical value at the ,05 level) are treated with caution. In the case of the angle measures in the present experiment, the departure from symmetry of the variance/covariance matrix can safely be ignored since (i) departure from symmetry is relatively small, (ii) the only  $F$  ratio of interest is very high (see Table 5.3).

#### 5.6.2 Distance scores

Means and standard deviations of the distance scores are shown in Table 5.3 and the analysis of variance is summarised in Table 5.4. The analysis of variance indicates that the strongest effect on the distances between dolls was the anxiety/confidence variable. Distances were much greater when the variable doll was described as anxious than when he was described as confident. The effect of the type of motivation attributed to the variable doll was also significant (at the ,025 level); distances were closer when the variable doll's motivation was described as aggressive or dominating than when it was described as affiliative. There was no effect on distances of the intensity of motivation variable, and none of the interactions between variables approached significance. As was found in the case of the distance scores in the previous experiment, there was a significant effect of individual differences between subjects.

#### 5.6.3 Angle scores

Means and standard deviations of the angle scores are shown in Table 5.3 and the analysis of variance is summarised in Table 5.5. It can be seen that apart from the significant individual differences between subjects, only one experimental effect is significant, that of the anxiety/confidence variable. The  $F$  ratio associated with this

TABLE 5.3

MEAN DISTANCES BETWEEN DOLLS AND MEAN ANGLES OF VARIABLE DOLL IN THE EIGHT CONDITIONS

		High Intensity				Low Intensity			
		Positive		Negative		Positive		Negative	
		Con	Anx	Con	Anx	Con	Anx	Con	Anx
Distance (Millimeters)	Mean	92,9	119,7	75,9	114,3	101,0	123,6	84,8	122,1
	SD	19,5	27,5	28,8	31,7	25,9	39,2	21,6	28,0
Angle (Degrees)	Mean	9,6	23,3	14,1	31,8	12,6	28,6	10,3	30,8
	SD	10,2	20,2	26,1	22,3	15,0	15,9	11,2	34,3

TABLE 5.4

## SUMMARY OF ANALYSIS OF VARIANCE OF DISTANCE SCORES

Source	SS	df	MS	<u>F</u>
Subjects	39566,7	19	2082,5	3,352***
Anxiety/confidence (A)	39187,6	1	39197,6	63,079***
Type of motivation (B)	4020,0	1	4020,0	6,471**
Intensity of motivation (C)	2059,2	1	2059,2	3,315*
A x B	1716,1	1	1716,1	2,762*
A x C	72,9	1	72,9	0,117
B x C	55,2	1	55,2	0,089
A x B x C	22,5	1	22,5	0,036
Residual	82626,6	133	621,3	
Total	169326,9	159		

\*\*\*  $p < ,001$

\*\*  $p < ,025$

\*  $p < ,1$

effect is significant at the ,001 level even if it is evaluated with conservative degrees of freedom, a procedure which a cautious interpreter of the results may wish to adopt (see Chapter 4, section 4.4.4); the number of conservative degrees of freedom is 1 for the numerator of the F ratio and 19 for the denominator.

TABLE 5.5  
SUMMARY OF ANALYSIS OF VARIANCE OF ANGLE SCORES

Source	SS	df	MS	F
Subjects	20510,4	19	1079,5	3,151*
Anxiety/confidence (A)	11543,0	1	11543,0	33,691*
Type of motivation (B)	419,3	1	419,3	1,224
Intensity of motivation (C)	31,5	1	31,5	0,092
A x B	174,3	1	174,3	0,494
A x C	66,3	1	66,3	0,193
B x C	425,8	1	425,8	1,242
A x B x C	0,8	1	0,8	0,002
Residual	45567,5	133	342,6	
Total	79738,7	159		

\*  $p < ,001$

## 5.7 DISCUSSION

### 5.7.1 Anxiety versus confidence

The variable of anxiety versus confidence proved to be a most powerful determiner of distances and angles. Placements of a doll representing an interactor who was described as confident were characterised by closer distances and more direct orientations than those representing one described as anxious and uncertain how to achieve his goals.

The results bear out the importance of the distinction between activity and passivity which was discussed in section 5.1.2. High levels of physiological arousal which are part of the state of anxiety result in large interpersonal distances and angles only when the interactor is passive. If he is active, and the high level of

arousal is used to motivate an organised goal-directed behaviour sequence, he is likely to maintain a direct orientation and a close distance. Anxiety, when simply viewed as the level of arousal of the sympathetic nervous system, does not lead either to direct or to indirect orientation, to close or to far distances. The component of anxiety manipulated in the present experiment was the degree to which the arousal, drive or motivation of the interactor was able to be expressed in active behaviour towards the other participant in the encounter. When motivation gives rise to an active attempt to gain or maintain control of the encounter close distances and direct orientations occur. When an interactor fails to find a strategy which he can employ in order to gain or maintain control, the arousal is aversive to him and he reduces it to some extent by averting his gaze and increasing the distance between himself and the other.

#### 5.7.2 Reliability of effect of anxiety/confidence variable

Because of the strength of the effect of the anxiety versus confidence variable, an examination of individual placements was carried out in order to discover the proportion of cases in which a placement by a subject in the anxious version of a situation was characterised by a larger distance and a larger angle than his placement in the confident version of the same condition. Since each subject made four placements on the confident condition, and four in the anxious condition, four comparisons for each subject could be made; there were thus eighty comparisons altogether.

Scores from placements in the confident condition were subtracted from those obtained from the equivalent placements in the anxious condition. (For example, the distance score of subject 1 in condition HPC was subtracted from his distance score in condition

HPA). The difference scores thus obtained are positive if the confident placement has the lower angle or shorter distance, and negative if the lower angle or shorter distance occurs in the anxious condition. Frequencies of the values of these differences appear in Tables 5.6 (Distances) and 5.7 (Angle). It can be seen that there were 9 cases where subjects placed the variable doll closer to the fixed doll in the anxious condition than in the confident condition; this is only 11% of placements. All but one of these 9 occur in the positive, affiliative conditions. There were 14 cases of angles being larger in the confident condition than in the anxious condition; this is 18% of the total. However, in six of these 14 cases the angle difference was  $5^{\circ}$  or less, so that there were few cases of placements in the anxious condition having angles smaller to any conspicuous degree than those in the confident condition.

TABLE 5.6

COMPARISON OF DISTANCES IN MATCHED PLACEMENTS IN THE  
CONFIDENT AND ANXIOUS SITUATIONS: TABLE OF FREQUENCIES

		Interaction Description				
		HP	HN	LP	LN	Total
Difference between	below -40	0	1	0	0	1
distance in	-40 to -21	3	0	0	0	3
confident condition	-20 to -1	2	0	3	0	5
and distance in	0 to 19	4	5	7	5	21
anxious condition	20 to 39	2	3	6	8	19
(If difference is negative	40 to 59	5	4	3	3	15
distance is greater in	60 to 79	2	6	0	3	11
confident condition)	above 80	2	1	1	1	5

TABLE 5.7

COMPARISON OF ANGLES IN MATCHED PLACEMENTS IN THE  
CONFIDENT AND ANXIOUS CONDITIONS: TABLE OF FREQUENCIES

		Interaction Description				
		HP	HN	LP	LN	Total
Difference between angle in confident condition and angle in anxious condition (If difference is negative angle is greater in the confident condition)	below -15	0	1	0	0	1
	-15 to -1	4	3	2	4	13
	0 to 15	9	6	8	6	29
	16 to 30	3	3	7	5	18
	31 to 45	3	2	3	1	9
	55 to 60	0	3	0	2	5
	61 to 75	1	1	0	1	3
above 75	0	1	0	1	2	

### 5.7.3 Overall immediacy of placements

The term "immediacy" is suggested by Mehrabian (1967) to mean "the degree of directness and intensity of interaction between people". It was indicated in section 5.3.1 above that interactions where immediacy is high are characterised by particular non-verbal behaviour patterns which distinguish them from those where immediacy is low. In immediate interactions, distances are close, eye-contact is frequent and orientations are direct (Mehrabian 1969a). If the immediacy of an encounter is reduced, this may be expressed by an increase in the interpersonal distance, a greater indirectness of orientation, a reduction in eye-contact or by changes in other non-verbal aspects of the encounter (Argyle and Dean 1965). Changes may take place in one or more behaviours together.

The present experiment has shown that a doll is placed in a less immediate position relative to another if he represents an

interactor who is uncertain how to act than if he represents an interactor who is confident. The lesser immediacy in the anxious condition was generally expressed by both an increase in distance and an increase in angle. 56 out of the 80 pairs of placements indicated a greater value both of the distance and the angle in the anxious condition. There were 4 cases where the angle remained constant and only the distance was increased. In 12 cases distance was increased but the angle reduced in the anxious condition; in 6 cases angle was increased but distance reduced; only in 2 cases were both angle and distance smaller in the anxious condition than in the confident condition.

If one placement has a smaller angle and a smaller distance than another it is clearly the more immediate. If on the other hand a placement has a smaller angle and a larger distance or a larger angle and a smaller distance than another a criterion is needed in order to judge which is the more immediate of the two. It is not yet known how distance and angle interact to influence the subject's perception of a figure pair. In order to derive a score of the overall immediacy of a placement to which both angle and distance contributed, it was therefore necessary to make the assumption that angle and distance make an equal contribution to the perceived immediacy. Distance scores and angle scores were converted to standard scores (z-scores) so that they would be expressed on comparable scales. The two z-scores, one for angle and one for distance, were then added in order to obtain an immediacy measure for each placement. This immediacy measure is low for a placement with a direct angle and a close distance, and high for a placement where angle and distance are large. Therefore immediacy scores of placements in the confident condition should be lower than those of

placements in the anxious condition.

When immediacy scores had been calculated for all placements, the scores of placements in the confident condition were compared with corresponding placements in the anxious condition. In only 10% of cases was the immediacy score found to be lower in the anxious condition than in the confident condition. This analysis suggests that the relationship between doll position and anxiety is fairly reliable.

The assessment of the overall immediacy of a placement by means of a composite score obtained by pooling the  $z$ -scores of the distance and the angle thus provides a means of comparing any two placements. However, since the relationship between distance and anxiety is stronger than that between angle and anxiety (as evidenced by the higher  $F$  ratio for the effect of anxiety/confidence on distance: the  $F$  ratio for anxiety/confidence was 63,0 in the case of the distance scores and 33,7 in the case of the angles) it might be appropriate to weight the contribution of the distance to the immediacy score more highly than that of the angle. The development of such scoring procedures might be particularly valuable if the method is to be used as an objective test in the clinic (as will be suggested in Chapter 6).

#### 5.7.4 Correlation between angle and distance

The analyses discussed above show that placements of dolls representing an anxious interactor are characterised by greater distances and by greater angles than placements representing a confident one. The question which arises from this observation is to what extent angles and distances vary together. If a placer perceives a figure as anxious, does he express this both through the medium of distance and through the medium of angle? Or does he

express it primarily through one variable?

As was mentioned in the preceding section, in 56 out of 80 cases placements in the confident condition had smaller angles and closer distances than those in the anxious condition. Thus in 70% of cases greater anxiety was expressed both through increase in angle and through increase in distance. However, in these cases the values of distance and angle were not necessarily increased by comparable amounts. In a further 20% of cases, placements in the confident condition had a higher overall immediacy than their equivalents in the anxious condition, but the greater non-immediacy in the anxious condition was brought about by either an increase in angle or an increase in distance, but not by both together. In the remaining 10% of cases placements in the confident condition were actually less immediate than their equivalents in the anxious condition.

Given these results, a slight positive correlation between angle and distance scores might be expected and this is what is in fact found. If a correlation coefficient is computed from the 160 pairs of angle and distance scores obtained from the experiment, a value of +,17 is obtained. This is significantly larger than would have been expected if no relationship existed at all ( $F = 4,86$ ;  $p < ,05$ ). However the value is so low that for all practical purposes predictability of one score from the other is practically negligible.

This independence of angle and distance is probably due to the fact that it is possible to express the same degree of immediacy by means of a doll placement through many different combinations of distance and angle. A close distance with a large angle may be perceived by a subject as expressing the same degree of non-immediacy

as an intermediate distance and an intermediate angle or as a far distance with a small angle. The experimental findings can thus be regarded as confirmation of the theory proposed by Argyle and Dean (1965). They suggested that the same relationship between two interactors might be expressed through many combinations of values on many dimensions. For example, these authors argue, if a pair of interactors wish to increase the intimacy of their encounter, this could take place by means of an increase in eye-contact, a greater proximity, or the discussion of a more intimate and personal topic of conversation.

This suggests that it would be a valuable follow-up study to the present research to present judges with doll configurations to rate which exhibited different combinations of distance and angle. By scoring a series of configurations on a number of semantic differential categories it should be possible to arrive at the relative contributions of angle and distance to the perceived immediacy of a placement.

#### 5.7.5 Affiliative versus aggressive motivation

In section 5.1.6, the prediction was made that placements would be similar whether the motivation attributed to the variable doll was affiliative or aggressive; the results did not entirely support this prediction. The prediction was supported firstly in that this variable had no effect on the angle at which the variable doll was placed, and secondly in that distances were relatively close in the confident versions of both affiliative and aggressive interaction descriptions when compared with the distances in the anxious versions. There was however a significant tendency for distances to be greater in the affiliative situations than in the aggressive ones. Inspection of the means in Table 5.3 suggests that the effect

is largely confined to the confident situations, although the analysis of variance indicates an interaction effect between Type of motivation and Anxiety/Confidence which is only significant at the 10% level of confidence.

Although the finding that distances were greater in the affiliative than in the aggressive situations is not in accord with the hypothesis advanced in section 5.3.4, it does not provide support for Mehrabian's theory either. Mehrabian argued that an interactor stands closer to a person he likes than to one he dislikes (see section 5.3.1); the present results are in direct opposition to this since distances in the affiliative situation where the doll placed represented an interactor who liked the other were greater than those in the aggressive condition where the doll represented an interactor who disliked the other.

Another basis for the expectation that distances would be closer in the affiliative situations is the theory of Cook (1970) that as motivation to interact increases so there is an increase in proximity if the interaction is affiliative (but at the expense of directness of orientation) and an increase in directness of orientation if motivation is aggressive (with distance remaining fairly large). Again, results are the contrary to such an expectation.

However there are a number of reasons why Cook's interpretation of his results does not apply in the present case. Firstly, Cook's finding that the side by side seating arrangement which maximises proximity at the expense of eye-contact was chosen for interactions where there was a strong affiliative motivation was based on encounters in which boy and girl friends were supposed to be interacting. In such interactions, affiliative motivation is confounded with sexual motivation. In a non-contact culture such as that to

which the subjects in the present study belonged, adults do not adjust their spatial relationships in order to maximise physical contact when engaged in affiliative encounters with members of their own sex.

Secondly, the spatial arrangements which Cook's subjects could choose from differed from those available in the present study. Cook's subjects could choose from a number of symmetrical patterns of varying degrees of directness; in the present study the fixing of the angle of one of the figures ruled out such patterns as the side by side ( $\text{Or} = 90, 90$ ) or intermediate ( $\text{Or} = 45, 45$ ) patterns available to Cook's subjects.

The affiliative interactions employed in the present experiment were quite different from that employed by Cook, and direct orientations had been predicted in the confident conditions on the basis of the finding of Pellegrini *et al.* (1970) that people use eye-contact when attempting to win the approval of another. Similarly, close distances had been predicted on the basis of Rosenfeld's (1965) finding that people move close to another if attempting to gain his approval.

The direct orientations in the confident affiliative conditions in the present experiment were therefore in accordance with expectation. The distances are surprisingly large, however, especially if they are compared with those obtained in Experiment II. Situation 3A of Experiment II is similar in many respects to the confident affiliative conditions of the present experiment. In 3A, subjects were told that one person was asking a favour of another and that the other was granting it. In that situation, as in HPC and LPC of the present study, one interactor was described as attempting to secure the co-operation of another. In 3A the subject

was told that he secures the required co-operation, and in HPC and LPC he was told that he is confident that he will secure it.

In both cases similar orientation patterns characterise placements: symmetrical patterns in which orientations are fairly direct. There is, however, a striking difference in the distances which are much closer in 3A than in HPC and LPC. The mean distance in 3A was 81mm; in HPC it was 93mm and in LPC 101mm. The distance in 3A is significantly closer than that at HPC ( $t = 2,206$ ;  $df = 48$ ;  $p < ,05$ ); it is also closer than that at LPC ( $t = 3,176$ ;  $df = 48$ ;  $p < ,01$ ).<sup>\*</sup> The distances in situations HPC and LPC of Experiment III are, therefore, surprisingly large, and require explanation.

#### 5.7.6 Status and reactance as possible determiners of distance

One possible reason for the relatively large distances in the HPC and LPC conditions in the present study is that subjects perceived a status difference to be implied in the description of the encounter. For example, the words from the description in the HPC condition "A very much admires and respects B" could well imply that A was of a lower status than B. In the LPC condition the words "A quite likes B" can hardly be taken to imply a status difference, but such a difference may be seen as implicit in the second part of the description, "he wants to act in such a way that B will be agreeable to him." If subjects did perceive a status difference, they may have placed the variable doll at a relatively large distance from the fixed doll as a signal of deference.

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\* Although these comparisons are not strictly a priori since they were not specified when the experiment was designed, the use of the t-test seems legitimate in this case since the comparison is specified by the argument in the above paragraph and was not simply indicated by snooping in the data for a pair of means which looked as if they might yield a significant difference if compared.

To act in a deferential manner is to indicate that one is aware of one's lower status and that one intends to act in accordance with it. It is a means of securing the goodwill and co-operation of the high-status interactor. If a low status interactor fails to signal deference, or if he attempts to control the encounter in a manner appropriate to a high-status person he runs the risk that he will lose the co-operation of the high-status person, because the latter will react against his "pushy" behaviour.

When a person so reacts against another, he develops psychological reactance and becomes less persuasible. A theoretical account of the nature of reactance and the conditions under which it will occur has been given by Brehm (1966). He defines the conditions for the development of reactance as follows:

"Given that a person has a set of free behaviours, he will experience reactance whenever any of these behaviours is eliminated or threatened with elimination." (Brehm 1966 p.4)

Reactance is defined as follows:

"Psychological reactance is conceived as a motivational state directed toward the re-establishment of the free behaviours which have been eliminated or threatened with elimination." (op.cit. p.9)

Brehm's analysis can be applied to the interaction situations HPC and LPC. In these situations, one interactor, B, is, prior to the start of the encounter, free to be friendly towards A and to administer social reinforcements to him or to be aloof or even hostile, as he chooses. However, at the start of the encounter, A makes a move which is designed to limit B to the former of these responses to A. A's behaviour thus sets a limit on B's freedom either to like or dislike A. A therefore runs the risk that he will

provoke reactance in B. If he were to provoke reactance, B would act in such a way as to remove the threat to his freedom. This would mean a resistance by B to A's attempts to get him to like him. This resistance or reactance would defeat A's object in initiating the encounter.

The degree of reactance provoked in a person is a function of "the magnitude of the pressure to comply" (Brehm op.cit. p.119). A can therefore lower the risk that he will provoke reactance in B by exerting only a subtle pressure on B. The pressure to comply is a function of a number of variables including the distance that separates the two interactors. A is less likely to provoke reactance in B if he stands further away from him. This was demonstrated by Albert and Dabbs (1970) who measured the amount of attitude change in subjects to whom persuasive communications were addressed by an experimenter from a close distance (1 - 2 feet), or an intermediate distance (4 - 5 feet), or a far distance (14 - 15 feet). These authors found that subjects' attitudes were changed most strongly in the direction of the communication when they were addressed at the far distance; at the close distance subjects actually changed their attitudes away from those expressed by the communication. Albert and Dabbs argued that reactance had been provoked in subjects addressed at the close distance and that this had caused them to reject the point of view expressed in the communication.

Whether or not a status difference is perceived in the affiliative confident situations of Experiment III, these situations are ones in which one interactor attempts to gain the co-operation of another. In such a situation, the provoking of reactance would result in failure for the interactor who was seeking to gain the approval of the other. Subjects may have placed figures at relatively large

distances in the HPC and LPC conditions therefore, because they saw them as representing interactors who were avoiding coming too close because they wished to minimise the risk of provoking reactance.

This provides a basis for explaining the closer distances in the aggressive conditions than in the affiliative conditions of Experiment III. When a person attempts to dominate or humiliate another he makes a bid for control of the situation whether the other co-operates with him or not. The provocation of reactance does not therefore defeat his goals. Thus in the aggressive situations of Experiment III the interactor represented by the variable doll does not need to keep his distance in order to avoid exerting too much pressure on B; on the contrary, the stronger the pressure he exerts, the greater are his chances of success. In the affiliative situations, however, inter-doll distances are greater because of the risk that reactance might be provoked.

The analysis in terms of reactance provides a less clear-cut explanation of the fact that distances were substantially larger in conditions HPC and LPC of Experiment III than in situation 3A of Experiment II (see section 5.7.5). Although it might be concluded that subjects perceived a greater risk of reactance being provoked in situations HPC and LPC than in situation 3A, this explanation is clearly post hoc and requires some further justification. This might perhaps be provided by future experimentation, but until this is done the finding cannot be considered to have been satisfactorily explained.

#### 5.7.7 Intensity of motivation to interact

Manipulation of the intensity of motivation variable had only a slight effect on the distances between the dolls, and no significant effect on the angle at which the variable doll was placed.

The mean distance in each high intensity condition was less than that in the corresponding low intensity condition. For example, the mean distance in condition HNC was lower than that in condition INC (see Table 5.3). However although the means were in the predicted pattern, the effect of the intensity variable on inter-figure distances was only significant at the 10% level. In the case of the angle measures, the  $F$  ratio associated with this effect was so low that the hypothesis that angles would be greater in the low intensity condition received no support at all.

The present data, therefore, provide only weak support for Cook's theory that there is a decrease in distance and/or angle as motivation to interact increases. Two possible reasons for this result are that the experimenter failed to manipulate the variable effectively, and that the variables of intensity and anxiety/confidence interact in some way. These two possibilities are discussed below.

Failure to manipulate the variable effectively: It is possible that the wording of the interaction descriptions in the high and low intensity conditions was not sufficiently different so that subjects perceived the motivation to interact as the same in the high intensity and the low intensity conditions. A priori this does not seem particularly likely. Words such as "hates", "dominate", "admire", which appear in the high intensity conditions are much stronger than "rather dislikes", "get the better of", and "likes" that appear in the low intensity situations. It would be possible to establish whether the variable was successfully manipulated by having a group of subjects rate the interaction descriptions. An indication of the degree of motivation to interact perceived in each description could thus be obtained. Unfortunately it was not possible to perform this additional study because of lack of time, and because the student population from

which the experimental subjects were drawn had already dispersed for the long vacation when the need for such a study was realised.

Confounding of intensity and confidence: It may be that intensity only affects proxemic behaviour at intermediate levels of confidence. In the interactions used in the present study, interactors were described either as very confident, or as completely lacking in confidence. It is possible that in both such situations interactors tend to adopt the same interpersonal distance whether the intensity is high or low, but that in cases where an interactor is neither very confident nor very anxious the intensity of his motivation to interact has a more marked effect on his proxemic behaviour.

It is also possible that subjects tend to imagine a highly motivated interactor as more confident than a weakly motivated one, so that when the degree of confidence is not specified by the experimenter (as in Cook's study) the immediate behaviour typical of confident interactors is attributed to strongly motivated interactors, and the less immediate proxemic behaviour of less confident interactors is attributed to weakly motivated interactors.

#### 5.7.8 Individual differences

There were significant individual differences between subjects both in the distances at which the dolls were placed from each other and in the angles at which the variable doll was placed. It can be seen from Tables 5.4 and 5.5 that in each case the  $F$  ratio associated with the effect of individual differences was significant beyond the ,001 level. In this respect the results of Experiment III parallel those of Experiment II.

It was noted in Chapter 4 that significant differences between subjects are a regular feature of doll placement data. The possible

causes of these differences are discussed briefly in section 4.6.4.

#### 5.7.9 Conclusions

The main conclusion that can be drawn from the results of this experiment can be stated simply as follows: when a doll is placed to represent an interactor, the chief determinant of the distance of that doll from a second doll and the angle at which it is placed in relation to the second doll is the degree of confidence which the placer perceives to be enjoyed by the interactor represented by the doll. If the interactor is perceived as confident, the doll is placed in an immediate position (i.e. close and in a direct orientation); if he is perceived as lacking in confidence, the doll is placed in a non-immediate position.

Apart from confidence/anxiety, other variables do affect the position of the doll. For example, in the confident conditions distances were closer in aggressive than in affiliative interactions. Distances were also closer when the doll being placed represented a more highly motivated interactor. But compared to the strength of the effect of anxiety/confidence variable as a determinant of doll position, the importance of these other variables is relatively small.

At the beginning of this chapter, confidence and anxiety were analysed and defined as two different motivational states in both of which the interactor is motivated to interact. It was argued that a confident interactor is physiologically aroused and acts in a planned and controlled manner towards the attainment of those goals which he is motivated to attain; an anxious interactor on the other hand, is also physiologically aroused and motivated to act but his behaviour is not organised towards the effective attainment of his

goals and is passive.

Because of the important place which the concept of anxiety has in psychological theory and particularly since much clinical work is concerned with the identification of those areas of a person's experience which make him anxious and which he does not know how to handle, the doll placement technique could come to have valuable applications in the clinic as well as in research. Some of the implications of the findings of this experiment and the one described in the previous chapter for the future of the technique will be explored in Chapter 6.

## CHAPTER 6

## PROSPECT FOR THE DOLL PLACEMENT TECHNIQUE

## 6.1 SIMPLICITY AND FLEXIBILITY OF THE DOLL PLACEMENT METHOD

At present the doll placement is not fully elaborated as a technique with practical applications in psychology. However the results of the present research suggest that the method has promise and could with profit be developed for use both as a research tool and as a clinical instrument.

There are a number of features of the method which recommend it. Firstly, the request to place a doll or a pair of dolls so as to represent a pair of persons engaged in a social encounter is meaningful to the subject of whom the request is made. Secondly, the task requires very little explanation and subjects make their responses quickly and easily so that quite a large number of placements can be made by a single subject in a short time.

The doll placement technique has certain advantages over the seating position technique employed by Sommer (1965), Cook (1970) and Ingham (1970). Firstly, the subject is not limited to those orientation patterns chosen for him by the experimenter, but is able to vary the orientation in which a doll is placed along a continuous scale; in this respect the doll placement method is the more sensitive of the two techniques. Secondly, the present work has shown that the asymmetry of an orientation pattern is an important feature of it; the doll placement method provides a measure of this asymmetry, whereas the seating position questionnaire does not. Thirdly, although the seating position questionnaire allows the subject to choose between close and distant seating arrangements,

its measure of distance is at best crude. The figure placement method on the other hand provides measurement of inter-figure distance on a continuous interval scale.

Furthermore, there is practically no restriction of age or culture in the use of the technique. Pilot studies with illiterate Xhosas by the writer indicate that these people respond to the task just as readily as do white university students. Although no doll placement studies in which children have participated have yet been reported it is probable that children will be found to perform the task with the same ease as do adults, at least from the age of 5 or 6, if not earlier. Placements by children of felt figures using the Kuethe technique have been studied by Carlson and Price (1966), Estes and Rush (1971), Weinstein (1965 and 1967), Fisher (1967) and Duhamel and Jarmon (1971). In the Estes and Rush study, children as young as 3 years of age participated.

Both Estes and Rush and Carlson and Price found that younger children placed groups of figures in a less constrained way than did adults. Whereas adults always arranged figures to form social social groups, young children often arranged them in non-social patterns. However when using the Kuethe technique, the experimenter simply hands a set of figures to the subject and tells him to place them on the board. He is not told specifically that the figures should represent a social encounter. It is probable that even young children would arrange dolls in social patterns without difficulty if asked, for example, to "show me your mummy and daddy talking."

It has already been stressed that the use of three dimensional dolls instead of flat figures as in the Kuethe technique is preferable since both orientations and distances are available to the

experimenter when dolls are used. The doll placement technique thus combines the best points of the Kuethe technique and of the seating position questionnaire. The distance score in a doll placement is comparable to that furnished by the former technique and the measure of orientation is more flexible than that furnished by the latter. The results of the three experiments reported in previous chapters all serve to indicate the value of including the orientation measure in the analysis of doll placements.

## 6.2 CLINICAL APPLICATIONS

### 6.2.1 Doll placements and emotional disturbance

A number of studies using the Kuethe technique and adaptations of it have demonstrated differences between emotionally disturbed and normal children in the way they place flat felt figures on a flannel board. These findings suggest that a doll placement task could usefully be added to a test battery as an additional source of material from which inferences about a client in a clinic can be drawn.

Fisher (1967) found that disturbed boys placed figures further apart than control boys or control girls. Weinstein (1965) failed to find a significant difference between disturbed and normal children in the distance between figures; however she did show that whereas undisturbed children usually place a child closer to a woman than to a man, disturbed children more often placed the child closer to a man than to a woman. She also showed that whereas undisturbed children normally placed a mother and child pair closer together than a pair of child figures, disturbed children placed the child-child pair closer than the mother-child pair. Another finding of Weinstein's was that when performing Kuethe's display

reconstruction task (described in section 1.4.1) normal children placed rectangle pairs and figure pairs at the same distance, but disturbed children placed the rectangles closer than the figure pairs.

There is a strong relationship between the way a person places figures or dolls and his own proxemic behaviour (section 1.4.2). Since the findings reviewed above indicate that emotionally disturbed children tend to place figures further apart than normals, it seems likely that these disturbed children normally stand further away from those with whom they are in conversation than normal children and that this is reflected in their figure placements. It is probable that disturbed children stand further away than normals because they are anxious about social encounters since they do not know how to manage them effectively (Argyle 1967 chapter 8).

It has been argued above that the doll placement technique is superior to the Kuethé technique since both distance and angle measures can be made when dolls are used. It is possible that a person's emotional disturbance would be reflected in the angles at which he placed dolls as well as the distance between them. If an experimenter or clinician were to ask a disturbed person to place a doll pair to represent a situation normally associated with direct orientations, such as that described in condition 2A or 3A of Experiment II, it seems possible that indirect orientations would characterise the placement, since he would project his own lack of confidence on to one or both of the figures.

#### 6.2.2 Anxiety and control

A patient generally seeks clinical help because a situation has developed in which he is unable to manage certain areas of his life effectively. This is often because certain areas of his

experience have become so anxiety provoking that effective planning or clear thinking in connection with them has become impossible. It is generally recognised that the greater the complexity of a problem with which a person is faced, the lower is the optimum level of arousal for solving it (the Yerkes-Dodson law). In such a case, the task of the therapist is to pinpoint the focal areas of a person's anxiety as accurately as possible and then to guide him towards a greater degree of control over them. This may involve the reduction of anxiety by some method of desensitisation and also the establishment of effective techniques to enable him to manage situations which he could not manage before.

The most promising area of the clinician's work in which the doll placement technique may prove effective may prove to be the process of identifying the foci of a patient's anxiety.

### 6.2.3 Anxiety-provoking relationships

The work of Weinstein reviewed above in section 6.2.1 showed that large distances between figures were particularly noticeable when disturbed children placed mother and child figure pairs. The finding suggests that these children's anxiety is mainly about their relationship with their mother. This interpretation is supported by Fisher's (1967) finding that children with irritable mothers placed figures further apart than those whose mothers were low on irritability. If a mother is irritable, this makes the child anxious, and impairs his ability to learn to cope effectively with his relationship with her. Anxiety about interaction with the mother may generalise to other social relationships, but the relationship with the mother remains the focus of anxiety.

That a disturbance of the mother-child relationship in childhood may be the source of inability to manage social relationships

effectively in later life is suggested by the findings of Higgins, Peterson and Dolby (1969). Using male undergraduates as subjects, these investigators demonstrated differences between the figure placements of poorly and well adjusted subjects. The Kuethe technique was used and subjects placed a four-figure set of silhouettes consisting of a father, mother, son and daughter. Subjects with poor social adjustment placed the son closer to the father, those with good social adjustment placed the son closer to the mother. The authors argued that the figure placements

" . . . may reflect a negatively toned maternal relationship in the early lives of males whose social-sexual adjustment is poor -- at least as perceived by the child."

A set of doll placements made by an emotionally disturbed person could provide valuable data to a therapist as to whether his patient's anxiety applied generally to all social relationships or only to one or two. If the patient was beset by a general anxiety about all social encounters, it might be expected that all his placements would be characterised by large distances. On the other hand, if his anxiety was mainly focused on one type of relationship, this might be evident if one or two placements from a set were characterised by large distances.

If a client's problem is anxiety about social encounters, it might be particularly valuable to be able to identify a relationship about which the patient is confident, since this relationship could be used as the basis for training him to manage all social encounters effectively.

#### 6.2.4 Anxiety-provoking topics and subjects

There may be areas of a client's experience other than those concerned with social relationships which a person finds emotionally

disturbing; there may be non-social activities in which he has to engage but about which he is anxious, or his anxiety might not concern particular people with whom he interacts, but particular types of social encounter or activity in which he has to engage. Hospitals, politics, sex, recreational activities or occupation may all furnish areas of experience which are anxiety-provoking. An anxiety of this type would be reflected in disturbances of proxemic behaviour if, for example, the person suffering from it were to be questioned about the area of anxiety directly. Thus a person who is anxious about sex may become embarrassed when they become involved in a conversation about matters concerning sex. Such embarrassment is reflected in a reduction of eye-contact, as well as in other ways.

A person might have an abnormal anxiety about hospitals. This might be due to some earlier experience in a hospital which was unpleasant. He might defend himself against the anxiety induced by the subject of hospitals by avoiding thinking or talking about hospitals, avoiding going near or visiting people in hospitals, avoiding relationships with people who work in hospitals, etc. This source of anxiety could affect the way he placed a doll pair if a suitable situation was constructed. He might, for example, be asked to place a doll pair to represent "Your doctor telling you that you will have to go to hospital to have your appendix out" or "Yourself talking to a friend who is telling you about an operation he has just had". These placements might be found to be characterised by larger distances than those in which the figures are imagined to be discussing topics that are neutral for the placer; in addition, an unusually large angle might be found with the figure representing "yourself".

If such a technique as that outlined above were to be found effective, it would be very similar in conception to one developed by Wiener and Mehrabian (1968). These workers have argued that a person's anxiety is reflected in many aspects of his verbal and non-verbal behaviour, and have been able to show that certain forms of speech occur more often when a person is talking about an anxiety provoking topic. For example, he tends to use the form "that guy" instead of referring explicitly to "Smith" and to employ qualifiers such as "obviously" and "I feel . . .". These forms of speech are called "non-immediate", just as indirect orientations or large interpersonal distances are called non-immediate forms of proxemic behaviour (Mehrabian 1969a).

Wiener and Mehrabian have shown that the focal areas of a person's anxiety may be identifiable from the text of a clinical interview. The person's utterances during the interview are scored for non-immediacy, and mean non-immediacy is calculated for those parts of the interview where particular topics are being discussed. Wiener and Mehrabian illustrate the technique by scoring a particular interview in which the following seven topics were isolated: people, tension, reading/books, escape/running away, school, happiness, pills/sleep. The topics of "people" and "tension" were characterised by high levels of non-immediacy; those of "happiness" and "pills/sleep" by low levels. Wiener and Mehrabian conclude that for the interviewee in question, "people" and "tension" were what they call the "most negatively experienced content areas". Since Wiener and Mehrabian use the term "negative experience" as a synonym for anxiety, the scoring of specific content areas for non-immediacy is a means of identifying the foci of the interviewee's anxiety.

Since a person's anxiety or negative experience appears to be reflected in non-immediate proxemic behaviour as well as in non-immediate linguistic forms, anxiety-provoking areas of a person's experience may prove to be identifiable by means of the doll placement technique as suggested above. In order to do this it may only be necessary to ask a person to make placements of doll pairs representing "two people talking about \_\_\_\_\_" with a suitable content area filled into the blank. On the other hand it may be necessary to get the placer to identify with one of the dolls by asking him to represent himself in conversation with another person in the way which was suggested above.

#### 6.2.5 Language difficulties

Many projective techniques used in the clinic require the client to respond verbally. In the TAT and the Four Pictures tests, for example, the client is required to make up a story which he then related to the therapist. In the Rorschach technique, the clinician is interested in what patterns the client sees in the ink-blots, but he relies on the client's verbal reports for his data. The doll placement technique requires no verbal response on the part of the testee. The latter must be able to understand language, of course, so that he knows what type of encounter he should represent when making a placement, but his response is non-verbal.

In some cases of emotional disturbance, a person's ability to express himself clearly by means of language may be seriously impaired, and this imposes an enormous barrier to successful clinical interpretation of his condition. It is possible to conceive of a therapist imaginatively and constructively adapting the doll placement task as a medium of expression for such a person. The latter might be encouraged to make a series of placements to represent a

sequence of stages during a single social encounter, for example. In this way he might be able to "speak to" the therapist by means of the angles and distances of the dolls. He might also be able to communicate by means of the way in which he moves the dolls. Patterns of movement can be a versatile medium of expression, and people readily project social behaviour upon inanimate figures which move in an orderly way. This was demonstrated by Heider and Simmel (1944) who made a film in which small triangles and circles moved about the screen. Persons to whom the film was shown were asked to say what they had seen. Practically always they talked of "the triangle chasing the circle" or "the two triangles fighting" or projected other social activities upon the abstract geometrical shapes they had seen in the film.

### 6.3 APPLICATIONS IN CROSS-CULTURAL RESEARCH

#### 6.3.1 Culture and doll placements

There are some differences and some similarities between the way dolls are placed by members of different cultures. Little (1968) showed that for a range of different social situations dolls were placed further apart by Swedes and Scots than by Italians and Greeks. Edwards (1972a) has shown that the doll placements of Xhosas differ from those of white South Africans both in terms of the distances apart and of the angles at which they stand. However all Little's groups placed dolls representing persons engaged in intimate encounters closer than those representing participants in socio-consultative encounters and Edwards found that the placements of Xhosas were similar to those of whites when friendly encounters between equal status interactors were being represented, and were only markedly different if there was a status difference between interactors or if the encounter was hostile.

These differences in the way in which dolls are placed parallel cultural differences in proxemic behaviour. It was the members of contact cultures in Little's study who placed the dolls close together and the members of non-contact groups who placed them further apart. Edwards found that Xhosas placed dolls at large distances when they represent a quarrel, and information observation and material gathered in interviews with Xhosas suggest that large distances between interactors do characterise actual quarrels between Xhosas.

It is probable that different orientation characteristics in the placements of members of different cultures would reflect different patterns of eye-contact in the cultures concerned. If placements by Arabs, for example, could be compared with placements by Englishmen, it would be surprising if the former were not found to exhibit closer interpersonal distances and more direct orientations than the latter, since Arabs interact at closer distances than Englishmen and engage in more eye-contact (cf. Collett 1971).

Care must be taken in the interpretation of differences between cultures in the way dolls are placed. Differences may reflect different cultural norms of proxemic behaviour; on the other hand they may reflect differences in the way the same type of social encounter is structured in different cultures. These two sources of variation in proxemic behaviour are discussed below.

### 6.3.2 Culture and norms of proxemic behaviour

Norms, culturally learned rules which govern various areas of behaviour, affect proxemics also. Hall (1955) argues that Arabs stand closer to each other than Americans do because of the operation of different norms in the two cultures. Similarly he implies (Hall 1966) that different norms of visual behaviour are learned by

English and Americans. The existence of different sets of norms governing non-verbal behaviour during interaction gives rise to differences in style of interaction from culture to culture. Argyle argues that these differences in style are not due to different personality characteristics of the cultures concerned:

"Much of what is sometimes described as 'national character' can be looked at simply as differences in social techniques and in norms of behaviour. When Latin Americans stand closer than North Americans, it does not follow that their desire for intimacy is greater; it may just be that they have learned different social techniques." (Argyle 1967 p.81)

Argyle also argues that people learn to interact smoothly with people who use the same style of social interaction as they do. If they encounter a member of another culture whose interaction style is different, smooth interaction is difficult because the interactors do not know how to use the non-verbal signals made by each other as signals for the regulation of the flow of the encounter. When interaction styles clash in this way, not only is the flow of the interaction disrupted, but the two interactors may regard each other as ill-mannered since it is rude to violate social norms. Thus Latin Americans may regard North Americans as cold and aloof because the latter have learned to interact at a distance which is greater than that which is normative in Latin American culture, while North Americans regard Latin Americans as rude because they stand too close.

The figure placement technique might prove to be a useful method of studying cultural norms of proxemic behaviour. However it cannot adequately substitute for the more thorough method of direct observation and measurement of actual interactors such as was employed by

Watson (1970). However it might serve as a useful heuristic instrument for a researcher who was embarking on a comparative study of the proxemic norms of two cultures, and wanted to isolate those types of encounter where differences were most likely to be found.

### 6.3.3 Cultural differences in interaction structure

Cultural differences in the way doll pairs are placed may not be due simply to differences in proxemic norms but may reflect differences in the nature of status relationships or other aspects of the structure of the interaction. There are several ways in which an interaction may have a different structure in two different cultures. A relationship may imply a status difference in one culture, but not in another. Thus a man and a woman may be regarded as of equal status by one group, while another group gives the man higher status than the woman.

It was noted by Edwards (1972a) that the structure of approach and avoidance factors for proximity and eye-contact which characterises a quarrel among Xhosas is different from that which characterises the same situation among whites. He found that placements by Xhosas representing friendly interactions and placements by whites representing both friendly interactions and quarrels all had distances of about 100mm. However when making placements representing quarrels Xhosas placed the dolls much further apart, with a mean distance of 140mm when the quarrel was between two men.

Although it might be argued that Xhosas and whites simply have different norms about proximity when persons are engaged in a quarrel, Edwards argued that a factor which affected the structure of approach and avoidance forces was present in quarrels as perceived by the Xhosas but was not present in quarrels as perceived by whites; this factor was the fear of violence. Middle class whites seldom strike

each other when they become involved in an argument. They therefore maintain the same distance when they are arguing as they do when they are engaged in a friendly conversation. They may move a little closer in order to threaten the other, or move a little back if the intensity of the confrontation is too strong, but there is no general pattern and the mean distance for the placements representing friendly encounters in the experiment was not significantly different from the mean distance for placements representing quarrels. When two Xhosas quarrel, on the other hand, there is a real possibility that physical violence will occur and each runs the risk that the other will attack him. Each therefore keeps his distance in order to avoid being struck by the other.

If this argument is correct, the large distance of the Xhosa placements representing the quarrel are not simply due to the operation of a formal cultural rule. Because of the fear of violence that is present in the quarrel the balance of approach and avoidance factors is dramatically different from that which pertains among whites. It is this difference in the balance of approach and avoidance forces governing proximity and eye-contact which is referred to when it is stated that the interaction has a different structure.

Ingham (1970) explained the results of his cross-cultural seating position questionnaire not in terms of norms but in terms of structure. He found that Swedes showed a marked preference for face to face seating positions, in contrast to his English subjects who showed a preference for seating arrangements at right angles. This was interpreted by him not as indicating a difference between norms of seating position in Sweden and in England, but as due to the greater need of Swedes to look at each other's faces in order to discover how the other evaluated their social behaviour.

The most interesting insights which the doll placement technique may furnish its users may prove to be into cultural differences in the way the same type of encounter is structured. Because it can provide sensitive distance and angle measures it is probably more suitable for this purpose than the Kuethe technique or the seating position method.

#### 6.3.4 Cultural differences in foci of anxiety

Many patterns of response to the doll placement task have cross-cultural generality. Xhosas place dolls to represent friendly encounters in much the same way as do whites (Edwards 1972a) and all the groups studied by Little (1968) placed figures closer together when they were engaged in intimate encounters than when the interactions were social-consultative. The tendency for members of two cultures to place dolls in the same way would suggest that the determinants of interpersonal distance and eye-contact are similar in the two cultures. When this is the case, the interpretation of situations which yield different placement patterns will be of particular interest.

A first step in the application of the technique in a cross-cultural setting must clearly be to discover whether the effect of the anxiety/confidence variable is similar in the cultures under study, since this has been shown in Experiment III to be such a powerful determiner of distance and angle. If placements representing interactors who are anxious and uncertain how to act are characterised by large distances and angles in two cultures, the technique could be employed in a comparative study of those areas of experience which are anxiety-provoking. It was suggested in section 6.2.4 above that figures placed to represent interactors discussing a subject which is anxiety-provoking for the subject might

be placed further apart and with larger angles than those representing people discussing neutral topics. If this could be demonstrated to be the case, the doll placement technique might be adapted as a means for making an indirect study of cultural differences in the amount of anxiety associated with various areas of experience.

#### 6.4 SOME PRACTICAL CONSIDERATIONS IN THE USE OF THE TECHNIQUE

The orientation and distance characteristics of a doll placement result from the operation of a particular set of approach and avoidance forces for proximity and eye-contact. However doll pairs representing two quite different social encounters may be placed in identical ways not because the approach and avoidance forces operating in the two situations are the same, but because two different combinations of approach and avoidance factors can result in identical placement patterns. For example, a figure may face another at an angle of  $20^{\circ}$  both when there are strong approach factors and strong avoidance factors operating (as in the anxious situations in Experiment III) or when neither approach nor avoidance factors are strong (as in the friendly situation 1A in Experiment II).

A doll placement cannot therefore be profitably interpreted out of context. Unless an investigator knows what sort of situation a placement represents he cannot draw any useful inferences from it. A knowledge of the situation represented by the placement, or of the role relationship between the two interactors will enable him to exclude many of the possible interpretations, and thus increase the likelihood of a meaningful interpretation.

Quite simple situations may be suitable to yield useful interpretations. A client at a clinic might be asked to make a series of placements to represent himself in conversation with persons standing

in various relationships to him: his mother, his father, his teacher, his best friend, etc. If the distance was abnormally great in just one of these this might provide the basis for an inference that the relationship represented by that placement was one which the placer was anxious about and was unable to manage effectively.

But this inference might prove to be quite unjustified. The placer might, for example, have imagined a game of golf taking place (especially if he regularly plays golf with the person in question) and have imagined a conversation occurring just as one interactor was teeing off and the other was standing back to give him room. Such imaginative projection of a complex scene is occasionally encountered. It can be controlled for if the experimenter specifies that the interactors are standing talking casually and are not engaged in any other pursuit. Another method of control is to question the placer about the situation he has tried to represent in order to check that extraneous factors of this sort have not influenced the placement.

An example of a simple type of imaginative projection of the kind referred to above was encountered by the writer in a pilot cross-cultural study. He found that Xhosa subjects often placed a pair of figures, supposed to be friends engaged in conversation, in a side by side pattern. This orientation pattern is not very common for interactors who are standing still, but is the only one practicable for two people who want to walk and talk at the same time. It was this latter case which subjects were representing when they placed the dolls in the side by side position. The frequency with which Xhosa subjects projected movement on to the figures was an interesting finding in itself. However, unless it was realised that the figures were perceived as walking together the mistaken

interpretation might have been made that Xhosas adopt orientations of this type for conversations in order to cut out the possibility of eye-contact.

If the dolls are seen as engaging in activities such as the playing of golf or walking along, or if they are imagined to be sitting down in a furnished room these factors, which are not always of interest to the experimenter, will strongly influence the positions in which the dolls are placed. If the experimenter is aware that such extraneous factors may occasionally effect the way dolls are placed, he can control them without difficulty and so increase the probability that inferences drawn from doll placements are valid.

Experience with the technique will show how strict a control of context is required and how extraneous factors of the type described above can best be prevented from affecting placements. It may be that the placer must be able to supply a certain amount of detail himself if his placements are to reveal anything. However the results of Experiments II and III suggest that even when the interaction to be represented is described in some detail there is still room for individual expression. In both of these experiments there were significant individual differences in the ways the figures were placed both in respect of the angles and distances.

It was noted in section 4.6.1 that when making placements in situation 3A of Experiment II most subjects placed the dolls in direct, symmetrical orientations, but a few made placements with quite high angle differences. In the clinic it could well prove to be that it is just such placements, representing well defined encounters, in which orientation and/or distance are different from those found in the majority of placements from which the most valuable insights can be gained.

## 6.5 CONCLUSIONS

The work described in the foregoing chapters has been intended to provide the basis for the development of the doll placement technique as a useful instrument for the psychologist. The results of the experimental work were encouraging. Variables were identified which acted to determine both the distances between dolls and the angles at which they faced each other. Identification of these variables provided the basis for a consideration of how the technique might serve the psychologist best. Possible ways in which the technique could be applied to practical problems in the clinic and in social and cross-cultural research were suggested above. Some of the suggestions are clearly speculative, some of them may be shown by future research to have been unwarranted, others already have a measure of support, both from work with the Kuethe technique by other investigators and from pilot studies carried out by the author with dolls. The main conclusion that can be drawn from the present project is that the technique is worth developing further. The findings made in the experimental work give a fairly clear indication of the direction which such a development might most profitably take.

## APPENDIX I

## RAW DATA FROM EXPERIMENT II

DISTANCE SCORES (IN MILLIMETERS)	. . . . .	220
LEAST ANGLE SCORES (IN DEGREES)	. . . . .	221
ANGLE DIFFERENCE SCORES (IN DEGREES)	. . . . .	222

EXPERIMENT II  
DISTANCE SCORES

	1A	2A	3A	1B	2B	3B
S 1	68	113	62	67	133	104
S 2	73	77	89	85	73	105
S 3	88	84	68	70	87	66
S 4	78	87	61	61	127	61
S 5	65	101	86	84	101	86
S 6	79	95	118	153	175	165
S 7	93	104	112	107	103	96
S 8	63	84	66	70	86	84
S 9	91	60	62	62	60	60
S10	60	85	101	95	60	68
S11	61	67	66	91	76	113
S12	83	70	82	106	70	96
S13	63	60	68	128	60	61
S14	60	91	60	81	108	77
S15	61	113	68	66	60	68
S16	62	61	65	172	65	80
S17	69	87	62	95	89	85
S18	76	64	98	102	70	103
S19	97	68	110	121	123	89
S20	67	89	91	99	88	92
S21	83	84	75	87	103	117
S22	87	85	85	129	80	90
S23	79	86	88	81	86	86
S24	72	65	66	67	76	98
S25	66	78	74	145	60	90
S26	102	178	92	90	131	166
S27	92	68	68	69	65	65
S28	70	124	72	62	93	80
S29	68	64	128	101	90	85
S30	63	68	73	73	114	91

EXPERIMENT II  
LEAST ANGLE SCORES

	1A	2A	3A	1B	2B	3B
S 1	20	1	0	6	15	20
S 2	55	1	32	10	9	0
S 3	23	0	2	5	2	3
S 4	29	0	3	25	2	4
S 5	4	0	2	0	9	11
S 6	32	3	24	17	17	8
S 7	3	2	0	11	1	12
S 8	7	5	5	9	10	12
S 9	26	0	2	11	14	15
S10	61	0	1	2	17	15
S11	23	10	15	16	2	21
S12	2	0	13	3	4	13
S13	60	0	10	5	6	15
S14	28	0	1	5	8	12
S15	38	2	5	5	8	3
S16	10	2	19	0	4	26
S17	55	2	21	4	2	5
S18	29	4	15	4	11	14
S19	16	1	6	3	9	10
S20	23	2	10	16	12	11
S21	0	2	1	15	5	2
S22	4	1	1	6	22	15
S23	19	3	8	25	0	10
S24	15	9	7	20	15	12
S25	10	1	3	5	7	5
S26	27	3	21	19	25	11
S27	40	49	3	34	31	11
S28	1	21	4	14	2	3
S29	28	0	34	8	30	11
S30	29	0	17	2	1	15

EXPERIMENT II  
ANGLE DIFFERENCE SCORES  
(WITH SIGN WHERE APPROPRIATE)

	1A	2A	3A	1B	2B	3B
S 1	5	4	-22	8	33	46
S 2	3	2	3	42	32	22
S 3	19	2	-1	49	78	45
S 4	6	5	-31	51	50	62
S 5	1	4	2	24	25	22
S 6	18	3	41	17	-19	42
S 7	6	1	-14	8	-7	37
S 8	0	2	2	1	-3	1
S 9	5	0	-3	34	58	56
S10	6	4	6	19	3	17
S11	20	8	17	4	47	9
S12	1	0	6	57	64	41
S13	1	0	-4	66	87	104
S14	8	6	0	29	60	33
S15	31	1	0	42	66	2
S16	28	2	6	109	45	74
S17	1	0	-14	54	47	46
S18	0	1	-4	4	84	63
S19	22	4	7	18	88	37
S20	12	0	-1	8	48	41
S21	4	3	6	1	13	-2
S22	9	2	3	31	12	23
S23	1	4	6	7	12	14
S24	14	1	0	12	40	100
S25	4	2	0	22	12	7
S26	20	0	8	56	69	109
S27	3	19	-57	71	105	44
S28	0	8	3	23	25	23
S29	4	3	21	83	70	40
S30	3	0	-10	50	35	53

## APPENDIX II

## RAW DATA FROM EXPERIMENT III

DISTANCE SCORES (IN MILLIMETERS)	. . . . .	224
ANGLE SCORES (IN DEGREES)	. . . . .	225

EXPERIMENT III  
DISTANCE SCORES

	HPC	HPA	HNC	HNA	LPC	LPA	LMC	LNA
S 1	93	106	60	133	92	121	63	114
S 2	91	171	85	97	153	181	92	121
S 3	99	77	67	106	85	90	76	134
S 4	83	74	62	110	93	100	89	115
S 5	60	126	76	165	101	115	110	130
S 6	75	130	190	112	105	90	103	106
S 7	114	84	103	181	89	78	117	137
S 8	132	145	70	143	161	175	90	187
S 9	87	144	73	95	95	204	143	168
S10	105	122	70	128	98	151	69	121
S11	102	131	60	84	119	120	63	137
S12	83	142	70	136	99	153	73	152
S13	95	88	61	65	83	111	72	108
S14	71	128	60	100	72	62	101	118
S15	76	119	69	137	74	83	85	101
S16	140	147	80	120	150	170	86	110
S17	88	113	63	77	97	129	70	80
S18	92	138	64	77	100	149	60	96
S19	97	75	63	74	79	89	60	67
S20	74	134	71	146	74	101	74	139

EXPERIMENT III  
ANGLE SCORES

	HPC	HPA	HNC	HNA	LPC	LPA	LNC	LNA
S 1	0	8	3	8	2	6	0	1
S 2	4	12	21	11	15	34	9	33
S 3	20	22	4	25	6	35	10	10
S 4	10	27	8	4	7	21	6	30
S 5	33	40	2	55	7	25	13	20
S 6	3	2	112	49	3	29	31	22
S 7	9	0	49	35	0	36	31	80
S 8	3	2	6	42	9	3	3	6
S 9	6	41	3	50	19	23	0	30
S10	7	18	5	10	4	30	10	0
S11	15	3	1	8	4	13	8	7
S12	17	44	6	68	0	35	2	25
S13	35	37	32	32	21	44	35	133
S14	7	8	0	40	61	67	3	24
S15	5	57	3	24	42	50	4	67
S16	0	0	0	0	5	0	5	0
S17	0	65	2	79	5	39	27	74
S18	3	40	3	53	10	33	4	45
S19	0	7	4	23	19	22	1	4
S20	14	33	18	19	12	27	4	5

## REFERENCES

- ALBERT, S. and DABBS, J. Physical distance and persuasion, Journal of Personality and Social Psychology, 1970, 15, 3, 265-270.
- ARGYLE, M. The Psychology of Interpersonal Behaviour, Harmondsworth: Penguin Books, 1967.
- ARGYLE, M. Social Interaction, London: Methuen & Co. Ltd., 1969.
- ARGYLE, M. Non-verbal communication in human social interaction, in Non-verbal Communication, (R. A. Hinde ed.) Cambridge: Cambridge University Press, 1972.
- ARGYLE, M., ALKEMA, F. and GILMOUR, R. The communication of friendly and hostile attitudes by verbal and non-verbal signals, European Journal of Social Psychology, 1972, 3, 385-402.
- ARGYLE, M. and DEAN, J. Eye-contact, distance and affiliation, Sociometry, 1965, 28, 289-304.
- ARGYLE, M. and INGHAM, R. Gaze, mutual gaze and proximity, Semiotica, 1972, 6, 32-49.
- ARGYLE, M. and MCHENRY, R. Do spectacles really effect judgements of intelligence? British Journal of Social and Clinical Psychology, 1970, 10, 27-29.
- ARGYLE, M., SALTER, V., NICHOLSON, H., WILLIAMS, M. and BURGESS, P. The communication of inferior and superior attitudes by verbal and non-verbal signals, British Journal of Social and Clinical Psychology, 1970, 9, 222-231.
- BALES, R. F. Interaction Process Analysis, Cambridge, Mass.: Addison-Wesley, 1950.
- BREHM, J. W. A theory of psychological reactance, New York: Academic Press, 1966.
- BRUNER, J. S. You are your constructs, Contemporary Psychology, 1956, 1, 355-357.
- CARLSON, R. and PRICE, M. A. The generality of social schemas, Journal of Personality and Social Psychology, 1966, 3, 589-592.
- COLLETT, P. On training Englishmen in the non-verbal behaviour of Arabs, International Journal of Psychology, 1971, 6, 209-215.
- COOK, M. Experiments on orientation and proxemics, Human Relations, 1970, 23, 61-76.
- DAVITZ, J. R., The Communication of emotional meaning, New York: McGraw Hill, 1964.

- DE SOTO, C. B. and KUETHE, J. L. Subjective probabilities of interpersonal relationships, Journal of Abnormal and Social Psychology, 1959, 59, 290-294.
- DOSEY, M. and MIESELS, M. Personal space and self-protection, Journal of Personality and Social Psychology, 1969, 11, 93-97.
- DUHAMEL, T. R. and JARMON, H. Social schemata of emotionally disturbed boys and their male siblings, Journal of Consulting and Clinical Psychology, 1971, 36, 281-285.
- EDWARDS, D. J. A. An investigation of the value of the doll placement experiment as a tool for cross-cultural research in social interaction, South African Journal of Psychology, Vol. 2, 1972, 41-53. (a)
- EDWARDS, D. J. A. Approaching the unfamiliar: A study of human interaction distances, Journal of Behavioural Science, 1972, 1, 4, 249-250. (b)
- EDWARDS, D. J. A. A cross-cultural study of social orientation and distance schemata by the method of doll placement, Journal of Social Psychology, 1973, in press.
- ELLSWORTH, P. C., CARLSMITH, J. M., and HENSON, A. The stare as a stimulus to flight in human subjects: A series of field experiments, Journal of Personality and Social Psychology, 1972, 21, 302-311.
- ESTES, B. W. and RUSH, D. Social Schemas: A developmental study, Journal of Psychology, 1971, 78, 3-9.
- EXLINE, R. V., GRAY, D., and SCHUETTE, D. Visual behaviour in a dyad as affected by interview content and sex of respondent, Journal of Personality and Social Psychology, 1965, 1, 201-209.
- EXLINE, R. V. and MESSICK, D. The effects of dependency and social reinforcement upon visual behavior during an interview, British Journal of Social and Clinical Psychology, 1967, 6, 256-266.
- EXLINE, R. V., THIBAUT, J., BRENNAN, C. and GUMPERT, P. Visual interaction in relation to Machiavellianism and an unethical act, American Psychologist, 1961, 16, 396.
- EYSENCK, H. J. Crime and Personality, London: Routledge and Kegan Paul, 1964.
- EYSENCK, H. J. The Biological Basis of Personality, Springfield: C.C. Thomas, 1967.
- EYSENCK, H. J. and EYSENCK, S. B. G. Manual of the Eysenck Personality Inventory, London: University of London Press, 1964.
- EYSENCK, H. J. and EYSENCK, S. B. G. Personality structure and measurement, San Diego: R. R. Knapp, 1969.

- FEATHER, N. T. A structural balance approach to the analysis of communication effects, in Advances in Experimental Social Psychology, 3, (Ed. L. Berkowitz), New York and London: Academic Press, 1967.
- FELIPE, N. J. and SOMMER, R. Invasions of personal Space, Social Problems, 1966, 14, 206-214.
- FISHER, R. L. Social Schemas of normal and disturbed school-children, Journal of Educational Psychology, 1967, 58, 88-92.
- GOFFMAN, E. The presentation of self in everyday life, Garden City, New York: Doubleday and Co., 1959.
- GOFFMAN, E. Behaviour in Public Places, Glencoe, Illinois: Free Press, 1963.
- GOLDBERG, G. N., KIESLER, C. A., and COLLINS, B. E. Visual behavior and face-to-face distance during interaction, Sociometry, 1969, 32, 43-53.
- GOTTHEIL, E., COREY, J. and PAREDOS, A. Psychological and physical dimensions of personal space, Journal of Psychology, 1968, 69, 7-9.
- GRAY, J. The Psychology of fear and stress, London: Weidenfeld and Nicholson, 1971.
- HALL, E.T. The anthropology of manners, Scientific American, 1955, 192, 4, 84-90.
- HALL, E. T. The Silent Language, Garden City, New York: Doubleday, 1959.
- HALL, E. T. A system for the notation of proxemic behavior, American Anthropologist, 1963, 65, 1003-1026.
- HALL, E. T. Adumbration as a feature of inter-cultural communication, American Anthropologist, 1964, 66, 154-163.
- HALL, E. T. The Hidden Dimension, Garden City, New York: Doubleday, 1966.
- HEDIGER, H. Studies of the psychology and behaviour of captive animals in zoos and circuses, London: Butterworths, 1955.
- HEIDER, F. The Psychology of Interpersonal Relations, New York: Wiley, 1958.
- HEIDER, F. and SIMMEL, M. An experimental study of apparent behavior, American Journal of Psychology, 1944, 57, 243-259.
- HIGGINS, J., PETERSON, J. C. and DOLBY, L. L. Social adjustment and familial schema, Journal of Abnormal Psychology, 1969, 74, 296-299.
- HUTT, C. and OUNSTEAD, C. The biological significance of gaze aversion with particular reference to the syndrome of infantile autism, Behavioural Science, 1966, 11, 346-356.

- INGHAM R. Cultural Differences in Social Behaviour: Interim report of an Anglo-Swiss comparative study, (revised paper), University of Oxford, 1970.
- KASI, S. V. and MAHL, G. F. The relationship of disturbances and hesitations in spontaneous speech to anxiety, Journal of Personality and Social Psychology, 1965, 1, 425-433.
- KELLY, G. A. The Psychology of Personal Constructs, New York: W. W. Norton & Co., 1955.
- KENDON, A. Some functions of gaze direction in social interaction, Acta Psychologica, 1967, 26, 1-47.
- KENDON, A. and COOK, M. The consistency of gaze patterns in social interaction, British Journal of Psychology, 1969, 60, 481-494.
- KIRK, R. E. Experimental Design: procedures for the behavioral sciences, Belmont California: Wadsworth, 1968.
- KLECK, R., BUCK, P. L., GOILLER, W. L., LONDON, R. S., PFEIFFER, J. R. and VUKCEVIK, D. P. Effect of Stigmatizing conditions on the use of personal space, Psychological Reports, 1968, 23, 111-118.
- KLECK, R. and NUESSEL, W. Congruence between the indicative and communicative functions of eye-contact and interpersonal relations, British Journal of Social and Clinical Psychology, 1968, 7, 241-246.
- KRECH, D., CRUTCHFIELD, R. S., and BALLACHEY, E. L. Individual in Society, New York: McGraw Hill, 1962.
- KUETHE, J. L. Social schema, Journal of Abnormal and Social Psychology, 1962, 64, 31-38 (a).
- KUETHE, J. L. Social schemas and the reconstruction of social object displays from memory, Journal of Abnormal and Social Psychology, 1962, 65, 71-74 (b).
- KUETHE, J. L. Pervasive influence of social schemata, Journal of Abnormal and Social Psychology, 1964, 68, 248-254.
- KUETHE, J. L. and WEINGARTNER, H. Male-female schemata of homosexual and non-homosexual penitentiary inmates, Journal of Personality, 1964, 32, 23-31.
- LA BARRE, W. Paralinguistics, Kinesics and cultural anthropology, in Approaches to Semiotics, (T. A. Sebeok ed.), Mouton: The Hague, 1964.
- LEVINGER, G. and GUNNER, J. The interpersonal grid: I. Felt and tape techniques for the measurement of social relationships, Psychonomic Science, 1967, 8, 173-174.
- LITTLE, K. B. Personal space, Journal of Experimental Social Psychology, 1965, 1, 237-247.

- LITTLE, K. B. Cultural variations in social schemata, Journal of Personality and Social Psychology, 1968, 10, 1-7.
- LITTLE, K. B., ULEHLA, Z. J. and HENDERSON, C. Value congruence and interaction distances, Journal of Social Psychology, 1968, 75, 249-253.
- LOTT, D. and SOMMER, R. Seating arrangements and status, Journal of Personality and Social Psychology, 1967, 7, 90-95.
- LYNN, R. Personality and National Character, Oxford: Pergamon Press, 1971.
- McBRIDE, G., KING, M. G. and JAMES, W. Social proximity effects on galvanic skin responses in adult humans, Journal of Psychology, 1965, 61, 153-157.
- MacKAY, D. M. Formal analysis of communicative processes, in Non-verbal Communication, (R. A. Hinde ed.), Cambridge: Cambridge University Press, 1972.
- MEHRABIAN, A. Orientation behaviors and non-verbal attitude communication, Journal of Communication, 1967, 17, 324-332.
- MEHRABIAN, A. The inference of attitudes from the posture, orientation and distance of a communication, Journal of Consulting and Clinical Psychology, 1968, 32, 296-308. (a)
- MEHRABIAN, A. Relationship of attitude to seated posture, orientation and distance, Journal of Personality and Social Psychology, 1968, 10, 26-30. (b)
- MEHRABIAN, A. Some referents and measures of non-verbal behavior, Behavior Research Methods and Instrumentation, 1969, 1, 6, 203-207. (a)
- MEHRABIAN, A. Significance of posture and position in the communication of attitude and status relationships, Psychological Bulletin, 1969, 71, 359-372. (b)
- MOBBS, N. A. Eye-contact in relation to social introversion/extraversion, British Journal of Social and Clinical Psychology, 1968, 7, 305-306.
- OSGOOD, C. E., SUCI, G. J. and TANNENBAUM, P. H. The Measurement of Meaning, Urbana, Chicago and London: University of Illinois Press, 1957.
- PEABODY, D. Symmetry and asymmetry in interpersonal relations, - with implications for the concept of projection, Journal of Personality, 1970, 38, 426-434.
- PELLEGRINI, R. J., HICKS, R. A. and GORDON, L. The effect of an approval-seeking induction on eye-contact in dyads, British Journal of Social and Clinical Psychology, 1970, 9, 373-374.
- PINTLER, M. H. Doll play as a function of experimenter-child interaction and initial organisation of materials, Child Development, 1945, 16, 145-166.

- PORTER, E. R., ARGYLE, M. and SALTER, V. What is signalled by proximity? Perceptual and Motor Skills, 1970, 30, 39-42.
- RAWLS, J. R., TREGO, R. E. and MCGAFFEY, C. N. A comparison of personal space measures, Technical report no. 6, NASA grant NGR-44-009-008, Institute of Behavioral Research, Texas Christian University, 1968. (a)
- RAWLS, J. R., TREGO, R. E., and MCGAFFEY, C. N. Correlates of personal space, Technical report no. 7, NASA grant NGR44-009-008, Institute of Behavioral Research, Texas Christian University, 1968. (b)
- ROSENFELD, H. M. Effect of an approval seeking induction on interpersonal proximity, Psychological Reports, 1965, 17, 120-122.
- SEARS, R. R. Influence of methodological factors on doll play performance, Child Development, 1947, 18, 190-197.
- SOMMER, R. Studies in personal space, Sociometry, 1959, 22, 247-260.
- SOMMER, R. Further studies in small group ecology, Sociometry, 1965, 28, 337-348.
- SOMMER, R. Intimacy ratings in five countries, International Journal of Psychology, 1968, 3, 109-114.
- STRONGMAN, K. T. and CHAMPNESS, B. G. Dominance hierarchies and conflict in eye-contact, Acta Psychologica, 1968, 28, 376-386.
- VERNON, M. D. The psychology of perception, Harmondsworth: Penguin Books, 1962.
- WADA, J. A. Modification of cortically induced response in brain stem of shift of attention in monkeys, Science, 1961, 133, 40-42.
- WATSON, O. M. Proxemic Behavior: A cross-cultural study, The Hague: Mouton, 1970.
- WATSON, O. M. and GRAVES, T. D. Quantitative research in proxemic behavior, American Anthropologist, 1966, 68, 971-985.
- WEINSTEIN, I. Social schemata of emotionally disturbed boys, Journal of Abnormal Psychology, 1965, 70, 457-461.
- WEINSTEIN, I. Social experience and social schemata, Journal of Personality and Social Psychology, 1967, 6, 429-434.
- WIENER, M., DEVOE, S., RUNBINOW, S. and GELLER, J. Nonverbal behavior and nonverbal communication, Psychological Review, 1972, 79, 185-214.
- WIENER, M. and MEHRABIAN, A. Language Within Language: Immediacy, a channel in verbal communication, New York: Appleton-Century-Crofts, 1968.
- WILLIS, F. N. Initial speaking distance as a function of the speakers' relationship, Psychonomic Science, 1966, 5, 221-222.