

The Effect of Residential Environmental Satisfaction on Quality of Life and the Moderating Effect of Housing Type: The Case of Gyeonggi, Korea¹

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Abstract

This study examined the relationship between residential environmental satisfaction and quality of life, and how the relationship between variables differed depending on housing type. Residential environments can affect a person's life in a variety of ways. However, there have not been many studies on the relationship between quality of life and residential environments, which increases the importance of this study. In this study, residential environments were categorized according to amenities, safety, and neighborhood relationships, which enabled the comparison of influence between these elements. In addition, this study analyzed the moderating effect of housing type to look for improvements for low-rise housing residents. For testing the hypotheses, moderating regression analysis was conducted with data from the 1st Gyeonggi Province quality of life survey that had 18,953 subjects. Results showed that residential environmental satisfaction had a positive effect on quality of life, with amenities having the largest influence. Furthermore, housing type had a significant moderating effect on the relationship between safety and quality of life. In other words, safety was proven relatively important in improving quality of life for low-rise housing residents. Today, with the limits to quantitative growth, qualitative development has become more important. In this respect, this study provides important implications for many developing countries undergoing urbanization.

Keywords: quality of life, residential environmental satisfaction, housing type, low-rise housing, moderating effect

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Urban development can be understood in terms of quantity, such as economic size, and in terms of quality, such as quality of life and community activation. Desirable cities are possible when these two aspects are achieved in a balanced manner (Song & Yim, 2015). However, in the past, urban management has prioritized quantitative growth over qualitative growth (Friedmann & Alonso, 1975). As a result, many cities today show remarkable results in terms of quantity, whilst various problems arise in terms of quality. In particular, Korean subjective quality of life was reported to be quite low. For example, Korea was ranked 30th of 40 countries in the OECD's 2018 Better Life Index (OECD, 2018). This means that efforts to improve quality of life are urgently needed in Korean society.

Accordingly, urban regeneration projects, which have recently been promoted in major cities in Korea, present "improvement of residents' quality of life" as their main goal (MLIT, 2018). Specifically, the government intends to increase quality of life by improving residential environments. Residential environments can affect residents' life in various ways (Lee et al., 2018; Lewicka, 2011). However, previous studies on quality of life that focused on residential environments demonstrated a relative lack of discussion on quality of life. This increases the need for studies into the causal relationship between quality of life and residential environments. In this study, residential environments were categorized according to amenities, safety, and neighborhood relationships, and examined the relationship between these factors and quality of life.

This study conducted an empirical analysis of how these factors differ depending on housing type. This was to identify the relative importance of factors in terms of quality of life by housing type. In particular, it is reported that in today's Korea, apartments have become established as a universal type of housing, leaving low-rise housing residents unsatisfied with their residential environments (Maeng & Baik, 2019; Shin et al., 2019). This suggests a need for a customized approach to low-rise housing residents. For this purpose, this study conducted moderating regression analysis (Baron & Kenny, 1986) by dividing housing types into "high-rise housing" and "low-rise housing." The eventual aim of this study will be to derive policy implications for residents' quality of life by examining the effect of residential environmental satisfaction and the moderating effect of housing type on quality of life.

Literature Review

Quality of Life

Today, there are many discussions around the world about quality of life. Since the mid-1970s, studies on quality of life have emerged in relation to promoting “value” related to human life rather than problems of economic growth in developed countries. Korea has also demonstrated a low growth trend since the mid-1980s, which confirms that quantitative growth and expansion in urban development face limits, resulting in an emphasis on qualitative development, including “quality of life” (Cho, 2011).

A number of terms are used with regard to quality of life, such as “happiness,” “well-being,” and “life satisfaction” (Lee & Son, 2017, p. 6). However, these commonly imply the concept of a general sense of life satisfaction that an individual perceives subjectively. Existing studies show that economic and residential environmental factors have important implications for quality of life. However, most of these studies only explained the causal relationship between economic factors³ (Deaton, 2008; Sacks et al., 2010; Stevenson & Wolfers, 2013), with a relative lack of study on residential environmental factors. However, individuals tend to meet their needs and interests primarily within their residential areas (Brehm et al., 2006; Lewicka, 2011). If the various conditions of their residential area make up a large part of an individual's life, residential environments can be an important factor in determining quality of life. Reflecting this, urban regeneration projects being undertaken today also aim to increase residents' quality of life by improving their residential environments (MLIT, 2018). Thus, this study investigates factors affecting quality of life, focusing on residential environments.

Residential Environmental Satisfaction and Quality of Life

The term “residential environments” refers to the aggregation of physical and non-physical conditions in a residential area (Moon et al., 2018). Residential environments consist of a variety of factors (Bae et al., 2019; Ozkan & Yilmaz, 2019), which can largely be divided into physical and social elements. In this regard, the OECD emphasized that

³ As for economic factors and quality of life, many scholars conducted empirical research on Easterlin's paradox (1974) that “economic growth does not necessarily improve human happiness,” and there were debates between the affirmative and negative stance.

measuring the quality of residential environments should include not only physical but also non-physical aspects—such as social environments (OECD, 2011). Specifically, “amenities” and “safety” are mentioned as representative of physical factors. For example, the World Health Organization (WHO) presents safety, health, and amenities as the basis for measuring residential environments (WHO, 1961). Satisfaction with many kinds of facilities located in the residential area provides a measure of amenities. Safety also refers to the degree of safety from natural disasters, fires, accidents, and crime. In addition, social factors are considered in relation to satisfaction with neighborhood relationships (Bae et al., 2019; Lee et al., 2018).

Existing studies have shown that amenities (Ahmadiani & Ferreira, 2019; Albouy et al., 2016) and safety (Kim & Lee, 2018; Taniguchi & Potter, 2016) have a positive relationship with quality of life. Thus, the greater the convenience of the area or the more residents perceive it as safe, the higher the quality of life. However, Sirgy et al. (2008) emphasize that both physical factors and good relationships within a neighborhood can have a positive effect on quality of life. Similarly, Kim et al. (2006) suggested that social capital (based on neighborhood relationships) can have a positive effect on quality of life. Based on these factors, it can be expected that residential environmental satisfaction will have a positive effect on quality of life.

H1: Residential environmental satisfaction will have a positive effect on quality of life.

The Moderating Effect of Housing Type

In the past, convenience facilities were established mainly in areas near apartments with a large number of households, which triggered a hierarchy of residential environments between high-rise and low-rise housing (Shin, 2019). Today, the population density of low-rise residential areas has increased. Nevertheless, the additional supply of living infrastructure has not been made, and low-rise residential environments have worsened (Maeng et al., 2015). Thus, Korea’s current urban policy for improving residential environments of low-rise residential areas is an important task (MLIT, 2018).

Some studies (Jang, 2008; Lee, 2018; Paek, 2017) argue that improvements in the physical environment of low-rise residential areas are urgently needed.

Specifically, they explain that low-rise residential areas are subject to more serious problems resulting from fires, poor sanitation, and natural disasters because of poor infrastructure. For example, areas affected by natural disasters such as heavy rain and snow are mostly found to be low-rise residential areas, where damage is even more severe because of low ground and insufficient drainage facilities. In addition, most low-rise housing was built long ago. Consequently, fire damage is reported to be significant due to aging materials (Shin, 2019). Furthermore, Lee et al. (2019) emphasize that residents of low-rise housing are more likely to be exposed to the risk of crime. Major crimes in Korea have been more frequently reported in low-rise residential areas, with narrow alleys being cited as one of the leading crime-prone areas. In particular, violent crimes against women living alone in low-rise housing are reportedly very high (SBS News, 2019).

Conversely, satisfaction with neighborhood relationships for residents of high-rise housing was found to be lower. Joungh (2014) explains that due to their vertical structure, high-rise housing results in less frequent contact with neighbors. In this regard, Shin et al. (2018) emphasize that low satisfaction with neighborhood relationships can lead to increases not only in social isolation but also in subjective depression, and a subsequent decline in trust among residents of high-rise neighborhoods. Recently, inter-floor noise and parking problems have emerged as important social issues for apartment residents in Korean society.

Based on these issues, satisfaction with residential environments perceived by individuals may differ according to housing type. This suggests that housing type might act as a moderator in the relationship between residential environmental satisfaction and quality of life. If the moderating effect of housing type is significant, this supports the need for a discriminatory approach to improving residential environments by housing type. Therefore, the following hypothesis is considered in this study:

H2: Housing type will moderate the relationship between residential environmental satisfaction and quality of life.

Research Design

Study Area and Data

This study focused on the Gyeonggi Province in Korea. Gyeonggi Province is part of the Seoul Metropolitan Area, along with Seoul and Incheon. As of 2018, the population of Gyeonggi Province was 13,103,188—the largest province in Korea, and the most representative area for understanding Korean quality of life. Like other major provinces, Gyeonggi Province is pushing to improve residents' quality of life through urban regeneration projects.

This study analyzed the 1st Gyeonggi Province quality of life survey⁴ conducted by the Gyeonggi Research Institute. The dataset is suitable for this study as it includes respondent demographics (such as age, monthly income, length of residence, and housing type) as well as residential environment satisfaction and quality of life ratings. In addition, this survey includes housing type important in the process of sampling design. Specifically, samples were allocated depending on housing type, which were categorized as detached houses, apartments, multi-family, and row houses (Lee & Son, 2017). This stratified sampling ensures that the dataset reflects the actual housing types in Gyeonggi Province at an appropriate level.

Further, this study focused on analyzing the moderating effect of housing type. Therefore, 1,047 people whose housing type was unclear were removed from the total sample of 20,000, leaving 18,953 respondents in the final analysis. Housing types for the whole sample are shown in Table 1.

⁴ The 1st Gyeonggi Province quality of life survey was conducted by the Gyeonggi Research Institute from July 1 to August 5, 2016 via face-to face survey. The sample design considered the number of household members and housing type. The survey was targeted at household heads aged 19 and older residing in Gyeonggi province. Finally, 20,000 responses were collected.

Table 1

Sample by Housing Type

Housing type		Number	%
High-rise Housing	Apartments	7,868	41.5
	Detached Houses	8,122	42.9
Low-rise Housing	Multi-family Houses	1,836	9.7
	Row Houses	1,127	5.9
	Total	18,953	100.0

Variables

The dependent variable was quality of life, which was identified in the 1st Gyeonggi Province quality of life survey by items such as "overall satisfaction level with life" and "consistency level with an ideal life." Measurements were made using a 5-point Likert scale. The results appear in the Appendix.

The independent variable was residential environment satisfaction (measured using a 4-point Likert scale), which included 12 items divided into three categories: amenities, safety, and neighborhood relationships (see Appendix). First, amenities were measured through satisfaction level with various facilities (such as stores, medical institutions, public institutions, living and cultural facilities, green parks and exercise facilities, and welfare institutions). Second, safety was measured through "safety level from disasters and accidents," "speed of notification of alerts and evacuation guidelines in the event of a disaster," and "appropriateness of establishment of the emergency medical system." Third, neighborhood relationships were measured by the degree to which residents exchanged assistance and trust in fellow residents.

For housing type (which is a moderating variable), apartments were included in high-rise housing, while detached, multi-family, and row houses were included in low-rise housing. This is because in general, studies dealing with housing type define detached, multi-family, and row houses as low-rise housing (Jang, 2007; Lee et al,

2019; Shin, 2019). The analysis focused on low-rise housing and designated apartments as the reference variable⁵.

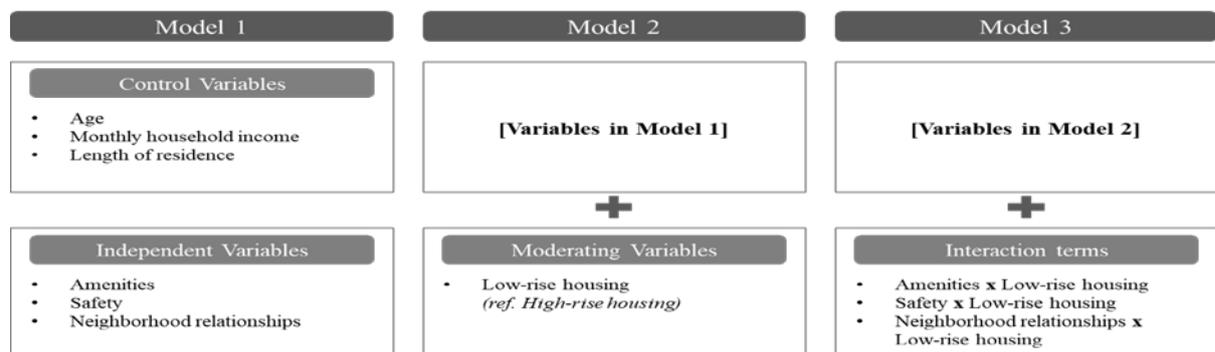
Finally, many studies suggest that age, income, and length of residence are important demographic variables that affect quality of life (Lim, 2012; Mohan & Twigg, 2007; Oliver et al., 1996). Therefore, these were included as control variables.

Analytic Method

Results were analyzed according to the following procedures. First, the validity and reliability of measurement indexes and explanatory variables were verified through exploratory factor analysis and reliability analysis. The results are presented in the Appendix. Second, the correlations between variables such as amenities, safety, neighborhood relationships, and quality of life was examined through correlation analysis. Third, an independent sample t-test was conducted to review whether the perception of each factor differed depending on housing type. Fourth, moderation regression analysis was conducted to test the hypotheses. Specifically, control and independent variables were input in the first stage, moderating variables in the second stage, and interactive terms in the third stage (Baron & Kenny, 1986). The research model for this study is presented in Figure 1.

Figure 1

Research Model



⁵ In this study, low-rise housing was coded “1” and high-rise housing “0.”

Results

Correlation Analysis

The correlation analysis demonstrated a significant positive correlation between all variables, as shown in Table 2. In particular, a high correlation coefficient can lead to problems with multicollinearity among variables during regression. However, correlation coefficients between all variables were less than 0.3, which means that there was no problem with multicollinearity.

Table 2

Correlation Between Variables

Variable		Correlation Coefficient			
		1	2	3	4
1	Amenities	1			
2	Safety	0.289**	1		
3	Neighborhood Relationships	0.034**	0.161**	1	
4	Quality of Life	0.238**	0.223**	0.174**	1

** $p < 0.01$

T-test Analysis Depending on Housing Type

Next, the difference between each variable was verified based on housing type. The analysis suggested significant differences between housing types for all variables. Specifically, residents of high-rise housing were more satisfied with amenities and safety. On the other hand, neighborhood relationships had a higher satisfaction level with low-rise housing residents. In addition, quality of life was higher for residents in high-rise housing. These results demonstrate the need for analysis of the moderating effect of housing type.

Table 3

T-test Analysis Depending on Housing Type

Variable		Housing Type		t-ratio
		High-rise housing (n = 7,868)	Low-rise housing (n = 11,085)	
1	Amenities	2.99 (± 0.441)	2.86 (± 0.471)	19.620**
2	Safety	2.77 (± 0.515)	2.72 (± 0.538)	6.687*
3	Neighborhood relationships	2.51 (± 0.677)	2.66 (± 0.693)	-15.370**
4	Quality of life	3.43 (± 0.677)	3.37 (± 0.678)	6.581**

Note: Amenities, Safety, and Neighborhood relationships were measured on a 4-point scale. On the other hand, Quality of life was measured on a 5-point scale.

* $p < 0.05$, ** $p < 0.01$

Test of Hypotheses

The purpose of this study was to analyze the effect of residential environmental satisfaction on quality of life and to identify the moderating effect of housing type. To do this, moderation regression analysis recommended by Baron and Kenny (1986) was conducted. The results are presented in Table 4. Prior to testing the hypotheses, the explanatory power of the model was measured as 14.0% ($R^2 = 0.140$) based on Model 3, which included all variables.

Specific results are as follows. First, in Model 1, it was confirmed that amenities, safety, and neighborhood relationships all had a positive effect on quality of life. Based on regression coefficients, amenities ($\beta = 0.175$) had a relatively strong influence. In Model 2, housing type was inputted as a moderating variable, but did not directly influence quality of life. Finally, in Model 3 (where interaction terms were input), it was found that “safety \times housing type” had a positive effect on quality of life. This means that housing type had a significant moderating effect between safety and quality of life. Housing type did not have a direct effect on quality of life; this could be seen as a pure moderator (Sharma et al, 1981).

Table 4
Results for Moderating Regression Analysis

		Model 1		Model 2		Model 3	
		β	t	β	t	β	t
Control Variables	Age	-0.035	-4.252**	-0.035	-4.243**	-0.035	-4.195**
	Household income per month	0.188	26.885**	0.187	26.603**	0.187	26.638**
	Length of residence	0.032	3.966**	0.032	4.026**	0.033	4.077**
Residential Environment Satisfaction	Amenities (a)	0.175	24.680**	0.174	24.420**	0.173	24.302**
	Safety (b)	0.138	19.348**	0.138	19.324**	0.138	19.284**
	Neighborhood relationships (c)	0.151	21.597**	0.151	21.577**	0.151	21.507**
Housing Type	Low-rise housing (ref. high-rise housing) (d)			-0.006	-0.839	-0.007	-0.957
Interaction Term	(a) × (d)					0.006	0.826
	(b) × (d)					0.017	2.452**
	(c) × (d)					-0.011	-1.585
Constant			39.442		36.409		36.474
n		18,953		18,953		18,953	
R ²		0.139		0.139		0.140	
F		513.872**		0.703		3.218*	

Note: Table 4 showed only three decimal places, so R² does not seem to make much difference between models. However, considering the number of samples together in the statistical analysis process, this difference was found to be significant.

* $p < 0.05$, ** $p < 0.01$

Discussion

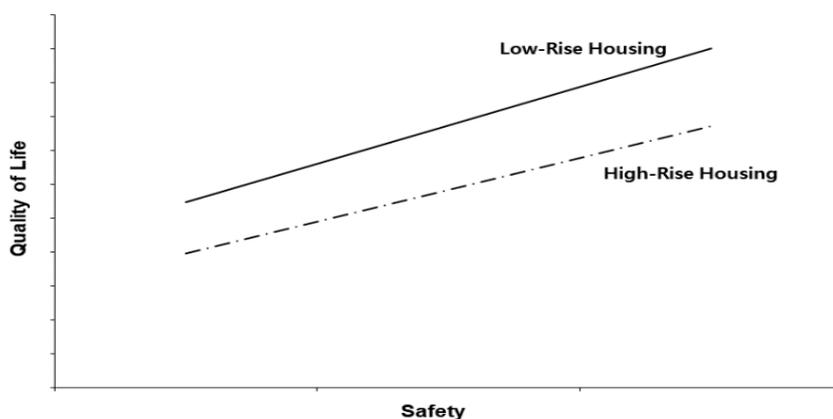
The discussion focuses on the main results as follows. First, residential environmental satisfaction was found to have a positive effect on quality of life. This is consistent with previous studies and supported Hypothesis 1. In particular, the influence of amenities (based on regression coefficients) was found to be the greatest and is therefore in accordance with Biagi et al. (2018), who explained that amenities were directly related

to quality of life. As noted previously, residents tend to meet basic needs within their residential areas (Lee et al., 2004). Good residential environments satisfy these needs, which can lead to improved quality of life. In this regard, Park & Lee (2015) found that residents of Seoul Metropolitan Area (including Seoul, Gyeonggi, & Incheon) attached importance to conditions of convenience for facilities in their residential areas.

Second, housing type had a significant moderating effect between safety and quality of life. It was possible to interpret that safety might be relatively important for low-rise housing residents. Based on existing studies, low-rise residential areas are more vulnerable to natural disasters (such as floods), fires, or crime than high-rise residential areas. These factors constitute a threat to the safety of residents. Specifically, Lee et al. (2019) conducted a study on the physical environments associated with the occurrence of a crime and found that areas with high crime rates are closely related to ground-floor parking lots which have spaces where criminals might hide, and cited low-rise residential areas as a representative example. In fact, urban regeneration projects suggest improvements in the safety of alleys for low-rise residential areas (MLIT, 2018). This analysis partially supported Hypothesis 2. In Figure 2, the moderating effect of housing type between safety and quality of life is presented.

Figure 2

Moderating Effect of Housing Type Between Safety and Quality of Life



Third, control variables were found to have significant effects on quality of life. First, age had a negative effect on quality of life, as reported by Choi (2016). It was also

evident that monthly household income had a positive effect on quality of life, which has been identified by a number of previous studies (Deaton, 2008; Sacks et al., 2010; Stevenson & Wolfers, 2013). Finally, length of residence was found to have a positive effect on quality of life (Mohan & Twigg, 2007).

Conclusion

This study focused on residents' quality of life in relation to the qualitative aspects of urban development. Specifically, the effect of residential environment satisfaction on quality of life were examined, and the moderating effect of housing type was verified empirically.

This study presents the following policy implications. First, when improving quality of life through increasing residential environmental satisfaction, it is necessary to pay attention to amenities. Today, amenities are considered to be one of the most important factors in assessing residential environments (OECD, 2011; WHO, 1961). The first consideration in the process of urbanization is the building of amenities in residential areas. Therefore, local governments should check and improve old facilities frequently to ensure that basic levels of amenities in the area are provided. Second, regarding residential environments, different approaches based on housing type is necessary. Specifically, according to the results of this study, it was found that safety is relatively important for low-rise housing residents. Indeed, the frequency of natural disasters, fires, and crime has been found to be high in low-rise residential areas (Lee et al., 2019). Therefore, police activities in low-rise residential areas should be strengthened, and in the event of a natural disaster or fire, notices should be delivered to residents quickly.

Meanwhile, today's urban development paradigm is shifting toward qualitative growth for sustainability because of the limitation of economic growth (Friedmann, 2000; Kelly, 2012). The Gyeonggi Province of Korea is a representative area that has experienced high economic growth and recent attempts to develop qualitative aspects of quality of life. Many developing countries, which are still undergoing urbanization, are pursuing only quantitative development by paying

attention to economic values, as Korea did in the past. Therefore, this study could have important implications for these developing countries.

Finally, there are a number of limits to this study. First, the variables were constrained by the use of secondary data. In particular, this study categorized residential environments into amenities, safety, and neighborhood relationships. However, there may be many additional factors that determine residential environments. Second, this study conducted empirical analysis only for the Gyeonggi Province in Korea. However, research needs to be expanded to other regions in the future. In particular, residential environmental satisfaction can be formed differently depending on local environments; thus, the effect on quality of life might well differ depending on residential areas. A meaningful study could proceed with such regional comparisons.

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Appendix

Validity and Reliability Analysis of Variables

Category		Measurements	Factor loading	Eigenvalue /Cronbach α
Quality of life		Overall satisfaction level with life	0.893	1.651 /0.800
		Consistency level with an ideal life	0.889	
Residential environmental satisfaction	Amenities	Satisfaction level with stores	0.651	2.855 /0.779
		Satisfaction level with medical institutions	0.673	
		Satisfaction level with public institutions	0.685	
		Satisfaction level with living and cultural facilities	0.693	
		Satisfaction level with green parks and exercise facilities	0.699	
		Satisfaction level with welfare institutions	0.682	
	Safety	Safety level from disasters and accidents	0.634	1.786 /0.641
		Speed of notifications of alerts and evacuation guidelines in the event of disasters	0.804	
		Appropriateness of establishment of emergency medical system	0.784	
	Neighborhood relationships	Degree of helping residents well	0.897	2.298 /0.844
		Degree of getting help from residents	0.904	
		Degree of trust to residents	0.801	

*KMO = 0.755, Bartlett sphericity test = 0.000

Biographical Notes

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