

## THE EXPERIENCE OF PERSONAL SPACE: PERCEPTION OF INTERPERSONAL DISTANCE

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**ABSTRACT:** The experience of personal space was studied by comparing objective interpersonal distance with subjects' perception of interpersonal distance. Regardless of sex, several personality traits, and objective size of personal space, perceived personal space is larger than objective personal space. Yet in non-personal space situations, subjects did not overestimate distance. In personal space situations, individuals apparently believe they are farther from other people than they actually are.

Research in personal space is rooted in the observations of naturalists (e.g., Hediger, 1950) that animals exhibit regularities in interindividual distance. Thus, when human personal space was first studied (Sommer, 1959), it was logical to measure it as objective interpersonal distance.

However, human personal space has a cognitive component as well as the objective interindividual distance (e.g., Meisels & Canter, 1970). This cognitive component was implicit in the earliest writing about human personal space. In the original Sommer (1959) article, personal space is described as including a feeling of *comfort* at the customary distance or *discomfort* at distances which are too close or too far away. Nevertheless, as Hayduk (1978) points out, there is an "absence of studies dealing with the subjective experience of personal space" (p. 129).

Since interpersonal distance is at the core of personal space, one appropriate way to initiate research into the experience of personal space is to examine the relationship between objective

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interpersonal distance (OIPD) and perceived interpersonal distance (PIPD). Part of the experience of personal space is the individual's estimate of the distance between self and other. When interacting, individuals presumably are basing their distancing behavior on PIPD, not OIPD. Thus, the relationship between PIPD and OIPD may be crucial to the understanding of personal space.

A word may be necessary about the difference between PIPD and such seemingly related concepts as psychological distance, cognitive distance, and perceived closeness. The latter three concepts (cf., Tolor, 1970; Downs & Stea, 1973; and Meisels & Canter, 1970, respectively) refer to distance between two individuals in the absence of one of the individuals. For example, the work by Kuethe (1962) on social schemata employed the placement of cut-out figures on a feltboard to measure a *reconstructed* relationship between self and various significant others who were not present. PIPD, on the other hand, refers to one's estimate of the distance between self and other in a live interaction, that is, during the actual distancing process central to personal space.

Psychological distance and the other two concepts refer to a relationship between two cognitive elements. This relationship may not even be best expressed by physical distance units (e.g., Kuethe, 1962) but by such measures as Meisels and Canter's (1970) "perceived closeness" measure, which was a bipolar scale. PIPD, in contrast, is explicitly the cognitive representation (estimation, distortion, interpretation, processing) of an *objective* distance. Therefore, PIPD and the other notions are conceptually distinct.

While no research has been reported which is directly concerned with PIPD, a study by Shontz and McNish (1972) has some relevance to the present study. Subjects were asked to estimate the size of various stimuli, including human body parts. As the stimuli increased in apparent humanness, estimates of their size differed increasingly from objective size. The more human the stimulus, the larger it appeared. This suggests that PIPD may be affected by a similar process, since the task involves judging distance from stimuli which, based on Shontz and McNish's work, should appear larger than life to the perceiver.

Shontz and McNish's results suggest that PIPD and OIPD may not match well. However, the specific nature of a mismatch is unclear. If we perceive human cues to be larger than they actually are, we may well misperceive the distance to them. But it is not

clear whether one would overestimate or underestimate the distance. Initially, it would seem that if other people are perceived as larger than they are, they would be judged to be closer than they are. But much previous experience in social interactions may have served to inform the perceiver of this error. A compensation process might operate to cause PIPDs to increase toward objective distance, or even beyond (i.e., we might conclude the other person is *farther* away than he or she objectively is).

This study examines the size relationship between OIPD and PIPD. In addition, sex and personality correlates of PIPD are investigated in order to provide preliminary evidence concerning the generalizability (across individuals) of the PIPD-OIPD relationship.

## METHOD

### *Subjects*

The participants were 100 undergraduates (45 male and 55 female) enrolled in undergraduate psychology classes who agreed to join in a study of personal space. Payment was in the form of a lottery ticket; for each participant, one dollar was placed in a fund. At the conclusion of the study a draw resulted in a prize of \$100 for one participant.

### *Procedure*

On arrival, each participant was seated in a laboratory room and administered a new self-report measure of interpersonal behavior dispositions (Wiggins, 1979).

After completion of the Wiggins inventory, the OIPD and PIPD measures were taken in a personal space context (Personal Space Set). Each participant was given standard stop-distance technique instructions (i.e., "approach until you reach a comfortable interpersonal distance, then stop"). Employment of a male and a female assistant allowed for same-sex pairing. To control for possible experimenter bias, the assistants were not informed of the ideas concerning OIPD and PIPD presented earlier in this paper. Personal space was measured first by having the subject approach the assistant, then by having the assistant approach the

subject. In the latter case, the stop order came from the subject. In each case, the assistant asked the participant to carefully estimate interpersonal distance (PIPD) on a toe-to-toe basis. Then OIPD was measured and recorded by the assistant. Thus, two PIPD and two OIPD measures of each participant's personal space were available.

Should differences between OIPD and PIPD be found, one obvious explanation of them would be that humans simply are not very good at distance estimation. Perhaps people *typically* overestimate or underestimate distances, not just in personal space situations. To test this possibility, base rate measures of the general ability to estimate distances were obtained from the participants.

The base rate distance estimation measures were also taken as a person-to-person distance, but in a different social context (Non-Personal Space Set). This set differed from Personal Space Set in that (a) participants were told "now we're going to do something different," (b) no stop-distance instructions were used or followed (the assistant simply stood at the pre-specified distances and requested distance estimates) and (c) the pre-specified distances ranged from smaller-than-, through typical, to greater-than-personal-space distances. The pre-specified distances and the order of their presentation were: 63.5 cm (25"), 284 cm (112"), 160 cm (63"), 13 cm (5"), 508 cm (200"), 107 cm (42"), 381 cm (150") and 36 cm (14").

## RESULTS

### *Effects of Sex, Approach, and Method*

The first analysis of the data examined the effects of Sex (male vs. female), Method of measurement (OIPD vs. PIPD) and Approach (subject vs. experimenter) on personal space. A 2 x 2 x 2 ANOVA with two repeated measures (Method and Approach) was computed. Table 1 presents the means and standard deviations.

The grand mean was 65.7 cm. Overall, males chose larger distances (71.8 cm to 60.6 cm). Perceived interpersonal distance was larger than objective interpersonal distance (69.1 cm to 62.2 cm) and subject-approach distances were larger than experimenter-approach distances (67.9 cm to 63.3 cm).

Table 1. Personal Space Means and  
Standard Deviations (cm)

Approach By:	Perceived IPD		Objective IPD		Grand Means
	Experimenter	Subject	Experimenter	Subject	
Males (n=45)	75.8/55.1	73.3/35.3	72.9/54.4	65.3/33.4	71.8
Females (n=55)	55.2/33.8	71.2/38.5	50.6/34.3	62.5/42.9	60.6
Grand Means	66.1	72.1	60.6	63.8	65.7

However, of the three main effects, neither Sex [ $F(1,98) = 2.10, p > .15$ ] nor Approach [ $F(1,98) = 2.26, p > .13$ ] are significant. Method, however, is highly significant [ $F(1,98) = 23.57, p < .001$ ]. The direction of the difference is that perceived interpersonal distance (PIPD) is greater than objective interpersonal distance (OIPD).

Among the interactions, neither the Method x Sex [ $F(1,98) = .90, p > .20$ ] nor the Method x Sex x Approach [ $F(1,98) = .78, p > .20$ ] interactions are significant. But the Approach x Sex interaction is significant [ $F(1,98) = 12.76, p < .001$ ]. The means for this 2 x 2 interaction show that males approach the experimenter slightly closer (69.3 cm) than they allow the experimenter to approach (74.4 cm) while females allow the experimenter to approach much closer (54.4 cm) than they approach the experimenter (66.9 cm). The other two-way interaction, Method x Approach, is not significant [ $F(1,98) = 1.73, p > .15$ ].

In sum, while there are no overall sex or approach differences, participants significantly overestimate the interpersonal distance they select and women allow the (same-sex) experimenter to approach significantly closer than do men. The overestimation effect is much stronger than the interaction effect ( $\eta^2 = .24$  vs.  $.13$ ).

### Base Rate Comparison

Participants' estimates of the eight other distances, in the Non-Personal Space Set, were much more accurate (see Table 2). For two of the Non-Personal Space Set distances, the group mean is less than 5 percent different from the actual distance. Two

Table 2. Mean Perceived and Actual Distances

	Perceived (cm)	Actual (cm)	Percent Differences
Personal Space Set	69.1	62.2	+24.0
Non-Personal Space Set	67.5	63.5	+ 6.3
	297.0	284.5	+ 4.4
	160.7	160.0	+ 0.4
	12.5	12.7	- 1.8
	515.1	508.0	+ 1.4
	107.2	106.7	+ 0.5
	393.3	381.0	+ 3.2
	33.9	35.6	- 4.8

Note: Distances are shown in the order they were presented. Because subjects were less familiar with metric units, "perceived" distances were originally expressed in feet and inches. The mean percent difference in the Personal Space Set was computed as  $\frac{\sum_1^N (P_i - a_i)}{N a_i}$ , where  $P_i$  is the perceived and  $a_i$  is the actual interpersonal distance of the  $i$ th participant.

others are less than 2 percent off, three others are less than 5 percent off the largest discrepancy is 6.3 percent. Some of these mean estimates are less than the objective distance, others are greater. The average of the absolute values of the eight discrepancies is 2.8 percent; the simple average is 1.2 percent. It may be concluded that the participants were able to judge distances under non-personal space conditions quite accurately.

### *Personality Correlations*

The Wiggins inventory is based on a circumplial model of interpersonal behavior. The model builds on a long tradition of trait-taxonomic efforts by Allport, Norman, Leary, and Goldberg; it may be viewed as an empirical synthesis of this tradition. The eight

scores it yields are intercorrelated in such a manner as to suggest that all important interpersonal behavior tendencies are represented around the circumplex.

The correlations of interest here are those between the Wiggins scores and individuals' OIPD-PIPD difference scores. Examination of these correlations suggests that the tendency to overestimate the magnitude of personal space is unchanged across most interpersonal behavior tendencies. None of the correlation coefficients even reach .20, although one of them, Lazy-Submissive, reached a marginal significance level ( $r = .198, p < .05$ ). This correlation suggests that as individuals increasingly describe themselves as lazy and submissive, PIPD exceeds OIPD. However, the correlation is not a very powerful explanation of difference scores; it accounts for less than 4 percent of their variance.

#### *OIPD-PIPD Correlation*

The correlation between OIPD and PIPD in this study is .94. Therefore, as objective interpersonal distance changes, perceived distance changes with it. This, of course, does not detract from finding that PIPD significantly exceeds OIPD in *magnitude*. Rather, it indicates that throughout the range of personal space sizes, participants overestimate OIPD.

## DISCUSSION

The study shows that in the personal space situation, individuals report they are much farther away from the other person than they actually are. Thus, part of the personal space experience seems to involve overestimation of the magnitude of our own personal space. Other data from the study suggest that this effect is the same for males and females, for most personality traits in the interpersonal trait domain, and holds true over the range of actual personal space sizes. That is, the tendency for PIPD to exceed OIPD appears to be a rather general one, holding up across various important individual difference measures.

At first sight, the findings might be interpreted as a confirmation of Argyle and Dean's (1965) intimacy-equilibrium hypothesis. As subjects experience an excess of intimacy in one mode (e.g., interpersonal distance), they compensate to re-achieve a previously established level of intimacy (i.e., they begin to *believe* they

are farther from the other person than they actually are). A seeming problem with this explanation is that participants chose their own level of intimacy, by choosing their own interpersonal distance. Hence, there ought not to be any loss of intimacy for which to compensate. The motive to distort OIPD, based on the intimacy-equilibrium theory, would not seem to be present.

An arousal theory (e.g., Patterson, 1976) might postulate that distance estimates diverge from objectivity as arousal rises; that, essentially, arousal causes error. Once again, however, in a self-chosen non-invasion personal space situation, arousal should not be very high.

These theories might, however, account for the findings if one assumes participants did not actually remain calm and unaroused during the Personal Space Set. If the situation caused participants some anxiety, the compensation explanations might be applicable. The Patterson (1976) theory would suggest that the arousal resulting from this intimacy was labeled negatively; the overestimations would then be viewed as attempts to cognitively increase interpersonal distance.

Could the findings be the result of some known principle of perception, such as linear perspective or an illusion? In their study of similar cues, Shontz and McNish (1972) were able to reject a variety of method-based reasons for their subjects' tendency to overestimate the size of the human body parts. In this study, both Personal Space Set and Non-Personal Space Set distance estimates were based on participant-to-experimenter distances (i.e., from one person to another). Thus, distortions do not seem to be explicable in terms of the objective conditions of the perceptual task. Shontz and McNish, concluded, somewhat gratuitously, that "stimuli recognized as human activate cognitive processes which lead to different perceptual responses."

Clearly, further work is necessary. We are currently investigating a variety of parameters, such as invasion, acquaintance level and estimation of distance to objects in an attempt to replicate and extend the apparent disposition of individuals in general to believe they are farther from others than they are.

Classical research in distance perception (e.g., Gibson & Bergman, 1954; Gibson, Bergman & Purdy, 1955; Harway, 1963; Purdy & Gibson, 1955) suggests a near-linear relationship between actual and perceived distances to nonhuman targets despite a variety of methods and distance ranges. The 3 percent mean error in OIPD in the present study using human targets in the Non-

Personal Space Set is in agreement with these classical findings which use physical objects as targets. The sudden increase in error to 24 percent in the Personal Space Set suggests that distance perception in social situations operates under a different set of determinants.

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