A STUDY ON THE SIMULATION OF PROXEMIC BEHAVIOR

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Running head: Simulation Study

ABSTRACT

Actual and simulated proxemic behaviors are compared using a behavioral game methodology that facilitates measurement of approach and avoidance "drive strengths." When interpersonal distances in the actual and simulated conditions are compared no significant differences are found, but when approach and avoidance drive strengths are compared a significant difference is found between the actual and simulated behaviors. When subjects are categorized by sex, no significant differences in drive strengths are found between actual and simulated proxemic behavior in males, but significant differences in drive strengths are observed in females, who exhibit increased drive strengths in the simulation.

INTRODUCTION

The purpose of this paper is to illustrate a methodology for the study of proxemic behavior that facilitates the operationalization and measurement of approach and avoidance drive strengths. A specific research problem is addressed, and results are obtained which may be of interest, but the focus of the paper is on issues of measurement and methodology, and the results are presented primarily as an example to illustrate the methodology and measurement technique.

LITERATURE REVIEW

Measurement techniques in proxemics research have been a central concern in every major review of the literature. The techniques used have been divided into three categories by Aiello (1987).

> **Projective or simulation studies** - Subjects are required to imagine some interaction situation and to project into that situation how they think they would behave.
>
> **Quasi-projective or laboratory studies** - Subjects use their own bodies in relation to a real or imagined other under laboratory conditions to distance themselves as if a real interaction were occurring. The most commonly used technique is the stop distance procedure in which subjects approach or are approached by another person and stop the approach when they begin to feel uncomfortable.
>
> **Interactional or field/naturalistic studies** – Subjects are observed directly (usually unobtrusively) in actual interaction. Subjects may be observed in naturalistic settings (referred to as **unstructured interaction measures**), or in laboratory or "laboratorylike" settings (referred to as **structured interaction measures**).

The methodology presented in this paper could probably best be categorized as a structured interaction measure. Unfortunately, no known measurement technique (including the one presented here) is without problems (such as external validity, informed consent, unobtrusiveness, control, etc.) but the interactional measures seem to have received the least criticism.

All of the major reviews of the proxemics literature have been critical of the projection or simulation studies. Altman and Vinsel (1977) omitted them entirely in their early review of the literature, since they "did not permit measurement of actual distances between real people." Hayduk (1983) seemingly wrote the obituary for this approach.

> This review leads to several major redirections in the study of interpersonal space, the most basic of these being the demise of the projective measures. The low correlations with real-life measures, the discordant pattern of findings, and the widely fluctuating scaled magnitude of effects provide seemingly insurmountable problems for these measures. Although the acceptable reliabilities indicate that these measures do measure something, that something is not personal space.

In the most recent major review of the proxemics literature known to the author, Aiello (1987), who reviewed more than 700 studies that had been published at that time, reinforced Hayduk's criticisms and extended them to the quasi-projective or laboratory measures (e.g. the stop distance procedure) which had been used in just under 100 studies. Although Aiello stopped short of recommending that researchers quit using the stop distance technique altogether, he pointed out that the same criticisms that Hayduk made of the projective measures (above) could be made with almost equal justification of the quasi-projective or laboratory measures.

This leaves the interactional or field/naturalistic measures, which, unfortunately have their own set of problems, including the fact that these experiments are usually more difficult and time consuming to set up and run than either projective or quasi-projective studies.

In addition, unstructured interactive studies tend to present special difficulties in controlling extraneous variables in the experimental situation, as well as characteristics of subjects, the nature of the relationship subjects have with each other, and the content of the interaction, all of which which may influence interpersonal distancing behavior. It may also be difficult or impossible to obtain the informed consent of subjects.

Structured interactive studies tend to make the above problems more managable, but they have their own problems, including a tendency to bring the nature of the study (i.e. interpersonal distancing behavior) to the conscious awareness of experimental subjects, which may in itself influence the behavior, and also other problems of external validity which always accompany research performed outside of natural settings.

Although there is probably no ideal solution to all of the difficulties presented by the study of human spatial behavior, the structured interactive measures (of which the methodology described in this paper is one example) have much to recommend them. In addition, the methodology described below has one advantage shared by no other technique known to the author. It produces data that can be interpreted in a fairly straightforward and natural way to allow the construction of experimental gradients of approach and avoidance in interpersonal distancing behavior. If this potential of the methodology can be realized, it should permit a significant step forward in our understanding of proxemic behavior, which is one of the most basic features of human interaction.

METHODOLOGY

The Approach/Avoidance Paradigm as a Framework of Analysis

An approach/avoidance paradigm provides an attractive vehicle for conceptualizing proxemic behavior. Most of the existing theories of proxemic behavior have been expressed in approach/avoidance terms. Argyle and Dean's (1965) affiliative conflict theory, which "remains the bellweather" (Aiello, 1987) model of proxemic behavior, is explicitly stated in approach/avoidance terms. Other models have also employed the approach/avoidance paradigm. Kaplan et al. (1983) present a comparison of the predictions of four theoretical models in an approach/avoidance format. The four models are "compensation" (Argyle and Dean, 1965), "reciprocity" (Gouldner, 1960; Jourard and Friedman, 1970), "attraction mediation" (Kaplan, 1977; Firestone, 1977) and "affective arousal" (Patterson, 1976).

A particularly clear and concise statement of the approach/avoidance paradigm is provided by Dollard and Miller (1950) as follows:

(1) The tendency to approach a goal is stronger the nearer the subject is to it. This will be called the <u>gradient of approach</u>.

(2) The tendency to avoid a feared stimulus isstronger the nearer the subject is to it. This will be called the <u>gradient of avoidance</u>.

(3) The strength of avoidance increases more rapidly with nearness than does that of approach. In other words, the gradient of avoidance is <u>steeper</u> that of approach.

(4) The strength of the tendencies to approach or varies with the strength of the drive upon which they are based. In other words, an increase in drive raises the <u>height</u> of the entire.

With minor modifications (discussed later), these assumptions and definitions can be directly applied to the analysis of proxemic behavior in the instrument described below.

An Instrument for the Study of Approach and Avoidance Gradients in Proxemic Behavior

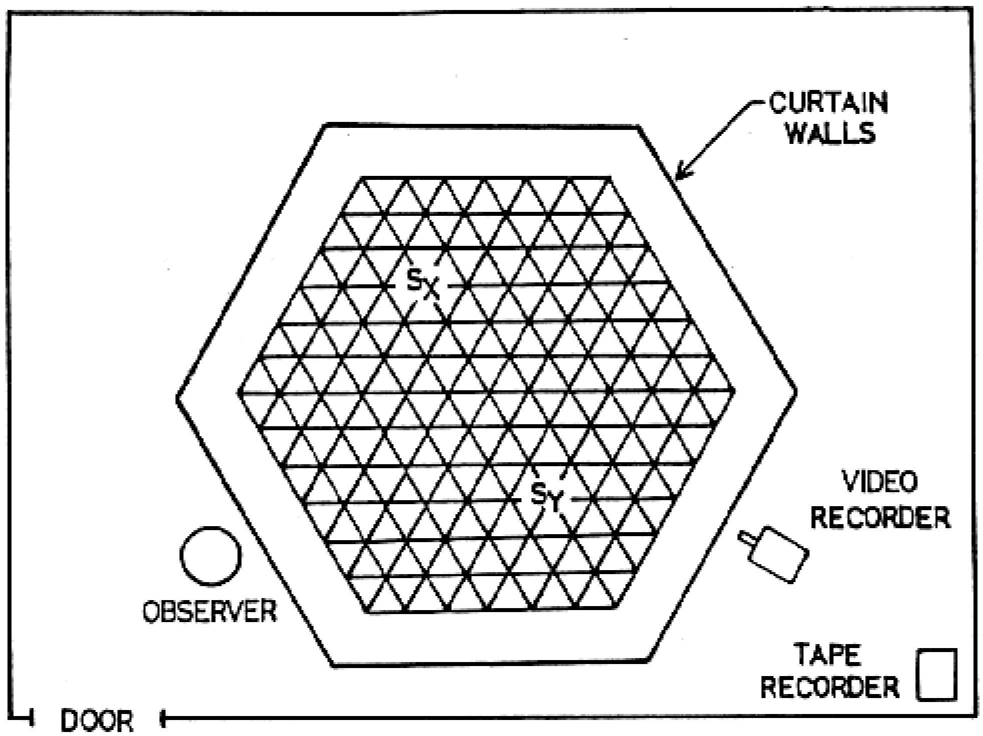
Despite the common use of approach/avoidance terminology in considerations of proxemic behavior, the available methodologies for the study of personal space have not produced data that can be easily interpreted in approach/avoidance terms. (Hayduk, 1978). In an effort to produce this type of data, Ickinger (1982) designed an apparatus for the observation and analysis of proxemic behavior and quantification of spatial distances.

It is useful to think of this apparatus as an instrument. The instrument is essentially a room with a pattern inscribed on the floor. The floor pattern has spatial and statistical properties that facilitate the analysis of individual or interpersonal distancing behaviors acted out on it in accordance with rules determined by an experimenter. These rules specify a "game" that can be played by one or more subjects and/or confederates within the room.

The room has a floor plan in the shape of a regular hexagon measuring 6 meters (approximately 19.7 feet) across its largest dimension. The walls of the room are made of opaque white canvas sheeting and are supported by a framework constructed of aluminum tubing. The walls create a symmetrical and featureless barrier to extraneous stimuli. They eliminate doors or other environmental features that might influence behavior. The instrument creates a reproducible setting that can be assumed to be equally unfamiliar to all experimental subjects. The floor of the room is a blue polyethylene swimming pool cover approximately 27 feet in diameter. The pattern on the floor is laid out with white cellophane tape. The sides of each small equilateral triangle in the pattern (see Figure 1) measure 0.5 meters (approximately 19.7 inches). Figure 1 depicts the room, which is portable and can be set up by two people in an hour or less. It is designed to be set up indoors within a larger room.[1]

FIGURE 1

A floor plan of the experimental apparatus as set up for this experiment.



Simulation of the instrument

A miniature version of the instrument described above has been used to simulate interpersonal distancing behavior. The floor pattern shown in Figure 1 was reproduced on a game board. The pattern was laid out with black tape at a scale of 1:11 on a two foot square white board. The resulting pattern was 0.55 meters (approximately 21.5 inches) across its longest dimension. In the game as played on the board, the experimental subjects are represented by 6 inch (15.25 cm) lengths of 1-1/4 inch (3.18 cm) diameter wooden doweling. These dowels are moved about on the game board by the experimental subjects.

Approach/avoidance in the Instrument and Simulated Instrument

In order to develop an approach/avoidance analysis, two definitions and two properties of the floor pattern are invoked:

DEFINITIONS

(1) Node: Any point on the pattern where three lines meet. (During an experimental run, or "game," experimental subjects are always requested to position themselves with a node between the balls of their feet.)

(2) Move: A person in the instrument makes a "move" when he/she moves from one node on the pattern to any other node adjacent to it. An "adjacent node" is further defined as one connected with another node by a line and not separated from it by an intervening node.

Using these definitions, the first property of the pattern that should be observed is that typically each node is surrounded by a "ring" of six adjacent nodes arranged in a hexagonal pattern. Furthermore, this hexagonal pattern of nodes is surrounded by another concentric hexagon of twelve nodes, each of which is one move "outward" from the nodes forming the first hexagon. This second concentric hexagon is surrounded by a third hexagon of eighteen nodes and so on until the boundary of the pattern is reached. (Boundary nodes which occur at the edges of the pattern have fewer adjacent nodes. This can slightly complicate certain computations, but it does not affect the basic analysis.)

These concentric hexagons are significant because a unique minimum number of moves is required to reach nodes on each one from the node chosen as the initial position. This minimum number of moves is also an approximation of the physical distance between the initial position and any node on the appropriate hexagon. Because of this property of the floor pattern, it is possible to approximate the interpersonal separation between two people standing on nodes in the apparatus by measuring the distance in "moves," where "distance in moves" is defined as the minimum number of moves required to move from any one arbitrarily chosen node to any other. See the **APPENDIX** for a brief discussion of the "distance error" that results from measuring distance in moves.

The second property of the floor pattern is that any move by a person in the instrument must, because of the basic geometry of the pattern, affect the interpersonal separation between subjects (assuming two experimental subjects in the device) in one of three ways. It can either reduce the separation (measured in moves), increase the separation, or leave it unchanged.

Using these properties of the floor pattern we can define two constructs that are conceptually very similar to Dollard and Miller's "gradient of approach" and "gradient of avoidance." The gradient of approach is defined as the percentage of moves made that reduce the interpersonal separation (that is, approaching the other person) as a percentage of all moves made. This percentage is calculated separately for moves made at each possible interpersonal separation, where separations are measured in moves. That is, one would obtain the percentage of moves reducing the interpersonal separation made from a separation of one move, then from a separation of two moves, etc. The gradient is then obtained by plotting the distance in moves along the horizontal axis and the percentages along the vertical axis (see Figure 2).

The gradient of avoidance is calculated in exactly the same way except using the moves made that increase the interpersonal separation as a percentage of all moves made. Finally, we define a new gradient which we call the gradient of indifference. (Perhaps the term "gradient of comfort" is more apt, but it also seems more value-laden.) It is the percentage of moves made that leave the interpersonal separation unchanged as a percentage of all moves made. The gradients obtained this way in the experiment described in this paper are shown as graphs A, B,& C in Figure 2.

The gradient of indifference provides slack in the system so that the heights of the gradients of approach and avoidance can vary independently of one another. At any given interpersonal distance, the values of the gradients of approach, avoidance and indifference must sum to 100 percent. However, an increase in the gradient of approach does not mean that the gradient of avoidance must necessarily decrease. The gradient of indifference could decrease and the gradient of avoidance could stay the same or even increase.

As in (4) in the Dollard and Miller model above, an increase in the mean height of the entire gradient of approach or avoidance can be interpreted as an increase in the underlying drive. However, interpretation of the mean height of the gradients defined above is not the completely straightforward process that it might at first appear to be. At first glance it may appear that one should simply obtain the mean value of the individual percentages at each distance in moves that make up the gradient. This ignores the fact that many more total moves are made at some distances than at others. This is shown in graph D in Figure 2. For example, inspection of the tabulated data in Figure 2 shows that in the actual game (Instrument condition) a total of 161 moves were made from a separation of two moves while only 30 moves of all types were made from a separation of one move. Therefore to give equal weight to the percentage of moves calculated at each distance would distort the overall strength of the underlying drive. A better measure of the overall drive strength is obtained by "weighting" the percentages at each separation by the total number of moves made at that separation. If one follows through the mathematics of this, it turns out to be equivalent (for the gradient of approach) to simply adding up the total of all moves reducing the separation made at all possible separations. Therefore it is these totals (total number of moves "reducing" for gradient of approach, "increasing" for gradient of avoidance, and "unchanged" for gradient of indifference) that are compared to test differences in "drive strengths" in the contingency tables presented in the **RESULTS** section of this paper.

The one departure of the gradients defined above from the four assumptions of the Dollard and Miller model is that typically the gradient of approach decreases instead of increases as one experimental subject nears the other (see Figure 2, graph A). This does not present a problem, and could in fact be seen as a plus since it means that the equilibrium point where the gradients of approach and avoidance cross over is more clearly defined. The idea that the gradient of approach in interpersonal interaction would decrease with decreasing interpersonal distance (that is, would have a positive slope) was anticipated by Knowles in 1980. In fact, this paper (Knowles, 1980) seems almost prescient to the current author in the light of the findings reported in this paper. It anticipates certain features of the gradients, including their nonlinearity. It also contains an excellent discussion of the Dollard and Miller (1950) model in general. This paper is highly recommended reading for anyone interested in approach and avoidance in human spatial behavior.

The gradient of avoidance satisfies Dollard and Miller's second assumption, as would be expected. Taken together, the gradients of approach and avoidance as defined above also satisfy the third assumption since the strength of avoidance does increase more rapidly with nearness than does that of approach (which actually decreases as noted above). It can also be seen that the height of the gradient of indifference is an inverse measure of the strength of the other two gradients added together.

EXPERIMENTAL DESIGN

The purpose of this study is to compare the proxemic behavior of subjects in the instrument with that of subjects using the simulated instrument. Two separate groups of subjects were used for this purpose. All subjects were university students who volunteered their participation. Each group contained 20 pairs of students. Members of all dyads were previously unacquainted with one another. Each test group contained six male dyads, six female dyads and eight mixed sex dyads.

Members of the "instrument" group were led inside the apparatus and assigned positions as subjects "X" and "Y". (The initial positions of the subjects are marked in Figure 1.) The experimenter read a standard set of instructions to subjects, answered any questions and departed. A recorded tape then directed the subjects to make 12 moves each, alternating moves at 15 second intervals, while the experimenter observed the session from outside the room through one way windows in the curtain walls.

Members of the "simulation" group were led into a curtained room usually used as a recording studio. Subjects were seated across a coffee table from one another in identical chairs. The "game" was set up on the coffee table. The experimenter read a set of instructions essentially identical to those read to the "instrument" group and departed. Subjects then moved the dowels in response to the same tape recording heard by subjects in the instrument. Sessions were videotaped and hand recorded through a glass panel in a door at one end of the studio.

RESULTS

Analysis of proxemic behavior in the instrument performed earlier with different subjects (Ickinger, 1982) showed an overall tendency for subjects to approach each other during the first three moves by each subject in the game when subjects were started on the nodes marked X and Y in Figure 1. This resulted from the relatively large interpersonal separation of 3 meters (about 9 ft. 10 in.) between the arbitrarily chosen initial positions for each subject. After three moves by each subject, an equilibrium distance was typically attained and there was no significant overall tendency for subjects to increase or reduce this separation during the last nine moves of the game. This led us to characterize the first three moves as the "approach" phase and the last nine moves as the "interaction" phase. We have analyzed only interpersonal distances or distancing behavior occurring during the interaction phase.

In discussing the utility of an approach/avoidance analysis of proxemic behavior it is of interest to compare it to a more conventional analysis using interpersonal distance as a dependent variable. Two null hypotheses are tested in each type of analysis.

(1) Spatial behavior in the simulated instrument does differ significantly from behavior in the instrument.

(2) Spatial behavior does not vary significantly with sex

When interpersonal distance is used as a dependent variable, the experiment is essentially a 2 x 3 factorial design, with the two environmental conditions (actual vs. simulation) crossed with three conditions of sex composition of dyads (female/female, male/male, and female/male).

Results of an analysis of variance on the mean interpersonal separations (in meters) are presented in Table 1. This analysis shows no significant main effects or interactions. Inspection of Table 1 reveals only one noticeable difference related to the experimental conditions, the consistently larger standard deviations for the interpersonal distance in the simulated condition.

TABLE 1

Analysis of variance on interpersonal distance in meters for all experimental subjects

	Mean Metric Distance(MMD)	Standard Devtion of MMD	Number of Dyads
Actual-Male	1.21333	.27624	6
Actual-Female	1.15500	.23193	6
Actual-Mixed	1.16875	32060	8
Actual-All	1.17810	--	20
Simulated-Male	1.74000[1]	.88790	6
Simulated-Female	1.24500	.68140	6
Simulated-Mixed	1.17625	.49900	8
Simulated-All	1.36600	--	20
Total dyads	1.27200	--	40

Analysis of Variance

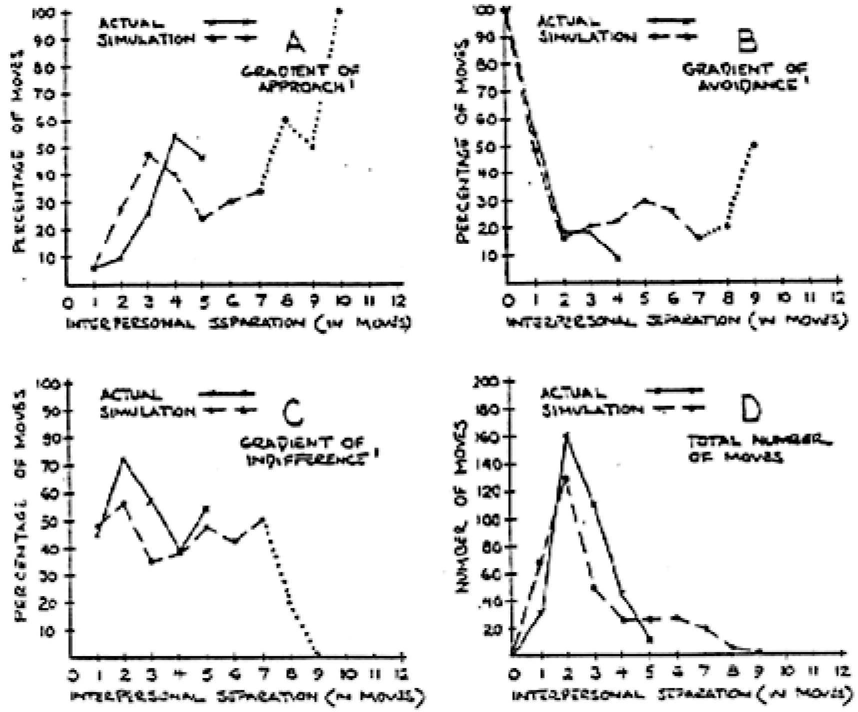
Source	Sum of Squares	d.f	Mean Square	F	Tail Prob.
Mean	64.652	1	64.652	234.44	0.00
Environment	0.425	1	0.425	1.54	0.22
Dyad Sex	0.723	2	0.362	1.31	0.28
Env. x Dyad Sex	0.503	2	0.252	0.91	0.41
Error	9.376	34	0.276		

[1]The large mean separation in the simulated-male condition is due to one dyad that maintained an anomalous large interpersonal distance.

An analysis based on the approach/avoidance paradigm can be performed by applying the definitions of the gradients of approach, avoidance and indifference developed earlier in this report. We begin by counting the number of moves made by subjects at each interpersonal separation that fall into each of the respective categories (separation reduced, increased or unchanged). These totals appear in the tabulated data section of Figure 2. Once the moves have been categorized, the gradients of approach and avoidance are obtained by plotting the percentages of the total number of moves made at each interpersonal separation (measured in "moves") that reduce or increase the separation. In addition, the gradient of indifference is obtained by plotting the percentage of moves that leave interpersonal separation unchanged. The results for the actual and simulation conditions appear in graphs A, B and C of Figure 2. Graph D plots the total number of moves (of all types) made at each interpersonal separation.

FIGURE 2

Gradients of approach, avoidance and indifference, and tabulated data.



TABULATED DATA

		INTERPERSONAL SEPARATION IN MOVES	0	1	2	3	4	5	6	7	8	9	10	TOTALS
		SEPARATION												
ACTUAL GAME	FEMALE	REDUCED	–	1	9	13	12	2						38
		UNCHANGED	–	6	64	35	8	4						117
		INCREASED	1	3	13	8	0	0						25
	MALE	REDUCED	–	0	6	16	11	4						37
		UNCHANGED	–	7	52	26	9	3						97
		INCREASED	0	13	17	12	4	0						46
SIMULATION GAME	FEMALE	REDUCED	–	3	25	15	5	2	2	2	0	0	1	55
		UNCHANGED	–	17	34	10	5	7	2	0	1	0	0	76
		INCREASED	2	21	10	3	4	3	2	2	1	1	0	49
	MALE	REDUCED	–	0	11	9	6	4	6	4	3	1		44
		UNCHANGED	–	16	41	7	5	5	9	9	0	0		92
		INCREASED	1	12	11	7	2	5	5	1	0	0		44

[1] SEGMENTS OF GRADIENTS BASED ON LESS THAN 10 OBSERVATIONS ARE PLOTTED AS DOTTED LINES (.....)

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The total number of moves in each category can be used to measure the mean height of the associated gradient as described in the **METHODOLOGY** section above. It should be noted again that these mean heights refer to "gradients" constructed by weighting the observations in graphs A, B, and C by the number of moves at each separation as plotted in graph D.[2] These "weighted" approach/avoidance gradients can be plotted directly, but the results are not meaningful visually because of the distortion caused by the tendency for most moves to be made at separations close to two moves. Therefore the unweighted gradients are shown in Figure 2.

It can be seen from the tabulated data at the bottom of Figure 2 that all of the interpersonal interaction in the "actual" condition takes place at interpersonal separations between 0 and 5 moves, while in the simulation the interpersonal distances vary between 0 and 10 moves. This provides confirmation for the observation of greater variance in the mean separations in the simulation condition in Table 1.

Inspection of graphs A, B, & C in Figure 2 shows differences in the gradients between subjects in the actual and simulated conditions, but provides no indication of whether these differences are statistically significant. The simplest measure of significance for such differences in behavior is a Chi square test that compares the total number of moves In each category (reduced, increased or unchanged separation) in each experimental condition. (This is equivalent to a test of whether the differences of the heights of the gradients, or "drive strengths" are significantly different, as described above.) Results of such a comparison are presented in Table 2. The drive strengths, as represented by the total number of each type of move in each condition, are significantly different (p=.0027). Both the approach and avoidance drives are elevated in the simulation.

TABLE 2

Chi-square analysis of drive strengths for all subjects in the actual vs. simulated conditions.

	Distance Reduced	**Distance Unchanged**	**Distance Increased**	**Total**
Actual	75	214	71	360
Simulated	99	168	93	360
Total	174	382	164	720

Pearson's Chi Square	11.801
d.f.	2
Prob.	0.0027

The Chi square analysis is next repeated for male and female subjects separately. The results are presented in Table 3. The table shows no significant elevation of approach or avoidance drives in male subjects in the simulation. Almost all the overall difference in drive strengths occurs in the female subjects.

TABLE 3

Chi-square analysis of drive strengths for male subjects in the actual vs. simulated interaction conditions (top table) and for female subjects in the actual vs. simulated conditions (bottom table).

Distancing by Males

	Distance Reduced	Distance Unchanged	Distance Increased	Total
Actual	37	97	46	180
Simulated	44	92	44	180
Total	81	189	90	360

Pearson's Chi Square	0.782
d.f.	2
Prob.	0.6765

Distancing by Females

	Distance Reduced	Distance Unchanged	Distance Increased	Total
Actual	38	117	25	180
Simulated	55	76	49	180
Total	93	193	74	360

Pearson's Chi Square	19.601
d.f.	2
Prob.	0.0001

DISCUSSION

Although the analysis of variance presented in Table 1 shows no significant difference in interpersonal distance by sex or by experimental condition, the approach/avoidance analysis presented in Figure 2 and Tables 2 and 3 indicates that the individual members of the dyads in each experimental condition, when categorized by sex, do exhibit different patterns of distancing behavior. How can these results be reconciled?

In fact there is not necessarily any real contradiction. Dyadic interpersonal distance is the result of an interaction of the distancing behaviors of both members of the dyad. The results presented in Table 1, and in other studies of proxemic behavior, indicate that this interaction tends to be homeostatic in nature. If one member attempts to violate the accepted norm or social schema for a particular situation, the other member tends to compensate to maintain the prescribed distance.

Therefore, in order to study individual differences in distancing behavior it is necessary to somehow circumvent this tendency. The "Stop distance" technique (Dosey and Meisels, 1969) solves the problem by immobilizing one member of the dyad. The approach/avoidance technique allows both members to move, but allows individual behaviors to be separated out analytically.

When individual level (approach/avoidance) analysis is performed, it appears that male responses are not affected by the experimental condition, whereas females experience heightened drive states in the simulated environment.

This experiment deals primarily with techniques of measurement. It is not set up to explore subjects' motivations in selecting the moves they choose to make. To the extent that we might speculate, perhaps an explanation of motivations will depend at least in part upon an analysis of the cues to which subjects are responding. Hall (1969) felt that distancing behavior, although culturally learned, depends largely on physical cues (visual, olfactory, aural, thermal and tactile). On the other hand, Kuethe (1962) emphasized the role of internalized "social schemas" that regulate behavior. Both the learned social schemas and relevant physical cues are operative in the actual proxemic situation, but only the social schemas (although possibly with a different set of physical cues) exist in the simulation.

The results of the approach/avoidance analysis may indicate that there is some difference in the way females and males respond to social schemas and physical cues. The nature of the difference is not so readily apparent. Are social schemas for distancing more deeply ingrained in males, so that behavior follows schemas even in the absence of physical cues? (The conventional wisdom might indicate that this is the case. For example, close contact seems to have historically been far less acceptable in our society for males than for females. As a result, young males are likely to receive more "noncontact" conditioning than young females. Therefore, by adulthood, the social schema of noncontact may be more deeply ingrained in males.)

Do the schemas themselves differ for males and females? According to Bem and Bem (1980), female babies receive different conditioning from age 2 days. If schemas are different, perhaps females conform to the schema of the male group (Males being generally larger, and historically higher in status) when it is reinforced by physical cues, but revert to their own schema in the absence of such cues. In any case, female distancing behavior seems to be more responsive to the physical cues present in actual interpersonal interaction, which appear to have an inhibitory effect. Females exhibited heightened drive states when these cues were absent.

The research reported in this paper reinforces the necessity for caution when interpreting the results of studies of simulated proxemic behavior. Although it is beyond the scope of this paper, since the focus is on demonstrating the methodology - and the results are somewhat incidental to this - it might be interesting to examine the literature to determine whether male/female differences in real and simulated proxemic interaction have been reported by other researchers.

FOOTNOTES

[1] The "instrument" described has been patented by one of the authors (Ickinger).

[2] Equating the total number of moves in each category with the mean height of the associated gradient requires that two conditions be met. First, the total number of moves made by subjects in the actual and simulated conditions must be equal. Our data satisfies this condition. Second, all gradients must be of equal length, where length refers to the maximum interpersonal separation. Since the maximum separation possible with the pattern used in both the actual and simulated conditions is twelve moves, this condition is also met. Heights of gradients at interpersonal separations not used by subjects (greater than five moves in the actual game or ten moves in the simulation) are considered to be zero.

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