Studies in Personal Space [1]

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Surprisingly little is known about the way people use space. Social scientists in the field of human ecology have been concerned primarily with the distribution of such things as social classes, economic institutions, and mental illness. An almost unexplored area is microecology or the way that people in pairs or small groups arrange themselves.

In the studies of Hediger (5), Howard (6), and Von Uexkull (15), "space" has had two different meanings. The more familiar of these refers to space in the geographic sense, i.e., space as area. It is most commonly discussed with reference to the animal's territory or home. However, some writers have applied the concept of territory to human behavior. W. F. Whyte (16) and Thrasher (14) have studied the territories of adolescent gangs. W. H. Whyte (17) also has studied the groupings of people within a housing development. Probably the most intensive investigation thus far has been that of Barker and Wright (2) in the Midwest. Yet this still remains relatively unexplored territory for social scientists.

The second way in which the term "space" is used can be called "personal space of the organism." Although it has its roots in the work of zoologists and ethologists, it is an entirely different concept from that of territory. Personal distance is the distance that the organism customarily places between itself and other organisms. This distance may vary from species to species and individual to individual. Hediger speaks of this as "flight distance" and has measured this for hundreds of animals.

This concept would seem to have relevance for the study of human behavior, although it has never been studied empirically so far as we know. It seems obvious that people feel uncomfortable when they talk to others who either stand too close or too far away. The concept itself has been used several times in the literature. David Katz (8) used the term "personal space" and compared it to the shell of a snail. Von Uexkull used the graphic analogy of people "surrounded by soap-bubble worlds." Stern (13) developed the concept of personal world. He noted that the physical world was without a center, but the

[1] This study was supported by grants from the Rockefeller Foundation, the Province of Saskatchewan, and the Department of Health and Welfare (Ottawa). Drs. Humphry Osmond and T. E. Weckowicz gave valuable advice and encouragement. The following people were research assistants during the study: R. Dewar, R. Hall, Eleanor Fenton, Sheila Kelly, Gwen Witney, Dorothy Sommer, Sandra Wright.

personal world had a natural center from which and toward which everything pertaining to it extends. This center is the person himself about whom the personal world is oriented. Stern's analogy to the "snail shell" of Katz and the "soap bubble" of Von Uexkull was to describe the "personally near" as an "aura" surrounding the person.

The concepts of "personal space" can be distinguished from that of "territory" in several ways. The most important difference is that personal space is carried around while territory is relatively stationary. The animal or man will usually mark the boundaries of his territory so that they are visible to others, but the boundaries of personal space are invisible. Personal space has the body as its center, while territory does not. Often the center of territory is the home of the animal or man. Animals will usually fight to maintain dominion over their territory but will withdraw if others intrude into their personal space.

This paper will describe several studies of personal distance. The first study was purely observational. That is, we were interested in the way that people who were *already interacting* were arranged. Subsequent studies used experimental procedures in that Ss were asked to interact, and observations were made as to how they arranged themselves. Schizophrenic patients are also used as subjects. We hope to learn if their difficulties in communicating with others are reflected in the way they place themselves. Will they sit too close to the other person or too far away? We are also interested in possible sex differences in seating arrangements. In all studies, every effort was made to secure natural conditions, i.e., to locate the experiments in settings where interaction was customary and where the subjects would feel comfortable.

Experiment One

Method

The first study was conducted in the staff dining hall of a 1500-bed mental hospital. Most staff members eat in this hall, hence it serves nurses, plumbers, accountants, secretaries, etc. The hall was 36 by 68 feet and contained thirteen tables (36 by 72 inches). Each of these tables consisted of two 36 by 36-inch tables placed together and with eight chairs arranged around it. One of these tables, along with the chairs (lettered for identification) is shown in Figure 1. Service in the dining hall was cafeteria style. The staff members secured their plates at the front of the cafeteria, went in line, were served, and then sat at whichever table they chose.

In this study we were interested in the chairs occupied by people who were interacting. That is, did communication occur between the head and foot positions (A-E in Figure 1), or between people seated alongside of one another

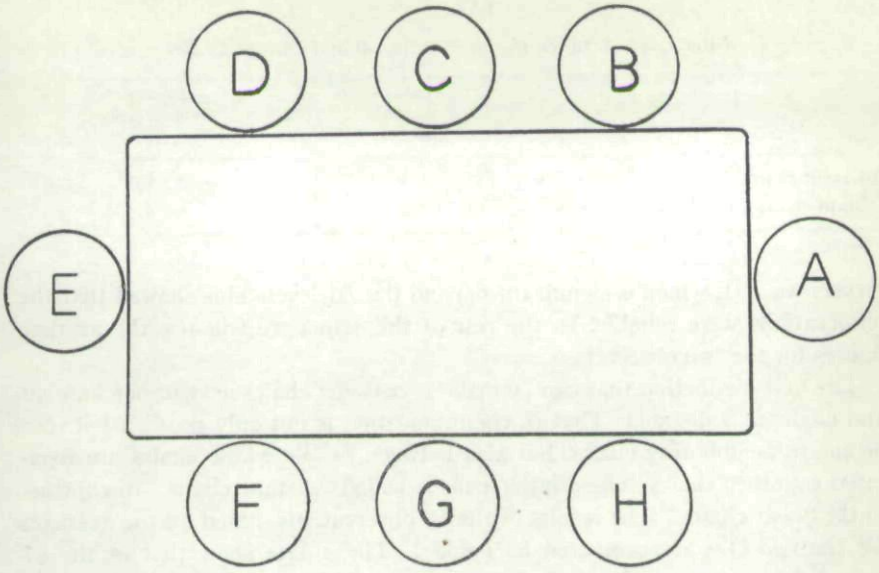

FIGURE 1

Table and Arrangement of Chairs Used in Experiment

(B-C or G-H)? This study was purely observational and, in one sense, exploratory in that no specific hypotheses were formulated.

Two observers were used throughout the study and all observations took place during the noon meal. Both O's would secure their food and then select a table at which to sit. On some days the O's sat at the front of the hall, sometimes at the rear, etc. The O's would then look around, and if both agreed that they had a clear view of another table, they would wait two minutes, and then record five seconds of interactions.

The recording was done on mimeographed forms, similar to Figure 1. Each would independently record the verbal interactions that ensued during the five-second period. If no interactions occurred, another table was selected later. Usually two records were made (by each O) at a meal, and the observations were done over a two-month period. In all, a total of 50 observations was made by each O.

RESULTS

The 50 interaction records for each observer were summed to find the number of conversations between people sitting in all possible combinations of chairs (A-B, A-C, F-G, F-H, etc.). The totals for Observer One were correlated with the totals for the second observer. The Pearson r between the two ob-

TABLE 1

Interactions between People in Adjacent and Distant Chairs

	Chance expectancy, per cent	Results of 50 observations, per cent
Adjacent chairs	39	73
Distant chairs	61	27

servers was .91, which is significant beyond the .01 level. This showed that the observations were reliable. In the rest of this paper we will use the average figures for the two observers.

The first distinction that can be made is between chairs next to one another and chairs at a distance. That is, communication is not only possible between people in neighboring chairs, but also between people whose chairs are separated by other chairs. These latter can be called "distant chairs" in contrast to the "near chairs." The results of the 50 observations, based on the averages for the two O's, are presented in Table 1. These data show that of the 67 recorded interactions, there were only 18 interactions between people sitting in distant chairs. This differs markedly from the figures based on the permutations and shows that the people interacted with those sitting in neighboring chairs. This is hardly unexpected, but it is necessary to recognize this trend first before making a separate analysis of the interactions between people in neighboring chairs.

If all permutations of possible interactions between *neighboring* chairs are computed, we should predict, on the basis of chance, 36 per cent of the interactions between people sitting *side by side,* 27 per cent between people sitting *face to face,* and 36 per cent between people sitting *corner to corner.* Both the expected frequencies and the obtained frequencies from the 50 observations are presented in Table 2.

The results in Table 2 show that the interactions between people seated corner to corner (i.e., A-B, A-H, E-D, E-F) exceeded chance expectancy while

TABLE 2

Arrangements of People Interacting

Arrangement	No. of pairs in this arrangement	Chance expectancy
Corner-to-corner	30	18.5
Side-by-side	16	18.5
Face-to-face	5	13.9

those between people seated face to face were less than chance expectancy. A test of significance of these data yields a chi-square of 19.1, $p < .01$.

DISCUSSION

These results parallel those of Festinger, *et al.* (3) and James (7) in showing that communication tends to take place between neighbors. Our results also showed that the corners of the table were the loci of most of the interactions.

We felt that these results made it necessary to determine if corner-to-corner interaction would predominate in other size tables, and also to see whether people who desire to interact will choose to sit corner to corner when presented with other possibilities. That is, there is the possibility that our results were not so much due to the corner positions sparking the interaction as to people who wanted to talk seating themselves in the corner positions.

Experiment Two

In this study we hoped to learn the way people arrange themselves when they desire to interact. Our method correspondingly changed from natural observation to active experimentation. Our goal was to ask groups of subjects to interact and then observe the ways in which they arranged themselves.

PROCEDURE

In order to conceal the purpose of the experiment from the subjects, we asked them to discuss particular proverbs and told them that they would be interviewed as to the meaning of the proverbs. The subjects were ushered to the door of the cafeteria and told:

> This is a study of discussion groups and the way people discuss things. On the card here is a statement I would like you to discuss. Please go into the cafeteria, sit down, and begin discussing it. After a while you will be interviewed as to what you discussed.

Various groups were used under different conditions. These will be described in detail in the next section. All subjects were interviewed as to the meaning of the proverb. During the interview E recorded how the people were sitting. It was apparent that none of the subjects suspected the purpose of the experiment.

RESULTS

A. In this part of the study six pairs of subjects were asked to sit at the type of table shown in Figure 1 and discuss the proverbs. The subjects were assorted employees (secretaries, personnel workers, nurses, etc.) and the groups were homogeneous as to sex. All six pairs arranged themselves at the corners (A-B,

A-H, E-D, or E-F). On the basis of permutations of all possible arrangements, this result is highly significant ($p < .01$).[2]

B. The same procedure was repeated in another cafeteria which contained tables 35 by 48 inches. There were four chairs around each table. The subjects used were ten pairs of hospital employees, again a heterogenous group of hospital employees (accountants, nurses, recreation workers, etc.). The results showed that eight of the pairs arranged themselves corner to corner, while two arranged themselves face to face.

C. The experiment was repeated in the staff dining hall (used in Study One and Study Two, Part A), but only single tables (36 by 36 inches) were used. The subjects could either sit face to face or corner to corner. The subjects used were nine pairs of student nurses from a nearby general hospital. The results showed that eight of the pairs arranged themselves corner to corner while one pair chose a face-to-face arrangement.

D. The experiment was repeated again, with groups of three subjects each. This time the topic discussed was "If you could help design a mental hospital ward, how many people would you prefer in a bedroom?" The subjects were eleven groups of three persons each, all members of a mental health association of a distant city. The results showed that nine of the groups chose the corner positions (H-A-B or D-E-F) while two groups chose other arrangements (H-B-D and C-D-E).

E. In view of the many discussions of the difficulties that schizophrenic patients have in communicating with others, the procedure was repeated using some of our hospital patients. We hoped to learn if the schizophrenic patients would avail themselves of the corner-to-corner arrangement chosen by the other subjects.

The subjects in this study were 26 pairs of schizophrenic patients in this hospital. Most had been used in other researches and had been reasonably cooperative. Nine of the S's were used twice, but the second time each was paired with a new partner. There were 38 males and 5 females in the sample and the average age of the group was 38.9 years.

As a control group, 11 pairs of nonschizophrenic mental patients in this hospital (depressives, alcoholics, psychopaths, etc.) were tested.

The subjects were taken in like-sex pairs to the entrance of the cafeteria, given cards containing a proverb, and asked to go inside, sit down, and discuss it.

The results are presented in Table 3. It shows that the nonschizophrenic patients resembled the normal group in that they used the corner positions

[2] The significances are evaluated by two-tailed chi-square tests, except where the frequencies are too small. Then Fisher's exact methods are employed.

more than would be expected by chance ($p < .05$). The schizophrenics, however, did not show any such trend. The greatest number chose to sit in "distant" arrangements. None of the normal or nonschizophrenic groups used this type of arrangement.

Observation of the session disclosed that very few of the schizophrenics talked at all. Most had wandered aimlessly up the aisles and sat down anywhere. They would face the floor or away from their partner. They seemed to lack both direction and interest.

TABLE 3

Seating Patterns of Pairs of Patients

	Opposite	Corner	Side	Distant
Schizophrenics	8	4	4	10
Nonschizophrenics	3	7	1	0

Experiment Three

METHOD

The studies that follow all employed a "decoy." This was a person who was a confederate of E and who was *already seated* at a particular chair *before* the subject entered the room. The subject would then be asked to go inside and discuss a topic with the other person (i.e., with the seated decoy). The decoy was instructed to sit passively and look down at the typewritten card until S began to sit down. Then the decoy would look up, greet S, and begin discussing the topic.

The normal Ss used in the study were a heterogeneous group of hospital employees and visitors. Many of the sample were used in two or more procedures, e.g., both with a male decoy and with a female decoy. No S discerned the actual purpose of the study. The seating usually took place automatically, i.e., without conscious decision. A few of the patients had to be urged to sit down, but this was very rare in the normal group. Most of the decoys were members of the Research Department, although several other staff members were used. In almost all conditions, at least two decoys of each sex were used.

The study is divided into three parts, depending upon the seat occupied by the decoy.

Part 1. Decoy at *B*[3]

Part 2. Decoy at *C*

Part 3. Decoy at *B*—no corner chair (i.e., Chair A removed)

[3] The chairs will be identified according to the letters shown in Fig. 1.

The results are presented in terms of the relationship between the chair selected by S and the chair occupied by the decoy. If the decoy was at *B*, the subject could sit alongside him (*C*), facing him (*H*), at the corner (*A*), or at one of the "distant" chairs (*D, E, F, G*). The schizophrenic Ss were all patients at this hospital.

RESULTS

Part 1: Decoy at B

The results for this condition are summarized in Table 4. The data are classified as to (a) the sex of the decoy; (b) the sex of the S; and (c) whether the Ss were normal or schizophrenic.

It can be seen that there are some striking differences in the positions occupied by the Ss. With the female decoy the female (normal) Ss tended to sit in the corner position. Males were more inclined to sit opposite both male and female decoys. The results from the female Ss with the female decoy differ significantly at beyond the .05 level from the other three groups.

There is a marked difference ($p < .01$) between the normals and the schizophrenics in this condition. The schizophrenics sat alongside the decoy far more than the normals and made almost no use of the corner chair (*A*).

TABLE 4

Seats Chosen When Decoy Sits at Seat B

Group	Sex of Ss	Sex of decoy	Number of Ss choosing to sit: Alongside (C,D)	Opposite (H)	Corner (A)	Opposite side (F,G)	Distant corner (E)	N
Normals	Male	Male	1	10	5	0	0	16
		Female	0	11	5	1	1	18
	Female	Male	0	11	6	0	0	17
		Female	2	0	10	0	0	12
Schizophrenics	Male	Male	3	6	1	1	1	12
		Female	4	8	1	1	0	14
	Female	Male	6	5	0	1	0	12
		Female	12	0	1	0	1	14

Part 2: Decoy at C

The results when the decoy sat at *C* are summarized in Table 5. Again the females sit "closer" to the female decoy, although this time their preference is heavily weighted toward sitting alongside her. Only one of the normal males sat alongside a decoy. This difference is significant beyond the .01 level. The

TABLE 5

Seats Chosen When Decoy Sits at Seat C

Group	Sex of Ss	Sex of decoy	Number of Ss choosing to sit: Alongside (B,D)	Opposite (G)	Corner (A,E)	Opposite side (F,H)	N
Normals	Male	Male	0	4	4	3	11
		Female	1	10	8	4	23
	Female	Male	1	10	4	2	17
		Female	13	1	4	4	22
Schizophrenics	Male	Male	7	2	6	3	18
		Female	2	4	5	2	13
	Female	Male	3	6	1	1	11
		Female	8	3	5	1	17

only significant difference between the normals and the schizophrenics in this table is that seven of the male schizophrenics sat alongside the male decoy while none of the male normals did.

Part 3: Decoy at B with No Corner Chair

The inclusion of this condition was dictated by our curiosity as to whether face-to-face or side-by-side seating would predominate if corner seating were precluded. Thus the neighboring corner chair (*A*) was removed but otherwise the procedure was identical to that of previous sessions. As only three of the 52 schizophrenics had occupied the corner chair when it was present (in Part 1), there seemed no point in assessing their reaction if it were absent. Hence only normal Ss were used in this condition.

The results in Table 6 disclose the same trend for females to prefer sitting alongside the female decoy significantly more than males, or than either sex with a male decoy.

Part 4: Some Further Studies

One surprising aspect of these results was that no trace was found of the "distant" seating pattern prevalent among the schizophrenic Ss of the previous study. "Distant" seating refers to one person sitting in the chair that is separated from his partner by another chair. In the previous study 10 of the 26 pairs of schizophrenics had arranged themselves in this way. As many of

TABLE 6

Seats Chosen When Decoy Sits at Seat B (No Corner Chair)

Sex of Ss	Sex of decoy	Number of Ss choosing to sit: Alongside (C,D)	Opposite (H)	Opposite side (F.G)	Distant corner (E)	N
Male	Male	1	10	0	0	11
	Female	1	9	0	0	10
Female	Male	3	14	0	0	17
	Female	8	8	0	0	16

these Ss were also used in the present study, we had expected to find similar results. Yet the data showed the Ss tended to sit *too near* rather than too far from the decoy.

However, the present procedure was very different from that of the previous study. Previously pairs of Ss had been escorted to the door of the cafeteria, given the topic, and asked to go inside, sit down, and discuss it. In this study, *single* Ss were brought to the door of the cafeteria, given the topic, and asked to go inside, sit down, and discuss it with a decoy who was already seated. The major differences were that the decoy was a staff member whereas the partner had been a patient, and the S was now given a clear "target" (the seated decoy) toward which he could orient himself.

The procedure of the present study was thus repeated but with schizophrenic decoys. We were interested in learning whether the patients would sit differently vis-à-vis a schizophrenic patient than they had vis-à-vis a staff member. Two separate experiments were carried out, one with a male decoy at seat *B* and another with a male decoy at seat *C*. To simplify matters only male decoys and male Ss were used. When the decoy sat at *B*, 11 Ss and 3 separate decoys were used. When the decoy sat at *C*, 18 Ss and 4 decoys were used.

The results are summarized in Table 7 and show that the status of the decoy as patient or nonpatient had very little influence on S's choice of a seat. One third of the patients sat side by side (which was very rare among the normal males) and no trend toward "distant" seating was found.

However, unlike the previous procedure these Ss had now possessed a clear "target" or goal (the seated decoy) toward which they could orient themselves. Previously neither S had known where his partner was going to sit nor what was expected of him. This may account for the aimless wandering and the "distant" seating of Study Two. Other writers (4) have commented on the

TABLE 7

Seating Patterns of Schizophrenic Ss with Schizophrenic Decoys

	S chose to sit:					
	Alongside	Opposite	Corner	Opposite side	Distant corner	N
Decoy at B	6	3	1	0	1	11
Decoy at C	4	6	5	3	—	18
Total	10	9	6	3	1	29

importance of a clearly structured situation for schizophrenic patients. If they do not know what is expected of them, their performance deteriorates and any group structure dissolves. This seems to have been what occurred when the two schizophrenics were asked to discuss a topic together. When a decoy was present, the S could be reasonably confident that if anything were expected of him, the decoy would let him know. No such guidepost existed when two schizophrenics were together. As research on mental hospital wards has shown (10, 11), spontaneous conversations between chronic schizophrenic patients are very infrequent occurrences. Many of these patients will, however, talk to nurses if they are approached.

DISCUSSION

The observations of interactions in Part One show that in small groups there is no simple relationship between distance and communication. Subjects who were sitting side by side were physically closer to one another but interacted less than subjects sitting corner to corner. However, the trend in all the data is that people sitting in neighboring chairs (regardless of their positions) will be more likely to interact than people sitting in distant chairs. Principles governing spatial arrangements in small groups must, therefore, take into account both the distance between people and their positions vis-à-vis each other. Steinzor's (12) hypothesis that interaction will be more likely between

people who can see one another is supported by these data but must be qualified in terms of the angle between the participants. The subjects in these studies did not show any preference for face-to-face seating, where corner seating was possible.

There are several conclusions to be drawn from the sessions in which the decoy was used. Females will sit closer to a female than to a male. This is closer than males will sit to decoys of either sex. Of the normal Ss only the females chose to sit alongside the decoy. The males overwhelmingly preferred the chair opposite the decoy. This result parallels the observation that females in our culture will often be seen holding hands or kissing other females, whereas these behaviors are uncommon for males.

Obviously, there are cultural influences at work here. Perhaps if Fiji Islanders were used as subjects they would prefer sitting on the tables instead of on the chairs. Yet this does not diminish the relevance of this research for our own culture. The situation has parallels in animal research where rats raised in one laboratory may be more gregarious or aggressive than rats raised in another laboratory. Domesticated dogs or horses are undoubtedly very unlike their wild brethren, especially in regards to their "flight distance" (cf. Hediger), but this does not deny the importance of studying the habits of domestic animals. In fact, there are more practical reasons for studying the habits and needs of captive and domestic animals than there are for studying the habits and needs of wild animals. The same holds true in the study of human ecology. As long as man must live in a world of walls, furniture, doors, and fences, there is good reason to study how they influence his behavior.

The second conclusion from these data is that schizophrenic patients have an impaired concept of personal distance. This was especially evident when the schizophrenics of both sexes sat alongside the male decoy. This rarely happened in the normal group. One can only speculate how this affects the relations between the schizophrenic and his neighbors. He undoubtedly intrudes on the personal space of those around him. This may cause the normal person, whether a nurse or a relative, to draw away from him (i.e., to maintain the customary personal distance). This may leave the schizophrenic feeling rejected by the withdrawal and the nurse feeling uncomfortable at the intrusion into her personal space.

It is possible to view this impairment of personal distance as a social artifact, but this time as a product of the mental hospital society. Usually a mental patient has little or no privacy and very few things he can call his own. The dayroom, dining hall, and especially the dormitory are often overcrowded. This may produce a situation analogous to that of the canaries in the small cage reported by Allee (1). When the area was crowded, no territories were staked out, but upon transfer to a larger cage, the birds began to

select areas of their own. It would be interesting to observe in such a situation whether prolonged imprisonment in a small cage would destroy or impair the birds' desire for individual territories.

It is curious that some of the most valuable research on the way that people or animals use space has occurred in situations of maximum constraint. Hediger's work with animals in zoos and circuses is exemplary. There is also a growing literature on the ecology of mental hospital wards and geriatrics centers (9, 10, 11). Studies of human interaction in fields or courtyards are practically nonexistent.

In closing it should be mentioned that our reason for conducting the studies in cafeterias was not simply that other space was unavailable. Rather we hoped to achieve a setting where interaction would be relaxed and natural. We wanted to avoid, as much as possible, the use of a cold and impersonal laboratory, where our subjects might suspect hidden microphones and one-way mirrors. Following the methods of the animal biologists, we hoped for a setting where free interaction could occur. Our feeling is that the cafeterias were successful in getting the subjects to feel at ease. For example, the director of a group of nurses that were subjects commented spontaneously, "The girls are at home discussing things in a cafeteria."

SUMMARY

This was a series of studies of the ecology of small discussion groups. The central question was the way that people will arrange themselves when they are interacting. The setting of the study was a cafeteria in a large mental hospital, selected because it was a place where interaction could be free and "natural." The chairs around the rectangular tables were used as coordinates for locating the positions of the Ss. Ss could be described as sitting opposite one another, alongside one another, at corner positions, or at some distance from each other. The study consisted of several related investigations.

1. Observations were made during the noon meal as to the position at the table of the people who were talking. The results disclosed that people in neighboring chairs interacted more than people in distant chairs. Also those in corner positions interacted more than people alongside one another or facing each other.

2. Pairs of Ss were asked to enter the cafeteria and discuss various topics. Again a preference for the corner positions was seen. The same trend was evident when groups of three Ss were used. Schizophrenic Ss made considerable use of "distant" arrangements and would face away from their partners and refuse to speak. However, nonschizophrenic mental patients resemble the normal group in their preference for corner positions.

3. In this study, a "decoy" was used. This was a person who was already seated at a table before S entered the room. The S was then asked to walk over and sit down and discuss a topic with him. Decoys and Ss of both sexes were used in various combinations (i.e., male Ss with female decoys, male Ss with male decoys, etc.). The results disclosed that females would sit "closer" to female decoys than they would to male decoys; this was also "closer" than males would sit to decoys of either sex.

Schizophrenics Ss were also tested, and they appeared to have an impaired concept of social distance. That is, male patients would sit alongside a male decoy, female patients would sit alongside a male decoy, etc. This hardly ever occurred in the normal group.

Manuscript received: October 27, 1958
Revised manuscript received: March 30, 1959

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