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Housing Environment Type And Resident Housing Satisfaction

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ABSTRACT

본 연구에서는 객관적 환경지표와 그에 대한 인간의 주관적 반응간의 인과적 관련도의 중요성이 강조된다. 좀 더 구체적으로, 거주자의 주관적 반응인 주거만족과 객관적 환경지표의 하나인 주거환경유형들 (건물유형과 건물배치유형)과의 인과적 관련도가 본 연구에서 중점적으로 토의된다. 한국의 6개 대단위 공동주택단지가 본 연구의 대상지로 선정되었고, 표본추출시 건물유형과 건물배치유형을 고려한 다단계 표집방법(multistage sampling)이 사용되었다. 설문면답방법(modified structured survey)에 의해 646명의 처리가능한 응답이 수거되었다. 인과모형 검증의 첫 단계로서 다수의 설문문항을 원래 관심있는 소수의 변수로 정선, 추출하기 위한 방법으로 요인분석이 사용되었다. 요인분석으로부터 정선, 추출된 변수를 이용해서 본 연구의 가설모형이 정립되고, 그 모형을 검증하기 위한 방법으로 경로분석이 사용되었다. 분석결과를 요약해 볼 때, 건물유형과 건물배치유형 모두가 거주자의 지각, 인식, 태도 등의 적절한 매개변수들을 통해 거주자의 주거만족에 유의한 영향을 미치는 것으로 나타났다. 건물유형은 일반적으로 저층주거에서 고층주거로 바뀌면서, 거주자의 주거만족에 부정적인 영향을 미치고 있음이 확인되었고, 고층주거가 거주자에게 주는 시각적 단조로움, 과밀감, 그리고 주차장을 포함한 옥외공간 이용상의 불편들과 또 그들로 인한 낮은 안전성 및 경관에 대한 불만족 등이 그 이유로서 밝혀졌다. 건물배치유형의 경우, U자형의 배치유형이 선형배치유형에 비해 과밀감 해소, 시각적 명료성 향상, 그리고 옥외공간 이용상의 편리 등 및 또 그에 따른 경관에 대한 만족의 향상때문에 거주자의 주거만족을 높이는 데 유리한 것으로 나타났다. 주거와 관련된 설계 및 계획분야를 위한 여러 다양한 제안들이 본 연구에서 제시되고, 추후 관련 연구들을 위한 가능성들도 토의되었다. 그 유용성 때문에, 아직 많은 이론적, 방법론적, 그리고 분석상의 문제에도 불구하고, 객관적 환경지표들과 이용자들의 만족을 포함한 다양한 주관적 변수들과의 관계를 경험적으로 밝히려는 시도가 계속되어야 할 것으로 사료된다.

A similar version of this paper with a little different view was submitted to Environment and Behavior for publication.

In spite of the implications of the theoretical models suggested by Marans and Spreckelmeyer (1982), Weidemann and Anderson (1985), one of the concerns in environmental design research is the lack of empirically demonstrated relationships between user's subjective responses (e.g., perceptions, beliefs, and affective responses) and objective measures of the physical environment, in general. Canter and Kenny (1982) have reviewed the existing literature, and argued that much of the empirical research typically carried out in North America leads to a view that the measurement of the "objective" physical world can be seen as independent from those of the "subjective" user perceptions. Thus, they stated that it is very difficult to establish reliable, generalizable relationships between these two sets of measures.

The argument by Canter and Kenny, however, could be challenged on the basis of the amount of variability in the measurement of the variables. That is, the measured variance of objective environmental attributes in real settings is not always enough to adequately allow for the testing of significant relationships. In addition, being a more important reason, the observed lack of relationship between an objective measure of the physical environment and subjective measures of people's perceptions comes, possibly, from the lack of study of potential intervening variables. Based upon Blalock(1964)'s discussion, Chin (1989) discussed that there should be a special consideration of various issues which can intervene and mediate between the two measures in explaining their relationships. He further found that there were significant relationships between the objective measures of the physical environment (e.g., net household density, the size of room per a person, etc.) and residents' subjective responses(e.g., residents' housing satisfaction), via appropriate intervening variables (e.g., perceived degree of crowding, and/or perceived safety, and/or satisfaction visual appearance).

This study seeks to investigate significant relationships between residents' housing satisfaction, as a subjective measure and housing evironment type (e.g., building type and building arrangement type), as an objective measure of the physical housing environment, utilizing appropriate intervening variables. Based upon the results, this study also seeks to suggest implications for future research as will as design and planning.

ISSUES

1. Residents' Housing Satisfaction[1)]

Residents' housing satisfaction has been an important criterion in evaluating the performance of not only the physical, but also social and behavioral aspects of housing environments (e.g., Campbell, Converse, and Rodgers, 1976; Francescato, Weidemann, Anderson, Butterfield, and O'Donnell, 1982). Residents' housing satisfaction, as a global representation of the affective response of people to the social-physical environment in which they live, has also been a useful predictor of larger domains, such as life satisfaction (e.g., Hempel and Tucker, 1979), quality of life (e.g., Campbell et al., 1976), and sense of well-being (e.g., Andrews and Withey, 1976; Scheid and Windley, 1983). Furthermore, residents' housing satisfaction has been seen as influencing residential mobility (e.g., Kennedy, 1984; Morris and Winter, 1978); hence, it has been frequently used as a predictor of residential relocation plans and preferences (e.g., Bach and Smith, 1977; Speare, 1974).

The more important usefulness of residents'

housing satisfaction in relation to the housing environment, however, may not rely only on its use as an indicator of sense of well-being or life satisfaction. Rather, as Weidemann and Anderson (1985) indicated, it has to do with its consistent relationship to specific aspects of the residential social and physical environment. This explains why housing satisfaction has been often used as an ad hoc evaluative measure for judging the performance of housing developments constructed by either the private sector (e.g., Zehner, 1977) or by the public sector (e.g., Chin, 1988; Cooper, 1975; Francescato et al., 1979; Hourihan, 1984; Weidemann et al., 1989).

2. Housing Environment Type

In this study, housing environment type consists of two physical types of the housing environment, building type and building arrangement type. Building type, which refers to the general form of the building (i.e., low-rise apartments, high-rise apartments, etc.), may be one of the first decisions which the designer and/or the planner considers. It has been shown to be more important in terms of the design/planning of the housing environment than other physical attributes (e.g., room size, density, etc.), since it also closely relates to other following physical attributes, such as, housing development density, building and/or floor ratio, parking and outdoor arrangement (Anderson, 1982; Macsai, 1982).

Many studies have investigated the direct relationship between building type and residents' housing satisfaction. Some studies (e.g., Bartz and Cook, 1987; Morris and Winter, 1978) have found that, in general, residents living in detached single-family housing are more likely to be satisfied with their housing than those in other building types (e.g., multi-family apartments, mobile homes, etc). Other studies, however, have not found a significant influence of building type on residents' housing satisfaction. For example, the studies by Moore and Crocker (1979), and Gruber, Shelton, and Godwin (1985) examined the effect of the building type (e.g., conventional homes, mobile homes, and multi-family apartments) on residents' housing satisfaction, but they failed to find a significant link between building type and residents' housing satisfaction.

Compared to building type, it seems that building arrangement type has been neglected in the previous studies. Only a few studies g., Brown and Werner, 1985) have examined the effect of building arrangement type (e.g., linear versus cul-de-sac) on peoples' perception and behavior (e.g., personalization). Brown and Werner (1985) found that building arrangement influenced personalization, i.e., people who lived in a cul-de-sac arrangement type were more likely to decorate the outside of their home on holidays, than did people who lived in a more typical linear housing pattern.

3. General Intervening Variables

There are three general intervening variables of particular interest to this study which are hypothesized to be directly related to residents' satisfaction, e.g. satisfaction with visual appearance, satisfaction with neighbors, and general safety. Previous research has discussed each of these. A large number of studies (e.g., Enosh, Leslau, and Shacham, 1984; and Jirovec, Jirovec, and Bosse, 1985) have reported a significant relationship between residents' evaluation of their overall housing environment (e.g., residents' housing satisfaction) and their affective response to

the visual quality of their housing environment (e.g., satisfaction with visual appearance).

Previous studies have also indicated that various aspects of residents' perceived social relations (e.g., satisfaction with neighbors) are related to residents' housing or neighborhood satisfaction (e.g., Chin, 1988; Fried and Gleicher, 1961; Weidemann, et al., 1989; and Yancy, 1971), or general sense of well-being (e.g., Okun, Stock, Haring, and Witter, 1984).

It is clear that many studies have shown a strong and significant relationship between residents' satisfaction with neighbors and visual appearance of their housing environments; however, the importance of safety (as a predictor) to residents' housing satisfaction has also been frequently reported. (e.g., Lawton, Kleban and diCarlo, 1984; and Weidemann et al., 1982).

While all of the above was empirically based, Maslow (1970) and Levy-Leboyer (1978) have also suggested, in a more theoretical orientation, the importance of the same three issues (satisfaction with visual appearance, satisfaction with neighbors, and general safety) on people's satisfaction toward their environment. They took a broader perspective than the physical (i.e., housing
; nonetheless, inferences based upon their discussion would suggest the importance of examining these issues in the context of housing environment. From their point of view, it is possible to argue that people would be satisfied with any kind of environment only if the solving of their basic needs is promised in the environment. Other supporting research emphasize the importance prestige (e.g., Enosh et al., 1984; Reynolds and Nicholson, 1972), and the issues of environmental comfort (e.g., dwelling convenience, outdoor convenience, Kim, 1988) on resident housing satisfaction.

4. More Specific Intervening Variables

A number of possible direct predictors of residents' housing satisfaction have been discussed in terms of empirical evidence. These are considered to act as general intervening variables between residents' housing satisfaction and the objective environmental attributes. It should be noted, however, that these three variables have also been often seen as being influenced by other, more specific issues. Therefore, this study examines the three general intervening variables, both as criterion for other specific variables, as well as predictors of residents' housing satisfaction. Hence, in turn, the specific variables are hypothesized to act as mediators between the objective environmental attributes and the three more general predictors of residents' housing satisfaction, and to also have the potential for direct influence on residents' housing satisfaction.

As predictors of residents' satisfaction with visual appearance, perceived visual variety (or monotony) (e.g., Kaplan and Kaplan, 1982; Rapoport and Hawkes, 1970), environment legibility-related issues (e.g., difficulty of way-finding; Carr, 1967; Nasar, 1983), and emotional feelings (e.g., peacefulness, excitement, attractiveness; Russell and Pratt, 1980) have been frequently reported.

Similarly, ease of metting neighbors (e.g., Chin, 1988; and Festinger, Schachter, and Back, 1950), perceived similarity with other residents (e.g., Gans, 1961, 1967; Rossi, 1980), sense of belonging to community (e.g., Ryan, 1963) and personalization (e.g., Brown and Werner, 1985; and Greenbaum and Greenbaum, 1981) have been found to be significantly related to residents' satisfaction with

neighbors.

There are also may issues which have been often mentioned to be significant predictors of residents' perception of safety. These issues are perceived vandalism, presence of litter, and presence of visual obstructions (Perkins, 1987; Weidemann et al., 1982; and Westover, 1985), natural surveillance and territoriality (e.g., Ley and Cybriwsky, 1974; and Newman, 1972), Other issues, such as perceived crowding (e.g., Loo, 1986; Porteous, 1977), traffic level (e.g., Fowler, McCalla, and Mangione, 1979), maintenance-related issues (e.g., Francescato et al, 1979; Weidemann et al., 1982), have been also often mentioned to be related to residents' perception of safety.

METHODS

1. Setting

From an investigation of existing data about possible housing developments in Korea and various (about 11) site visits, six large-scale housing developments were initially considered based on the criteria 06 whether the housing developments were large diverse enough for sampling to represent the designated physical characteristics of the housing environment (e.g., building type and building arrangement type)[2].

Among the six large-scale housing developments, groups of buildings were sampled to represent the designated physical types of the housing environment. In this study, four types were considered as building type; town-houses, low-rise apartments, mid-rise apartments, and high-rise apartments. As building arrangement type, two types were examined in this study; linear type and U-shaped type.

2. Resident Interview

From among the set of subjective measures, this study used structured self-reports from residents about various perceptions of, and satisfaction with their housing environment. Most interview items were from the Occupant Satisfaction and Perception Survey developed by Francescato et al. (1979), and they were intended to measure each of the concepts mentioned previously. All items were translated into Korean; they were examined for accuracy of translation by 3 Korean students at University of Illinois at Urbana-Champaign, who are quite familiar with both Korean and English. Revisions were made as appropriate.

All subjective items, were measured on a five point scale with the mid-point of "I don't know"; the most negative response being scored as "1" and the most positive scored as "5".

As the interview procedure, the modified structured interview form was used in the procedure of data gathering. Twelve interviewers, all female college students with previous experience in interview or survey techniques, were hired to conduct the interviews. The interviewers were to visit the selected housing units with the forms and answer sheets, to show the forms to the residents, and to record the residents' answers on the answer sheet. For the purpose of pretesting the interview items, a pilot interview was also conducted. From the results of the pilot interview of 12 housing units, a number of redundant and obscure items were revised or dropped from the interview.

Using the revised structured interview forms[3], which contained 132 items, the 12 interviewers contacted the housing units to be sampled over a 5 and 1/2 day period during the summer of 1989. Among the sample bui-

ldings in the six housing developments, a total of 646 housing units were interviewed. It was found that most interviews were usable; few had missing responses. The interview response rate varied from site to site, with an average of 39%. While some residents refused to be interviewed, most of non-interviewed units were the result of no one being home at the time the interviewer visited the unit.

RESULTS

1. Development of Indices

As the beginning step of causal model testing, the indices to serve as operational measures of the constructs of interest in this study were developed based on factor analyses of the items. One of the first steps of factor analysis is the selection of the number of factors to be extracted. In this study, both Kaiser's criterion and the skree test were considered in the decision of the number of factors. Among various solutions, it was found that the 41 factor solution using a varimax rotation was the most appropriate, since the factors more clearly matched the hypothesized concepts and had fewer variables with multiple loadings.[4]

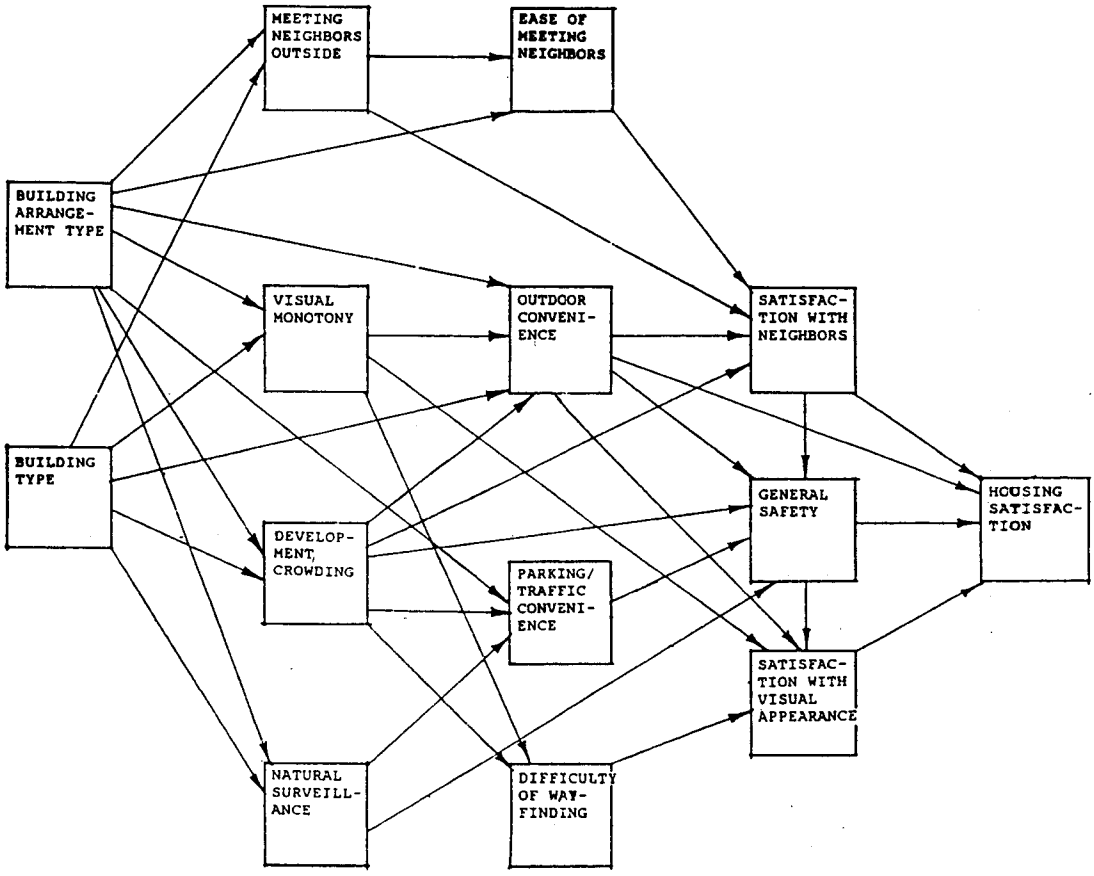
Each of indices were created by combining the items which had factor loading scores greater than .40. Specifically, the indices were developed by adding the scores on the highly correlated items together, and dividing the sum by the number of items to give a single score corresponding to the scale of the original items. The index of satisfaction with visual appearance, for example, included four items, "This housing development looks beautiful, in general.", "This housing development looks peaceful.", "Everybody would think this housing development looks interesting.", and "In general, I am satisfied with visual appearance of my housing development.".

Similar to the previous research (e.g., Chin, 1988; Francescato et al, 1979; and Weidemann et al., 1982), the index of residents' housing satisfaction was created by combining four correlated items in this study. The items were : "How long do you want to continue living here?", "If you move again, would you like to live in another place like this?", "Would you recommend this place to one of your relatives (or friends) if they were looking for a place to live?", and "After considering all of these issues mentioned above, how satisfied are you with living here, in general?". The four items were omitted from main factor analysis, since it was to be the final criterion; however, when they were also included in an initial factor analysis with all other items, the four items were found to be in the same factor. Furthermore, the reliability as evaluated by Cronbach's alpha was .65.

2. Hypothesized Model

Figure 1 shows the hypothesized causal model of this study with the indices derived from the factor analyses. The empirical findings of the previous studies and theoretical framework related to the causal ordering and causal links between variables in this study were extensively discussed, as the basis of development of the model shown in Figure 1.

As shown in Figure 1, the two physical measures of the housing environment (e.g., building type and building arrangement type) were included to test their effect as possible predictors of the final criterion, residents' housing satisfaction. Building type was coded as a continuous variable[5]; town-houses, 1; low-rise apartments, 2; mid-rise apartments, 3; and



Note. The paths /arrows in the figure indicate hypothesized causal relationships between variables. The two physical types of the housing environment (e.g., building type and building arrangement type) were considered to be exogenous variables, which means that they are independent of all the remaining variables in the model. The other twelve variables including the final criterion are considered to be endogenous variables.

Figure 1. The Hypothesized Causal Model of This Study

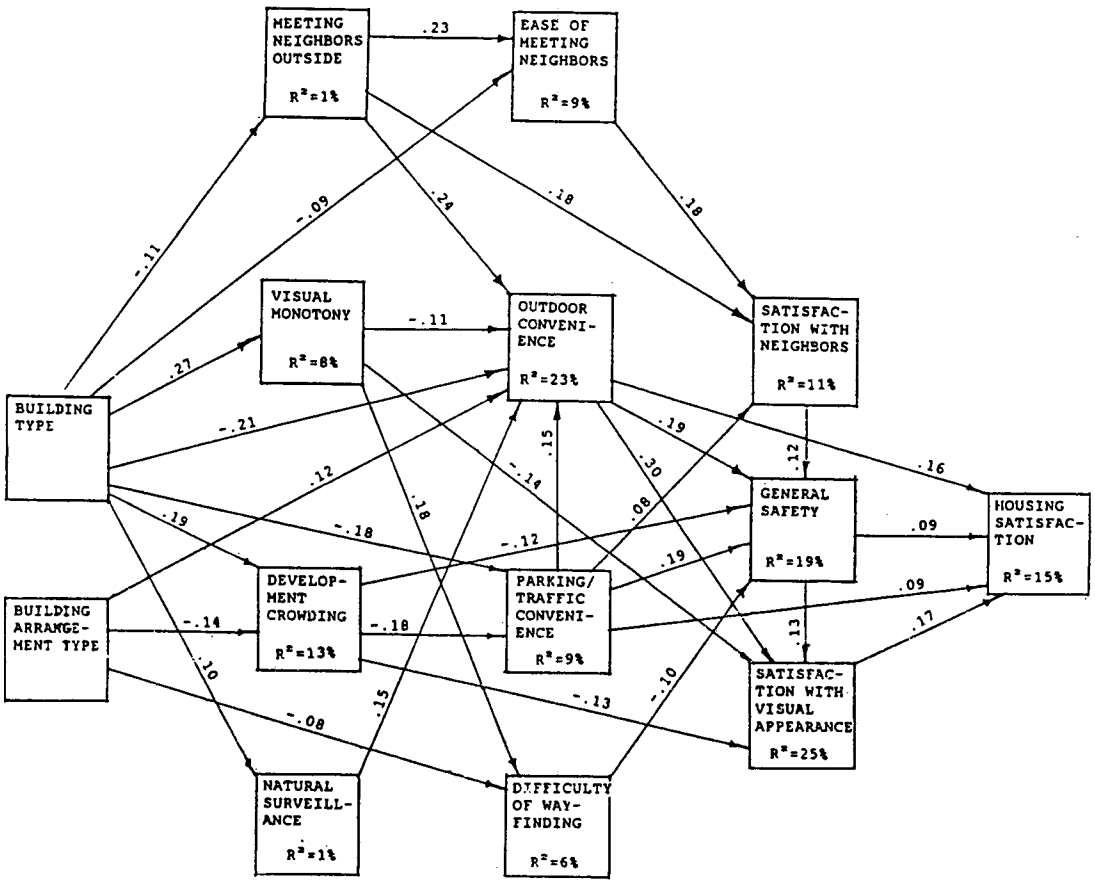
high-rise apartments, 4. Building arrangement type was dummy-coded; the linear type coded as 0, and the U-shaped type was coded as 1.

Eleven subjective variables (five index variables and six single items) were considered, as appropriate intervening variables which were expected to successfully mediate the causal effect of the housing envirronment type on residents' housing satisfaction[6]. In a hierarchical causal ordering based on the theoretical framework, they range from very specific (e.g., visual monotony) through more general (e.g., outdoor convenience) to very general variables (e.g., general safety).

3. Model Testing

1) Direct Predictors of Residents' Housing Satisfaction

Figure 2 shows the empirically derived model by path analysis. Supporting the hypothesis of this study, general safety, satisfaction with visual appearance, and outdoor convenience were found to be directly related to residents'



Note. The paths /arrows in the figure represent predictors significant at $p<.05$ level. The values of R^2 indicates the variance of the criterion variable predicted by all significant predictors. The numbers shown above the paths are path coefficients (beta weights or standardized regression coefficients).

Figure 2. The Empirically Derived Model

housing satisfaction ($R=0.39$, $R^2=.15$)[7]. All showed a positive direct effect on housing satisfaction, of which satisfaction with visual appearance was the strongest direct predictor of housing satisfaction (beta=.17). Thus, this indicates that the residents who were more satisfied with the visual appearance of their development, felt safer, and were more satisfied with outdoor convenience of their development, were more likely to be satisfied with their housing.

In addition, it should be noted that satisfaction with neighbors was not a direct predictor of housing satisfaction, as hypothesized. However, as the paths between the related variables indicate, it was a significant indirect predictor of housing satisfaction, via general safety and satisfaction with visual appearance.

2) Effects of Housing Environment Type

Figure 2 also shows how building type inf-

luences resident' housing satisfaction, The derived model shows that all hypothesized relationships between building type and other variables were found to be significant. Building type has a direct and negative effect on the meeting neighbors-related issues (e.g., meeting neighbors outside, beta=−.11; and ease of meeting neighbors, beta=−.09), outdoor convenience (beta=−.21), and additionally, parking/traffic convenience (beta=−.18). Furthermore, it had a positive effect on visual monotony (beta=.27) and development crowding (beta=.19), which had all negative effects on housing satisfaction. This suggests that as building type changes from a low-rise to hight-rise housing, the residents were more likely to feel that their housing environment was monotonous and crowded. They also felt more difficulties to meet their neighbors, as building type changes.

The closest and strongest paths between building type and housing stisfaction were shown in paths from building type to housing satisfaction via outdoor convenience or parking/traffic convenience. This indicates that one of the biggest problems of the high-rise housing development is that they have disadvantages for providing more appropriate outdoor and/or parking/traffic areas than the other bruilding types.

While the causal paths discussed above all showed negative effects of building type, a positive effect of the building type on housing satisfaction was also shown in the relationship between building type and perceived natural surveillance. In this study, perceived natural

Table 1. Effects of Predictors on Residents' Housing Satisfaction

Variables	Indirect[1)]	Direct[2)]	Total[3)]	Rank
Building Arrangement Type	.04		.04	8
Building Type	−.10		−.10	5
Meeting Neighbors Outside	.06		.06	7
Visual Monotony	−.03		−.03	8
Development Crowding	−.08		−.08	6
Natural Surveillance	.04		.04	10
Ease of Meeting Neighbors	.002		.002	13
Parking/Traffic Convenience	.05	.09	.14	3
Outdoor Convenience	.07	.16	.23	1
Difficulty of Way-finding	−.01		−.01	11
Satisfaction with Neighbors	.01		.01	11
General Safety	.02	0.09	.11	4
Satisfaction with Visual Appearance		.17	.17	2

1) One of the advantages of path analysis is that it enables one to measure the direct and indirect effects that one variable has upon another. The indirect effects are calculated as the product of two or more path coefficients shown in the relevant paths. For example, among 42 indirect paths, one indirect effect of building type on housing satisfaction was shown in the path from building type to housing satisfaction *via* outdoor convenience. The indirect effect (−.034), thus, was calculated as the product of −.21 (the path coefficient between building type and outdoor convenience) and .16 (the path coefficient between outdoor convenience and housing satisfaction).

2) The direct effect is the influence of one variable on another, that is unmeditated by any other variables in a model. Its value is exactly identical to the path coefficient in a recursive causal system.

3) The total effect is the sum of the direct effect and indirect effects.

surveillance had a positive significant effect on housing satisfaction via enhanced outdoor convenience and/or general safety. Thus, in spite of its various negative effects on housing satisfaction, the high-rise building type in this sample had its own advantages, in terms of offering increased natrual surveillance. It should be noted, however, that this positive effect of the building type on housing satisfaction was almost negligible (.003).

As shown in Table 1, the total effect of building type on residents' housing satisfaction, which was the sum of the 42 indirect effects of building type on the final criterion, was −.10. In general, hence, we may conclude that building type appears to significantly affect residents' housing satisfaction in a negative way, as building type changes from a low-rise to high-rise housing.

In terms of building arrangement type, it did not show any direct influence the issues related to meeting neighbors, visual monotony, and natural surveillance, as hypothesized. Perhaps, it is because the degree of residents' perception of visual monotony and their perception of natural surveillance do not depend on building arrangement type itself, but more likely on other landscape features (e.g., trees or street furniture) and/or building type (refer to the relationship between building type and natural surveillance : beta=.10).

However, building arrangement type had a significant, but negative influence on residents' perception of development crowding (beta=−.14). This means that the residents who live in a U-shaped building arrangement type were less likely to feel that their housing environemt was crowded. This also indicates that the perception of crowding could be influenced not only by the development density (Chin, 1989) but also by building arrangement type. Perceived development crowding also directly, buy negatively, influenced parking/traffic convenience, general safety, and satisfaction with visual appearance. They were all direct predictors of housing satisfaction, whose effects were all positive on housing satisfaction. We can say that, therefore, the residents who lived in a U-shaped building arrangement type were more likely to be satisfied with their housing than those living in the linear building arrangement type, through lessened development crowding.

Other indirect effects of building arrangement type on housing satisfaction were shown in the paths of outdoor convenience and difficulty of way-finding. Compared to the U-shaped type, the residents who live in a linearly arranged buildings were more likely to feel that the outdoor areas in their housing development are less convenient, and that there were more difficulties in finding ways to their home ; hence, in turn, they were more likely to be dissatisfied with thir housing.

Additionaily, an attention should be given to the lack of the relationship between the two meeting neighbors-related issues and building arrangement type. It was hypothesized that the residents living in a U-shaped building arrangement type would meet their neighbors more frequently outside and, thus, be more likely to feel that they can easily and casually meet their neighbors. The results of the tested model in this study, however, ded not support the hypothesis. It might be because all buildings in a U-shaped building arrangement type in Korea do not necessarily face to the U-shaped court. In Korea, the building (in particular, the direction of the living room) in the housng environment, usually faces only to the south or east side, which also indicates that the entrances of the apartment buildings or houses not necessarily face the U-shaped court. Therefore, this means

that the functional distance between buildings in a U-shaped building arrangement type, which can influence the degee of ease of meeting neighbors (Chin, 1988 ; and Festinger, 1951), is not necessarily smaller than that in the linear type in Korea.

The lack of relationship found in this study between residents' perceived natural surveillance and the building arrangement type might also support this argument. Contrary to the Newman's discussion (1972) that the U-shaped type would provide a more natural surveillance from nearby residents than the linear type, the U-shaped building arrangement type in Korean multi-family housing may not provide more surveillance than the other building type, due to the directions of buildings.

The sum of the number of indirect paths from building arrangement type to residents' housing satisfaction were all 14, stepping across the relevant intervening variables. The longest path between building arrangement type to housing satisfaction was, for example, the path from building arrangement type to development crowding, to parking/traffic convenience, to general safety, to satisfaction. As shown in Table 1, the total effect, which is the sum of the 14 indirect effects of building arrangement type on housing satisfaction, was .04. While the total effect seems relatively small, compared to building type (the total effect of building type=−.10), its value is significant. Thus, in general, we can conclude that the U-shaped building arrangement type has advantages in terms of achieving higher residents' housing satisfaction than the linear type does.

DISCUSSION

Housing environment type, an objective measure of the physical housing environment in this study, clearly demonstrated the significant effects on residents' housing satisfction through various intervening variables of residents' perceptions, belies, and affective feelings. From the perspective of both the planner and designer, this finding is important, since the two housing environment types are closely controlled by design and planning decisions.

One of the implications of the empirical model of this study was the suggestion that the U-shaped building arrangement type might be better than the other type (linear type), in terms of achieving higher levels of residents' satisfaction. The U-shaped building was associated with more convenient and usable outdoor, and lessened perceptions of crowding and difficulty of way finding. Therefore, this suggests that the designer/planner begins with non-linear building arrangement types at the initial stage of site development.

In terms of building type, the negative effects of higher-rise housing on resident's' housing satisfaction were clear, implying that the designer should consider lower-rise housing as a more ideal building type. Too often, the decision of a certain building type in developing a housing project is a product of the planned density of the housng project without the designer's input. In cases where the development of a higher-rise building type is dictated to the designer by the policy planner or developer, and the designer can not change the decision, the model suggests other areas where the designer can reconcile the negative effects of higher-rise building types, e.g., by enhancing outdoor convenience, general safety, and so on.

Even though a significant relationship between housing environment type and residents' housing satisfaction has been reported,

a special notion should be given to that there are other types in investigating the relationships to residents' housing satisfaction. Some of these aspects include cul-de-sacs, loops, and so on, as building arrangement type ; and single-family housing, mobil home, and so on, as building type. Thus, it is suggested that a continuous effort to investigate the relationship between more various housing environment types and residents' affective responses should be given to future research.

NOTES

1) For a more extensive and elaborate discussion about the conceptual framework of residents' housing stisfaction, see Weidemann and Anderson, 1985.
2) For a more information in detail about the selected housing developments, refer Chin (1989).
3) A full version of the survey used in the study is shown in Chin (1989), pp 141−174.
4) A total of the 41 factor solution containing items and factor loading scores can be obtained from anyone of the authors.
5) Someone may argue that the building type in this study should be dummy-coded, since it would not be a continuous variable, but a nominal variable. However, a more critical argument for this matter is still remained. It was considered that the variable, the building type in this study, has various continuous characters (e.g., building height, development density, building ratio). If we use a dummy variable as a predictor, due to the basic difference between ANOVA and regression analysis, we couldn't see the trend of the relationship (e.g., linearty) between the predictor and criterion. In case when we use a continuous variable as a predictor, if there is not a significant linearty between the predictor and criterion, then it is appropriate to consider the predictor to be nominal. From the result using a nominal predictor as dummy coded, we know only whether there is significant mean differences of the criterion (e.g., residents' housing satisfaction) between nominal groups (e.g., low-rise housing group, mid-rise housing group, etc.). The result of this study clearly shows that there is a linear influence of the building type on residents' housing satisfaction. Therefore, in spite of a possible argument about its continuous character, the building type was considered as a continuous variable, since we want to see not only the presence of group differences but also the trend of group differences.
6) The originally developed variables from 132 interview items were a total of 47. For the purpose of this study, only eleven variables were selected.
7) The value of R seems relatively small, compared to the values found in other similar research. Using more variables, chin (1989) found that the explained variance (R^2) of residents' housing satisfaction was .41 (R=.64) in the same data. It should be noted that the main emphasis of this study was on finding a significant relationship between housing environment type and residents' housing satisfaction, rather than finding all possible predictors of residents' housing satisfaction.

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