A Multimethod Assessment of Personal Space Development in Female and Male, Black and White Children

Lawrence J. Severy
Donelson R. Forsyth
Peggy Jo Wagner

ABSTRACT: In order to obtain evidence of the effects of demographic parameters and measurement techniques on personal space, several different assessments were used to determine the impact of subject age, race, and sex on interpersonal distancing. Thirteen different variables representing stimulation, paper-and-pencil, and behavioral techniques indicated that as age increased, personal space requirements decreased, particularly for whites. Blacks as compared to whites required less space at age 7, and mixed-sex dyads tended to require more space than same-sex dyads. The results thus indicate that while some previous findings appear to be measurement method specific, others show intermethod consistency.

Despite the popularity of personal space as a research topic during the last decade, questions remain concerning the quality of the data amassed. As Evans and Howard (1973) note, the data are "often inconsistent and ambiguous. Those that are not have generally been collected by poor techniques, which make positive conclusions possible only in cases where the data overwhelmingly supports the conclusion" (p. 334). And Hayduk (1978) concludes that "if one accepts findings based only on the strongest measurement techniques, considerable reevaluation of research on personal space appears necessary" (p. 117). Evans and Howard suggest that one way to rectify the problems of inconsistent findings in the literature is to examine personal space requirements using several measurement techniques.

Lawrence J. Severy is affiliated with the Department of Psychology, University of Florida, Gainesville, Florida; Donelson R. Forsyth, with the Department of Psychology, Virginia Commonwealth University, Richmond, Virginia; and Peggy Jo Wagner, with Pennsylvania Hospital, Philadelphia, Pennsylvania. Requests for reprints should be directed to Lawrence J. Severy, Department of Psychology, University of Florida, Gainesville, Florida 32611.

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Greatest emphasis should be placed on determining the relationships which exist between these various techniques and how they are affected by surrounding demographic parameters of age, sex, and race of respondent.

Briefly, there are three general approaches to the measurement of personal space: simulation, paper and pencil, and behavioral. The essence of the simulation approach is to have the subject place figures or objects on a flannel board in any desired format (e.g., Kuethe, 1962a, b; Tolor, 1968). Evidence suggests that when subjects place human figures on such fields, systematic organizations are produced, and Little, Ulehla, and Henderson (1968) have used the interfigure distances as a measure of personal space. The Duke and Nowicki (1972) Comfortable Interpersonal Distance Scale represents the most widely used paper-and-pencil measure of personal space. Subjects are asked to imagine themselves in the center of a room with radiating lines, which supposedly represent paths to different doors. They are asked to imagine persons advancing at various angles to them from these doors and are instructed to indicate on each line how close they will allow different individuals to approach. In essence, this measure can be conceptualized as a simulation of behavioral approach in the laboratory setting. As for behavioral measures, a variety of approaches have been utilized. Most researchers, such as Aiello and Jones (1971), use an observational technique. Interacting participants are simply noted or photographed in natural settings, and their distances, one from another, are determined. Another approach is exemplified by the work of Bailey, Hartnett, and Glover (1973), in which actual behavioral "approach" versus "approached by" measures of personal space are obtained. Subjects are placed a distance apart from a stimulus individual. Subjects are instructed to approach as closely as they desire. This is labeled SMI—subject movement index. Alternatively, the stimulus person approaches the subject until the subject indicates a desire for the stimulus to stop (labeled EMI—experimenter movement index). Hayduk (1978) labels these procedures "stop-distance." Lastly, a variety of researchers (e.g., Leibman, 1970; Adler, Note 1) have utilized chair selection and placement as an unobstrusive behavioral measure of personal space.

Although few methodological studies have attempted to examine the convergent validity of these various measures, those that have been done have yielded inconsistent results (Dabbs, Fuller, & Carr, 1973; Haase & Markey, 1973; Harnett, Bailey, & Gibson, 1970; Knowles & Johnson, 1974; Pederson, 1973; McGaffey & Trego, Note 2). For example, Harnett et al. (1970) suggest that personal space as

measured by their EMI is smaller than distancing using the SMI, while Dabbs et al. (1973) found no differences between the two measures in their college student subjects. Haase and Markey (1973) report fairly high correlations between a simulation figure placement measure of personal space and an approach measure similar to the SMI, but Knowles and Johnson (1974) report several differences between the behavioral (only) measures they used to tap personal space. Their conclusion that the generalizability of results would be heightened if measures were varied in obtrusiveness, and subject involvement were employed, was incorporated into the design of the present investigation.

Lastly, the fact remains that no single investigation has attempted to assess empirically the interrelationships and similar effects of each of the above three methods for a single subject population. Hayduk's (1978) review and evaluation includes important comparisons, but lacks empirical evidence.

AGE

Research on the developmental aspects of personal space has addressed two general issues: first, the age at which personal space is established and second, the consistency of spatial behavior in young children. Research by Meisels and Guardo (1969) indicates that children as young as third graders evince personal space via Kuethe's (1962a,b) social schemata approach. Duke and Wilson (1973) utilized their Comfortable Interpersonal Distance Measures with preschool children, while Eberts and Lepper (1975) found consistent behavioral evidence of personal spacing behavior in children ranging in age from 45 to 63 months. In all of these studies adultlike behavior was reflected, with strangers being placed at farther distances than friends. Several studies, however, suggest that personal space may shrink with age until it matches the normative distancing of adulthood. Meisels and Guardo (1969) report a general trend toward personal space reduction over the ages 8 to 16. They receive partial support from Pederson (1973) and Jones and Aiello (1973). Unfortunately, personal space did not consistently decrease at each of the six elementary school grade levels studied by Pederson, and the trend toward space reduction found in the Jones and Aiello study held only for white subjects and was not very pronounced. Indeed, Markey (1971), Tennis and Dabbs (1975), and Aiello and Aiello (1974) report that personal space increases with age. Of these studies, the investiga-

tions using a behavioral index utilized observation of controlled same-sex dyadic interactions. Although all other investigators used a simulation figure placement technique, Pederson and Markey stressed that subjects choose a comfortable distance, whereas Meisels and Guardo asked subjects where they *would be* in the situation. Lastly, neither Pederson nor Markey specified whether the stimulus persons were friends or enemies.

SEX DIFFERENCES

The general conclusion regarding sex differences appears to be that females have smaller personal space zones than males and that heterosexual pairs demonstrate smaller zones than same sex pairs (Hartnett, Bailey, & Gibson, 1970; Kuethe, 1962a, b; Leibman, 1970; Willis, 1966). However, Altman (1975) points out:

> The whole sex picture clouds somewhat when other factors are considered, such as age, ethnic composition and situational factors . . . for every study cited that reports sex differences, I could probably cite another study with no such differences. To really understand the effects of sex characteristics, it is necessary to develop a program of research with sex as the central rather than the secondary factor (pp. 75–76).

For example, Quick and Crano (Note 3), using an observational method and time as a dependent measure, report the "rather unexpected finding that female confederates elicited more rapid defensive reactions than males" (p. 3), suggesting that personal space violation and invasion was occurring at greater distances for females. Similarly, Fisher and Byrne (1975) discovered a differential response on the part of females and males based upon whether invasions of personal space were made side by side or face to face. Lastly, Knowles and Johnson (1974) observed relatively few sex differences and suggested that the issue is "not yet clearly described or understood" (p. 15).

Working with 11½-year-olds, Guardo (1969) discovered that girls had significantly smaller interfigure distances (figure placement) than boys when the situation entailed a best friend or "someone you really like." However, girls had significantly greater interfigure distances than did boys when the other figure was described as "someone you are afraid of." Bailey, Hartnett, and Glover (1973), again working with 11½-year-old subjects, found that boys both ap-

proached and allowed approach by a 40-year-old experimenter much closer than did girls of the same age. Adding to the complexity, Jones and Aiello's (1973) observational study of grade-school children suggested that black females stood closest to one another, white females stood farthest apart, with males of both groups in the intermediate ranges.

ETHNICITY

Work on personal space differential according to ethnic groups is, of course, best argued in Hall's (1966) work on spacing in various cultures. Hall suggested that "differences in the structuring of space between minority groups and the dominant white culture are basic" (p. 165) and are products of early socialization. More recently, the Jones and Aiello (1973) investigation indicated that black-white, first-, third-, and fifth-grade differences appear to be related to sex differences. Scherer (1974), also utilizing a field study, tried to partial out contaminating effects of social class in the Jones and Aiello study and obtained results which indicated that there were no differences between subcultures. Baxter (1970) and Willis (1966) both report that whites stand closer to one another than do blacks. However, the consistent use of unitary measurement techniques requires that any conclusions about individual development and desired personal space drawn from the above research be accepted only tentatively. (Even the direct observation of actual interaction is problematic. In a two-person [or more] interaction, negotiation of spacing occurs, creating compromises eventuating in differences between "individual distance" and "personal space" as delineated by Sommer 1969). The current effort was concerned with conceptually and methodologically "surrounding" the individual development of personal space, hence the difficulty with even the observation of behavioral interaction.)

METHOD

In the present study, given the need for multiple measurement techniques and the maintenance of control in the situation, the personal space of individuals varying in age, sex, and ethnicity but matched on socioeconomic status was assessed using behavioral, simulation, and paper-and-pencil techniques. Differences in space maintenance as a func-

tion of subject age, race, and age were examined, with the explicit intention of creating an adequate data base for the evaluation of previous research findings investigating personal space. Further, by delineating the similarities and differences of the results produced by the various methods, one could evaluate the results of nonbehavioral methods in those settings where certain procedures such as direct observation are not practical.

Subjects

One hundred and forty-four children served as subjects, 12 for each cell of the 2 (race) by 2 (sex) by 3 (age: 7, 11, and 15) factorial design. All children were recruited at the laboratory school affiliated with the University of Florida and were matched across all variable levels for socioeconomic status, as measured by family income.

Measures

Measures representative of all three personal space measurement modalities were employed.

Behavior. Two types of behavioral measures of personal space were used. The first was obtained by having the observer record the distance subjects maintained when approaching or being approached by an adult (approximately 22 years old) of matching race. The "approaches" measure is virtually synonymous with Bailey, Hartnett, and Glover's SMI and the "approaches by" measure is synonymous to their EMI. The stimulus persons were casually dressed and of approximately equal attractiveness. Each approached the child, starting at a distance of about 36 feet. Subjects were told to indicate when they "felt uncomfortable and wanted the stimulus person to stop." Next the subject approached the stimulus, again until the subject began to feel uncomfortable. Eye contact was to be maintained at all times in both procedures. These procedures were repeated for a second stimulus person, opposite in sex from the first stimulus person, but again with matched race, with the order of the sex of the stimulus person randomly determined. The second type of behavioral measure utilized was the seat placement technique. When the subject first entered the experimental room, he or she was asked to take a seat in a row of stationary chairs situated along one wall of the room. When seated, the distance that separated the subject from the matched race first stimulus person (seated in the end chair) was recorded by an unobtrusive observer seated behind a screen.

Paper and Pencil. The Comfortable Interpersonal Distance Scale (CIDS), developed by Duke and Nowicki (1972), graphically represents a large room on paper. Subjects are asked to imagine themselves standing in the central position, and as various stimulus persons approach them along one of eight,

80 mm radii, subjects indicate at what point along a given radius they begin to feel uncomfortable about the imagined approach. Responses to the four types of imagined stimulus persons—male and female intimates (e.g., mother, father, best female friend) and male and female strangers (e.g., male stranger, female stranger, mailman, saleslady)—were totaled to yield four separate personal space scores.

Figure Placement. A simulation technique similar to that developed by Kuethe (e.g., 1962a, 1962b) provided subjects with small yellow felt figures representing stimulus persons to place singly on a 16½ in. X 24 in. green felt board that already held a similarly shaped figure representing the subject. The Figure Placement Measure (FPM) permitted calculation of the size of the desired interpersonal distance maintained by the subject and the same four types of stimulus persons utilized for the CIDS measure.

Procedure

Each subject was accompanied from the classroom to the experimental lab by one of three white female experimenters randomly assigned to that session. Upon arrival, the subjects choice of distance from the first stimulus person (seat measure) was noted, and the "approach, approached-by" measure of personal space was taken for both male and female (randomly determined) stimulus persons. The felt board simulation task and the CIDS were administered next, with their presentation order counterbalanced by having one-half of the subjects in each condition receive the felt task first while the remaining subjects received the CIDS first. In addition, the sex of the stimulus person (order) remained constant over all measures, such that all subjects who were first exposed to a male stimulus person upon being seated were also approached first by the same male stimulus person and were exposed to the male stimulus persons first on both the felt task and CIDS. Similar procedures were employed if a female was randomly selected as the first stimulus person.

In spite of our attempt to counterbalance and randomly assign subjects to procedural order, several unfortunate confounds remained, e.g., behavioral measures always occurred first, and the stimuli persons in the behavioral measures were not those responded to via CIDS or FPM. Our lengthy procedure incorporating complex protection from other confounding potentials, and the lengthy procedure per se, precluded attention to these issues and consequent interpretation of results is necessarily affected.

RESULTS

The data were subjected to several forms of analysis. First, the various original measures were subjected to analyses of variance.

Second, the original variables were factor analyzed and interrelationships noted. Third, factor scores were submitted to an analysis of variance.

Simulation, Paper-and-Pencil Measures

Since exactly the same set of stimulus persons was used with both the Figure Placement Measure (FPM) and the Comfortable Interpersonal Distance Scale (CIDS), these two measures can be directly compared across all of the stimuli employed. Subjects' responses were first standardized and then submitted to a mixed analysis of variance with race (black or white), sex (male or female), and age (7, 11, or 15) serving as between-subjects factors and sex of stimulus person (male and female), intimacy of stimulus person (intimate or non-intimate), and type of measure (FPM and CIDS) serving as the within-subjects factors. Table 1 presents a summary of these effects significant at the $p = .1$ level or better.

Age Trends. More space was used by 7-year-olds than by 11-year-olds, who, in turn, used more space than 15-year-olds ($ps < .05$ by Duncan's Multiple Range Test). The means were $+.44$, $-.07$, and $-.38$, respectively. The age X race interaction, however, does indicate that this inverse relationship between distance and age was more pronounced for whites than blacks. White 7-year-olds required more space than white 11-year-olds, who required more space than 15-year-olds; the means were $+.66$, $-.04$, and $-.55$, respectively ($ps < .05$). For blacks, the 7-year-olds did maintain greater distance than the 15-year-olds ($p < .05$), and the mean for the 11-year-olds fell intermediate, but it did not differ significantly from the other two age groups; the means were $+.22$, $-.09$, and $-.20$. These results strongly support Meisels and Guardo's (1969) conclusion that children's personal space shrinks as they grow older, while also suggesting that this developmental trend is most pronounced for whites. Black children's space requirements were less variable than whites, such that blacks required significantly less space than whites at age 7, but more space at age 15 ($ps < .05$).

Sex of Self and Other. The sex of self × sex of other interaction was qualified by the three-way interaction of sex of self, other, and age shown in Table 2. The greatest variance in personal space was found at age 7, with females maintaining a relatively large distance from male others and males maintaining a smaller distance from male

Table 1

Summary of analysis of variance for the effects of race,sex, age, and stimulus characteristics on personal space: Sources significant at the 10 percent level or better

Dependent Variable: Simulation, Paper-and-Pencil Measures

Source	df	MS	F	p
Age (A)	2	65.61	21.28	.001
A X Race (R)	2	15.29	4.96	.01
R X Sex (S)	1	15.78	5.12	.05
R X Other's Sex (O)	1	1.71	4.06	.05
S X O	1	16.68	39.49	.001
R X Intimacy (I)	1	9.51	10.48	.01
A X I	2	2.41	2.66	.1
A X S X Measure (M)	2	2.69	2.59	.1
A X S X O	2	2.28	5.39	.01
S X M X O	1	1.24	3.65	.1
A X S X I	2	2.10	2.31	.1
A X M X I	2	1.06	3.09	.05
A X S X O X I	2	0.96	2.96	.1

Dependent Variable: Behavioral Responses

Source	df	MS	F	p
Age (A)	2	23.06	7.68	.01
Race (R) X Approach (Ap)	1	2.50	10.00	.001
R X Other's Sex (O)	1	1.56	6.01	.05
O X Sex (S)	1	2.06	7.95	.01
A X S X O	2	0.71	2.72	.1
R X Ap X O	1	1.10	9.98	.01
R X A X Ap X O	2	0.28	2.50	.1

Table 2

Developmental changes in

personal space in same- and mixed-sex dyads

AGE	SEX OF OTHER	SEX OF SUBJECT	
		Male	Female
7	Male Other	$+.17_{c}$	$+.74_{a}$
	Female Other	$+.49_{b}$	$+.36_{b}$
11	Male Other	$-.22_{d}$	$+.07_{c}$
	Female Other	$+.09_{c}$	$-.21_{d}$
15	Male Other	$-.49_{e}$	$-.28_{d}$
	Female Other	$-.41_{de}$	$-.33_{de}$

Note: The larger the score, the more space required. Means without a common subscript are different at the $p = .05$ level.

others. Interestingly, males and females did not differ in their placement of female stimulus others.

By age 11 mixed-sex pairings required more space than same-sex pairings. The placement of same-sex others (i.e., males placing males or females placing females) required less space than either males placing females or females placing males.

At age 15 the personal space patterns were similar to the pattern for 7-year-olds, but much less pronounced. Again, males and females did not maintain significantly different distances from female others. Males did, however, place male others closer than did females.

Both sex of subject and sex of other interacted with race. Although black males required less space than black females ($p < .05$), white males and females did not differ. The means for this interaction were black males = $-.20$, black females = $+.15$, white males = $+.08$, and white females = $-.03$. However, whites placing a female stimulus person did require more space than blacks ($p < .05$), with the respective means falling at $+.06$ and $-.06$. The means for male placement were intermediate and did not differ from any other conditions; the means were $-.02$ and $+.02$.

Intimacy of Other. Intimacy interacted with race and with age and type of measure employed. Whites' distancings were oppostie those predicted since they placed more distance between themselves and intimate others than nonintimate others ($p < .05$); the means were +.11 and −.06, respectively. The reverse held true for blacks, who placed intimates closer than nonintimates ($p < .05$); the means were −.11 and +.06, respectively. Cross-race comparisons indicated that whites placing intimate others required more space than blacks ($p < .05$).

The significant age × intimacy × type of measure interaction was apparently produced by several subtle differences in the older subjects' responses. Although there were no differences among the means for 7-year-olds, the CIDS detected that 11-year-olds used less space for intimates than nonintimates ($p < .05$); the means were −.16 and +.03, respectively. The FPM means, while in the same direction as the CIDS means for 11-year-olds, differed from the CIDS for 15-year-olds. The FPM indicated that at 15 nonintimates required less space than intimates ($p < .05$); the means were −.49 and −.27, respectively.

Behavioral Measures

Approach Distances. The four distances maintained when approaching a male, approaching a female, approached by a male, and approached by a female were standardized and then examined in a mixed analysis of variance procedure. While the between-subjects factors were the same as those used for analysis of the simulation measures, sex of other (male and female) and approach (self and other) served as within subjects variables to yield a 2 × 2 × 3 × 2 × 2 factorial design. A main effect of age, which is reported along with the other significant effects in Table 1, was again obtained. Fifteen-year-olds stood closer to and allowed others to approach more closely than 11- and 7-year-olds ($ps < .05$); the means were −.39, +.12, and +.27, respectively.

The interaction of sex of subject and sex of other was again significant, although not as pronounced as the same interaction obtained when simulation and paper-and-pencil measures served as the dependent variables. Males put more distance between themselves and a female than did female subjects ($p < .05$), with the means falling at +.08 and <.08. The means for males and females when interacting with a male were −.03 and +.03 and did not differ from any other conditions.

Several points can be made about the triple interaction of race of subject, approach, and sex of other presented in Table 3. First, and as indicated by the significant two-way interaction of race and approach, blacks approached others more closely than did whites ($p < .05$). Second, the two-way interaction of sex of other and race indicates that whites maintained more distance between themselves and male others than did blacks ($p < .05$). Third, distances varied depending upon whether or not the subject was being approached by or approaching a female stimulus other. For blacks, greater distance was maintained when being approached by a female than when approaching a female. Just the opposite effect held for whites since their own approaches to a female were more distant than when females approached them ($p < .05$).

Seat-Selection Measure. No significant effects were revealed in the analysis of variance performed on the standardized seat-selection distances.

Relationships Among Measures

Subjects' responses to all distance measures were submitted to factor analysis in order to reduce the original 25 items to a few

Table 3

Effects of Race on Personal Space when

Approaching and Being Approached by Males and Females

	Race of Subject			
	White		Black	
	Male Stimulus	Female Stimulus	Male Stimulus	Female Stimulus
Approached by Other	$.09_a$	$-.10_b$	$-.09_b$	$.10_a$
Approaching Other	$.13_a$	$.12_a$	$-.13_b$	$-.12_b$

Note: The larger the score, the more space required. Means without a common subscript are different at the p =.05 level.

coherent dimensions which reflect interrelationships among the subjects responses on the different measures. A principal axis analysis with orthogonal varimax rotation was performed using the pooled-within-cell correlations (race × sex × age), which were computed by subtracting the appropriate cell mean from each subject's original score. Four factors, with eigenvalues of 5.9, 2.6, 1.8, and 1.2, accounted for 82.2% of the variance. A BC-TRY Empirical Key Cluster Analysis and a factor analysis using oblique rotations yielded extremely similar solutions and low interfactor correlation, thereby justifying the use of the conceptually clearer orthogonal rotations.

The first factor, *CIDS-intimate,* was composed of CIDS measures of personal space with relatives and close friends serving as the stimulus persons. Representative items and factor loadings were distance from father (+.61), best female friend (+.58), and mother (+.72). The second factor was comprised of the four *behavioral* measures, all with loadings of .80 or better. Both CIDS and FPM items which used strangers as the stimuli loaded on the *strangers* factor. These included such items and loadings as saleslady (CIDS = +.72, FPM = +.49) and male stranger (CIDS = +.63, FPM = +.62). The final factor, *FPM-intimate,* was determined by responses to relatives and close friends as measured with the FPM. Items and factor loadings exemplifying this factor were best male friend (+.48) and mother (+.50). These four factors are clear cut with little overlap across measurement methods, except for the significant exception of the strangers factor. No item reflective of friends or family came close to loading significantly while FPM and CIDS variables appeared to be equally characteristic of the dimension. Lastly, it is important to note that the seat-selection measure of personal space did not relate to any of the other measures. The loadings of this item on each of the four factors were +.05, +.01, −.10, and −.05, and its final estimated commonality only +.01.

In order to compare these four factors one to another, standardized factor scores were computed for each subject and submitted to a mixed analysis of variance which treated the four factor scores as levels of a repeated measure. A main effect of the personal space measures indicated that the four different indices of personal space did not yield strictly comparable results: $F(3,396) = 14.90$, $p < .05$. The greatest amount of distance maintained was with strangers, incorporating both CIDS and FPM items (strangers, 1.76; FPM-intimate, 1.35; behavioral, 1.21; and CIDS-intimate, 1.05). Within the remaining three conditions only the CIDS-intimate and FPM-intimate means differed from one another. However, the interaction of personal

space measure with race qualifies these effects to some degree; $F(3,396) = 2.90$, $p < .05$. For whites, the mean (1.55) on the FPM-intimate factor is large enough so that it (1) does not differ from the strangers factor mean (1.64) but (2) does differ from the CIDS-intimate factor mean (1.07). For blacks, only the strangers factor is different from the other measures.

In addition to these effects involving the repeated measure, a main effect of age, $F(2,132) = 20.00$, $p < .05$, once more indicated that personal space size is inversely proportional to age. The means for 7-, 11-, and 15-year-olds, which all differed, were 1.7, 1.3, and 1.0. Again, this relationship between age and personal space was stronger for white children than black children: $F(2,132) = 5.18$, $p < .05$. Although there was a significant decrease in personal space size at each age level for whites (the means, from younger to older children, were 1.9, 1.3, and 0.9, all $ps < .05$), the mean for 11-year-old blacks did not differ from the means for either 7- or 15-year-olds (the means, from younger to older children, were 1.4, 1.2, and 1.1). Black 7-year-olds did, however, use more space than black 15-year-olds ($p < .05$).

Lastly, a marginal race by sex interaction was noted: $F(1,132) = 3.6$, $p < .1$. This interaction closely matches the interaction of these same variables when simulation measures served as the dependent variables. Although less pronounced, the means indicate that black males require less space than black females. In addition, black males' space requirements were significantly smaller than white males space needs ($p < .05$). The means for this interaction were as follows: black males = +1.1; black females = +1.4; white males = +1.4; and white females = +1.3.

DISCUSSION

In an effort to resolve previously reported inconsistencies, this multimethod investigation has attempted to determine the effect of sex, race, and age on personal space. The initial concern, however, addressed the quality and degree of relationship among methods of personal space assessment. One implication of Hayduk's (1978) review of personal space was that different approaches should be utilized for different settings (stop-distance for experimental and unobtrusive for naturalistic studies). The empirical question remained, however, as to whether different techniques (representative of all

approaches), obtaining responses from the *same* population, would lead to different conclusions.

Our findings suggest that there is a great deal of method specificity. The factor analysis of the original personal space variables generates only one dimension dependent upon items from two techniques. In fact, the *strangers* dimension might be conceptually, as well as empirically, a "good" measure of personal space. The item referents are similar to the concept of a "generalized other." Definitionally, personal space is often conceived to be that area into which "others" may not intrude. (We have reasons for letting family and friends come closer). The fact that the *behavioral* dimension generates its own factor is not surprising. Whereas the other three factors can be conceptualized as representing cognitive orientations (attitudes?) toward where they would "like to" have others distanced, the behavioral measures necessarily incorporate two-person negotiation and impression management concerns. The chair measure's failure to relate to the other measures or load on any factor at greater than .10 empirically justifies Hayduk's (1978) statement that the "relation chair placement or selection has to personal space is largely unknown" (p. 119). (A logical concern for external validity arises when the only unobtrusive behavioral measure appears unrelated to the rest of the investigation. In a sense, all of the other measures "simulate" where one "would" stand and distance themselves. Given the many problems with the chair measure, however, we believe the "simulators" to more "real" regarding the concept of "personal space" than chair placement.)

In summation, we would expand Knowles and Johnson's (1974) finding that measures are distinguished along dimensions of subject awareness by suggesting that the "referent other" appears additionally to characterize dimensions of personal space assessment.

The most pronounced effects obtained in this multimethod approach were indicative of developmental changes. As demonstrated in the factor scores as repeated measures analysis of variance and individual procedures as well, personal space required by the children decreased at a steady rate from 7 to 15. These effects were obtained in simulation, paper-and-pencil, and behavioral measures and are consistent with previous work on developmental trends in personal space (Jones & Aiello, 1973; Meisels & Guardo, 1969; Pederson, 1971). Further, the fact that the decrease was not as pronounced for black subjects as for whites supports Jones and Aiello's (1973) findings of black-white differences. However, our findings that

blacks' space size decreased with age did not support Jones and Aiello's report of an increase for their black subjects and contradicts the incremental trends reported by Markey (1971), Tennis and Dabbs (1975), and Aiello and Aiello (1974). In addition, and as Jones and Aiello report (Aiello & Jones, 1971; Jones & Aiello, 1973), younger blacks used less space than whites.

Because subjects were matched for socioeconomic status, the results do not support Scherer's (1974) contention that these differences will disappear when ethnic confounds are eliminated. (It might be noted that Tennis and Dabbs' subject population might be meaningfully different from that investigated here. Their subjects displayed an older age range, and were all whites of the upper-middle class.) The interesting point here is that, generally, when decreases with age were obtained in prior investigations, the assessment procedures were predominantly behavioral (instead of "where would you be comfortable," which led to increases with age). As all of our approaches evinced this relationship, external validity credibility is added to the manner in which the simulation and paper-and-pencil measures were responded to by subjects. (Indeed, it is the "observed same-sex interaction patterns" procedure that leads to inconsistent findings as regards age and begs the question of validity. For example, one investigation notes increases for whites in one study [Jones & Aiello, 1973] and decreases in a second [Aiello & Aiello, 1974].)

Results regarding sex of subject demonstrate greater complexity. Not only do there appear to be method, age, and racial differences, but characteristics of the other always seem to be important (e.g., other's sex and degree of intimacy or familiarity). In essence, there were no sex main effects.

The paper-and-pencil and simulation results indicate that sex differences are age and partner specific. At age 7 females maintained an inordinately large distance from male others. This finding is analagous to Guardo (1969) and Bailey, Hartnett, and Glover's (1973) observation that young females put great space between themselves and strangers, nonintimates, or experimenters. Males and females did, however, react similarly to the female stimulus others at this age. Although many factors could possibly account for the similar reactions of male and females to female stimulus others, the traditional dependence of children at this age on female others could account for the distancing evidenced. By age 11 interpersonal distancing took the shape of that described by Meisels and Guardo (1969). These authors suggest that preadolescence is a period of same-sex intimacy and that the spacing of less distance from

opposite-sex others will not be evidenced until adulthood. If this is the case, then the personal space obtained with 15-year-olds could represent an intermediate stage which occurs prior to the change. Overall, however, the tendency for mixed-sex pairings to require more space than same-sex pairings was strongly supported since it was obtained on simulation, paper-and-pencil, and behavioral measures. In fact, it was the *only* significant result as determined by the stop-distance (behavioral) measures. As a consequence, the factor score repeated measure analysis of variance findings are marginal and probably determined by the simulation and paper-and-pencil measures. In this analysis race became important with black males requiring the least space, white females in the middle, and white males and black females tied with the greatest space requirements. The finding that white male and black female are most similar is buttressed in a variety of other social areas, but the direction of the findings directly conflict with Jones and Aiello (1973) utilizing quite different measures. Clearly, the influence of sex is not completely delineated, and age and assessment technique appear to influence findings, which supports Tennis and Dabbs' (1975) and Aiello and Aiello's (1974) results.

Although blacks required less space than whites, partially supporting Hall (1966), there was no main effect for race. Rather, the influence was again complex and involves method, age, and sex. Previous argumentation regarding race effects may simply be due to age. Simulation, paper-and-pencil, and the factor analysis results suggest that 7-year-old white children require a great deal of space, but by age 15 it is the black child that is requiring the greater amount. (An interesting by-product of this analysis is that blacks are more consistent across ages.) A second possibility involves sex of subject and sex of other. Black females required more space than white females and vice versa for males. Depending upon one's choice of sample or population for study, either result might obtain. The sex of the other was also important. For example, in the behavioral measures blacks "approached" more closely than whites (especially when men were the "others"), whereas when being "approached," blacks kept greater distances than whites (especially when the "other" was female). Lastly, the measures themselves interacted often with race. For blacks, it seems to have been strangers versus all others; while for whites, the simulation procedure derived results similar to the strangers measure—and both were different from the other two.

In summation, decreasing space with increasing age appears

robust across assessment procedure. However, the effects of sex and race seem to be much more complex as well as differentially sensitive to the measurement procedure being utilized. More globally, as youngsters grow older, they may become more accepting of others. Another way of stating this is that they may be getting over a long-term "stranger anxiety." This is suggested by the fact that decreasing space occurs later with stranger referents than with familiar referents. Or, it may be that as there is simply a limited amount of space in the real world, one learns that "to get along, one goes along" by "requiring less." While adapting to space concerns, clearly other social learning is also occurring which, in turn, effects the sex, sex of other, intimacy versus strangers, comparisons on distancing desires. As regards the interactions involving race, recall that socioeconomic differences were controlled for in this study. That does not obviate potential differences in family cultural conditions, wherein whites concern for larger house space for each child may be the custom. Hence, all of our effects (besides technique differences) are conceptually consistent with an adaptation or social learning perspective.

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