A METHODOLOGICAL AND DEVELOPMENT STUDY OF PERSONAL SPACE

GORDON STEPHEN PATRICK HUSK


CENTRE FOR NFLD. STUDIES
JUN 27 1984
MEMORIAL UNIVERSITY
OF NEWFOUNDLAND

CANADIAN THESES ON MICROFICHE

I.S.B.N.

THESES CANADIENNES SUR MICROFICHE

National Library of Canada
Collections Development Branch

Canadian Theses on
Microfiche Service

Ottawa, Canada
K1A 0N4

Bibliothèque nationale du Canada
Direction du développement des collections

Service des thèses canadiennes
sur microfiche

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

NL-339 (r. 82/08)

Canada

A METHODOLOGICAL AND DEVELOPMENTAL STUDY OF PERSONAL SPACE

by

© Gordon Stephen Husk, BSc.

A Thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science

Department of Psychology
Memorial University of Newfoundland

October 1977

St. John's Newfoundland

ABSTRACT

The main purpose of this experiment was to assess the validity of the simulation and laboratory methods of measuring interpersonal distance (IPD) over a broad age range. Male dyads from five Grade levels (K, Grades 3, 6, 9 and Adult) were asked to perform a skit, the preparation of which was surreptitiously video-taped and later assessed for IPD and three other components of personal space (orientation, looking and talking). The comparison of this field method IPD with laboratory and simulation IPDs at each Grade level demonstrated little validity for the latter two methods below the Adult level. Using the simulation method, the consistent findings of closer spacing for friends than strangers (at most levels) led the author to conclude that it should be used to assess relative spacing than for determination of absolute IPD.

Components of personal space assessed from the video-tapes yielded low multiple correlations of IPD as a function of the other components. Although there was a marked increase in multiple correlations for the Adult group from the other Grade levels, this was not supported by both judges. More elaborate research procedures using the field method were advocated, with the purpose of examining a greater variety of potential components of personal space.

ACKNOWLEDGEMENTS

A thesis is certainly a noteable milestone in one's life. What starts off as a seedling (but is envisioned as a blooming garden) is gradually through careful nurturing and pruning brought into a reasonable project. Most people only observe the flower. Very few have watched the gradual, sometimes painful, unfolding of ideas; and the nights it almost succumbed to the frost of "thesis interruptus". One of the few who actively participated in this development is my supervisor Jack Strawbridge. Only through his patience and tolerance could the ideas have been made communicable to others.

Al and Caroline helped a great deal towards the end with their suggestions and comments. This isn't the most enjoyable and desirable of manuscripts to curl up to on a Fall's night; thank-you, Caroline, for the many re-reads.

Ruth, Angela, Betty, Cathy and especially Bonnie are perpetually so happy-go-lucky and it creates a wonderful atmosphere for the punching-out of draft after draft. They have been extremely patient with my constant hovering about waiting for a 'free' typewriter.

I would like to add a special thanks to Gordon Barnes

from all the Graduate students of our department. Because of him our students rarely have to worry about silly things like money. Thank-you.

Lastly, but not least, is my mother who has quietly 'put up' with me over many years of university. She has unquestionably and selflessly supported me in whatever endeavours I have chosen to pursue, many times not knowing the reason or rhyme of it. It is therefore only fitting and just that this tangible end-product of many years be hers. A small token of my gratitude.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

> "We live...with a number of rooms inside us. The best room is open to the family and friends and we show our finest face in it. Another room is more private, the bedroom, and very few are allowed in. There is another room where we allow no one in...not even our wives and children, for it is a room of the most intimate thoughts we keep unshared. There is one more room, so hidden away we don't even enter it ourselves. Within we lock all the mysteries we cannot solve and all the pains and sorrows we wish to forget."
> (Uris, 1976, p. 56)

Uncertain as we may be about the room inside ourselves, there appears to be substantial empirical evidence supporting the existence of rooms outside ourselves. These "rooms" might often be referred to as one's personal space, a subject which has received considerable attention over the past decade.

Personal space is generally conceived as being the distance between people...interpersonal distance (IPD). Yet, this definition and the ways in which it is measured are considered too restrictive and hazy by some researchers.

In following this lead, this paper will first review the major theories of personal space and explicitly define the relevant concepts. Then the major methodologies used to measure "personal space" are critically reviewed with reference to these theories. The general conclusion

drawn is that the most popular means of measuring personal space require comparison with a real-life measurement, and this is the object of the present experiment.

The author is also interested in how personal space develops, and this is intrinsically bound to the very nature of personal space, which is viewed as a dynamic, fluctuating phenomenon that entails more than just IPD. From the theoretical discussions and research findings, specific hypotheses about how personal space develops are presented and tested experimentally.

The final section of this paper will discuss the results of this present experiment and how they relate to the previous theoretical and methodological considerations, and more specifically to the approach adopted in this paper. Finally, implications of this experiment for future research in personal space are presented.

C H A P T E R I

THEORETICAL CONSIDERATIONS

Over the course of its short research history, personal space has been defined as: an expanding and contracting bubble surrounding a person (Hall, 1966) where "... the majority of his interactions with others take place" (Little, 1965, p. 237) and "...no intruders may come" (Sommer, 1969, p. 26); a body buffer zone to protect one's "emotional health" (Dosey & Meisels, 1969), an area for idiosyncratic behaviours, an area for maintaining identity, and an area for facilitation or hindrance of interaction (see Evans & Howard, 1973). In sum, it is generally considered to be a physical zone surrounding the person and not necessarily symmetrical (Sommer, 1969).

Although personal space is most often assessed in terms of interpersonal distance (IPD) only, this uni-dimensional approach has been rejected by some researchers (e.g. Beach & Sokoloff, 1974; Eberts & Lepper, 1975; Evans & Howard, 1973; Leibman, 1970; Patterson, 1973). They have emphasized a multi-dimensional approach, with IPD being only one (albeit the main) component of personal space. For example, Leibman (1970) proposes that the term "personal space" be reserved to indicate a psychological construct which "... intervenes between antecedent conditions and consequential interpersonal

behaviours" (p. 210). In recognition of this distinction and for the sake of clarity, this paper will distinguish between interpersonal distance and personal space, the latter term being used in the Leibman sense and the former as the distance between the interactants.

Theoretical discussions of personal space have been rare relative to the amount of empirical work, and this has contributed to much of the confusion within the field:

> "The emphasis on simple operational definitions with the resultant absence of more theoretical concepts has resulted in a series of isolated findings which empirically, but not theoretically, relate specific antecedent conditions to specific interpersonal distance."
> (Leibman, 1970, p. 210)

The two most frequently referenced theorists in the field of nonverbal communication, and more specifically personal space are Hall (1966) and Argyle (1969). Leibman (1970), although less well-known, has also outlined a comprehensive theory of personal space. The following sections will discuss and later compare these three major theories.

HALL

The anthropologist Edward T. Hall (1966) has been one of the most influential writers and astute observers

in the area of personal space (Altman, 1975). He gave a special name to the scientific study of spatial usage: "Proxemics is the term I have coined for the interrelated observations and theories of man's use of space as a specialized elaboration of culture" (Hall, 1966, p. 1). Spatial usage is considered to be part of the more general area of nonverbal communication and consequently bound by culture and learned at an early age. Just as various cultures have acquired different languages, many have evolved different nonverbal communication systems. Much of Hall's early work involved smoothing delicate communication problems at the diplomatic level between Arabs and Americans. The problem was determined to be one of conflicting spatial usage of different cultures. Arabs converse at very close range, often touching, and consider it polite to smell each other's breath as part of the interaction. These customs are often intimidating and embarrassing for North Americans, in that besides their general discouragement of body odors, being at close quarters may also carry sexual overtones, especially for males.

At the crux of Hall's emphasis upon spatial usage as a means of communication is the important distinction that it is not proximity per se which is the message,

but rather it is the greater perceptual information that is made available as more sensory channels are brought into play with decreasing IPD. At relatively great distances only visual (and possibly auditory) senses are receiving much information. As the interaction distances decrease, the senses are tuned in to finer details of the face, for example. It is interesting that not until the distance is reduced to the 'intimate' zone (0 to 18 inches) that one of man's oldest senses, olfaction, receives information about the target person.

Hall not only implied certain distances were common for different types of interactions, but he divided them into four explicit zones, each with a near and far phase (see Table 1). The intimate zone is one of "... greatly stepped up sensory inputs" (Hall, 1966, p. 116) and usually confined to very private circumstances. At the near phase, vision is blurred and used comparatively less than in the other zones. The personal zone is the area of general encounters with friends, and close acquaintances, with its extreme to the limit of touching. The social zone is the formal zone and finer facial features become hazy. It is generally used for business-like interactions. Once into the public zone, speech usually becomes more formal and also louder. Speakers and public figures employ this

TABLE 1

Hall's (1966) zones for American adults, with near and far phases.

ZONE	NEAR PHASE	FAR PHASE
INTIMATE	0 to 6 in.	6 to 18 in.
PERSONAL	1½ to 2 ft.	2 to 4 ft.
SOCIAL	4 to 7 ft.	7 to 12 ft.
PUBLIC	12 to 25 ft.	25 ft. and on

zone and it is "...well outside the circle of involvement" (Hall, 1966, p. 123). Hall compiled these zones from interviews and observations of "...non-contact middle-class, healthy adults, mostly natives of the northeastern seabord of the United States" (p. 116) and he did not imply that other Americans (let alone other cultures) should have the same spacing patterns.

Although his book The Hidden Dimension (Hall, 1966) undoubtedly sparked a lot of interest in the area of personal space, most of the research appears to have used it more as a stepping stone than a foundation upon which to build. The emphasized multi-dimensional nature of personal space for instance, has often been ignored by researchers.

> "Given Hall's central historical position in the emergence of nonverbal communication and given his systemic orientation, it might be assumed that subsequent research would have been influenced strongly in these directions. Not so. Whether conceptualized as an independent or as a dependent variable, the great preponderance of published research has considered personal space as unitary and isolatable entity."
>
> (Beach & Sokoloff, 1974, p. 1303)

ARGYLE

In the Argyle model (Argyle, 1969; Argyle & Dean, 1965) the emphasis is on the balancing of two counter-

acting forces (drives) in an interaction. The "approach" forces are a function of other drives such as a need for affiliation and feedback. The "avoidance" forces are considered to be those such as the fear of exposing one's inner self. The ambiguity of the latter concept has been taken to task by some authors (e.g. Russo, 1970). In their major theoretical paper, Argyle and Dean (1965) stressed the maintenance of a consistent level of intimacy or an equilibrium of intimacy, this being "... a joint function of eye contact, physical proximity, intimacy of topic, smiling, etc." (p. 295). The crux of the theory is: if the degree of intimacy is disrupted by an imbalance of approach or avoidance components, an anxiety-arousing situation develops and attempts are made to neutralize the imbalanced component by compensatory change(s) within the system. For example, if a stranger were to come too close to an individual, the latter could react by reducing eye contact and/or opening the angle of shoulder orientation (turning away) or some other combination of behaviours that would offset the undesired closeness of the stranger. This is known as the compensatory hypothesis (Argyle & Dean, 1965) which describes the covarying relation between interpersonal distance and eye contact. In an extensive review of the literature, Altman (1975) found substantial empirical

evidence in support of the compensatory hypothesis: as distance between two people increases, the amount of eye contact increases (Argyle, 1969; Argyle & Dean, 1965; Argyle & Ingham, 1972; Coutts & Schneider, 1975; Sundstrom, 1975).

However, Stephenson, Rutter and Dore (1973) argue that the increase in individual eye contact with increasing distance may be more of an observer artefact, since measurement accuracy decreases as Ss move further away from the observer. In replicating the Argyle-Dean experiment, but using closed-circuit television with a split-screen (hence, the observer was not affected by distance), they did not find an increase in the duration or frequency of individual looking behaviour to be a function of distance between Ss. Furthermore, they suggest that the significant increase in measures of mutual visual behaviour indicates the need for a more precise delineation of what exactly Argyle and associates meant by increased eye contact with increasing distance.

Although IPD is a component of the Argyle model, it has different emphasis than that of Hall. Porter, Argyle and Salter (1970) found no change in "liking" as a consequence of varying proximity to that person. They concluded: "Proximity is certainly used to begin and

end encounters, but when two people are in a room together, so that it is quite clear who is interacting with whom, proximity communicates no information at all" (p. 43). Argyle (1969) was more likely to stress the individual differences in one's "preferred proximity" (the mean approach distance, in next chapter) and its relation to personality, which is a different emphasis than that of Hall, who stressed the communication channels that are a function of distance.

LEIBMAN

Leibman's (1970) argument is that personal space has been used as a "catchall" term sometimes meaning interpersonal distance and other times implying cognitive structures and schemata. The measurement of it has ranged from observational assessment of the distance between two standing people through the distance that one individual approaches another person or object, to the placement of miniature dolls and silhouettes. Trying to include all these methods and their implied meanings into a simple definition of personal space (i.e. interpersonal distance) is too restrictive and concrete, Leibman contends. This fails to take into account abstract concepts associated with personal space.

She proposes a different approach:

> "The focus of the model is psychological, i.e. events are viewed from the phenomenal world of the perceiving individual and are interpreted in terms of the meaning he attributes to them. In addition, interpersonal distance, i.e. the amount of physical space between individuals, is considered a significant but not the exclusive nonverbal response to a situation."
> (Leibman, 1970, p. 210, emphasis added)

Personal space is not considered to be static, but instead, it is momentarily changing as the person's interpersonal goals and antecedent conditions change. The sequence that is visualized by Leibman is: antecedent conditions → interpersonal goals → personal space → behaviours. The antecedent conditions are determined by the task, mood, presence of others and so on. The interpersonal goals are the individual's objectives in interacting with another person, e.g. level of privacy or intimacy desired. These goals consequently determine the personal space and so the latter must be quite flexible—a "psychological bubble". According to the goals desired, one can extend or contract one's personal space, the size of which will in turn determine the behaviours that are appropriate. "Any behaviour on the part of the individual or others which fulfills the interpersonal goals attached to a momentary personal space is sufficient to satisfy the definitions of personal space" (p. 212). These

behaviours can be spatial or nonspatial, physical or psychological. IPD is only one of the many "interrelated dimensions" of personal space, but under normal circumstances it is most indicative, in that it allows for direct translation of the psychological distance into physical terms. This holds unless IPD is blocked or inappropriate, in which case "symbolic distances" (e.g. averted eyes or soft breathing) become more important. Symbolic distances and physical distances normally act in concert with one another.

For Leibman, personal space is learned and under the influence of personal and social norms. "Norms are the antecedent conditions which determine interpersonal goals and which affect spatial behaviour through mediation of personal space" (p. 213). For example, the 'don't-trust-strangers' norm determines the interpersonal goal of avoidance of strangers, which in turn implies a desired extension of personal space with strangers. Hence, in a crowded situation where it becomes impossible to exhibit large physical distance, compensatory symbolic-distance behaviours such as body stiffness, averted eyes and silence are displayed instead. Note that these are not only acceptable, but expected behaviours in these circumstances.

OTHERS

The foregoing are not the only theories of personal space, but they are the most representative of the major systems involved. Some other "mini-theories" which are not as complete, and might be considered supplementary to some of the above, include: the stress-reducing functions of personal space (Evans & Howard, 1973); the social learning model of personal space (Duke & Nowicki, 1972; Duke & Wilson, 1973); a 'systems' approach to personal space (Pedersen & Shears, 1973); and personal space as a mechanism for controlling privacy (Altman, 1975).

This chapter has reviewed the three major theories of personal space and although there appear to be differences, they seem to be essentially semantic in nature. What Argyle refers to as "Intimacy Equilibrium" is quite similar to Leibman's "personal space" or Hall's desired level of communication. The theories do not have strong empirical footing, and little attention has been given to how these systems are supposed to develop. Since cultural norms play a determining role in all three systems, then one could expect that the use of more subtle mechanisms of personal space would only gradually be learned. But this is speculation.

With such diverse disciplines as anthropology, architecture, sociology, psychology, psychiatry and education interested in personal space, it is not surprising that the area has become confused and the measurement methods numerous. The next chapter will be devoted to a consideration of the major methodologies employed in the study of personal space, with a view towards discussing them in terms of the theories reviewed.

CHAPTER II

METHODOLOGICAL CONSIDERATIONS

Before discussing explicit methodologies, it is valuable to distinguish between interpersonal distance (IPD) when it is used as a predictor (independent variable) and when it is measured as the outcome of one or more variables (dependent variable). In reviewing more than 200 articles on personal space, Altman (1975) found only 20% of them used distance as an independent variable. Scott (1974) for instance, had young children look at pictures of adult couples interacting at different distances and then judge the relative degree of affinity. In a similar type of situation, Post and Hetherington (1974) evaluated the onset of children's awareness to the cues of eye contact and proximity as indicators of affinity. The more common approach when IPD is the independent variable is to use spatial instrusions (Konečni, Libuser, Morton & Ebbesen, 1975), but relatively few of these types of experiments have been done with children (see Evans, Pezdek & Nalband, 1975).

The majority of experiments are concerned with measuring IPD as a result of manipulating some other variable such as affinity, eye contact or sex. The three basic techniques used to assess IPD are: laboratory, simulation and observational/field. The following sections will discuss each of these in greater detail.

LABORATORY TECHNIQUE

The most common type of laboratory technique is the Approach Test (and the two terms are used interchangeably in this paper), in which S is asked to approach a target (or have a confederate approach S) until S feels uncomfortable and stops (or asks the confederate to stop). Most often the target is another person (Hartnett, Bailey & Gibson, 1970) but other times it is an inanimate object (Hiat, 1971). In most of these cases, the dependent variable IPD is measured from toe to toe.

There is an obvious bias of subject control associated with the Approach Test (Evans & Howard, 1973) in that S decides subjectively what level of discomfort E refers to; which is probably further confounded by S's desire to appear "normal", and in such cases he may space according to how he thinks *others* would act. How can such conscious efforts accurately reflect this particular person's normally unconscious behaviours?

The fact that many Es give the instructions, do the approaching and then do the measuring themselves further contaminates the Approach Test data (Pedersen, 1973a). Regardless of these problems of bias and the high degree of artificiality involved (Evans & Howard, 1973; Porter

et al., 1970; Sobel & Lillith, 1975), this same method has still been used by many Es as the standard for assessing the validity of their own particular method (Duke & Kiebach, 1974; Duke & Wilson, 1973; Gottheil, Corey & Paredes, 1968; Haase & Markey, 1973; Pedersen, 1973a). Even though it uses real people to assess IPD, the laboratory method can hardly be considered any more than a simulation of what occurs in real life.

Pedersen (1973a) referred to his "approach" technique as the Awareness Behavioural Personal Space Measure. After he had ascertained this "awareness" measure and another simulation measure, E indicated that he had to leave the room for a few minutes. Meanwhile, he asked Ss to move their chairs to a particular spot for the next task. While they were doing this, E went to another room and judged the chair separations via a hidden camera. This Unawareness Behavioural Personal Space Measure was used to assess the validity of the "awareness" measure...even though 38% of the Ss indicated afterwards that they were aware of the "hidden" camera in the room, and most guessed the measurement had something to do with social interactions!

> "The unawareness task was so ambiguous that Ss were not very likely to establish a social interaction with the other person, and, if they did, it was likely to be quite

> artificial. It is not known what the relationship of either of these criterion measures would have been to personal space *in vivo*. A better criterion for assessing the predictive validity of the Pedersen Measure would have been a measure of personal space of Ss as they interacted socially with strangers of the same sex in natural situations. However, the technology of that type of measurement was prohibitively complex."
>
> (Pedersen, 1973a, p. 535, emphasis in original)

A further point is that the inter-chair measurement of this type of experiment does not account for the likely possibility of important nose-to-nose changes, which are considered to be a more discriminating measure of IPD by some researchers (e.g. Strawbridge, 1974).

Some investigators have required Ss to sit beside another already seated person, measuring the distance between the torsos (Leibman, 1970; Lomrantz, Shapira, Horesh & Gilat, 1975). Whether such forced groupings of individuals can be considered comparable to situations in which a few people are engaged in "focused interactions" (Goffman, 1963) is questionable, especially when so many other aspects of personal space such as eye contact or orientation, are not considered.

The obvious artificiality of the approach technique and the complexities associated with more naturalistic field methods, have probably accounted for the popularity of another means of assessing IPD, *viz* the simulation method.

SIMULATION METHOD

Over the past decade, simulation techniques in the measurement of "personal space" have appeared quite frequently in the literature (see Altman, 1975). In the typical simulation exercise, S is given a cut-out or other representation of himself and others (friend, mother, etc.), and asked to indicate where he would place "himself" in relation to the target figure. Recent child studies have employed: silhouettes (Bass & Weinstein, 1971; Guardo & Meisels, 1971b; Meisels & Guardo, 1969; Shoichet & Williams, 1973; Strawbridge, 1974); line drawings (Hiat, 1971; Lerner, Karabenick & Meisels, 1975a, 1975b; Russo, 1970); and miniature dolls (Duke & Wilson, 1973; Spinetta, Rigler & Karon, 1974), to mention a few.

Kuethe was one of the first to make use of "schemata" or "...culturally shared perceptions about how things and people go together spatially" (Altman, 1975, p. 56). Originally, he used the Free Placement Technique, in which Ss placed felt objects representing themselves and others on a flannel board. Later he used the Replacement Technique (Kuethe & Weingartner, 1964), in which Ss, having been shown felt-board representations of a group, were asked to reproduce the same set-up again. In the latter case, the error distance in replacement was the dependent variable.

The simulation method has been heralded as having many methodological advantages over the other two methods; for example, its reliability in measuring interpersonal distance, which is especially evident when it is compared to the judged IPDs often used in field studies (Strawbridge, 1974). It provides a means for attaining standardization which is desparately needed in such a confused area as personal space; and a way to measure a person's general response (e.g. distance from a friend) (Pedersen, 1973a). More control of the experimental situation is possible because the variable that E wishes to examine, such as body build, relationships or age can be tested at different and controlled levels.

But all of these advantages of this method's efficacy depend upon a number of critical factors. First is the question of the simulation method's validity: is its measurement accurate? Does it really measure a person's typical IPD? Secondly (and this applies as well to the laboratory method), one must ask if it is meaningful to measure IPD in isolation from the other possible components of personal space?

The first question of validity has usually been answered in terms of the correlations between the simulation exercise and a laboratory method. Although there are an equal number of insignificant results (see

Table 2). From previous discussions of the laboratory method, one would be hard-pressed to consider this method as the criterion of validity. The few experiments that have compared this simulation method with a real life measurement of IPD have not found significant relationships (reported in a recent article by Sundstrom & Altman, 1976, Table 2).

The second question concerning the isolated measurement of IPD leads back to the very essence of personal space as discussed in the previous chapter. But all the theories imply that there is more to personal space than IPD and generally both the simulation and laboratory methods do not provide for this.

Further complications are introduced when age is considered. Experimenters are using the simulation techniques for assessing "personal space" of children (e.g. Meisels & Guardo, 1971b), yet there is virtually no evidence that the simulation score is correlated with any real life measurement of IPD, not even for adults! This could explain much of the confusion and diversity within developmental results.

The claim that the simulation method is more accurate in its assessment of IPD has yet to be confirmed. Although the measurements are certainly easier to obtain and interpret than for the field method for instance, there is still no

TABLE 2

Experiments that have compared methods of measuring IPD

Duke & Kiebach (1974)	0.62	CID* and approach (same sex, front)
Sells (cited in Russo, 1974)	0.70	projective and live persons
Hiat (1971)	ns	approach and drawing test
Haase & Markey (1973)	0.67 0.56	felt board & live persons felt board & *in vivo*
Little (1965)	0.77	placement of live actresses & silhouettes
**Haase (1970)	0.75	figure placement & approach
Duke & Nowicki (1972)	0.65 to 0.85	CID* & various lab. methods
**Price & Dabbs	.0.35 (ns)	CID & approach (in school)
Dosey & Meisels (1969)	0.30 (ns)	figure placement & approach
**Rawls *et al.* (1972)	0.34 to 0.91	approach & 4 simulation tests
**Knowles & Johnson (1974)	-0.09 to 0.68	9 different measures, including all three methods .. mean r=0.21; 16/36 sig. correlations
**Aiello *et al.* (1975)	ns	simulation; approach; field
Gottheil *et al* (1968)	0.40	round magnets & interviewing distance
**Kleck *et al.* (1968)	ns	two different methods

*CID is Duke's Comfortable Interpersonal Distance measurement

** these are experiments referred to in Sundstrom & Altman (1976)

proof that this is how the person actually operates in such a situation. "The manipulation of figures, e.g. dolls, silhouettes and actors, by subjects may demonstrate how people perceive interaction but not necessarily how people do, in fact, interact" (Heshka & Nelson, 1972, p. 492).

In the quest for the most objective and reliable method of measuring "personal space", personal space itself may have been discarded, or at least pushed aside:

> "Although the trend toward more objective methods is necessary for adequate study of personal space, we do not feel that it is sufficient. Given the complex nature of human-environment variables, exploration in this area of personal space should employ a combination of techniques that seek to minimize bias and maximize data generalizability. Piecemeal examination of individual variables based upon a single dependent measure will continue to provide us with much data and little insight into the nature of personal space..."
>
> (Evans & Howard, 1973, p. 338)

With few exceptions (e.g. Duke & Kiebach, 1974; Pedersen, 1973a; Pedersen & Shears, 1974) simulation techniques have not measured dependent variables other than IPD, even though there is ample evidence of the relationship of other variables such as: orientation (Jones, 1971; Jones & Aiello, 1973); eye contact (Beach & Sokoloff, 1974; Eberts & Lepper, 1975) and others (see Mehrabian, 1969). At present neither the simulation nor approach techniques provide the mechanism to examine the more dynamic aspects

believed to be associated with personal space, and this is where the field method becomes invaluable.

OBSERVATIONAL/FIELD TECHNIQUE

By using the observational/field technique, it is possible to directly observe man in a more natural environment. Rather than treating it in an over-simplified manner, personal space may now be examined within a multi-dimensional dynamic framework, as it was originally envisioned by Hall:

> "Hall's approach to personal space is multi-variate in two senses. First, he has analyzed the phenomenon as complex, involving eight 'dimensions'. Secondly, he has specified four variables determining the distance maintained in an interaction: culture, status, personality, and the feelings of the interactants toward each other. Furthermore, his orientation is clearly systemic, viewing the organized complexity of spatial non-additive relationships among many variables..."
> (Beach & Sokoloff, 1974, p. 1303)

Although this might seem the most obvious way of studying personal space, very few experimenters have actually taken this route. Eberts and Lepper (1975) compared an unobtrusive approach-type experiment (in which children willingly approached adults, who also varied eye contact) with a more naturalistic in-classroom situation (in which E measured IPD and the type of interaction).

Their results showed a high degree of consistency both within the former experiment and across situations, e.g. children who initially had greater "approach" distance were less likely to interact at closer distances within the classroom.

In another controlled/observational study of pairs of children, Aiello and Jones (1973) varied sex and race of the dyads; and then unobtrusively measured IPD and orientation while the pair were discussing some topic for later presentation.

Beach and Sokoloff (1974) used a video tape-recorder to simultaneously assess five potential components of personal space. They observed triads of same-sexed pre-schoolers playing with blocks. There were indications of an integrating of these different means of communication, they concluded.

These few experiments (and especialy the last one) are the types of experiments that are needed to investigate personal space. More than one or two readings determine an individual's average IPD; and other potential components are available for investigation within such an unrestricted and natural environment. At present many of the field experiments in proxemics are intrusions (e.g. Baum & Greenberg, 1975; Konečni et al., 1975) or invasions (e.g. Ellsworth, Carlsmith & Hanson, 1974; Leibman, 1970; Sobel & Lillith, 1975),

which introduce unnecessary complications into the area at this early stage of investigation. We do not know enough yet about what happens during free and focused interactions.

There is no doubt that observational/field studies are complex and require more procedural sophistication and more complicated measuring instruments, but these deterrents are far out-weighed by the ability to actually observe and systematically record man as he really interacts, and not how he says he would. Only using such field techniques can many other potential components of personal space be evaluated as to their single and combined contribution to the whole phenomenon.

Both the simulation and laboratory methods are insufficient at this stage to deal with the complex phenomenon that is personal space. Both of these methods are still unconfirmed even as to their validity in measuring IPD. Toward this end, the experimental part of this thesis will compare these methods of measuring IPD with a field method. First though, a review of the relevant empirical findings is presented.

CHAPTER III

LITERATURE REVIEW

Personal space and interpersonal distance (IPD) have been considered as equivalent concepts by many researchers, the terms often being used interchangeably. As mentioned earlier this is perceived as a major weakness within the area. These terms have been defined explicitly in this paper: interpersonal distance refers to the physical distance between two people, whereas personal space refers to a psychological construct which is an intermediary between antecedent conditions including personal goals and manifested behaviours such as IPD and eye contact.

Although the main interest of this writer concerns the development of personal space and an examination of the validity of the major methods used to assess it, the literature review has been broadened to include cultural aspects, situational aspects, familiarity and affect, personality factors and sex differences as well as developmental aspects. Because of this interest in the effects of age on the methods of measuring IPD and the components of personal space, more emphasis is placed on child studies throughout.

CULTURAL ASPECTS

CROSS CULTURAL Although Hall (1966) was initially the major figure in personal space exploration, his emphasis on "...personal space as specialized elaboration of culture..." (p. 1) did not spark much cross-cultural interest in this area.

His contention that different cultures have different spacing behaviour patterns has been supported by many studies (see Evans & Howard, 1973). For example, Germans appear to have larger and less flexible zones than Americans (Hall, 1966); in contrast, Arabs have smaller zones, confront each other more directly, and have more contact than Americans (Watson & Graves, 1966). Sommer (1968) did not find any differences between a number of cultures' mean spacing, and he further pointed out that such studies are difficult to interpret because of the inability of the subjects to comprehend the purpose of the experiment.

SUB-CULTURAL The greater availability of sub-cultural groups has probably been one of the major reasons why considerably more work has been done here than in the cross-cultural area. In a naturalistic/observational study that encompassed all age groups and took place in a zoo, Baxter (1970) found that Mexican-Americans interacted closer than Anglo-Americans, who in turn were closer than Black-Americans. In contrast, Sober and Lillith (1975) did not find any race differences in the distance at which pedestrians veered away when another person was walking directly in their path; and if there is a forced seat-choice situation, in which females have an alternative between race or sex considerations, sex

is the more distinguishing feature (Leibman, 1970). But the results of these last two studies should be treated cautiously as they are both invasion studies, and different processes of dealing with personal space might be in play.

Sub-cultural studies also provide the opportunity to examine the early stabilization of proxemic behaviour patterns (Hall, 1966). Aiello and Jones (1973) unobtrusively observed same-sex children interact in a classroom setting after they had been given a topic to discuss. Although Blacks maintained closer IPD than Whites in the first Grade, the difference disappeared by the fifth Grade; yet, Blacks still remained more direct in their orientation throughout. The initial sub-cultural differences give tentative support to the early crystallizing of personal space patterns, but the variation over the first five years of school implies that it is not yet stabilized.

SITUATIONAL ASPECTS

This section deals with more than the physical setting *per se* and the term "situational" is used in its broadest sense. The effects of close proximity, particularly the effects of crowding and intrusions are discussed.

These latter two topics are considered to be of value to the study of personal space because they offer more insight into the use of symbolic-distance behaviours that are exhibited when the blocking of IPD as the main indicator of personal space occurs (Leibman, 1970).

SETTING In one of the few studies examining the influence of setting on individual spacing, Little (1965) used a simulated, line-drawing technique (against three imagined backgrounds: living room, office, and street corner) and found that setting was only significant for males. In the second part of the experiment, Ss controlled the spacing of live actresses in different imagined settings. As before, setting was a significant variable, with the closest distancing occuring in the imagined 'open air' setting.

Using a naturalistic field study, Baxter (1970) showed that setting (inside/outside) interacted with sub-culture; and having reviewed Little's data, he concluded that there was very little evidence for Little's contention of closer spacing in more informal/intimate settings. Actually, children have been found to use larger inter-personal distance in an informal setting (home) than in a formal setting (principal's office) (Bass & Weinstein, 1971).

Some other researchers (Eberts & Lepper, 1975; Jones & Aiello, 1973) who have included setting as a minor concern have not found any significance attached to it.

PERSONAL SPACE INVASIONS Studies in this area have generally been concerned with the consequences of a smaller than expected or desired IPD. According to the theoretical models previously discussed, unless there is sufficient opportunity for compensatory behaviours, the invaded person should experience increased anxiety, and if given the chance to escape, would quickly avail of it most likely.

Empirically, there is support for this line of reasoning. People who have had others come too close to them (for the situation and relationship involved) became aroused, as evidenced by GSR responses (Heshka, Kenny & Pylypuk, 1975). Escape as a result of invasion has also been demonstrated in field studies (Konečni et al., 1975; Sobel & Lillith, 1975; Sommer, 1967). Even a stare (an invasion of privacy) has been shown to induce flight (Ellsworth et al., 1972). These findings provide evidence for the existence of a "psychological bubble" surrounding us, which is susceptible to psychological intrusions.

CROWDING Crowding is distinguished from a personal space invasion, in that the latter is considered to be a more distinct event, happening over a short time, with only two people involved, and usually having the alternative of flight available. Crowding experiments, on the other hand, study the resultant behaviours of a group of people interacting in close quarters for a period of time without the availability of escape.

Animal studies have shown that prolonged crowding has severe and detrimental effects, either physiologically (on the adrenal glands especially) and/or behaviourally (Calhoun, 1962; Leyhausen, 1965; see Evans et al., 1975, for a more complete review). One of the conclusions of Evans et al. (1975) was that crowding generally slows down the rate of maturation of the young organism. But they further emphasize that although there appear to be some striking comparisons between animal and human research in this area "...both the physiological mechanisms of our responses to crowding as well as our conceptualization of a crowded environment are probably very different from that of other species" (Evans et al., 1975, p. 1).

Many researchers (Eoyang, 1974; Evans et al., 1975; Strawbridge, 1974) have stressed the distinction between crowding and density. Crowding is a psychological phenomenon, affected by the observer's perception

of actual space, temperature, social group, leadership, sex, mental health, birth order, et cetera, while density is the actual space that is available. Density increases do not necessarily imply privacy decreases (Eoyang, 1974).

Strawbridge (1974) had parents fill our questionaires as to actual living space, number of adults and children, number of bedrooms, et cetera, and from these factors calculated a "crowding index". Although the density was greater in the downtown area than the uptown, the downtown Ss did not move self-referent silhouettes substantially closer to peer-silhouettes than did their uptown counterparts. One would assume that from a theoretical point of view, their expectancies of IPD would have been smaller than uptown Ss, having had less room to "spread out" in their homes; but apparently not.

From that study it appears that high density does not have any long term effect on IPD. In contrast, Pedersen and Shears (1974) found that ratings of IPD on a number of simulation and laboratory scales decreased after Ss had been confined to a small room for a short period of time. However, the results are suspect since the experimental group also spent more time with one another between tests; thus providing more time for increased acquaintance, which the "controls" did not have.

Evans et al. (1975) reported that increased density among animals resulted in fewer interactions with one another. There are also child studies (cited in same) which tentatively support this conclusion (e.g. Hutt & Vaizey, 1966). Even anticipating crowded situations appears to have the effect of increasing the desire for solitude (Baum & Greenberg, 1975).

TYPE OF ENCOUNTER Not surprisingly, the type of encounter has been shown to influence the spacing patterns of individuals (Sommer, 1959, 1965, 1967, 1969; Porter et al., 1970; Ryen & Kahn, 1975). Investigating the intricacies of small group dynamics, Ryen and Kahn (1975) found that co-operating males sat closer than competing ones. The winning side's members also sat closer to one another than did the losers.

Sommer found similar results with the seating arrangements around tables: co-operating Ss tending to sit side-by-side; competing——opposite one another; and co-acting——toward the ends of the table.

In sum, it does not seem to be setting per se that affects IPD, but rather what the setting implies. Larger spacing in more informal settings might be more indicative of the person's actual personal space, with more

compensatory components having to be activated in more formal, yet physically closer settings. The crowding and invasion effects are almost purely speculative in light of the theoretical approach emphasized in this paper. If other measures of personal space are expected to compensate under blocked usage of physical distance, then changes in personal space are difficult to interpret without some measures of these other components.

FAMILIARITY AND AFFECT

One of the more empirically stable relationships within the personal space literature is that people who like one another generally interact at smaller IPDs (e.g. Heshka & Nelson, 1972; Hiat, 1971). This is easily accommodated by all three major theories discussed.

Little (1965) had each S pretend that one line-drawing of a human was himself, and another was either a good friend, casual acquaintance or a stranger. Ss were then asked how far apart they would space them in different settings. Later in the second part of the experiment, they controlled the positioning of live actresses in different imagined settings. Results confirm that IPD increases with unfamiliarity.

Children as young as third Graders have also

demonstrated that they are capable of associating closeness with affection (Meisels & Guardo, 1969), and even younger children are able to identify this relationship in others (Post & Hetherington, 1974). Four and six year-olds were presented with picture-cards of a young male-female couple looking (or not looking) at one another and at varying distances. With the emphasis on nonverbal responses, the children were instructed to point out which couple they thought liked one another more. At 4 years of age the children were decoding the proximity cue about 63% of the time (significantly better than chance). It is interesting to note, that although the pre-schoolers did not relate eye contact with affinity in pictures of others interacting, they do recognize it as an indicator of an "open channel" in others (Eberts & Lepper, 1975).

Not all studies have demonstrated this inverse relationship between IPD and liking; for example, Russo (1970) did not find that school children placed their chairs closer to those whom they liked more. But considering the circumstances, this is not surprising. Proximity is usually a constrained variable in school with seating distances usually fixed or decided by the teacher, and affinity is not usually one of the factors involved.

If affinity determines proximity as most of the studies have demonstrated, Porter et al. (1970) thought

it would be interesting to know if short-term proximity could affect affinity. Apparently not, as males' ratings of liking were not significantly related to the distance at which the interviewer sat from them.

Increasing positive attitude through such means as praising has the effect of decreasing IPD. Guardo and Meisels (1969) had young children of both sexes pretend that they had just been praised or scolded by their parents. In the "praise" condition self-referent figures were placed significantly closer to the father-figure, while in the "reproof" condition they indicated greater distance from the father-figure, possibly denoting his more punitive role in the family.

The status of the person praising is also another consideration. Adler and Inverson (1974) found that Ss placed their chairs at a greater distance from a low-status person who praised them for an obviously easy task, than from a high-status person.

In conclusion, there appears to be little dispute with the claim that personal space is smaller for those who are liked more.

PERSONALITY FACTORS

Much of the early work on personal space studies concentrated on mental patients (Sommer, 1959, 1967, 1969)

and although Sommer found that schizophrenics stand closer to a confederate, findings generally do not support any clear-cut spacing pattern for personality abnormalities (Dosey & Meisels, 1969; see Evans & Howard, 1973). In analyzing the research data for "normals", however, there do appear to be at least two groups that space differently.

Investigating a number of young male adults as to their approach distances and also their placement of silhouettes, Hiat (1971) parcelled out three distinct distance groupings, which she labelled: close, average, and distant. The Distant group of 18 year-olds exhibited similar distancing patterns to adults. Hiat formulated a hypothesis of maturity differences to account for these groupings, with the Close group being the least mature of the three.

Unlike Hiat, Patterson (1973) found a bi-modal distribution with very few Ss falling into the intermediate range. From personality ratings and self-ratings there was evidence that the more distant students were more anxious than those who approached closer. He concluded that anxiety was the crucial factor that differentiated the three groupings. Sommer (1967) and others (reported in same) have found a similar relationship between IPD and anxiety. Sommer reports that anxious Ss sat farther away from a confederate, for example.

It appears that extroverts place themselves closer to others than introverts do (see Evans & Howard, 1973; Sommer, 1967). The finding that extroverts also look more often (Argyle & Ingham, 1972) agrees with Argyle's Equilibrium Model, in that more eye contact would be expected to compensate for the greater than desired IPD for extroverts. Porter et al. (1970) could find no evidence of this relationship in their own study, however.

There are indications that other personality characteristics such as the need for affiliation are associated with personal space. Rosenfeld (1965) found that females acting the role of someone seeking approval moved considerably closer to confederates than someone trying to avoid approval.

Homosexuality has also been considered in proxemics. Kuethe and Weingartner (1964) using the Felt Replacement Technique, found that prison inmates with higher ratings on homosexuality scales more often erred by replacing male felt figures closer together than did a group of 'heterosexual' prisoners. Hartnett et al. (1970) studied homosexuality in relation to the distances that males and females approach one another. Although there was no significant relationship between heterosexuality ratings and distances, there was a trend for smaller male-female distances to be associated with higher ratings of

heterosexuality. But with only two Es being approached by Ss, the differences could also be due to individual differences.

Using the Schneirla organismic theory (that body build is related to personality) Lerner and his colleagues (Lerner et al., 1975a, 1975b) predicted that even in Grade 3, endomorphs would arouse a negative affect, especially when compared to ectomorphs. Using different-sized silhouettes the children consistently spaced the endomorphs of either sex significantly farther away than the other two body-build types. There is also a tendency for self-referent figures to be placed farther from ectomorphs than mesomorphs. Testing this same group a year later, Lerner et al. (1975b) found no significant change in the relationship of body-build type and proximity. They also found this relationship held for Japanese children of the same age (Lerner, Chihara & Iwawahi, 1976).

The personality data gives clear evidence that personal space is affected by such interpersonal goals as approval-seeking, and more general antecedent conditions such as anxiety. There is no proof that certain personality-types such as schizophrenics have definite spatial patternings associated with them, although people with broad classifications such as homosexuality may have

definite proxemic patternings. There appears to be ample proof that such stigmas as obesity do determine people's spacing, even as early as Grade 3.

SEX DIFFERENCES

ADULTS Hall (1966) considered sex to be such an important variable affecting personal space that he claimed men and women actually live in different worlds. Empirical evidence indicates that in social interactions: women are more sensitive to nonverbal cues (Rosenthal, Archer, DiMatteo, Koivumaki & Rogers, 1974); have a more direct shoulder orientation (Jones, 1971; Mehrabian, 1968); look more often (Coutts & Schneider, 1975; Exline, 1963) and also longer (Patterson, 1973; Schneider & Hansvick, 1974).

The general finding is that women interact with each other at a closer distance than men (Baxter, 1970; Dosey & Meisels, 1969; Heshka & Nelson, 1972; Sommer, 1959). Hartnett *et al.* (1970) found that women let E approach closer than did men. Some (Hiat, 1971 ; Schneider & Hansvick, 1974) did not find any significant difference in an approach situation, although Hiat's data tended to be in that direction. Given the choice between sitting with men or women on a bench, women usually chose other women and they usually sat closer together than with men (Leibman, 1970).

Sobel and Lillith (1974) reviewed some of the literature of the Approach Test and concluded that "... although American females prefer to be given more personal space than Americal males, they are in fact given less" (p. 40). In their own moving invasion experiment on the streets of New York, Ss moved out of the path of a female E at a greater distance than for a male E. This apparently contradictory finding actually demonstrated the need to distinguish between laboratory and real-life invasion studies, they added.

The lower variability within the IPD measurements for women (Adler & Inversen, 1974; Russo, 1970) was viewed by Russo to indicate that women have more eye contact to gain more information so they can respond appropriately in a particular situation. It may be more that women's social norms are far less flexible than men's, and consequently they become far more sophisticated in their utilization of symbolic behaviours.

CHILDREN Even in the early school years, many of the adult proxemic behaviour patterns are evident. For example, even at the Grade 3 level females have been found to be more sensitive than males in nonverbal communication (Rosenthal et al., 1974). Females are also more direct in their orientation by Grade 1 (Jones & Aiello, 1973).

Investigating Grades 1, 3, and 6, Russo (1970) found that males' variance in chair placement was greater than females' variance, the effect becoming significant with age.

Girls were also found to place chairs closer than boys, especially in Grade 3 (Russo, 1970). Using silhouettes, Lerner et al. (1975a, 1975b) found similar results with 3 and 7 year-olds, but the 5 year-olds did not apparently discriminate on the basis of sex. Not all females at this early age give indication of smaller "personal space" than boys (e.g. Bass & Weinstein, 1971; Beach & Sokoloff, 1974).

Eberts and Lepper (1975) tested pre-schoolers in an unobtrusive approach technique and did not find any difference between boys and girls, but the female adult was approached closer by all Ss, possibly reflecting the easier accessibility of women for young children based on their experience with mothers and teachers.

Jones and Aiello (1973) observed same-sex and same-race children in pairs as they prepared a skit to perform for their class. Although they did not have different IPDs, the boys were less direct in their shoulder orientation towards one another than were the girls.

Simulation studies which have concerned themselves with a wider age spectrum (Meisels & Guardo, 1969; Strawbridge, 1974) have generally found that although same-sexed pairs are placed closer in the early Grades, the opposite sex pairs are closer after puberty. Males give smaller spacing to their own sex in the early Grades, and as they grow older they move self-referent figures farther away from their own sex until, by the ninth Grade, both sexes are spaced the same distance. After that cross-over point female-figures are approached closer than male-figures, with the distance between male-figures increasing with age. Females on the other hand, initially appear to keep more distant from males than their own sex and maintain the same distance from female-figures throughout school years, meanwhile, steadily moving farther away from male-figures. These studies will be discussed in more detail in the next section.

In one field study (Beach & Sokoloff, 1974) females actually had larger spacing than males. Besides measuring IPD for these 4 and 5 year-olds, they also recorded orientation, looking and position (centre/periphery), but IPD was the only major difference between the sexes. They gave a number of <u>post hoc</u> explanations as to why girls had greater IPD in this situation. If the activity of playing with blocks is a novelty for the girls, then

social considerations would have been less important. On the other hand, if the girls are more social than boys at this age then maybe they were more at ease in this particular setting than the boys, who consequently crowded together for more security. Finally, a third explanation is that girls are developmentally different than boys at this age. The actual results should be treated with reservation however, as the number of Ss is very low, with only 14 of the original 42 remaining in the experimental situation for the required 10 minutes.

The affect of the situation also seems to have a different effect upon boys and girls. Girls tend to place self-referent figures closer to their parent-figures when praised (Guardo & Meisels, 1971b); while under negative affect situations such as fear, females preferred more space than males (Meisels & Guardo, 1969).

Working under the assumption that girls have more "expressive" characteristics than boys, who favour more assertive, mastery-type activities, Post and Hetherington (1974) tested boys and girls in their recognition of eye contact and distance in pictures of adult couples, with these two cues as indicators of affection. At 4 years of age, neither boys nor girls recognized the eye contact cue, but both recognized the proximity cue, even

though only just above the chance level. At 6 years of age the girls had significantly improved in recognition of both cues while the boys continued not to recognize the eye contact cue. In the second part of the experiment, younger groups of both sexes (3½ year-olds) were trained on a discrimination task, with eye contact being the reinforced variable. After training the boys did not show any significant improvement, yet the 3½ year old girls did even better in recognizing the eye contact cue than the older 4 year-olds of the previous part of the experiment.

In a similar type of experiment, Scott (1974) instructed Grades K to 3 children to judge what an adult couple were saying to one another by using a proximity cue only. They were shown pictures of same-sex or opposite-sex couples at one of the four different zones specified by Hall (see Table 1, p.15). They had to inform E whether the couple were::(a) telling each other a secret (intimate zone); (b) what was for dinner (personal zone); (c) how to find a store (social zone); or (d) calling the other to dinner (public zone). The early Grades could not do this. Methodologically, the Scott study was different from the Post-Hetherington study in that the latter did not require verbal responses, which could have very important consequences for younger children (see next section).

It is also debatable if the topic matters used by Scott can be confidently linked to their respective spatial zones, e.g. secrets could be associated with three feet.

The evidence certainly confirms that sex is an important factor in personal space research. North American males gradually learn over age (especially after puberty) that close spacing with other males is frowned upon. Females, on the other hand, may wish more space from males, but apparently did not receive it (in static Approach situations anyway). The greater portion of this research is based upon approach tests and simulation tasks, and it should be treated accordingly. Very few studies have included other components, fewer still recording them simultaneously in a real-life setting. These are especially important for females who seem to learn them much younger than males. Considering the evidence of closer IPDs, more eye contact and more direct orientation for females, it appears that they prefer smaller personal spaces than males.

DEVELOPMENTAL ASPECTS

Although young children are less sensitive than adults to decoding (detecting) nonverbal cues (Post & Hetherington, 1974; Rosenthal et al., 1974; Scott, 1974), they encode (generate) typical proxemic behaviours as

early as 3 years of age (Eberts & Lepper, 1975). This section will review some empirical findings as to when proxemic behaviours become evident and how the relationships change over time, although not much is known about this.

Children as young as 3½ years have demonstrated consistency in their interaction distances, across both trials and situations a month apart (Eberts & Lepper, 1975). Young children of this age were aware of the significance of eye contact, for they stopped sooner if the adult looked up at them. They probably associated this look with the adult's willingness to communicate with them, i.e. it indicated an open channel. Children in Grade 1 also use adult sex-typical orientation behaviours with the males being less direct in shoulder orientation (Jones & Aiello, 1973).

Scott (1974) expressed doubt that children would be able to decode the meaning of IPD before 8 years of age. In his experiment (described in last section) Grades 1, 2 and 3 children were not able to match Hall's four zones with the corresponding level of intimacy implied. He explained the decoding process in terms of a discrimination task in which there are three steps. First, the child must recognize that IPD communicates something. Then after discriminating the four different

distances employed, the child must be able to correctly match each distance with its respective meaning. He argued that young children, being more easily distracted and less competent in their use of verbal mediators, would not be capable of performing the first two steps before the age of 8. Interestingly, even at Grade 3 children have shown that they are using Hall's zones differentially for friends, acquaintances and strangers, which would seem to indicate that they had already learned to relate proximity to affinity (Meisels & Guardo, 1969).

The problem in the above might involve verbal inefficiency more than the inability to discriminate. It has been shown that although children could not verbalize affect in certain circumstances, they could point out the picture of someone's face expressing the appropriate emotion (Borke, 1971). Post and Hetherington (1974) eliminated verbal responses by having children actually point out which couple liked each other more. By 4 years of age, children recognized 63% of the time that couples closer to one another liked one another more (although it was just above the chance level) and by 6 years of age, they had no difficulty with recognition of the relationship. However, both boys and girls experienced more difficulty with the eye contact cue. Besides its

representation on paper utilizing smaller physical differences, eye contact is possibly a more subtle cue of affection and associated more with later heterosexual relations.

Young pre-schoolers and early Grade children have been shown to utilize interpersonal space differentially on the basis of: sex (Duke & Wilson, 1973; Lomrantz et al., 1975; Pedersen, 1973b; Strawbridge, 1974); race (Duke & Wilson, 1973; Shoichet & Williams, 1973); body build (Lerner et al., 1975a, 1975b, 1976); relationship (Bass & Weinstein, 1973; Meisels & Guardo, 1969); eye contact (Argyle & Dean, 1965; Eberts & Lepper, 1975); authority (Duke & Wilson, 1973); and as a consequence of praise or scolding (Guardo & Meisels, 1971b). All of the above certainly indicates that personal space is operating at an early age, at least by the time the child enters school. In this regard, there is support for Hall's contention of an early crystallizing of proxemic behaviours. The co-ordination and stabilization of these behaviours has yet to be researched. Most of the developmental studies have concentrated upon the investigation of IPD and how it changes over the school years, and this will be the next topic of discussion in this section.

The research dealing with how personal space in general and IPD in particular changes over the school years is confusing and intrinsically bound to other factors such as sex and affect. The evidence for a generally increasing mean IPD is contained in Argyle and Dean (1965), Bass and Weinstein (1971), Baxter (1970), Eberts and Lepper (1975), Lomrantz et al., (1975) and Strawbridge (1974). The arguments for an increasing IPD follow already established theory such as the increasing tendency for self-exploration (Russo, 1970) and the growing discouragement of parents for dependency-type behaviours (Heshka & Nelson, 1972; Strawbridge, 1974).

On the other hand, Meisels and Guardo (1969) found a generally decreasing IPD over Grades 3 to 10, but their simulation experiment had also included 7 levels of affect among other factors. Under positive affect (e.g. liking) there was an increasing IPD, and since most of the above experiments used Ss who knew and liked one another, there does not appear to be such disagreement after all. Some other works that have examined a smaller age span have suggested a curvilinear relation between IPD and age with a maximum in Grade 3 (Eberts & Lepper, 1975; Pedersen, 1973b). Heshka and Nelson (1972) similarly found a curvilinear relationship over age with

maximum occurring around 40 years of age; the decline in IPD in later years probably being due to failing senses and increasing dependency on others. Jones and Aiello (1973) and Shoichet and Williams (1973) reported no evidence of any relationship between IPD and age, with the former being one of the few observational/field sources.

Very few studies have investigated personal space components other than IPD. Beach and Sokoloff (1974) found indications of an increasing integration of personal space components as early as five years of age. Observation of boys and girls playing with blocks led them to conclude that Ss were using an "...integrated system of nonverbal communication". They further added:

> "The interpersonal distance behavior of the hypothetical average boy and girl over time were each a significant function of a particular weighting of the other variables, indicating the interdependence of these components of communicational activity. At the same time, as indicated by both these results and also correlation matrices, each of the five rated behaviors made a somewhat unique contribution to the composite." (Beach & Sokoloff, 1974, p. 1309)

In sum, it appears that children by 3½ years of age are utilizing space in a systematic manner. Early in life they are able to recognize that propinquity is

related to affinity, but the recognition of more subtle cues such as eye contact does not become associated with psychological space until later. Apparently, North Americans increase their desired personal space as they grow older, this being especially evident in males interacting together. Females do not appear to change (at least in IPD) over age. The integration of personal space components over age has received very little study, but indications are that this integration does occur by the time of school entry.

This chapter has investigated personal space from the aspects of setting, affect, personality, sex and age; and the general conclusion is that much of the confusion within the area is due to the preponderance of artificial methods of measuring "personal space", and the lack of consensus and clarity in the definitions of relevant concepts surrounding this phenomenon. There is a definite need for validation of the instruments used to assess IPD before concentrated research into the development of the personal space processes can proceed. The next chapter describes an experiment which pursues these objectives.

CHAPTER IV

THE EXPERIMENT

Up to this point personal space has been discussed in terms of theory, methodology and research. It has been defined as a psychological construct, which is not directly accessible for measurement, but it is manifested by a number of behaviours, among which IPD is one of the most important. In the quest for objectivity the measurement of IPD has essentially been reduced to simulated versions of how man interacts in real life. People have been asked to think about behaviours of which they are normally unaware, and then consequently indicate how far they would position themselves (or representations) from other people (or objects).

Among other issues confronting the researcher in this area, the question of the validities of the simulation and laboratory methods is unresolved. Neither method has demonstrated sufficiently that it is a valid measurement of IPD at any age level, not even for adults. Regardless of the argument as to whether personal space is or is not more than IPD, the measurement of IPD must be valid. At present it has not been shown to be.

The following experiment has been designed to investigate that issue of validation by comparing measurements of IPD from both the Approach Test and a simulation technique to a mean IPD determined from a

real life situation, under similar circumstances and using the same persons. Because the validity question is more important at this time, only male subjects will be used, so as not to confuse the issue with another variable, sex.

The development of personal space in the Leibman sense is virtually an unexplored area vis-à-vis the interdependency of the components and the changing relationship over age. There is an indication of an increasing integration of the components examined by Beach and Sokoloff (1974), but the number of Ss used in their analysis is small. Therefore the field part of this experiment will be used to assess a number of components, and their changing relation throughout the school years.

The following sub-sections will list and describe the independent and dependent variables; state a number of hypotheses and the rationale for each; and then describe the procedure used in this experiment.

INDEPENDENT VARIABLES

Grade Level The five Grade levels chosen were: Kindergarten, Grade 3, Grade 6, Grade 9 and Adult. These particular Grades were selected on the basis of developmental considerations and previous experiments (e.g. Strawbridge, 1974). Younger subjects were not used because of their inability to understand the instructions and perform some of the tasks (Strawbridge, 1974).

Methods Three methods of measuring IPD were employed: the Approach Test, the Simulation Test, and the Field Technique. There is a fairly standard technique used in the in the Approach Test (described on page 15); and this is the most common laboratory method. The simulation test consisted of materials used by Strawbridge (1974) and this particular technique was chosen because of its use of age- and sex-appropriate silhouettes. It also allowed for a reliability check of the technique. The field technique was based upon procedures used by Jones and Aiello (1973) and Beach and Sokoloff (1974).

Relationship As a further test of the reliability of this particular simulation exercise, the placement of

self-referent figures in relation to a "friend" and a "stranger" were compared. The findings have been consistent in the placement of friends being closer than strangers.

DEPENDENT VARIABLES

IPD (interpersonal distance) This was an obvious choice as many researchers consider this to be personal space, and besides, it is an important variable in the Leibman model. Also, it is the variable of comparison for the three methods. The explicit measurement of IPD was from nose to nose in all three methods and it was measured as a continuous variable, with the simulation method also requiring a scaling up from the original measurements (from 1 inch to 1 foot). Unlike the simulation and approach methods, the field method required an estimation of IPD.

Eye Contact This variable (along with orientation and talking) was included because of its possibility as a component of personal space. All three components were measured only during the field method. Eye contact was loosely defined as being one person "looking at the other" and it was measured as being present or absent at each "freeze" (stopped motion of the video-tapes).

There is ample evidence of the existence of a relationship between IPD and eye contact (Argyle & Dean, 1965; Sommer, 1967).

Orientation Orientation (of the shoulders) has been shown to be related to IPD in a number of studies, and there is also evidence of the existence of this relationship even in the early grades (Jones & Aiello, 1973). It was estimated at each "freeze", using a "clock" technique, i.e. from 0 to 12, with 0 representing face-to-face and 12 being back-to-back

Talking This was included not because of its relationship to IPD, but rather its known association with eye contact (Mehrabian, 1969). Beach and Sokoloff (1974) had also included this variable in their experiment. It was measured as being present or absent during the interval between freezes of the video-tapes.

Other Measurements Because of the nature of the field method, and the necessity of having the same or comparable conditions across methods, not all IPD readings in the field could be considered, e.g. when Ss were sitting. Thus other readings such as pretending and sitting were monitored, with the intention of later deleting those

intervals which were "invalid" (See Appendix A for complete listing).

HYPOTHESES

The explicit predictions about the relationship of these aforementioned variables is presented in the hypotheses following. Each hypotheses is followed by a brief rationale for its inclusion.

HYPOTHESIS I INTERPERSONAL DISTANCE WILL INCREASE WITH AGE FOR ALL THREE METHODS EMPLOYED.

There were arguments (presented already) as to whether the mean interaction distance of males increases or decreases with increasing age, but the weight of evidence reviewed favours an increasing mean IPD for males under positive affect (e.g. friends).

HYPOTHESIS II OVERALL INTERCORRELATION OF THE THREE METHODS OF MEASURING IPD WILL INCREASE WITH AGE.

This hypothesis is probably better expressed in terms of an increasing Multiple Correlation of the field IPD as a function of the simulation IPD and approach IPD. Presumably, the simulation exercise is more difficult for the younger children, both in terms

of the concepts involved (Elkind, 1974) and the instructions (Duke & Wilson, 1973). Similarly the approach method has sometimes been found difficult for young children, with some reported cases of Ss walking right into one another. As the age of Ss increase, these difficulties should diminish, with a resulting increase in the predictability of the field IPD from knowledge of simulation and approach scores.

HYPOTHESIS III WITHIN THE SIMULATION METHOD, THE DISTANCE FOR FRIENDS WILL BE LESS THAN THAT FOR STRANGERS.

The evidence for this has been very consistent.

HYPOTHESIS IV WITHIN THE SIMULATION METHOD, THERE SHOULD BE AN INTERACTION OF GRADE LEVEL AND RELATIONSHIP (FRIEND/STRANGER).

Previous discussions indicated that the simulation task was more difficult for and poorly comprehended by the youngest Ss (e.g. see Duke & Wilson, 1973). Then, although the youngest Ss might normally space themselves farther from strangers than from friends, the method would be less effective in determining this for that age group. As they grow older their indicated placements of figures should become more reliable, and this changing

effectiveness of the simulation method should be reflected in the interaction of Relationship and Grade level.

HYPOTHESIS V THE INTERCORRELATION OF PERSONAL SPACE COMPONENTS OF EYE CONTACT, DISTANCE, ORIENTATION AND TALKING WILL INCREASE WITH AGE.

This hypothesis is included more for exploratory purposes. There is no empirical evidence of an increasing integration of personal space components over age, other than that indicated in Beach and Sokoloff (1974). Hall (1966) does theorize that these components (proxemic behaviours) crystallize in early childhood. Their intermeshing with increasing age should be indicated in increasing intercorrelations among the components. Because of the statistical difficulty of dealing with a psychological construct (personal space) and the necessity of selecting a dependent variable for the Regression analysis, the obvious choice was IPD, as this is the main indicator of personal space under normal circumstances (Leibman, 1970). If all the behaviours are intrinsically bound and related to one another, the knowledge of all of them less one should be predictive of that one.

"It would seem that physical and symbolic distances are mutually

> supporting and act in concert with one another. If this is the case the one can compensate for the absence or overabundance of the other to achieve maximally satisfying psychological distance."
> (Leibman, 1970, p. 212)

METHOD

SUBJECTS The Ss were all male and there were 30 (15 pairs) from each of 5 Groups (Grades K, 3, 6, 9 and Adult), for a total of 150 Ss (75 pairs). Their mean ages were 5.82 years, 7.04 years, 12.09 years, 14.92 years and 21.51 years respectively. Initially it had been proposed to use pairs of strangers, but this gave rise to many problems of access and would have entailed too much interference and inconvenience in school schedules. Since all school students stayed in the same groups for all class periods, they all knew one another. Names were chosen at random from classroom lists of volunteer students whose parents had given them permission to participate. E later confirmed that most dyads considered themselves to be "friends" with the minority being "best friends" or "acquaintances". Each adult S was asked beforehand to bring along a male friend with him.

PROCEDURE Adult Ss were met outside the test room, while the pupils were met at their classrooms by E. After a brief introduction in the test room, E asked the pair if they would prepare a skit about a T.V. commercial or show that later would be filmed; E pointed to the two cameras in the far corners of the room. E made no attempt to conceal the two tripod-mounted cameras from the Ss. Because the cameras were silent and only a blank picture appeared on either camera screen, it was presumed that they would be considered "off". Also E gave the impression that his presence was required for them to work. Actually, both cameras were on all the time and there was an inconspicuously-placed microphone in the room also. These were connected by concealed cables to a monitor and video tape recorder (VTR) in an adjacent room.

Satisfied that the instructions were understood, E then left the room, saying that he would return "in a couple of minutes" to film the skit. He also asked Ss to stay away from his desk. This instruction along with the positioning of tables and chairs about the room were intended to keep Ss within camera range. In a small number of cases Ss moved well out of camera range while E was in the next room. If it appeared they would stay there for a long time, E would casually re-enter the room

and go to his desk; meanwhile, he would ask them if "everything was alright", and then leave again. This always succeeded in bringing them back into camera range.

After 2 or 3 minutes of recording each pair from an adjoining room, E returned, took one of the cameras, pushed a switch on the back of the camera and filmed their skit (if they had one). When this was over, Ss were then asked to sit in two back-to-back chairs. After answering some questions they were instructed not to turn around for the rest of that particular task. Then each was handed an age-and sex- appropriate cardboard cut-out, which had been constructed from actual photographs (with a scale of 1 inch to 1 foot being used) (see Strawbridge, 1974). Each S was asked to pretend that this was himself. The booklet lying on his desk was then opened by E. Each page contained a horizontal line, one inch above and parallel to the bottom edge. Centred 3 inches from the right-hand edge was an appropriately aged male silhouette figure, facing left with its feet on the line (see Appendix B for sample page). It was the same size as the cardboard cut-out which S held in his hand. The instructions given by E were:

> "Now if you pretend that this is a new student who has just come to your school (pointing to the silhouette)

> and this is you (indicating the cut-out), where would you stand while talking to him during a class break?"

Having made sure they both understood the instructions, E traced the facing side of the cut-out and then turned to the next page, which was exactly the same as the preceding one. Almost the same instructions were given except that they were told that this time the silhouette represented a "friend". Similarly, the position of the self-referent figure facing the "friend" was marked by E. These two exercises constitued the simulation part of the experiment.

After the simulation task, both Ss left their desks and went to an open part of the room. One S was then placed standing with his back to the wall, and the other S was positioned about 15 feet away, facing him. Speaking to the latter (the one not against the wall), E said:

> "I want you to walk straight up to (name) and stop where you normally would if you were talking to him."

E then took a measuring tape and measured the distance in inches (to the nearest ½ inch) from nose to nose, and recorded this "Approach" score for the moving S. Then they switched roles and the same procedure was followed again, yielding an Approach score for the other S.

Both Ss were then asked what they thought the purpose of the experiment was and also if they were "best friends, friends or acquaintances". E thanked them and asked them

not to talk about any of the happenings until a couple of weeks after he had left the school. They were told that E would return in the near future with the film of their skits and would then explain the purpose of these tasks. In contrast, Adult Ss were debriefed immediately afterwards.

JUDGING To reduce the raw field material to more operational data, the original tapes of each pair were later re-recorded with the action "frozen" (stopped for a few seconds) every consecutive 5 seconds, with the first interval commencing just after E had left the room, and continuing until 2 minutes of intervals had been obtained for each pair (if possible). The re-recorded tapes and a video tape machine were placed in a room where each of the two paid judges (male and female university students) was free to evaluate them at leisure over several weeks. Each judge concentrated on only one member of the pair, specificially the S who was initially on the right or left side of the screen. The judge noted if during the preceding interval this S was talking and/or pretending, and also if S was looking at the other member of the pair at the time of the freeze. For each interval these assessments were recorded on a tally sheet for each member of every pair.

The tally sheet also contained columns for determining whether either of the Ss was sitting at the time of the freeze, or if either was in motion, and some other information (see sample sheet in Appendix A). The "moving" and "invalid" distances were excluded from further analyses.

Before the two judges were given the video-taped interactions of the pairs, they were given training with video-taped, staged interactions. These training tapes contained an age-appropriate pair for each of the 5 Grade levels, with each pair assuming approximately 20 random poses. Each judge went through the training tapes, estimating the interpersonal distances for the poses and compairing these with the actual distances (previously measured by E). The orientation during each pose was also estimated and recorded, but no objective standards were available. The exact instructions are reproduced in Appendix A.

C H A P T E R V

THE RESULTS

As previously mentioned, the two judges (male and female college students) were first trained in estimating 20 IPDs and orientations of a pair of age appropriate Ss, at each Grade level. The correlations between judged and actual distances for each of the 4 practice sessions are presented in Table 3. The correlations between judged orientations are presented in Table 4.

The two judges independently examined the 5-second intervals of the 76 pairs* and recorded a total of 3740 observations altogether. Each observation specifically contained a judgement with regard to: pretending, talking, sitting, looking, interpersonal distance (IPD) and orientation. Along with this field data there were also 2 simulation scores (friend and stranger) and an approach score for each S.

The field data were composed of a variable number of data points for each pair, whereas both the simulation and approach methods each yielded one datum per S, thus presenting problems for comparison of the latter two methods of the field data. An interaction distance for

---

*Although there were supposed to be only 15 pairs for each age level, one pair in grade nine had been given the wrong simulation material. To compensate for this another pair was later run for that group. Except for analyses within the field method, this pair's data were excluded from all analyses.

TABLE 3

Correlations of Judged Distances with Standard Distances during Training Sessions.

Training Session	1	2	3	4	(n of Ss)
JUDGE "F"					
Kindergarten	0.91	0.92	0.91	0.90	19
Grade 3	0.83	0.93	0.93	0.92	22
Grade 6	0.92	0.87	0.87	0.91	22
Grade 9	0.88	0.80	0.75	0.76	22
Adult	0.92	0.91	0.89	0.97	22
JUDGE "M"					
Kindergarten	0.94	0.92	0.93	0.91	18
Grade 3	0.84	0.82	0.87	0.93	22
Grade 6	0.84	0.88	0.85	0.88	22
Grade 9	0.78	0.80	0.83	0.88	22
Adult	0.92	0.91	0.95	0.92	22

TABLE 4

The inter-correlations of ORIENTATION judgements made by judges during the Training sessions.

		JUDGE F				JUDGE M			
		T1	T2	T3	T4	T1	T2	T3	T4
Kindergarten	T1	1.00	0.83	0.92	0.81	1.00	0.21	0.61	0.55
	T2		1.00	0.90	0.76		1.00	0.48	0.23
	T3			1.00	0.73			1.00	0.23
	T4				1.00				1.00
Grade 3	T1	1.00	0.83	0.80	0.66	1.00	0.64	0.66	0.65
	T2		1.00	0.53	0.45		1.00	0.56	0.55
	T3			1.00	0.86			1.00	0.98
	T4				1.00				1.00
Grade 6	T1	1.00	0.84	0.82	0.72	1.00	0.39	0.39	0.39
	T2		1.00	0.60	0.55		1.00	0.93	0.81
	T3			1.00	0.90			1.00	0.84
	T4				1.00				1.00
Grade 9	T1	1.00	0.50	0.52	0.79	1.00	0.83	0.64	0.46
	T2		1.00	0.85	0.63		1.00	0.59	0.38
	T3			1.00	0.64			1.00	0.63
	T4				1.00				1.00
Adult	T1	1.00	0.01	0.67	0.99	1.00	0.45	0.38	0.42
	T2		1.00	0.30	-0.03		1.00	0.68	0.22
	T3			1.00	0.64			1.00	0.30
	T4				1.00				1.00

the field data had been defined a priori as the distance when either S was not pretending nor sitting, and either looking at the other person or talking to him. This naturally led to different amounts of data (the number of "interaction" intervals) for each pair. This data is referred to as the Original field data. Rather than have widely different amounts of data for each pair in a group, just the mean IPD for each pair was considered in assessing the group's mean IPD. This Modified group mean (n=15) was compared to the Original group mean (e.g. n=483) at each Grade level and none of them were significantly different (Table 5). For the sake of reduced complexity the Modified Data are used hereafter for the field method in comparisons with the other two methods.

Although each observer had concentrated on only one member of each pair in compiling the necessary information during each 5-second interval, obviously the actual IPD at each freeze was the same for both members of the pair. Since each S of the pair had the same IPD and it was being estimated by each judge, the pair was used as the basic unit in the analysis of variance (Anova) of Grade level (K, Grade 3, Grade 6, Grade 9, Adult) by Methods (Field, Simulation, Approach) with the latter being a

TABLE 5

Comparison of ORIGINAL and MODIFIED Field data.

	ORIGINAL			MODIFIED		
group	mean	s.d.	(n)	mean	s.d.	(n=15)
Kindergarten	17.94	12.52	(483)	17.03	07.73	
Grade 3	28.47[a]	14.81	(471)	28.84	10.96	
Grade 6	28.14[a]	12.01	(402)	28.19	07.79	
Grade 9	35.37[ab]	13.78	(531)	35.97	08.66	
Adult	41.10[b]	18.72	(516)	41.80	10.25	

[a]common letters indicate ORIGINAL means are not significantly different (Scheffé post hoc comparisons, α=.05)

within-subject variable. Grade level by Methods interaction yielded a significant effect [$F(8/140) = 8.59$, $p < .001$]. In addition, significant main effects were found for Grade level [$F(4/70) = 2.84$, $p = .029$] and Methods [$F(2/140) = 16.71$, $p < .001$]. The results are presented in Figure 1 with the actual data in Appendix C. Further analyses are presented under the appropriate hypotheses.*

HYPOTHESES

HYPOTHESIS I INTERPERSONAL DISTANCE WILL INCREASE WITH AGE FOR ALL THREE METHODOLOGIES EMPLOYED

One-way Anovas were performed on Grade level for each method separately. Since there were individual data available from each S for the simulation and approach methods, Ss were used as the basic unit for the Anova. The subject-pair means were the basic units of the Anova for the field method. Each method will be discussed separately below.

Field Method As Figure 2 reveals, there is a general increasing IPD with increasing Grade level [$F(4/70) = 15.42$, $p < .001$]. The IPD means for each Grade level are presented in Table 5. A post hoc comparison of IPD means ** revealed

---

*Summary tables of all Anovas are presented in Appendix C.

**All post hoc comparison of means are Scheffé tests with $\alpha = .05$.

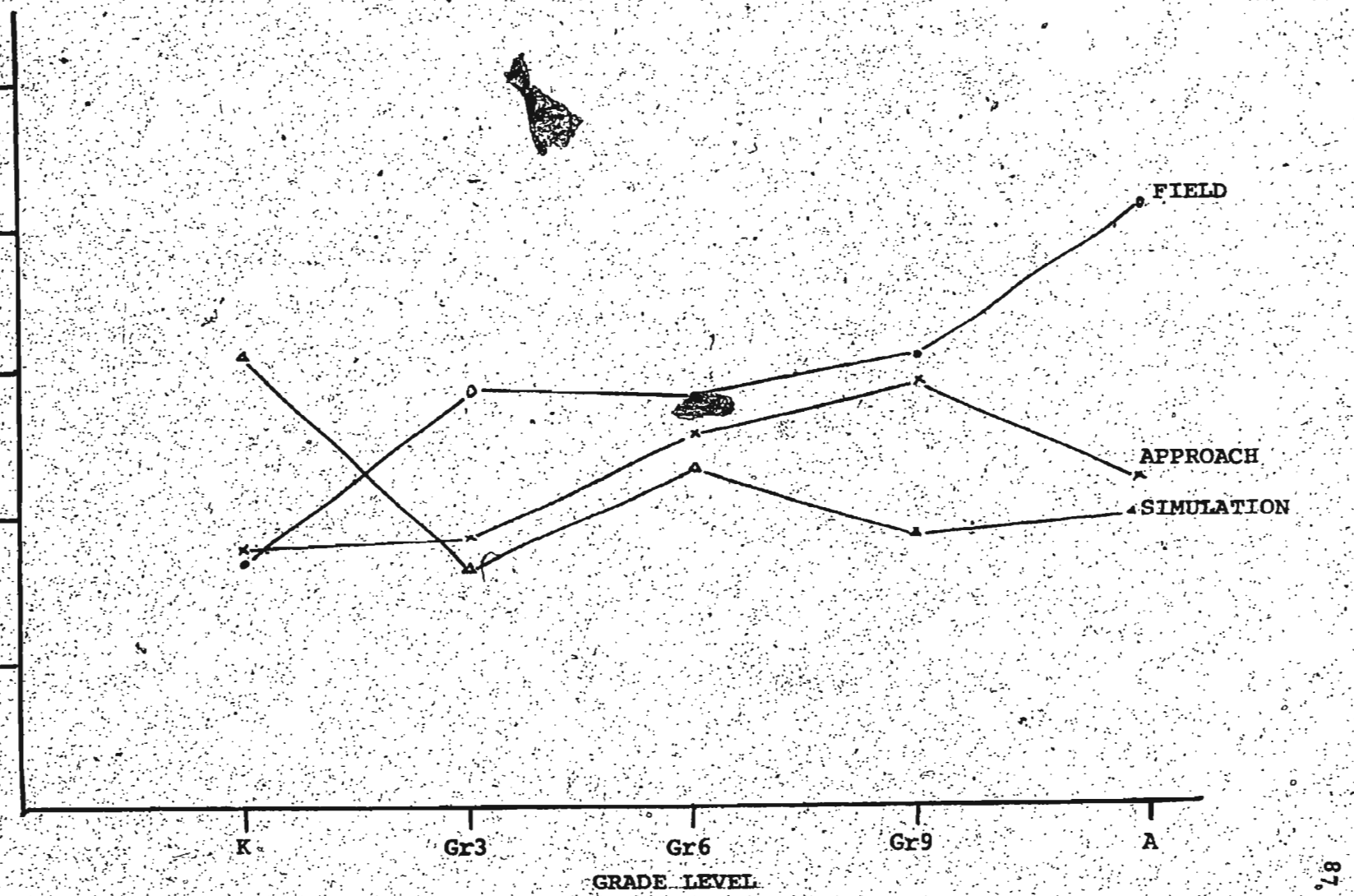


Figure 1. Interpersonal Distance as a function of Grade Level and Method.

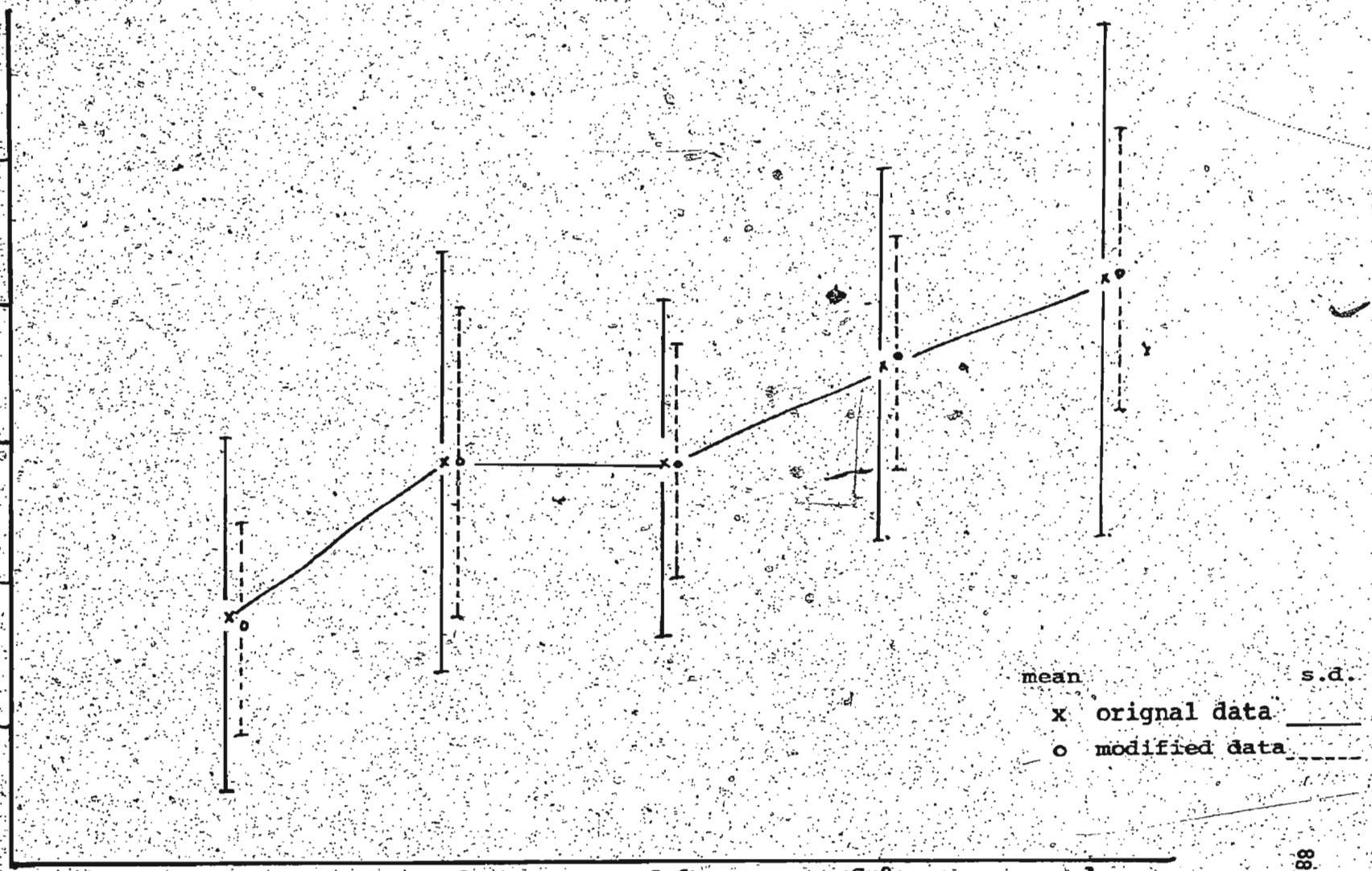


Figure 2. Comparison of the ORIGINAL and MODIFIED data of the Field method.

that there was a significant increase from K to Grades 3 to 9 (which were not significantly different); and an increase from Grade 6 to the Adult level.

Simulation Method Although the Grade level main effect was significant [$F(4/140)=2.99$, $p=.021$], there is no obvious indication of an increasing IPD with an increase in age (see Table 6). If anything, the fluctuating means appear to be gradually decreasing over age, but it can hardly be considered consistent (see Figure 3). Post hoc comparisons of IPD means reveal: a decrease in IPD from K to Grade 3; then an increase in IPD to Grade 6; followed by a decrease to Grade 9 and Adult.

Approach Method The main effect of Grade level (see Table 7 and Figure 4) was found to be significant [$F(4/140)=6.79$, $P<.001$]. Post hoc comparisons of IPD means show a significant increase from K and Grade 3 to Grades 6 and 9, and then a decrease for Adults. Thus, with the exception of the Adult group, IPD is increasing over Grade level.

The hypothesis is supported for the Field and Approach methods, but is not supported for the Simulation method.

TABLE 6

Mean interpersonal distances for the SIMULATION method.

GROUP	MEAN	S.D.	n
Kindergarten	31.22[a]	27.39	29
Grade 3	16.64[b]	7.23	30
Grade 6	23.19[ad]	19.29	29
Grade 9	18.80[bc]	10.84*	27
Adult	20.93[cd]	15.49*	30

[a]means with common letters are not significantly different (Scheffé post hoc comparisons, α=.05)

*indicates that adjacent variances are significantly different (F-test, α=.05)

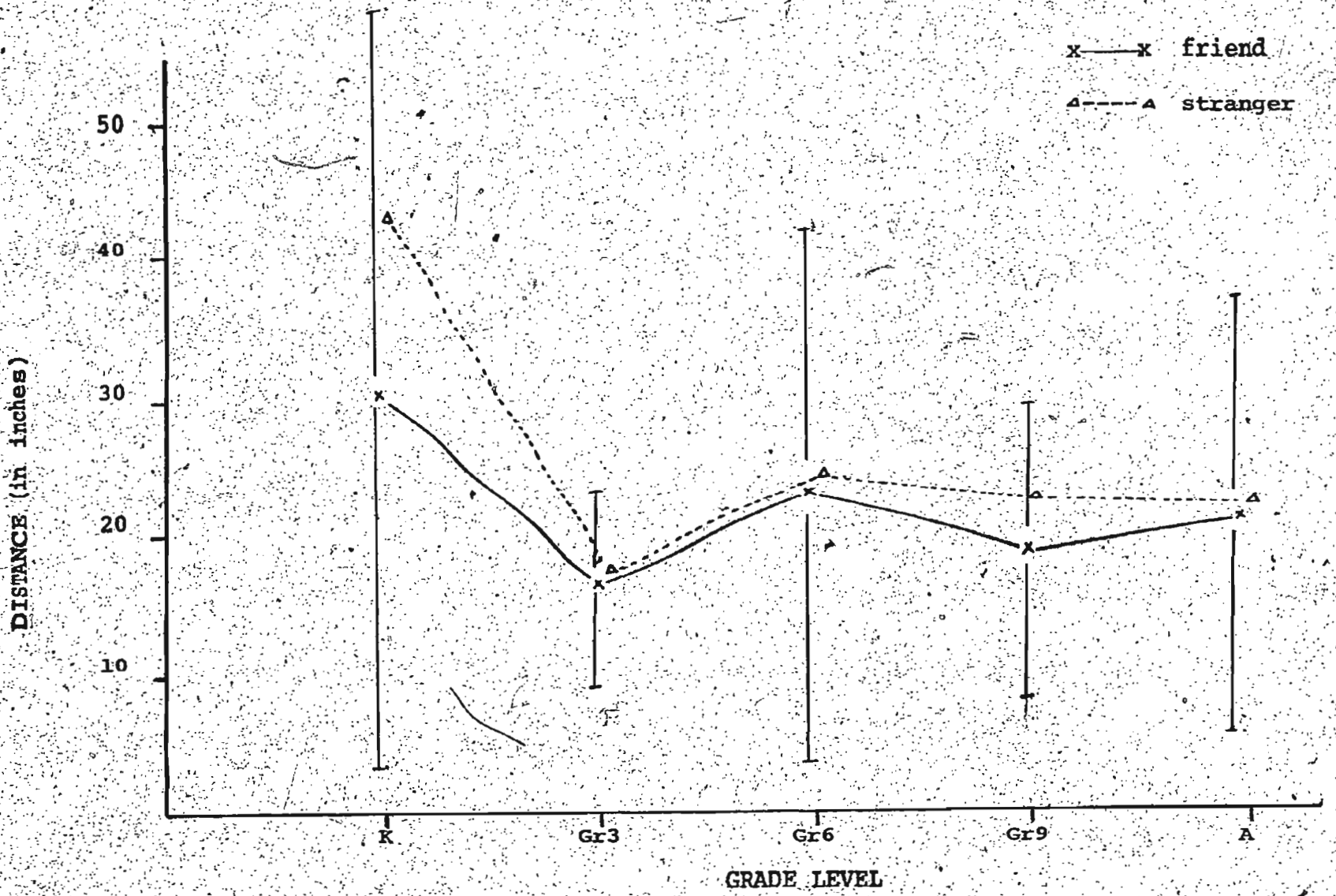


Figure 3. Mean IPDs and standard deviations at five Grade levels obtained from the Simulation Method.

TABLE 7

Mean interpersonal distances for the APPROACH method

GROUP	MEAN	S.D.	n
Kindergarten	17.19[a]	10.01	29
Grade 3	19.63[ab]	6.83	30
Grade 6	25.74[cd]	9.99	29
Grade 9	29.28[d]	12.45	27
Adult	22.70[bc]	9.10	30

[a]means with common letters are not significantly different (Scheffé post hoc comparisons, α=.05)

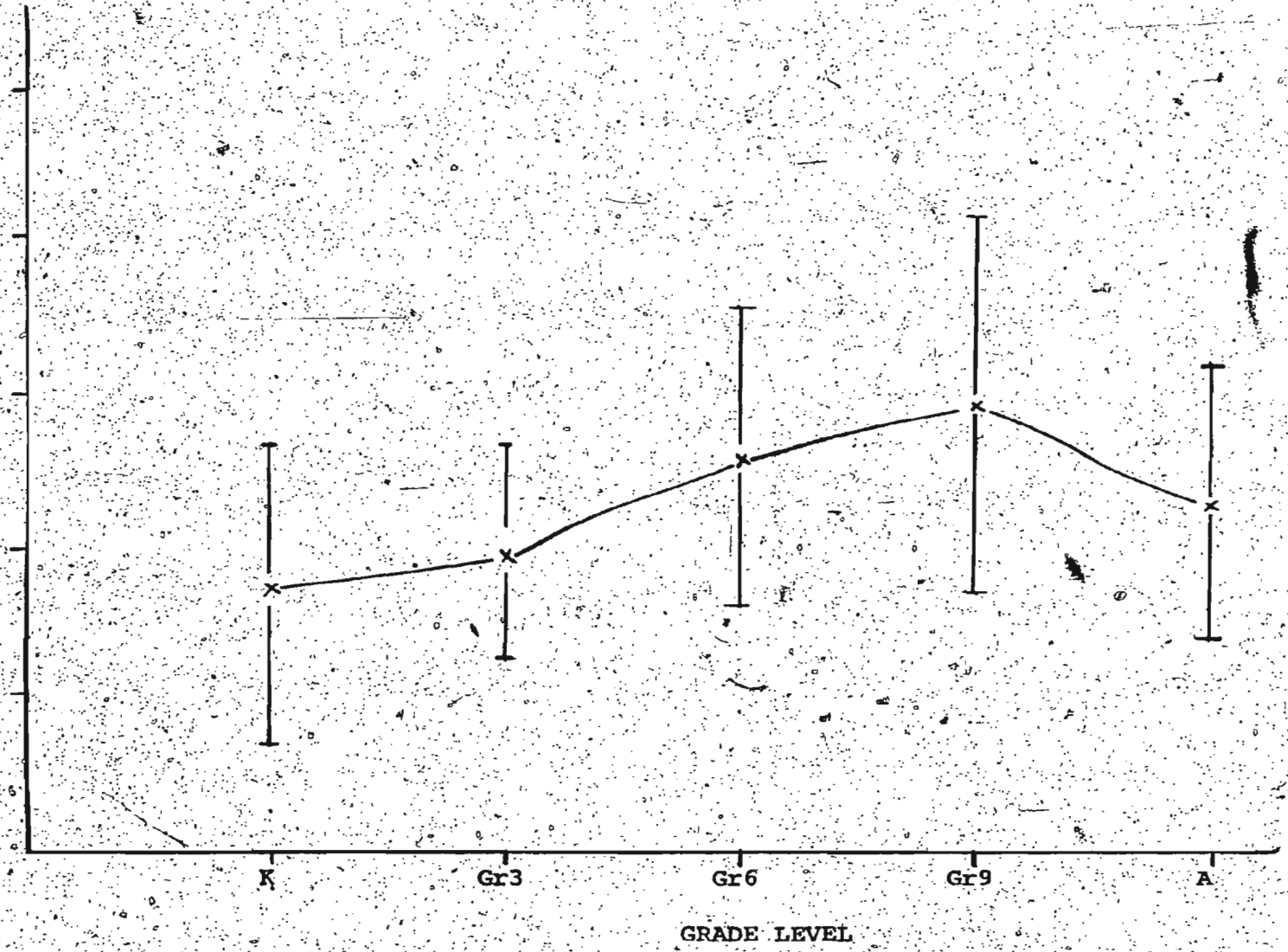


Figure 4. Mean IPDs and S.D.'s at five Grade levels obtained from the Approach Method.

HYPOTHESIS II THE OVERALL INTERCORRELATION OF THE THREE METHODS OF MEASURING IPD WILL INCREASE WITH AGE.

Using each pair's mean IPD as the basis for comparison, the simple correlations of each method with the other and at the five Grade levels are presented in Table 8. The field and simulation correlations fell from a significant 0.65 ($p<.05$) in Kindergarten to virtually no relation in Grade 3 ($r=-0.05$, $p>.05$); and then -0.40 ($p>.05$) in Grade 6 and +0.31 ($p>.05$) in Adults, with the last two correlations approaching significance. Consequently, there is no indication of an increasing intercorrelation between the field and the simulation methods. Simulation and approach correlations of pair IPDs were only significant in Kindergarten ($r=0.54$, $p<.05$) and in Adults ($r=0.82$, $p<.05$). The field and approach correlations did not reach significance until the Adult level ($r=0.55$, $p<.05$).

Allowing the field IPD to be the criterion and the simulation and approach IPDs to be the predictors, then in terms of the hypothesis, the latter two methods should be increasingly more predictive of the field IPD with increasing age, and this should be reflected in increasing Multiple Correlations (Rs). The Multiple Correlations along with the simple correlations are presented in Table 8. The changing values do not appear to bear any systematic

TABLE 8

The inter-correlations of the three methods of measuring IPD over the five Grade levels.

GROUP	*SIMPLE r			MULTIPLE R
	r_{12}	r_{23}	r_{13}	$R_{1.23}$
Kindergarten	0.65**	0.54	-0.04	0.80***
Grade 3	-0.05	0.40	0.33	0.36
Grade 6	-0.40	-0.03	0.18	0.45
Grade 9	0.07	0.37	0.24	0.24
Adult	0.31	0.82	0.55	0.60

*in the simple r, the sub-scripts 1, 2, 3 represent Field, Simulation and Approach respectively; so that, for example r_{12} is the simple correlation between the Field and Simulation IPDs.

**indicates simple r's which are significantly different from zero; in this case when (t-test, α=.05, df=13).

***significant (F-test, df=2/12, α=.05).

increasing relationship. The largest Multiple Correlation is at Kindergarten ($R=0.80$, $p<.05$), with the next highest being at the Adult level ($R=0.60$) which is not significant. In terms of increasing age, there is very little indication of an increasing predictability of the field IPD by knowing the simulation and approach scores of a subject-pair.

The hypothesis is not supported.

HYPOTHESIS III WITHIN THE SIMULATION METHOD THE DISTANCE FOR FRIENDS WILL BE LESS THAN THAT FOR STRANGERS.

Most of the other hypotheses deal with the methods in relation to one another. This particular hypothesis and the following one were presented mainly to examine the reliability of the simulation method in assessing the effects of relationship on IPD. The evidence for closer distancing of friends (vs. strangers) is consistent and variation from this would surely have cast doubt on the procedure used in this method. An Anova of Relationship (Friend, Stranger) by Grade level (K through Adult) is presented in Appendix C. with the means for each group appearing in Table 9 and Figure 3. The main effect of Relationship was statistically reliable [$F(1/70)=4.089$, $p<.05$]. IPD was less when the silhouette was described as a friend ($\bar{X}=22.27$ in.) than as a stranger ($\bar{X}=25.83$ in.).

TABLE 9

Simulation Method: Comparison of the mean distance (inches) that self-referent figures are placed from strangers and friends (extrapolations on the scale of 1 in:1 ft. from silhouttes)

GRADE LEVEL	STRANGER		FRIEND		N
	mean	s.d.	mean	s.d.	
Kindergarten	43.96	39.60	31.22	27.39	29
Grade 3	17.18	8.23	16.64	7.22	30
Grade 6	24.78	14.48	23.19	19.28	29
Grade 9	22.64	11.43	18.80	10.84	27
Adult	21.90	7.78	20.94	15.49	30

It should be noted that these scores were extrapolated from the original exercises (since a scale of 1 inch to 1 foot had been used).

The hypothesis is supported.

HYPOTHESIS IV WITHIN THE SIMULATION METHOD THERE SHOULD BE AN INTERACTION OF GRADE LEVEL AND RELATIONSHIP (FRIEND/STRANGER)

The previously mentioned two-way Anova of Relationship by Grade level did not yield a significant interaction [$F(4/70)=1.911$, $p=.12$] (see Table 9, p.97; Figure 3, p.91).

The hypothesis is not supported.

HYPOTHESIS V THE INTERCORRELATION OF THE PERSONAL SPACE COMPONENTS OF EYE CONTACT, IPD, ORIENTATION AND TALKING WILL INCREASE WITH AGE.

The simple correlations of all these pairs of components are presented in Table 10. Although the hypothesis had stated "intercorrelations" the intended meaning was that the components would become more interdependent with increasing age. The former is obviously difficult to interpret with so many simple correlations, and so these will be left for further

TABLE 10

	$\bar{x}$	$S_{\bar{x}}$	r_{DL}	r_{DO}	r_{TL}	r_{LO}	r_{DT}	n
Kindergarten	19.95	5.67	.16	.06	.60*	.32	.03	15
	15.47	7.82	.22	.13	.33	.33	.02	15
Grade 3	24.42	5.50	.34	-.22	.55	-.80	.30	13
	31.45	12.32	.01	.36	-.33	-.79	.47	15
Grade 6	32.46	7.92	-.40	.37	.10	-.83	-.26	12
	29.00	7.34	-.08	.13	.14	-.69	.08	13
Grade 9	35.20	7.35	-.46	.25	.44	-.58	-.07	15
	38.62	10.02	-.16	.27	-.54	-.68	.12	16
Adult	44.45	8.32	-.46	.43	.69	-.33	-.34	15
	40.40	11.12	-.41	.14	.36	-.26	-.14	15

Mean Interaction Distances and Simple Correlations of the components for each judge.

*sig r values are underlined (t-test, α=.05)

elaboration in the Discussion Chapter.

The hypothesis is better analyzed in terms of a multi-variate analysis, specifically with Multiple Correlation. This means that the components should become more predictive of one another with increasing age (or the compensatory hypothesis should become more evident) and since IPD is normally the preferred indicator of personal space (Leibman, 1970), then knowledge of other related components should become more predictive of IPD with increasing age. Thus the Multiple Correlations with the variable IPD as a function of the other components should increase with age.

While observing the video-tapes each judge had concentrated on a different member of each pair in recording pretending, sitting, talking, etc. This resulted in different amounts of data for each member of the same pair. Consequently it was decided to present data from each judge rather than combine them. By further averaging each S's raw data within S variance was removed. For example, some Ss yielded 40 valid observations while some others only produced 1 and in some cases none. This resulted in only one mean datum for each variable of each S.

The Multiple Correlations with IPD as the criterion and talking, looking and orientation as predictors are

presented in Table 11. None of the correlations are significantly different from zero (F-test, α=.05) for either judge.

The hypothesis is <u>not</u> confirmed.

TABLE 11

Multiple Correlations of the components of Personal Space

	$R_{1.234}$	$R_{1.34}$	n
JUDGE "F"			
Kindergarten	.19	.16	15
Grade 3	.37	.35	13
Grade 6	.50	.41	12
Grade 9	.48	.46	15
Adult	.55	.55	15
JUDGE "M"			
Kindergarten	.24	.23	15
Grade 3	.64	.60	15
Grade 6	.17	.13	13
Grade 9	.28	.27	16
Adult	.41	.41	15

key
1. IPD
2. talking
3. looking
4. orientation

none significant (F-test, α=.05)

CHAPTER VI

DISCUSSION

The purpose of this thesis has been to experimentally compare the three major methods of measuring interpersonal distance (IPD) within a developmental framework; and also to examine the changing interdependence of some components of personal space over a significant segment of the development span. Although there is a definite overlapping of methodological and developmental concerns throughout this paper, the discussion will attempt to consider each of these two aspects separately.

The methodological section will concentrate upon the comparison of the three methods of measuring IPD, with an emphasis upon validity assessment. Because the field measurements are less subject-controlled than those of the other two methods and considered more indicative of reality (this is discussed in more detail below), it is used as the standard of comparison.

Since the major developmental concern of this paper is the changing interdependence of personal space components over age, only the field method is relevant to this aspect of the discussion. On the other hand, the secondary issue of changing IPD over age encompasses all three methods. In the final section of this chapter, implications of this experiment for personal space theory are discussed and future research techniques are recommended.

METHODOLOGICAL ASPECTS

There are essentially three general methods used in the measurement of IPD——most of the experiments employing the simulation and approach techniques (Altman, 1975). Whereas the simulation and approach methods yield more objective and direct distance measurements, the field method (in its most common form) is dependent upon estimation and interpretation of distance "scores". As was mentioned in the introduction of this chapter, the field method is used in this study as the standard of comparison in assessing the validity of the other two methods. Because there is no proof that the values arrived at in the field method are truly representative of a person's average interaction distance with friends, the simulation and approach scores are also compared to one another. There is ample precedent in previous research for this comparison.

Simulation Method If the simulation task is to have any significance in the measurement of IPD then obviously the distance indicated during the simulation test should bear some direct relation to the real life situation it is meant to simulate. Superimposed upon the question of the absolute validity of the method is the developmental question as to whether the validity is a function of the

subject's age. An examination of the simulation and field IPDs over the 5 Grade levels using simple correlations (see Table 8, p.95) gives no indication of a linear relationship or even a developing one. With the only significant correlation being at the Kindergarten level ($r=0.65$, $p<.05$), it is difficult to conclude that the two methods are indeed assessing the same phenomenon.

Many experiments have used the approach technique as the standard for assessing the validity of their simulation model (see Chapter II). Correlations between the measurements of these two methods in this experiment demonstrate a significant correlation in Kindergarten ($r=.54$, $p<.05$), which thereafter diminishes, rising again to a quite respectable relation in Adults ($r=0.82$, $p<.05$) [see Table 8, p.95]. Except for the very low value in Grade 6, the three levels before the Adult level are fairly consistent, even though two of them are not statistically significant. It should be further noted that although the mean IPDs are not consistently changing with one another at the various Grade levels (see Figure 1, p.87) the two means of the Adult group appear to be roughly in agreement with one another ($\bar{X}=20.93$ in. and $\bar{Y}=22.70$ in. for the simulation and approach means respectively). Maybe the reason for this is that the adults are more conscious of the similarity of the two tasks than are the younger subjects.

In comparing a simulation test and an approach test, Gottheil et al. (1968) found a low correlation of 0.40 with adults. They referred to the former test as a measurement of "psychological space" and the latter as "geographical space" and argued that test behaviour is usually different than in vivo behaviour. The results of other methodological comparisons are presented in Table 2 (p. 32). Although many of the experiments with adults have indicated a strong relationship between simulation and approach methods, an equal number have reported no significant relationship.

From developmental theory it would appear that, with the steadily increasing pressure to conform to cultural norms vis-à-vis proxemic behaviours, a resultant decreasing variance in IPD responses with age could be expected (Meisels & Guardo, 1969). There is some indication that this is happening, but only in the simulation method (see Table 6, p. 90). But the decreasing IPD variance could also be attributed to an increasing ability to handle the simulation materials, what with better perception and cognitive decentering. This last reason might make more sense, in that the other two methods did not result in decreasing variance. If that is the reason for decreasing variance, then the simulation method is a poor choice in determining the absolute IPD of

young children.

The consistent placement of self-referent figures at a farther distance from a "stranger" than a "friend" as found in this experiment and others points to the usefulness of this method in assessing relationships. The opportunity to indicate one distance in relation to one just performed is probably easier than using the simulation method to indicate one distance in isolation. Compare this task to walking up to a friend and stopping "where you normally would" (especially if the friend has just demonstrated his "preferred" distance) and it is understandable why so many of the methods do not concur with one another. Even though this experiment had used virtually the same materials and age range as Strawbridge (1974), there is surprisingly little in common between the results (Table 12). In conclusion, it is recommended that the simulation technique might be a far more effective and useful tool for measuring intra-individual differences (such that the subject may be able to indicate relative spacing) than for assessment of absolute distances.

Approach Method As indicated in Chapter II, the approach method has frequently been used as the standard for testing the validity of other techniques, especially the simulation method. Thus it is important that the approach method itself

TABLE 12

Comparison of the results of Strawbridge (1974) and the present experiment, using the same technique.

	STRAWBRIDGE*	PRESENT EXPT.
Kindergarten	15.81	31.22
Grade 2	13.28	
Grade 3		16.64
Grade 4	11.94	
Grade 6	12.06	23.19
Grade 8	15.88	
Grade 9		18.80
Adult	15.56	20.93

* These raw data become monotonic increasing when transformed by a logarithmic function (personal communication)

be compared to another *in vivo* and more naturalistic method. In comparing the approach IPD and the field "interaction" distances at each Grade level (see Table 8, p.95), the only significant correlation was at the Adult level ($r=0.55$, $p<.05$) and even that accounts for only 30% of the variance. The other three correlations range from 0.18 in Grade 6 to 0.33 in Grade 3. There is clearly little agreement between the two methods. Based upon these results and others (see Table 2, p.32), the choice of the Approach Test as the standard for assessing the validity of another method, and especially for non-adults, seems most inappropriate.

Field Method. The simulation and approach techniques have been compared to the field method in assessing the validity of each. The question of absolute validity of the field method has been introduced already and this section will elaborate upon some of the points pertaining to this assumption.

In comparing the other two methods with the field method, the basis of comparison has been the mean interpersonal distance (IPD), and there appear to be two important issues in relation to this. First, there is the discussion of how the relevant field data were obtained, which means examining the actual criterion used to select the operational data. This necessarily involves

the procedures used to transpose a continuous, complex and dynamic interaction of two people into a set of discrete measurements that represent their "personal space". The second issue is more theoretical and fundamental to the whole experiment: does the isolated measurement of IPD have any meaning without consideration of the other components of personal space?

The operational data of this field method were obtained from a set of judged measurements. This is one of the perennial obstacles faced in a naturalistic-type experiment. Some, like Pedersen (1973a) chose to use a grid floor to increase accuracy, even though that meant sacrificing a more natural setting. A second procedural complication involved the selection of interactions to be used in the assessment of IPD. This had been decided on an a priori basis of what constituted an interaction, and also on other factors that would allow for a reasonable comparison with the other two methods. For example, Ss could not be sitting or pretending; E should not be present. It is obvious, for instance, that because the couple were not talking or looking at one another, is no reason to assume that they were not interacting with one another; but, according to the criterion they would not be interacting. "Interaction" had previously been decided to mean "focused interaction" (see Goffman, 1963), even though that might

mean losing some valuable information. At least in this way, there was more assurance of authentic interactions; and besides, later analyses could show if pretending- and/or sitting-distances and so on, were significantly different from the selected "interaction" distances.

The experiment took place in three settings: Primary school (K, Grade 3); Elementary school (Grades 6 and 9); and university (adults). The Primary school setting was a teachers' conference room with bright natural lighting, and seldom used by students. In contrast, the Elementary school setting was a large "activity room" which was windowless and somewhat warm. It was much larger than the previous setting and had to be "blocked down" by using tables, chairs and the like, so that the areas would be about the same. The Adult setting was on campus in a small room that was part of the psychology department. Its smaller size necessitated the use of wide-angle lenses on the cameras. The different camera positionings and lenses, coupled with the changing statures of the different age levels, undoubtedly made the judging of distances more difficult across groups. The high correlations of judged with actual distances in the training sessions argue against any great effect due to these differences though (see Table 3, p.82). To counter these difficulties, the judges practiced with the standards

for a group, which were in the appropriate setting, before judging the subjects of that particular group. This is not to say that the different settings did not possibly confound the age effects though.

Although there are many procedural problems and complications involved with this kind of study, this surely does not account for the poor relationships with the other two methods. A recently published review by Sundstrom and Altman (1976) has revealed that other such methodological comparisons have resulted in little or no relationship between methods of measuring IPD. For example, Aiello, Love and Epstein, 1975) unobtrusively observed college roommates and then compared these IPD "scores" to an approach test and the placement of felt figures by the same Ss. Knowles and Johnson (1974, cited in same) recorded 9 different measures of IPD, including an unobtrusive, an approach and several simulation tests. They found only 16 out of 36 significant correlations——ranging from -0.09 to +0.21 with a median of 0.15. Having reviewed these and others (see Table 2, p.32), Sundstrom and Altman (1976) concluded:

> "From these data, it appears that only a limited degree of intra-individual consistency exists among data from laboratory, simulation, and field techniques.

> But, given the low degree of consistency that often emerges, it seems inappropriate to assume that findings generalize from one method to another."
>
> (Sundstrom & Altman, 1976, p. 49)

Perhaps these inconsistencies across methods are an indication, if not proof, that the study of IPD in isolation from other important components of personal space has very little meaning.

DEVELOPMENTAL ASPECTS

The major developmental trend expected from this study was an increasing inter-dependence of the components of personal space. If personal space is viewed as a psychological construct in the Leibman sense, there is no reason to deny that initially IPD might be the only component of personal space (i.e. psychological space is the same as the physical space indicated). As the child develops and the distances between certain people (e.g. Hall's zones) become more culturally fixed, more subtle means (symbolic distances) are learned to achieve the desired personal space. If this view of personal space development holds true, then there should be more evident integrating of components with increasing age.

The actual findings of this experiment indicated only small and varied Multiple Correlations of IPD as a function of the other three components (i.e. their predictability of IPD).

One possible explanation for this weak effect is that there were not enough appropriate components included in this study. "Talking" for example consistently accounted for little of the predictability of IPD, as shown when it was removed as a predictor (see Table 11). The interactions did not consider amount of smiling, body openness, et cetera, which are very likely associated with personal space (see Mehrabian, 1968, 1969). Even the components that were considered were somewhat simplistic in their measurement. For example, eye contact and IPD have been shown consistently to have a strong relationship (Argyle & Dean, 1965). Yet, in this experiment, it is not so much eye contact (eye to eye) that was measured, but rather visual regard (looking at the other person). This was judged at every 5 second freeze as being present or absent, as compared to the frequency of eye contact in some other experimant (e.g. Russo, 1970). On the other hand, it must be realized that the greater the accuracy and number of components included, the greater the complexity of the whole experiment. In this particular experiment emphasis was

placed more on the comparison of the methods of measuring IPD, with the inter-relationship of the components of personal space over age being of a more exploratory nature. To concentrate on the latter issue without sufficient proof of the non-relationship of the methods would have been premature at this stage. To try to include too much detail and complexity in the field method, while at the same time trying to compare across methods, was indeed beyond the scope of the present endeavour.

In reviewing the simple correlations between components there were only 10 out of 50 correlations that were significantly different from zero. All of these significant correlations occurred on the talking/looking and looking/orientation correlations. Generally this meant that if one was talking it was more likely that one would be looking. The other significant correlation indicated that as one turned away it was less likely that one of the pair would be looking. These expected results do lend some support to the methodology, albeit without shedding much light on personal space.

In considering just the mean IPD over the Grade levels, an increasing function was supported by the Approach Test and the field method, although the former method indicated a maximum distance between males at the Grade 9 level.

This increasing IPD for male friends with increasing age is in agreement with past research, although the majority of these findings were conducted with simulation exercises. There appears to be little doubt that as males grow older there is an increasing tendency for even friends to interact at greater physical distances on the average. Whether this is symptomatic of an increasing personal space has yet to be determined.

IMPLICATIONS

The comparisons of the different methods of measuring IPD give little reassurance that their measurements are related to a person's normal spacing, regardless of the definition of personal space. More concentrated effort should be placed on a dynamic and multi-dimensional approach to the study of personal space. There are undoubtedly intricate and complex relationships between the components of personal space and investigation of these within a static and artificial situation appears overly simplistic, especially when the person has to consciously display many behaviours of which he was previously unaware. Simulation-type methods are by their very nature unable to accommodate complex and subtle components such as eye contact, posture, smiling and facial

cues simultaneously and within a dynamic framework.

The naturalistic field method of this experiment did yield low correlations between the few components considered; but, taking into account the exploratory nature of this study, it still appears to have the most potential in the analysis of personal space. Among other things, there is a need for more effective means of interpreting the huge amount of data available. The guesswork must be minimized in the judgements of IPD and the other components. This could be remedied by using more objective, yet inconspicuous ways of determining the distances; for example, by utilizing tiled floors or more subtle electronic aids. The assessment of the other components was not a source of difficulty, with the possible exception of orientation, which was somewhat ambiguous when the Ss were not front-on to one another. But this could be solved by using another coding system or overhead cameras. Serious thought should be given to the inclusion of other possible components such as body openness, which have been shown to be related to personal space. With sufficient testing, weak variables which contribute little or nothing to the effect would be gradually eliminated, yielding a set of strong components.

The use of video-taping (VTR) equipment is unquestionably most beneficial in this type of experiment. Once the taping

is finished one may freely review the material and re-assess it at leisure; using different time-intervals or testing different aspects such as body openness; in other words, post hoc comparisons that might lead to the generation and testing of new hypotheses using old material. There is a wealth of untapped information contained within the tapes.

Contrary to other experiments which have recommended the use of at least 3 cameras and also hiding them, the procedure used in this experiment appears most satisfactory as is, using two well-placed cameras at sufficient distance and separation. By not trying to conceal the cameras and even pointing them out and explaining a plausible purpose, E hopefully presented an atmosphere where they were more acceptable to Ss, and there was less reason for them to suspect deceptions. Very few Ss said they felt the cameras might be on, but the few that did, said they "didn't care anyway". The actual presence of E or another adult had some startling inhibitory effects on the younger Ss (in pilot work) and it is strongly advised against.

This experiment and others have undoubtedly raised many questions as to the significance of using just any method with any age group, in the assessment of "personal space". Serious consideration must be given to methodology

and the age of the participants if other than a field method is used. Finally, the examination of interpersonal distance in isolation from other known related behaviours will continue to add to the considerable confusion already existing in this area of personal space...regardless of the name applied to the latter. Only more expansive research can help resolve the dispute as to the exact nature of personal space.

> "Experimental psychology presents one aspect of our paradox in its sharpest form. In order to behave like scientists we must construct situations in which our subjects are totally controlled, manipulated and measured. We must cut our subjects down to size. We construct situations in which they can behave as little like human beings as possible and we do this in order to allow ourselves to make statements about the nature of their humanity. It may be that an imprisoned, miniscule man is all we are capable of studying, but let us acknowledge that we do miserable experiments because we lack the imagination to do better ones, not claim that these are scientifically ideal because they are simple-minded."
>
> (Bannister, 1966, p. 24)

REFERENCES:

Adler, L. & Iverson, M. Interpersonal distance as a function of task difficulty, praise, status orientation, and sex of partner. Perceptual and Motor Skills, 1974, 39, 683-692.

Altman, I. The Environment and Social Behaviour: Privacy, Territory, Crowding. Belmont, Calf. Wadsworth Pub., 1969.

Argyle, M. Social Interaction. Chicago: Atherton Press, 1969.

Argyle, M. & Dean, J. Eye control, distance and affiliation. Sociometry, 1965, 28, 289-304.

Argyle, M. & Ingham, R. Gaze, mutual gaze, and proximity. Semiotica, 1972, VI, 32.49.

Bannister, D. Psychology as an exercise in paradox. Bulletin of British Psychological Society, 1966, 19, 21-21.

Baum, A. & Greenberg, C. Waiting for a crowd: the behavioural and perceptual effects of anticipated crowding. Journal of Personality and Social Psychology, 1975, 32, 671-679.

Baxter, J. Interpersonal spacing in natural settings. Sociometry, 1970, 33, 444-456.

Bass, M. & Weinstein, M. Early development of interpersonal distance in children. Canadian Journal of Behavioural Science/ Rev. Canad. Comp., 1971, 3, 368-376.

Beach, D. & Sokoloff, M. Spatially dominated nonverbal communication of children: a methodological study. Perceptual and Motor Skills, 1974, 38, 1303-1310.

Borke, H. Interpersonal perception of young children: ego-centrism or empathy? Developmental Psychology, 1971, 5, 2, 263-269.

Calhoun, J. Population density and social pathology. Scientific American, 1962, 206, 139-148.

Coutts, L. & Schneider, F. Visual behaviour in an unfocused interaction as a function of sex and distance. Journal of Experimental Social Psychology, 1975, 11, 64-77.

Dosey, M. & Meisels, M. Personal space and self-protection. Journal of Personality and Social Psychology, 1969, 11, 93-97.

Duke, M. & Kiebach, C. A brief note on the validity of the comfortable interpersonal distance scale. Journal of Social Psychology, 1974, 94, 297-298.

Duke, M. & Nowicki, S. A new measure and social-learning model for interpersonal distance. Journal of Experimental Research in Personality, 1972, 5, 119-132.

Duke, M. & Wilson, J. The measurement of interpersonal distance in pre-school children. Journal of Genetic Psychology, 1973, 123, 161-162.

Eberts, E. & Lepper, M. Individual consistency in the proxemic behavior of pre-school children. Journal of Personality and Social Psychology, 1975, 32, 841-849.

Ellsworth, P., Carlsmith, J. & Hanson, 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.

Elkind, D. Children and Adolescents: Interpretive Essays on Jean Piaget. 2nd Ed, New York: Oxford U., 1974.

Eoyang, C. Effects of group size and privacy in residential crowding. Journal of Personality and Social Psychology, 1974, 3, 389-392.

Evans, G. & Howard, R. Personal space. Psychological Bulletin, 1973, 80, 334-344.

Evans, G., Pezdek, K. & Nalband, E. Behavioural and physiological consequences of crowding in children. Paper presented at the 3rd Biennial Conference of the International Society for the Study of Behavioural Development, 1975.

Exline, R. Explorations in the process of person perception: visual interaction in relation to competition, sex, and need for affiliation. Journal of Personality, 1963, 31, 1-20.

Fergusen, G. Statistical Analysis in Psychology and Education, 2nd Ed, New York: McGraw-Hill, 1966.

Goffman, E. Behavior in Public Places; Notes on the Social Organization of Gatherings. London: Free Press of Glencoe, 1963.

Gottheil, E., Corey, J. & Parades, A. Psychological and physical dimensions of personal space: Journal of Psychology, 1968, 69, 7-9.

Guardo, C. & Meisels, M. Child-parent spatial patterns under praise and reproof. Developmental Psychology, 1971b, 5, 365.

Haase, R. & Markey, M. A methodological note on the study of personal space. Journal of Consulting and Clinical Psychology, 1973, 40, 122-125.

Hall, E. The Hidden Dimension. New York: Anchor Books, Dubleday & Co., 1966.

Hartnett, J., Bailey, K. & Gibson, F. Personal space as influenced by sex and type of movement. Journal of Psychology, 1970, 76, 139-144.

Heshka, S., Kenny, T. & Pylypuk, A. Proximity and arousal in social encounters. Unpublished manuscript, 1975.

Heshka, S. & Nelson, Y. Interpersonal speaking distance as a function of age, sex and relationship. Sociometry, 1972, 4, 491-498.

Hiat, A. Explorations in personal space. Disertation Abstracts International, 1971, 31, 7572-B, 459.

Hutt, C. & Vaizey, M. Differential effects of group density on social behaviour. Nature, 1966, 209, 1371-1372.

Jones, S. A comparative proxemics analysis of dyadic interaction in selected subcultures of New York city. Journal of Personality and Social Psychology, 1971, 84, 35-44.

Jones, S. & Aiello, J. Proxemic behaviour of black and white first-, third-, and fifth-grade children. Journal of Personality and Social Psychology, 1973, 25, 21-27.

Kelly, F., Beggs, D. & McNeil, A. Multiple Regression Approach. Carbondale: Southern Illinois U. Press, 1979.

Konečni, V., Libuser, L., Morton, H. & Ebbesen, E. Effects of a violation of personal space on escape and helping responses. Journal of Experimental Social Psychology, 1975, 11, 288-299.

Kuethe, J. & Weingartner, H. Male-female schemata of homosexual and non-homosexual penitentiary inmates. Journal of Personality, 1964, 32, 23-31.

Leibman, M. The effects of sex and race norms on personal space. Environment and Behavior, 1970, 2, 208-246.

Lerner, R., Chihara, S. & Iwawaki, T. Development of personal space schemata among Japanese children. Developmental Psychology, 1976, 12, 466-467.

Lerner, R., Karabenick, S. & Meisels, M. Effects of age and sex on the development of personal space schemata toward body build. Journal of Genetic Psychology, 1975a, 127, 91-101.

Lerner, R., Karabenick, S. & Meisels, M. One-year stability of children's personal space schemata toward body build. Journal of Genetic Psychology, 1975b, 127, 151-152.

Leyhausen, P. The sane community...a density problem? Discovery, 1965, 26, 27.

Little, K. Personal space. Journal of Experimental Social Psychology, 1965, 1, 237-247.

Lomrantz, J., Shapira, A., Horesh, N. & Gilat, Y. Children's personal space as a function of age and sex. Developmental Psychology, 1975, 11, 541-545.

Mehrabian, A. Relationship of attitude to seated posture, orientation, and distance. Journal of Personality and Social Psychology, 1968, 10, 26-30.

Mehrabian, A. Significance of posture and position in the communication of attitude and status relationships. Psychological Bulletin, 1969, 71, 359-372.

Meisels, M. & Guardo, C. Development of personal space schemata. Child Development, 1969, 40, 1167-1178.

Nie, N., Bent, D. & Hull, C. Statistical Package for the Social Sciences. New York: McGrath-Hill Inc., 1970.

Patterson, M. Stability of nonverbal immediacy behaviours. Journal of Experimental Social Psychology, 1973, 9, 97-109.

Pedersen, D. Development of a personal space measure. Psychological Reports, 1973a, 32, 524-535.

Pedersen, D. Developmental trends in personal space. Journal of Psychology, 1973b, 83, 3-9.

Pedersen, D. & Shears, L. A review of personal space research in the framework of general systems theory. Psychological Bulletin, 1973, 80, 367-388.

Pedersen, D. & Shears, L. Effects of an interpersonal game and of confinement on personal space. Journal of Personality and Social Psychology, 1974, 30, 838-845.

Porter, E., Argyle, M. & Salter, V. What is signalled by proximity? Perceptual and Motor Skills, 1970, 30, 39-42.

Post, B. & Hetherington, E. Sex differences in the use of proximity and eye contact in judgements of affiliation in pre-school children. Developmental Psychology, 1974, 10, 881-889.

Rosenfeld, H. Effect of an approval-seeking induction on interpersonal proximity. Psychological Reports, 1965, 17, 120-122.

Rosenthal, R., Archer, D., DiMatteo, M., Koivumaki, J. & Rogers, P. Body talk and tone of voice: the language without words. Psychology Today, 1974, 8(4), 64-68.

Russo, N. Eye contact and distance relations in children. Unpublished doctoral dissertation at Cornell University, 1970.

Ryen, A. & Khan, A. Effects of intergroup orientation on group attitudes and proxemic behaviour. Journal of Personality and Social Psychology, 1975, 31, 302.

Schneider, F. & Hansvick, C. Gaze direction and distance as a function of variations in the other person's gaze direction. Paper presented at the meeting of the Canadian Psychological Association, Winsor, 1974.

Scott, J. Awareness of informal space: a longitudinal analysis. Perceptual and Motor Skills, 1974, 39, 735-738.

Shoichet, J. & Williams, J. The effects of sex and skin colour on personal space preferences of children. Paper presented at the meeting of the Canadian Psychological Association, Victoria, B.C., 1973.

Sobel, R. & Lillith, N. Determinants of non-stationary personal space invasion. Journal of Social Psychology, 1974, 97, 39-45.

Sommer, R. Studies in personal space. Sociometry, 1959, 22, 247-260.

Sommer, R. Further studies of small group ecology. Sociometry, 1965, 28, 334-348.

Sommer, R. Small group ecology. Psychological Bulletin, 1967, 67, 145-152.

Sommer, R. Intimacy ratings in five countries. International Journal of Psychology, 1968, 3, 109-114.

Sommer, R. Personal space: The Behavioral Basis of Design. New Jersey: Prentice-Hall, Inc., 1969.

Spinnetta, J., Rigler, D. & Karon, M. Personal space as a measure of a dying child's sense of isolation. Journal of Consulting and Clinical Psychology, 1974, 42, 751-756.

Strawbridge, J. The development of personal space. Unpublished doctoral dissertation at Queen's University, Kingston, Ont., 1974.

Stephenson, G., Rutter, D., & Dore, S. Visual interaction and distance. British Journal of Psychology, 1973, 64, 251-257.

Sundstrom, E. An experimental study of crowding: effects of room size, intrusion, and goal-blocking on non-verbal behaviour, self-disclosure, and self-reported stress. Journal of Personality and Social Psychology, 1975, 32, 645-654.

Sundstrom, E. & Altman, I. Interpersonal relationships and personal space: research review and theoretical model. Human Ecology, 1976, 4, 47-67.

Uris, L. Trinity: A Novel of Ireland. New York: Doubleday & Co., 1976

Watson, O. & Graves, T. Quantitative research in proxemic behavior. American Anthropologist, 1966, 68, 971-985

APPENDIX A

A-1. Standard distances for practice sessions.

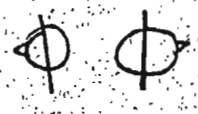
CORRECT DISTANCES: (in inches)

Grades	3	K	6	9	Adult
A	29	24	29	43	33
B	32	22	49	36	26
C	13	26	36	44	27
D	41	31	37	69	38
E	28	46	30	24	37
F	39	38	59	38	43
G	36	46	36	48	22
H	6	5	24	32	42
I	7'20"	11	25	5'3"	26
J	16	10	22	42	24
K	26	14	48	61	8'2"
L	15	7	16	31	38
M	22	17	33	29	20
N	18	18	42	36	40
O	7	29	24	31	25
P	16	7	64	72	43
Q	44	24	65	40	14
R	45	17	78	36	53
S	18	2	19	28	24
T	43		26	21	37
U	30		45	48	28
V	31		78	29	14

Observers will judge the distance from nose to nose of each pair and record this in inches. Check each guess with the correct reading, being careful not to see the following answer completed. Then repeat the exercise, starting with Grade 3 and so on. (Groups are in the order listed above).

Also judge the orientation of each pair, considering planes thru the shoulders of each subject to be hands of a clock. Use the hours of clock to indicate same, e.g. 12, 1, 2, 3 (o'clock) etc. (see diagram below).

4 o'clock



12 o'clock

A-2. Sample Tally Sheet for Judges

DATE ..... OBSERVER .....

GROUP ..... (K, 3, 6, 9 or A) SUBJECT PAIR # ..... & .....

Subject specifically observed (left or right) .....

Please indicate affirmative by placing "X" in the appropriate box for all but the last two items, viz. DISTANCE and ORIENTATION. Estimate DISTANCE to the nearest inch; and ORIENTATION, use "clock" notation. INVALID is checked if: (a) E is present during the interval; or (b) both Ss cannot be seen.

Interval #	Invalid (a) E present (b) not both speaking	Either S pretending during interval	Either S in motion now	S was talking during interval	S is looking at other now	S is sitting now	Distance now	Orientation now

INSTRUCTIONS FOR OBSERVERS

This will attempt to explain the tabulation papers.

GROUP Place group being observed in this space (i.e. K, 3, 6, 9, A)

SUBJECT PAIR Referred specifically to one being observed in that particular group. They are all in numerical order; and the pair number is in front of most pairs (the exception being the ADULT pairs), in all cases the pairs are in order, e.g. 1&2, 3&4, etc.

So Subject observed. Some of the columns refer specifically to just one subject, viz. So. On the first freeze visible for each Mary will pick the left person farthest left on the screen; Rick the person farthest to the right. (If only one person appears on the screen, and the other is off to the right; then Mary would follow the person visible; Rick, the person off-screen; and vice-versa for the other instance).

Before starting any group (not pair) review the standard pair for that group, comparing the right distance with those judged. Then proceed to first pair, viz Ss 1&2 of that group. Fill in the tabulation sheet for that pair. The first freeze visible (i.e. no interval before) is numbered #0. So is chosen (left or right). Then proceed to the next "freeze", # 1, and fill in all the required information. Continue at your own speed, starting each new pair with a new sheet of paper.

COLUMNS OF TABULATION SHEET

INVALID — This is checked if (a) E's presence is indicated during the interval, e.g. can hear his voice or he is seen; (b) only one subject can be seen, e.g. other subject is out of picture or directly behind the other, such that a good guess can not be made.

PRETENDING — This is checked if either S is acting out a skit or such during the interval. You will have to use your own discretion, in listening to the conversation, etc.

IN MOTION — If either one of the Ss is in motion at the time of the freeze, e.g. walking or bending over, this box is checked. Discretion is to be used, in that if Ss are close to stationary position, then this can be recorded as NOT in motion. Sometimes the next interval may have to be used to determine if they were in motion. That's O.K.

So TALKING — This is only to be checked if S being observed was talking to other subject sometime during the interval.

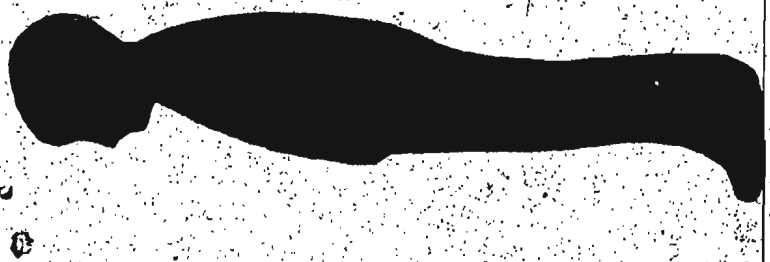
So LOOKING — This is to be checked if observed S is looking at other subject when film is stopped/frozen.

So SITTING	This is checked if observed S is sitting, includes lying on floor, kneeling, etc. i.e. not standing on feet at the time the film is stopped.
DISTANCE	Judged to the nearest inch and from nose to nose; at the time the film is stopped.
ORIENTATION	The judged angle between the shoulders of the pair, using the clock notation of 1, 2, ..., 12, as instructed before.

APPENDIX B

B-1. Sample simulation sheet.

B-1. Sample simulation sheet.



APPENDIX C

C-1. Anova: Methods by Grade Level

C-2. Anova: IPD by Grade Level (field)

C-3. Anova: IPD by Grade Level (sim.)

C-4. Anova: IPD by Grade Level (app.)

C-5. Anova: Relationship by Grade Level.

C-1 ANOVA Methods (simulation, approach, field) X Grade Level (5)

SOURCE	df	SUM OF SQ's	MEAN SQ	F-value	PROB.
Between Groups	4	1883.370	470.844	2.843	.029
Error	70	11592.800	165.611	16	
Within Groups (methods)	2	3056.690	1528.350	16.717	.000
Interaction	8	6282.190	785.274	8.589	.000
Error	140	12799.400	91.425		
TOTAL	224	35614.500			

C-2 ANOVA IPD (field method) X Grade Level (5)

SOURCE	df	SUM OF SQ's	MEAN SQ	F-value	PROB.
Age Level	4	5205.940	1301.490	15.42	.000
Error	70	5908.120	84.402		
TOTAL	74	11114.100			

C-3 ANOVA IPD (simulation method) X Grade Level (5)

SOURCE	df	SUM OF SQ's	MEAN SQ	F-value	PROB.
Age Level	4	3675.31	918.82	2.99	.021
linear term	1	991.14	991.14	3.23	.071
dev. from lin.	3	2684.16	894.72	2.91	.036
Error	140	42951.06	306.79		
TOTAL	144	46626.37			

C-4 ANOVA IPD (approach method) BY Grade Level (5)

SOURCE	df	SUM OF SQ's	MEAN SQ	F-value	PROB.
Age Level	4	2597.81	649.45	6.79	.000
linear term	1	1250.01	1250.01	13.07	.001
dev. from lin.	3	1347.80	449.26	4.69	.004
Error	140	13389.00	95.63		
TOTAL	144	15986.81			

C-5 ANOVA Relationship (friend/stranger) X Grade Level (5)

SOURCE	df	SUM OF SQ's	MEAN SQ	F-value	PROB.
Grade Level	4	7150.350	1787.590	6.35	.000
Error	70	19689.300	281.275		
Relationship	1	475.973	475.973	4.08	.044
Interaction	4	889.904	222.476	1.911	.117
Error	70	8147.980	116.400		
TOTAL	149	36353.500			

APPENDIX D

D-1. Letter sent to parents of school children.

D-1. Letter sent to children's parents.

Psychology Department
Memorial University,
April 12, 1976.

Dear Parent:

This letter is sent to you to ask permission for your son to be involved in a study which I am undertaking at Holy Cross schools. The study will involve 1/2 hour of your son's time in school, in which he will be asked to make up a skit with another student. Afterwards he will be asked some brief questions. Based upon previous studies of this kind, he should find it most enjoyable.

I have explained the purpose of this study to both the school board and the principals involved. They have given their full support. After the study is over I will be sending you a note as to why the study is being done, and what we found. As a former student of Holy Cross myself, I place myself in your trust.

If you wish further information about this study, please feel free to phone me at the numbers listed below.

Sincerely yours,

Gordon S. Rush
Psychology Department, MUN
phone 753-1200 (ext 3551)
726-2007 (home)

CHILD'S NAME..... BIRTH DATA _____

GRADE _____

SIGNATURE OF PARENT OR GUARDIAN _____

DATE _____