

THE RELATION BETWEEN ROOM ORGANIZATION AND SPACIOUSNESS⁽¹⁾

Vacit İMAMOĞLU

Received September 23, 1976.

1. This study is part of a Ph.D. thesis presented to the University of Strathclyde in 1975.

2. R. SOMMER, *Personal Space*, New Jersey: Prentice-Hall Inc., 1969.

3. D. CANTER and R. WOOLS, A Technique for the Subjective Appraisal of Buildings, *Building Science*, v.5, 1970, pp. 187-198.

4. V. İMAMOĞLU, The Effect of Furniture Density on the Subjective Evaluation of Spaciousness and Estimation of Size of Rooms, *Architectural Psychology*, ed. R. Küller, Proceedings of the Lund Conference, Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross Inc., 1973, pp. 341-352.

5. A.H. MASLOW and N.L. MINTZ, Effects of Esthetic Surroundings: I. Initial Effects of Three Esthetic Conditions upon Perceiving "energy" and "well-being" in Faces, *Journal of Psychology*, v. 41, 1956, pp. 247-254.

6. N.L. MINTZ, Effects of Esthetic Surroundings: II. Prolonged and Repeated Experience in a "beautiful" and an "ugly" room, *Journal of Psychology*, v.41, 1956, pp. 459-466.

7. J.V.KASHMAR *et al.*, Effects of Environmental Surroundings on Outpatients' Mood and Perception of Psychiatrists, *Journal of Consulting and Clinical Psychology*, v. 32, n.2, 1968, pp. 223-226.

8. J.V. KASHMAR, The Development of a Lexicon of Environmental Descriptors, *Environment and Behaviour*, v.2, n.2, 1970, pp. 153-169.

Past research have shown that the furniture layout and organization of rooms affect the way they are perceived and hence lead to different types of interactions patterns. Sommer found that different furniture arrangements suggest different degrees and qualities of interaction;² similarly, Canter and Wools' study showed that an easy chair grouping where the occupants sat at right angles to each other were seen as being more friendly than a desk grouping where the occupants of the rooms sat opposite to each other.³ In a recent study the present author found the relationship between furniture density and spaciousness evaluations of rooms to be of an inverted - U shape.⁴

All of these studies used rooms that were somewhat orderly. However, our daily observations show that when in use, the order of furniture in a room changes, at times becoming quite disorderly if not chaotic. In general the effect of orderliness on the way rooms are perceived did not receive direct research attention. It was indirectly studied in investigations dealing with pleasantness of interiors. Of these, Maslow and Mintz's study investigated the psychological effects of exposure to *beautiful, average and ugly* rooms on the perception of the moods in facial expressions.⁵ From the authors' descriptions it appears that the ugly room was also less orderly than the beautiful one. In the beautiful room photographs of faces were judged to be more energetic and well-being than the ones rated in the other rooms. Mintz further studied the behaviour of the two people who administered the Maslow and Mintz's experiment and showed that these *examiners* usually finished testing more quickly in the ugly room as compared to the beautiful one.⁶ Moreover, the *examiners* in the ugly room had such reactions as monotony, fatigue, headache, sleep, discontent, irritability, hostility and avoidance of the room. Following the same line of research Kashmar *et al.* studied the way a beautiful and an ugly room are rated on the Environment Description Scale (EDS).^{7,8} Again the ugly room was unkempt, with work papers over the furniture and an overflowing wastebasket and ashtray, while the beautiful room was neat and well-kept. The results indicated that the ugly room was rated as having less aesthetic appeal, poorer physical organization and as being smaller compared to the beautiful room.

9. D.J. SAMUELSON and M.S. LINDAUER, Perception, Evaluation and Performance in a Neat and Messy Room by High and Low Sensation Seekers, *Environment and Behaviour*, v.8, n.2, 1976, pp. 291-306.

10. It can be noted that the present study was reported in the author's Ph.D. thesis in 1975, before Samuelson and Lindauer's paper was published.

11. D.J. SAMUELSON and M.S. LINDAUER, Perception, Evaluation and Performance in a Neat and Messy Room by High and Low Sensation Seekers, *Environment and Behaviour*, v.8, n.2, 1976, pp. 291-306.

12. Spaciousness is a widely used term in everyday life and architecture to describe and evaluate spaces. It is a derivative of space, and Murray's dictionary (1919) defines it as "1. The state or quality of being wide, spacious or commodious; extensiveness of area or dimensions; roominess. Spacious (adj.) of dwellings, rooms, etc.; having or affording ample space or room; large, roomy, commodious" (vol. IX, part 1). The Random House Dictionary (1967) on the other hand gives for spacious: 1. Containing much space, as a house, room, court, street, etc.; amply large. Syn. 1. roomy, capacious, wide. Ant. 1. small, cramped". The nearest word for spaciousness in Turkish is "ferahlik". It is of Arabic origin "ferah" meaning happiness, gayness, pleasing thing. In Turkish today it literally means "the sensation of being open". It is closely related to the quality and amount of space as well as the openness of the interior (fenestration, view). The antonym of "ferahlik" implies a strong meaning- difficult to stand, unbearable, unlivable. In the Arabic language "Ra'habah" is the nearest to spacious and means welcoming, welcoming and greeting with its soul and heart. In French "spaciosité", in German "Geräumigkeit", in Japanese "kaiho" or "basho no ooi" are the nearest terms and relate to roominess and width of an interior.

13. V. İMAMOĞLU, "Spaciousness of Interiors", Unpublished Ph.D. thesis, University of Strathclyde, Glasgow, 1975

In all these studies the effects of orderliness was confounded with the general pleasantness of the interiors; hence it is impossible to figure out the separate effects of the variables involved. In a recent study Samuelson and Lindauer considered the effect of neatness separately and studied "perception, evaluation and performance in a neat and messy room by high and low sensation seekers".^{9,10} A 3.0x1.5 m room was used for both messy and neat room conditions; "The messy room had a general appearance of disorder: an overflowing wastebasket, crumpled papers, pencils and pens strewn about, and newspapers and books scattered on the table"¹¹ as compared to an orderly appearance of the neat room. The messy room was perceived as being fuller and smaller compared to the neat one.

It should be noted that even Samuelson and Lindauer's study did not clarify the effect of disorder of furniture on the perception and evaluation of rooms since they conceived of disorder in terms of messiness. The present study, on the other hand, aimed to explore the effects of organization-disorganization of furniture directly -as distinct from messiness, ugliness, etc.- on spaciousness evaluation of rooms.¹² Such a study seemed intriguing since past research implied that spaciousness is a powerful construct bringing together many important aspects of an interior: its appeal or pleasantness in general; its planning and organization; its physical size with respect to the type of activity and the number of people who will be involved in that activity.¹³

METHOD

SUBJECTS

Sixty six volunteer students, staff members and technicians from different departments of the University of Strathclyde were used as subjects. The overall mean age was 31 years. There were 22 subjects in each of the three conditions of the experiment.



Fig. 1. The conference room in the "organized" condition of the experiment.

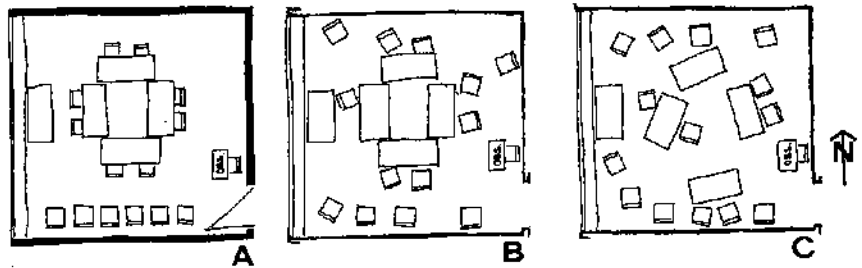


Fig. 2. The furniture arrangement of the conference room in the (A) organized, (B) disorganized and (C) very disorganized conditions.

STIMULI

A square conference room was used as stimulus. The floor was about 36 square meters, ceiling height 2.70 m. It had a continuous window with a 0.95 m sill height. The room was located at the fourth floor of one of the University buildings and had a view to the west, to other University buildings and cityscape of Glasgow. The room had a dark-brown wall-to-wall carpet, white tiled ceiling and parchment painted walls;¹⁴ five 1.52x0.71 m brown tables, a 0.80x0.50 m observation desk, 15 aluminium tubular chairs upholstered in charcoal colour. As can be seen in Figures 1 and 2, in the first condition of the experiment -organized condition- four tables were placed in the middle of the room, one table in front of the window and a row of chairs on the south side; in the second -disorganized- condition the chairs were shuffled around the tables, as they might appear at the end of a meeting when people have just got up and left; and in the third -very disorganized- condition the chairs and tables were more or less haphazardly arranged in the room.

RATING SCALES

Ratings of the conference room in three conditions of the experiment were obtained using the Spaciousness-Crampedness-Scale developed by Imamoğlu.¹⁵ Spaciousness-Crampedness-Scale contains 19 adjective pairs and is made up of two parts; the first part consists of the three spaciousness factors of I) appeal, II) planning and III) space freedom; whereas the second part is made up of the four crampedness factors of I) planning, II) physical size, III) clutteredness and IV) appeal.¹⁶ A 7-point bipolar rating scale was used throughout.

PROCEDURE

Subjects were taken to the conference room one by one. Upon ensuring that the subject understood how to use the rating scales, he was asked to evaluate the conference room from the observation desk, near the door in one of the three conditions. Each experimental session lasted for about 8 minutes.

RESULTS

Each of the 66 subjects' evaluations on the 19 adjective pairs

14. In British Standard terms ceiling tiles were in BS 2660 range, BS 9-102 white, and wall paint in BS 2660 range BS 4-046 parchment.

15. V. İMAMOĞLU, "Spaciousness of Interiors", Unpublished Ph.D. thesis, University of Strathclyde, Glasgow, 1975, pp. 183-193.

16. The spaciousness factors were represented by the following adjective pairs: I) *appeal factor*; repelling-inviting, uncomfortable-comfortable, disturbing-restful, unlivable-livable, II) *planning factor*; poorly organized-well organized, poorly scaled-well scaled, poorly balanced-well balanced, uncoordinated-coordinated, poorly planned-well planned, III) *space freedom factor*; cramped-roomy, tiny-huge, small-large, restricted space-free space, cluttered-uncluttered, crowded-uncluttered, closed-open; narrow-wide.

The crampedness factors were represented by the following adjective pairs: I) *planning factor*; poorly planned-well planned, poorly organized-well organized, uncoordinated-coordinated, poorly balanced-well balanced, II) *physical size factor*; small-large, tiny-huge, narrow-wide, III) *clutteredness factor*; full-empty, crowded-uncluttered, cluttered-uncluttered, cramped-roomy, inadequate size-adequate size, IV) *appeal factor*; uncomfortable-comfortable, unlivable-livable, disturbing-restful.

were converted into two sets of numerical scores of 1 to 7 (1 representing the undesirable end of the scale, e.g., small, cluttered, repelling, etc., and 7 referring to the desirable one, e.g., large, uncluttered, inviting, etc., for spaciousness factors and the reverse for crampedness factors). Then for each subject the mean scores of the adjective pairs for each of the three spaciousness and four crampedness factors were calculated. These two sets of scores were then used in the two separate analyses of variance for spaciousness and crampedness.

SPACIOUSNESS

The mean scores for the spaciousness factors I, II, III of the organized room were 5.00, 4.90, 5.03, and those of the disorganized room were 4.62, 4.35, 4.24, and finally those of the very disorganized room were 4.14, 3.30, 3.87, all respectively. The differences between the three conditions of the experiment were analyzed by a two-way analysis of variance for factorial designs with repeated measures on one factor. Table 1 summarizes the results of this analysis.

Table 1. Summary table for analysis of variance for the evaluations of the conference room with organization and spaciousness factors as two variables.

Source	SS	df	ms	F	p
Between Subjects					
A(organization)	51.9651	2	25.9825	10.7533	p<.001
S within groups	152.2221	63	2.4162		
Within Subjects					
B (spaciousness factors)	4.9842	2	2.4921	4.9483	p<.01
AB	4.1344	4	1.0336	2.0523	n.s.
B x S within groups	63.5474	126	.5036		
TOTAL	276.7635	197			

As can be seen in Table 1, both main effects of organization and spaciousness factors were significant ($p<.001$ and $p<.01$, respectively), whereas their interaction was not. Figure 3 shows that in general, as the room became more and more disorganized, it was evaluated as being less spacious. (The mean values for organized, disorganized and very disorganized conditions were 4.98, 4.44 and 3.77, respectively. Separate t- test analyses indicated the differences between all three of these conditions to be significant ($t=2.22$, $p<.05$ for organized versus disorganized; $t=2.19$, $p<.05$ for disorganized versus very disorganized; and $t=4.38$, $p<.001$ for organized versus very disorganized conditions, each with $df=42$)).

The mean values for the main effect of spaciousness factors I, II and III were 4.59, 4.18 and 4.38, respectively. It seems that generally the room received the highest value in the appeal factor, a relatively lower one in space freedom and the lowest in planning.

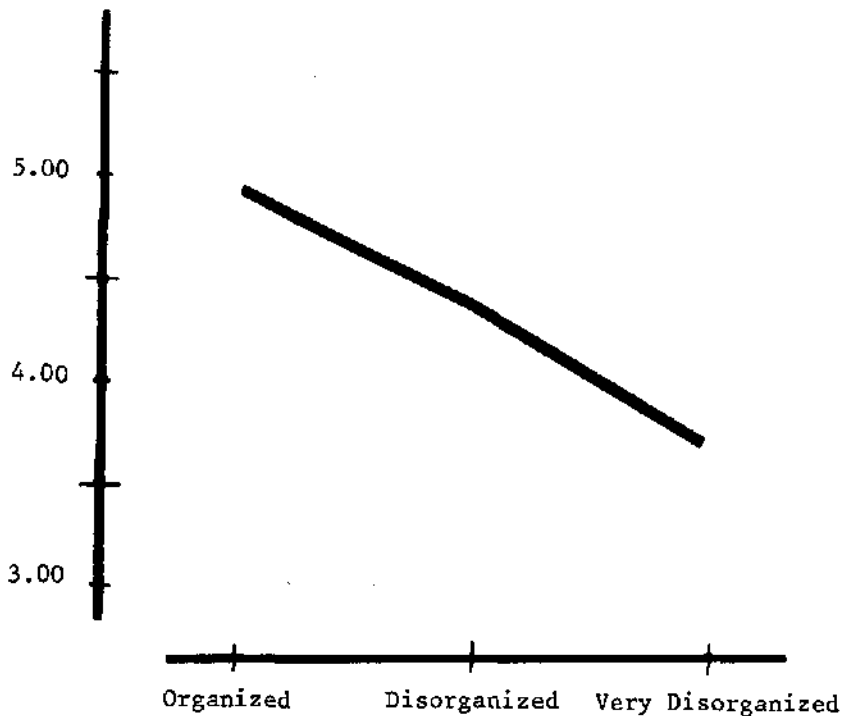


Fig. 3. Mean evaluations as a function of the levels of organization and spaciousness.

CRAMPEDNESS

The mean scores for the crampedness factors I, II, III and IV in the organized conditions were: 2.12, 2.57, 1.88 and 1.93, respectively; those in the disorganized condition were: 2.74, 2.75, 3.02 and 2.20, respectively; and those in the very disorganized condition were: 3.90, 2.58, 3.41 and 2.77, respectively. The differences between these three experimental conditions were analyzed by a two-way analysis of variance for factorial designs with repeated measures on one factor, the results of which have been summarized in Table 2.

Table 2. Summary table for analysis of variance for the evaluations of the conference room with the organization and crampedness factors as two variables

Source	SS	df	ms	F	p
Between Subjects					
A(organization)	47.8918	2	23.9459	8.8486	p<.001
S. within groups	170.4876	63	2.7061		
Within Subjects					
B (crampedness factors)	13.8868	3	4.6289	6.9332	p<.001
AB	24.6164	6	4.1027	6.1450	p<.001
B x S within groups	126.1854	189	.6676		
TOTAL	383.0682	263			

As is seen in Table 2, both the main effects and their interactions were highly significant ($p < .001$). The mean values for the main effect of organization were 2.12, 2.68 and 3.16, for the organized, disorganized and very disorganized conditions, respectively; hence indicating that as the degree of disorganization of a room increased, it was perceived as being more cramped. Separate t-test analyses indicated the organized condition to vary significantly from both the disorganized ($t=2.54$, $df=42$, $p < .02$) and the very disorganized conditions ($t=4.17$, $df=42$, $p < .001$). The difference between the disorganized and very disorganized conditions was not significant.

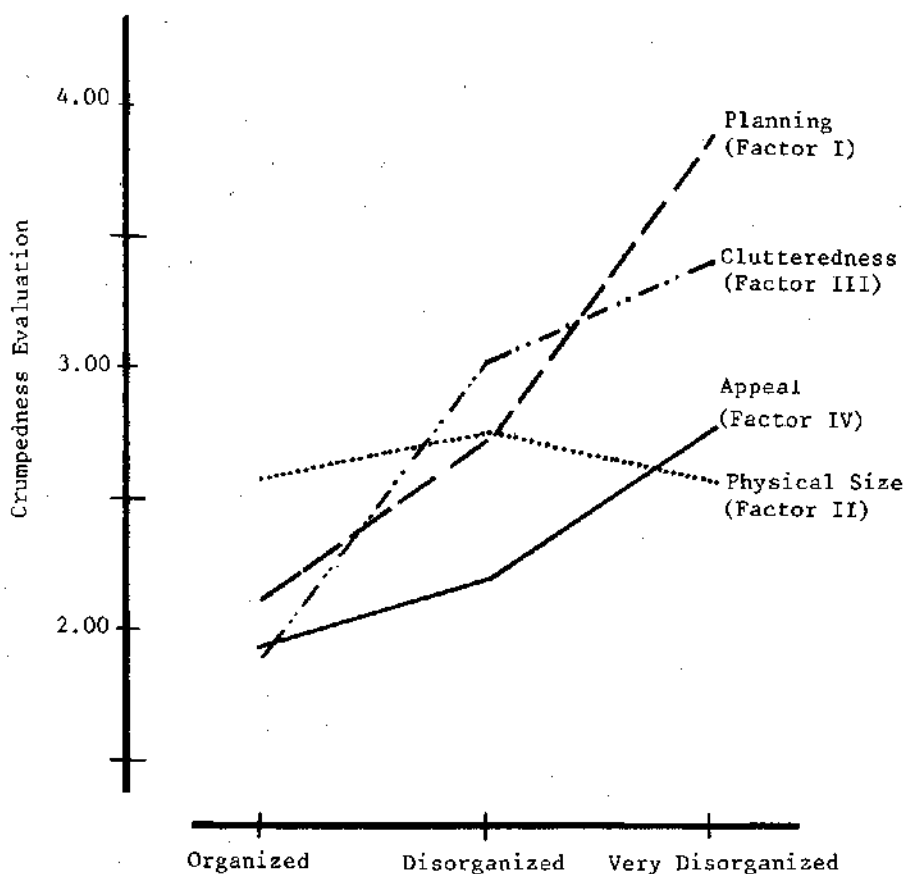


Fig. 4. Mean evaluations as a function of the levels of organization and crampedness.

The mean values for the main effect of the crampedness factors I, II, III and IV were: 2.92, 2.63, 2.77 and 2.30, respectively. More interesting than this main effect is the interaction of organization and crampedness factors which can be seen in Figure 4. An examination of Figure 4 shows that with the exception of the physical size factor, the mean values of which interestingly did not change significantly, the means for all crampedness factors increased as the room became more and more disorganized. The results of the separate t-test analyses for the differences between organized and very disorganized conditions were $t=4.53$, $p < .001$, $t=4.50$, $p < .001$, and $t=2.48$, $p < .02$, for factors I, III and IV, respectively, each with 42 df.

However, the increase observed in the appeal factor was relatively less than that in the clutteredness and planning factors. Although the mean values of these three factors were close to each other in the organized condition, in the disorganized condition the difference between the mean values of Factors III and IV was significant ($t=2.54$, $df=42$, $p<.02$) and in the very disorganized condition, that between Factors I and IV reached significance ($t=2.78$, $df=42$, $p<.01$).

To understand how each of these factors varied as a function of the three levels of organization, further t-test analyses were carried out. For the appeal factor, neither the differences between the mean values for organized and disorganized conditions, nor those for disorganized and very disorganized reached significance. As was reported above, only the mean appeal factor for the organized room varied significantly from that of the very disorganized condition, hence indicating that a room becomes significantly less appealing only when it is very disorganized. As for the clutteredness factor, in addition to the significance of the difference between organized and very disorganized condition, also that between organized and disorganized was significant ($t=4.23$, $df=42$, $p<.001$). The difference between disorganized and very disorganized conditions was not significant for the clutteredness factor. Thus it seems that both the disorganized and very disorganized interiors appear more cluttered than organized ones. Finally, the mean values for the planning factor did not vary in the organized and disorganized conditions, whereas in the very disorganized condition, it increased significantly—hence implying more crampedness—($t=2.79$, $df=42$, $p<.01$, for disorganized versus very disorganized conditions). In the very disorganized condition, the planning factor received the highest value indicating that this factor was affected relatively more than the others.

DISCUSSION

The results in general indicated that the organization or orderliness of furniture in a room affects its evaluation significantly in terms of spaciousness and crampedness factors. The results of the spaciousness evaluation showed that as the room became more and more orderly it was perceived as being more and more spacious. This main effect was valid for all three spaciousness factors.

As far as the general crampedness evaluations were concerned, there were no differences between the disorganized and very disorganized rooms, but the organized room was perceived as being significantly less cramped than both the disorganized and very disorganized ones. However, the significant organization x crampedness factors interaction indicated that the difference between the conditions of organization varied as a function of the crampedness factors. Hence, when the specific crampedness factors were considered, the very disorganized condition was evaluated as being significantly less appealing than the organized one, and less well-planned than both the organized and disorganized conditions. As for the clutteredness factor, the organized condition was perceived as being significantly less cluttered than both the disorganized and very disorganized conditions. This finding is congruent with Samuelson and Lindauer's findings where the messy room was seen as being fuller, compared to the neat one.¹⁷ One of the most

17. D.J. SAMUELSON and M.S. LINDAUER, Perception, Evaluation and Performance in a Neat and Messy Room by High and Low Sensation Seekers, *Environment and Behaviour*, v.8, n.2, 1976, pp.291-306.

interesting findings was the constancy of the physical size factor; regardless of the levels of organization, the values for physical size did not vary significantly. This result may seem in conflict with the findings of Samuelson and Lindauer where the messy room was seen smaller as compared to the neat one. However, the present author was interested in orderliness of furniture and manipulated its organization only, while Samuelson and Lindauer were interested in messiness and manipulated mainly smaller items like books, papers, pencils, etc.; therefore the findings might be considered of a different nature, since a disorganized room is not necessarily a messy one as in the present experiment. Also the room used by Samuelson and Lindauer was a tiny test room and can be considered to be of an unusual function and size. In addition to that, they used only one adjective pair, *small-large*, to obtain size ratings, whereas the physical size factor of the Crampedness Scale in the present experiment was measured by the three adjective pairs of *small-large*, *tiny-huge*, *narrow-wide*, and hence can be considered to be more reliable.

In concluding it can be pointed out that the level of organization of the furniture in a room seems to affect all the spaciousness factors in a similar way, while there appears to be differences as far as the crampedness factors are concerned; of these, that of the physical size remains unchanged, whereas planning and clutteredness factors change relatively more than the appeal factor. In evaluating the findings of this experiment it should be kept in mind that these results were obtained from the male adult population who judged a particular conference room arranged in a specific way. Further experimentation may be needed to specify the degree to which these findings can be generalized to the population in general and to other settings having different layouts.

ODALARDA DÜZEN VE FERAHLIK İLİŞKİSİ

ÖZET

Bu çalışmada bir toplantı odasındaki eşyaların düzenlilik-düzensizlik derecesi ile odanın ferahlığı arasında bir ilişki olup olmadığı incelenmiştir. Bu amaçla seçilen toplantı odası *düzenli*, *düzensiz* ve *çok düzensiz* deney koşullarında 22 şer kişi tarafından değerlendirilmiştir. Değerlendirme için yazar tarafından geliştirilmiş olan *Ferahlık-Sıkıntı Vericilik Ölçeği* (Spaciousness-Crampedness Scale) kullanılmıştır. Bulgulara göre oda düzenli koşulda düzensiz ve çok düzensiz koşullara kıyasla anlamlı şekilde daha ferah olarak değerlendirilmiştir; aynı şekilde düzensiz koşuldaki oda da çok düzensize göre daha ferah görülmüştür. Sıkıntı vericilik açısından ise oda düzensiz koşullarda düzenli olana kıyasla daha sıkıntı verici bulunmuştur. (İki ayrı düzenli koşul arasında sıkıntı vericilik yönünden fark bulunmamıştır.) Ancak sıkıntı

vericiliği oluşturan dört etmenin üç düzenlilik koşulunda farklı biçimde değiştiği görülmüştür. Şöyle ki, oda her üç koşulda da *büyüklik* etmeninde aynı şekilde değerlendirilmiştir. *Planlanma* etmeni ise sadece çok düzensiz koşulda diğer koşullara göre farklılık göstermiş, oda daha kötü planlanmış olarak algılanmıştır. *Karışıklık* etmenine bakıldığında ise düzensiz ile çok düzensiz koşullar arasında fark görülmemiş fakat her iki koşul düzenli koşullardan daha karışık olarak değerlendirilmiştir. Odanın *çekicilik* etmeninde aldığı değerler ise ancak düzenli ile çok düzensiz koşullarda farklılık göstermiş, düzenli oda daha çekici görülmüştür.

BIBLIOGRAPHY

- CANTER, D. and WOOLS, R. A Technique for the Subjective Appraisal of Buildings. *Building Science*, v.5, 1970, pp. 187-198.
- IMAMOĞLU, V. "Spaciousness of Interiors". Unpublished Ph.D. thesis, University of Strathclyde, Glasgow, 1975.
- IMAMOĞLU, V. The Effect of Furniture Density on the Subjective Evaluation of Spaciousness and Estimation of Size of Rooms. *Architectural Psychology*, ed. R. Kuller. Proceedings of the Lund Conference, Stroudsburg, Pennsylvania: Dowden, Hutchinson and Ross, Inc., 1973, pp. 341-352.
- INUI, M., and MIYATA, T. Spaciousness in Interiors. *Lighting Research and Technology*, v.5, n.2, 1973, pp. 103-111.
- KASHMAR, J.V. The Development of Usable Lexicon of Environmental Descriptors. *Environment and Behaviour*, v.2, n.2, 1970, pp.153-169.
- KASHMAR, J.V., GRIFFIN, W.V. and MAURITZEN, J.H. Effect of Environmental Surroundings on Outpatients' Mood and Perception of Psychiatrists. *Journal of Consulting and Clinical Psychology*, v.32, n.2, 1968, pp. 223-226.
- MASLOW, A.H. and MINTZ, N.L. Effects of Esthetic Surroundings: I. Initial Effects of Three Esthetic Conditions upon Perceiving "energy" and "well-being" in Faces. *The Journal of Psychology*, v.41, 1956, pp. 247-254.
- MINTZ, N.L. Effects of Surroundings: II. Prolonged and Repeated Experiences in a "beautiful" and an "ugly" room. *The Journal of Psychology*, v.41, 1956, pp. 459-466.
- MURRAY, J. *A New English Dictionary*. Oxford: Clarendon Press, 1919.

SAMUELSON, D.J. and LINDAUER, M.S. Perception, Evaluation and Performance in a Neat and Messy Room by High and Low Sensation Seekers. *Environment and Behaviour*, v.8, n.2, 1976, pp. 291-306.

SOMMER, R. *Personal Space*. New Jersey: Prentice-Hall Inc., 1969