

Article

Physical Environment, Socio-Psychological Health, and Residential Satisfaction: A Link across Housing Types in the Unique Chinese Context

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Abstract: Housing plays a critical role in health and has real consequences on people's wellbeing. Numerous studies have provided extensive insights into the housing–health–wellbeing association. However, in the Chinese context, the unique housing allocation system with institutional force may present a distinct picture from that based on international knowledge. Using sample data from housing surveys, this study employs statistical analysis and the Tobit model to explore the links between the physical environment, socio-psychological dispositions, and residential satisfaction at the neighborhood level across different housing types in the unique Chinese context. The analyses reveal that (1) residents' socio-psychological dispositions and residential satisfaction vary remarkably across different housing types, with residents in replacement housing experiencing particularly low levels of residential satisfaction, presenting a regionalization trend; (2) housing types appear to have a significant effect on socio-psychological dispositions; and (3) physical environment characteristics in conjunction with socio-psychological dispositions significantly affect residential satisfaction. These findings suggest that social housing development should integrate socio-psychological initiatives with physical environment improvement, particularly for disadvantaged groups in public and replacement housing, to achieve more livable communities with better residential satisfaction and higher social resiliency and sustainability.

Keywords: housing inequality; socio-psychological health; residential satisfaction; physical environment; sustainability



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1. Introduction

Housing inequality caused by governmental housing regimes lies at the root of socio-spatial segregation and exclusion in most cases [1–6]. This issue has been increasingly recognized as a corrodent to the social resiliency of cities and is a threat to human health [7–9] and people's life satisfaction [10–14]. This is especially true in the Chinese context, in which a unique political system and institutional forces operate, such as housing reform, which has played a critical role in many aspects of residents' lives [15]. Housing reform in urban China has led to the co-existence of diversified housing types, including work-unit, commodity, public, and replacement housing [16,17].

Different housing types occupy different regions of a city. They have different building standards and cater to different socio-economic groups, and they are accompanied by different levels of freedom in terms of residential choice [18]. In this context, different social classes have traditionally been treated in a discriminatory manner. This can regionalize residents into distinct socio-spatial patterns, which can, in turn, lead to distinct

socio-psychological contexts at the neighborhood level. A large body of research has shed light on socio-spatial differentiation, inequalities, and segregation [3,19–24], which can occur in various domains of life [25], such as residences, workplaces, and schools. However, few have investigated this topic from the perspective of socio-psychological health, and little is known about its impact on residential satisfaction. Particularly, the unique housing allocation system in urban China may deliver a quite different scenario from the international view.

To address this gap, this study examines whether and how socio-psychological dispositions geographically distribute and affect residential satisfaction across four main housing types in the Chinese context. Specifically, based on the data collected from community surveys in Shanghai, this study applied statistical decomposition and the Tobit model to explore the relationship between housing types and socio-psychological dispositions and to quantify their impact on residential satisfaction, aiming to answer the following questions:

- (1) Do residents' socio-psychological dispositions and their residential satisfaction vary across housing types?
- (2) If so, do housing types affect the differentiation of residents' socio-psychological dispositions?
- (3) What is the interwoven relationship between the physical environment, socio-psychological dispositions, and residential satisfaction, and what is the role of housing type in this relationship?

By shedding new light on the housing–health–wellbeing link from a socio-psychological perspective, this study provides government officials, policymakers, and developers with policy implications for future sustainable housing development, neighborhood planning, and urban governance.

2. Unique Housing System in China

2.1. Land and Housing Policies

As a socialist country, all land in China is either owned by the government or by the collectives. Urban land is owned by the government and is called “state-owned land.” By contrast, rural and suburban land is owned by rural collectives, such as local farmer groups, and is called “collective land”.

In addition to the special land laws and regulations, China has various special housing policies. The government has been implementing housing reforms since 1978, which have included the following stages [26,27]. Since 1978, the housing system in China has been transformed from a welfare distribution carrier to a market-oriented system. Till 1993, the government aimed to promote house ownership by privatizing and commercializing urban public housing at a national scale. Between 1993 and 1997, the Chinese government subsidized the provision of commodity housing for middle- and low-income households while simultaneously promoting housing market growth for high-income groups. Starting in 1998, the central government abandoned the old system of linking housing distribution with employment (i.e., welfare-based housing allocation) and established a market-based system of housing provision. Since 2005, the Chinese government is being urged to enhance the availability of affordable housing (public housing) for those with moderate and low incomes.

Considering the country's housing reforms under various policies, four main types of housing can be observed in urban China: *work-unit*, *commodity*, *public*, and *replacement housing*.

2.2. Housing with Institutional Force

Owing to the unique housing allocation system in the Chinese context, different housing types come with different views in terms of institutional force, featuring different levels of freedom in residential choice—that is, the levels of freedom in residential choices vary across housing types (i.e., *work-unit*, *commodity*, *public*, and *replacement*).

Work-unit housing is allocated to the employees of state-owned enterprises or public institutions. Even so, there is no egalitarianism or equality in the process of allocation,

although it was once characterized by socialism. Moreover, people who have made mistakes in the past (e.g., violated the previous one-child policy or have a criminal record) may be excluded altogether [16]. In essence, housing allocation (e.g., house area, house size [two-room or three-room], and floor number) is performed according to the employees' socio-economic status, including official status (e.g., job grade and working years), educational attainment, and so on. Yet, those factors affecting a family's living conditions, like household size and/or the number of children under age 18, are not considered at all. In doing so, the leaders of these institutions are given high priority in housing allocation, while general staff may not have a say [28]. In this context, the quality of life is largely determined by occupation, as housing is a heavily subsidized commodity that is directly correlated with social status (e.g., how others see residents and how they see themselves).

Commodity housing is targeted at social groups with mid-to-high income. Apartment buildings, which are usually mid- to high-rise structures, are dominant in this housing type. However, not all residents are capable of freely purchasing commodity housing. The choice and eligibility are constrained by residents' *Hukou* (*Hukou* is an official household registration system in China. A *Hukou* record (household register) issued by the Chinese government (Ministry of Public Security) contains socio-demographic information such as name, date of birth, home address, educational attainment, occupation, marital status, and household formation, that certifies a person (the holder) as a legal resident of a particular area) [29], marital status, and other factors. In many large cities like Shanghai, with the formulation of a house purchase quota policy [30], only residents with local *Hukou* have the right to buy commodity housing.

For public housing, households/residents who apply for this type of housing (either rental or purchase) must have had a local *Hukou* for at least one year. Additionally, they need to meet various other requirements, including age, marital status, income, present living space, and household net assets. For example, residents in Shanghai can choose preferred public housing locations from a very limited set of choices within six indemnificatory housing bases. Yet the provision of adequate public housing in desirable locations is a major challenge in China; this type of housing is mainly located in less desirable locations (e.g., urban periphery). Moreover, residents tend to have less access to services and amenities like public transit, healthcare, and education, as well as fewer job opportunities [31].

For replacement housing, residents whose previous homes have been pulled down for the purpose of urban renewal and redevelopment have three forms of possible compensation: (1) monetary offset, (2) value standard, and (3) equivalent area housing resettlement. If the household chooses monetary offset, the household takes a compensation payment from the government, with which they can purchase new housing anywhere they prefer. If they choose the value standard, the household can buy a new commodity housing from the developers working with the government at a discount that is well below market price. If the household chooses resettlement, the household will be offered the opportunity to move to government-provided alternative housing (i.e., replacement housing) [32]. The specific location of residence for resettlement is set by the local government with a limited number of communities (the actual options will generally be limited to one to two neighborhoods within existing planned communities) according to the overall plans of the resettlement program.

In summary, as sketched in Table 1, commodity housing residents hold the highest freedom in residential location choice, followed by residents in work-unit and public housing, whereas replacement housing residents have very little freedom regarding residential choices [18,33].

Table 1. Housing characteristics by type.

Housing Characteristics	Housing Types			
	Work-Unit	Commodity	Public	Replacement
Location	Central urban	Throughout the urban	Peripheral and outer suburban	Peripheral and outer suburban
Social class	Low-to-high (mixed) income group	Mid-to-high income group	Low-income group	Low-to-mid income group
Freedom in residential choice	+++	++++	++	+
Floor area ratio (FAR) *	+ (1.2)	++ (2.2)	+++ (2.5)	++++ (2.6)
House area *	++ (72)	++++ (96)	+ (60)	+++ (78)

Notes: 1. The marks (+, ++, +++, +++) denote a very low, low, medium, and high performance of the characteristics. 2. * reported for sampled neighborhoods only.

2.3. Varying Housing Environment, Standards, and Areas

Different types of housing result in various labels of housing characteristics, including planning locations, construction standards, and living areas.

First, land-use zones, intended for different housing types with various physical environment characteristics, have become prominent landscapes in urban China [17]. Work-unit housing is mostly situated in the original areas in old historical urban centers, whereas public and replacement housing are usually labeled as large housing communities and planned in peripheral and outer urban/suburban regions. Overall, the four housing types tend to appear in different urban regions, reflecting the spatial differentiation of the housing development in urban planning within the framework of the housing reform.

Furthermore, different housing types have different construction standards [16]. In terms of housing land-development intensity, as measured by floor area ratio (FAR), replacement and public housing have the highest average density (2.6 and 2.5, respectively) compared to work-unit housing (1.2), while commodity housing varies in density.

In terms of house area, public housing is generally considerably smaller than work-unit housing, while commodity housing is generally far more spacious. For replacement housing, the compensatory living area of a new replacement house is calculated and determined according to both the market value of the previous house and the corresponding subsidies for decoration, moving, and other related expenses. In general, a variety of incentives to encourage relocation are provided to households who choose the third option. The most common incentive is to simply increase the space allocated for the new replacement house. In Shanghai, for example, households that agree to move to alternative housing (i.e., replacement housing) receive an additional 20 to 30 percent more space, dependent on their household size, crowding, and their initial amount of living space. No matter which type of compensation the household chooses, they all fundamentally share the same implication—monetary subsidy, based on the mechanism known as the “Brick-Count + Dwelling Guarantee”.

In a word, the four dwelling types take up different urban locations with different physical environments, cater to different social classes, and present varying degrees of freedom in residential choice, thus indicating that residents experience differentiated housing space as well as living conditions. These differences may lead to the regionalization of socio-psychological dispositions and residential satisfaction. The housing characteristics of the four types are summarized in Table 1.

3. Method

3.1. Data

Data items were derived from a housing survey conducted in Shanghai from 2015 to 2018, which included content related to (1) socio-economics and demographics, (2) physical environment, (3) socio-psychological dispositions, and (4) residential satisfaction.

The survey was carried out through on-site interviews in sampled neighborhoods of the four different types of housing. These neighborhoods represent a range of features: (1) urban, suburban, and exurban regions, (2) with and without a rail transit station within an 800 m radius, and (3) diversified land-use types. Finally, 80 neighborhoods representing the four housing types were surveyed using judgment sampling [34], as shown in Figure 1. Around 90 respondents were interviewed in each neighborhood. In the end, a total of 7650 respondents were interviewed, resulting in 6752 completed and valid records.

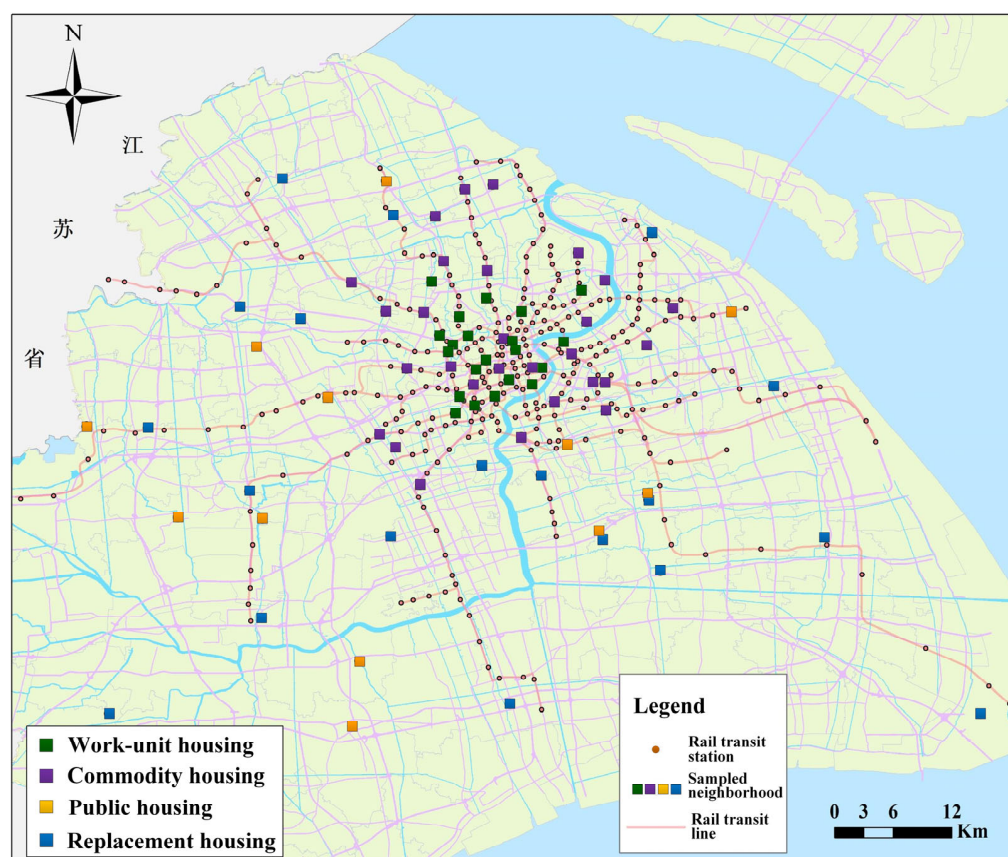


Figure 1. Geographical locations of the surveyed neighborhoods.

Detailed data on the physical environment around individual residential locations were compiled from GIS shapefiles gathered from the local planning bureau of land resources. In terms of socio-psychological dispositions, respondents were asked to rate 15 statements about their personality and 12 about their lifestyle. The respondents' degrees of agreement with each of the descriptive statements were gauged using a five-point Likert scale (i.e., 1—completely disagree to 5—completely agree). The respondents were also required to mark their subjective residential satisfaction.

3.2. Variables

The dependent variable is residential satisfaction, which refers to people's feelings of contentment in their residential neighborhoods. The independent variables include (1) socio-economics and demographics: educational attainment, employment status, household size, car ownership, annual income, and living space; (2) physical environment characteristics (measured in an 800 m radius buffer): density, diversity, design, destination accessibility, and distance to transit (i.e., the "5Ds") [35]; and (3) socio-psychological dispositions: four types of personality (i.e., organizer, calm-tempered, loner, and sensation-seeker) and four types of lifestyle (i.e., family-oriented, status-seeking, unaccomplished, and workaholic), which were constructed from the statements using common factor analysis, based on prior research [36,37]. Table 2 presents the personality and lifestyle factor loadings.

Table 2. Factor loadings related to personality.

Descriptive Statements	Factors Loadings with Regard to Personality			
	Organizer	Calm-Tempered	Loner	Sensation-Seeker
I am a routine type of person	0.598			
I like to be scheduled	0.363			
I like to plan my errands	0.469			
I am gregarious and extraverted	0.415			
I am self-controlled and disciplined outside		0.402		
I do have patience		0.398		
I am very easygoing		0.520		
I enjoy staying alone			0.768	
I tend to be independent			0.512	
I like to surf the Internet to avoid outings			0.597	
Fast motion is fun for me				0.693
I like staying at home			0.412	−0.511
I like being outdoors			−0.502	0.804
I like change, variety, and adventure				0.678
Descriptive statements	Factors Loadings with Regard to Lifestyle			
	Family-Oriented	Status-Seeking	Unaccomplished	Workaholic
Family is my priority in life	0.711			
I enjoy spending time with my family	0.523			
Family matters more than my job	0.496			
I could work less if I earned enough	0.315			
Car is a status symbol to me		0.525		
Large single-family houses are more prestigious than multi-family housing		0.398		
It is a hassle to travel without a car		0.302		
Emotional and financial ups and downs have caused me great worry			0.752	
I have great ideas but no drive to see them through			0.438	
My life is fulfilling me			−0.396	
I aim high and do it				0.765
I choose to devote more time to my job				0.302
I feel anxious and guilty while not working				0.508
Family time is limited by my work				0.664

3.3. Model

The Tobit regression model was employed in this study to quantify the impact of socio-psychological conditions on residential satisfaction while controlling for housing type and physical environment.

The probability that an individual holds m th personality (or lifestyle) can be specified by the following formulas:

$$\begin{aligned} Pro_m^P &= Pro(P_{im} + u_{im} > P_{in} + u_{in}) \\ Pro_m^L &= Pro(L_{im} + u_{im} > L_{in} + u_{in}) \\ m, n &\in (1, 2, 3, 4), \text{ all } n \neq m \end{aligned} \quad (1)$$

where P_{im} , L_{im} , and u_{im} are the observable and unobservable components, respectively, of the indirect utility that individual i receives from having m th personality (or lifestyle).

P_{im} or L_{im} are functions of several variables, respectively, which are given as follows:

$$\begin{aligned} P_{im} &= \alpha HT_i + \beta SO_i + \gamma PE_i \\ L_{im} &= \delta HT_i + \varphi SO_i + \theta PE_i \end{aligned} \quad (2)$$

where P_{im} stands for the personality that an individual i has; L_{im} stands for the lifestyle that an individual i has; HT_i indicates the housing type in which an individual i resides; SO_i denotes socio-economic characteristics of an individual i ; PE_i represents the physical environment characteristics of the location where individual i resides; and $\alpha, \beta, \gamma, \delta, \varphi$, and θ are the vectors of the corresponding parameters.

The residential satisfaction that an individual has depends on the same variable set as the indirect utility function P_{im} or L_{im} included, along with the physical environment characteristics entered as independent variables in the model, which can be written as follows:

$$RS_i = \lambda HT_i + \eta SO_i + \mu PE_i + \zeta P_i + \psi L_i + \varepsilon_i \quad (3)$$

where RS_i stands for the residential satisfaction of an individual i ; HT_i indicates the housing type that individual i resides; SO_i denotes the socio-economic characteristics of an individual i ; PE_i represents the physical environment characteristics of the location where an individual i resides; P_i stands for the personality that an individual i has; L_i stands for the lifestyle that an individual i has; $\lambda, \eta, \mu, \zeta$, and ψ are the vectors of corresponding parameters to be estimated by the model; and ε is the vector representing the unobserved error.

4. Results

4.1. Descriptive Statistics

4.1.1. Socio-Psychological Disposition

Table 3 shows that the socio-psychological conditions of residents differ significantly across the four types of housing. Dramatically, a substantial percentage of residents in work-unit housing demonstrates the “Organizer” personality trait and “Status-seeking” and “Family-oriented” lifestyles. In contrast, a substantial proportion of residents in public housing exhibit the “Loner” personality and “Frustrated” lifestyle. Meanwhile, a fairly high proportion of residents in replacement housing show the personality of “Loner” and “Sensation-seeker” and the lifestyle of “Frustrated”. Interestingly, the various types of personality and lifestyle tend to be very evenly distributed in commodity housing. Overall, the differences in personality and lifestyle are statistically significant across the different housing groups.

Table 3. Distribution of social–psychological conditions according to housing type.

Social–Psychological Condition	Housing Types				Sig. (p)—Between Groups
	Work-Unit	Commodity	Public	Replacement	
Personality					0.027 **
Organizer (%)	47.3 +	26.1	17.5	13.7	
Calm-tempered (%)	28.6 +	27.5	27.8 +	7.5	
Loner (%)	11.8	23.6	47.4 +	33.1 +	
Sensation-seeker (%)	12.3	22.8	7.3	45.7 +	0.042 **
Lifestyle					
Status-seeking (%)	37.6 +	26.3	3.8	27.4 +	
Family-oriented (%)	30.7 +	25.8	27.4 +	8.7	
Frustrated (%)	7.9	21.2	48.1 +	48.8 +	
Workaholic (%)	23.8	26.7	20.7	15.1	

Notes: 1. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. 2. + indicates the preponderantly large value of a specific indicator in a specific group.

4.1.2. Residential Satisfaction

Table 4 shows that residential satisfaction in the four housing types varies significantly. Compared to other housing types, commodity housing residents are most satisfied with their housing conditions, with an overall satisfaction score of 3.89. This is not particularly surprising, as they have the most freedom in residential choice and their current residences were chosen according to their own preferences—residential self-selection. On the contrary, residents in replacement housing felt most uncomfortable with their housing condition,

with an overall satisfaction as low as 2.62. This can be attributed to the large gaps in facilities, amenities, and services before and after their relocation. In the meantime, public housing residents have moderate satisfaction with their housing conditions. Residents in this cohort are mostly those with low-to-middle income and that are middle-to-old-aged, who cannot afford to buy a house. The national housing program has greatly enhanced the standard of their dwellings. Residents in work-unit housing also felt quite satisfied with their living conditions, having a fairly high satisfaction score (3.51), although their housing space may not be very large compared to other housing types. This could be mainly due to the high accessibility that work-unit housing has, as this type of housing is often located in the central area of the city.

Table 4. Distribution of residential satisfaction across the four housing types.

Residential Satisfaction	Housing Types				Sig. (p)—Between Groups
	Work-Unit	Commodity	Public	Replacement	
Average overall satisfaction score	3.51	3.89	3.09	2.62	0.035 **
[satisfaction score = 1] (%)	5.21	2.15	10.24	18.32	
[satisfaction score = 2] (%)	12.58	5.14	16.49	26.81	
[satisfaction score = 3] (%)	28.87	19.51	39.74	35.58	
[satisfaction score = 4] (%)	32.92	48.18	21.18	13.21	
[satisfaction score = 5] (%)	20.42	25.02	12.35	6.08	

Note: 1. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.2. Model Results

4.2.1. Association between Housing Type and Socio-Psychological Disposition

Table 5 presents the results of the model on the association between housing types, physical environment, and socio-psychological disposition, controlling for socio-economics. Housing types are significantly associated with residents' personality and lifestyle. Compared to commodity housing, residents from work-unit housing are more likely to hold the personality of being calm-tempered and a lifestyle of status-seeking and being less frustrated, while those in public and replacement housing are more likely to be loners and workaholics. This can be attributed to the fact that residents in these two housing types are typically disadvantaged groups or external populations with a low household annual income [17], which strengthens the labels of "disadvantaged community", "problem community", and "rootless community" in these two types. Such a situation can have an imperceptible influence on the socio-psychological disposition of the residents in the cohorts.

The socio-economics are significantly related to the resident's personality and lifestyle. People with a higher educational status are less likely to be loners but more likely to experience status-seeking lifestyles. This is plausible, as higher education attainment generally means people are better informed and have more expectations in life. Unemployed people tend to be loners and frustrated. When a person is unemployed for a long time, they may feel helpless, worthless, aimless, and unfulfilled, which can lead to a low mood and a loss of confidence in life. People with larger household size are more likely to be workaholics. A family with more household members means more living expenses; this may prompt them to work harder. Notably, residents with higher household annual income, more household car ownership, and larger house living space tend to be sensation-seekers with a lifestyle of status-seeking. This is readily comprehensible, as in most cases, these attributes mean more human, physical, and financial resources, which can more likely lead to a lavish lifestyle. Interestingly, higher household annual income is also more likely to be associated with a frustrated lifestyle. This can be explained by the fact that more money increases people's concerns. In other words, the greater the expectation, the greater the disappointment.

Table 5. Impact of housing types on personality and lifestyle.

Explanatory Variables	Personality						Lifestyle					
	[Calm-Tempered]		[Loner]		[Sensation-Seeker]		[Status-Seeking]		[Frustrated]		[Workaholic]	
	Estimate	Sig. (p)	Estimate	Sig. (p)	Estimate	Sig. (p)	Estimate	Sig. (p)	Estimate	Sig. (p)	Estimate	Sig. (p)
Housing types												
[Work-unit housing]	13.325	***	−7.212	-	−8.749	-	17.985	**	−7.248	***	−5.097	-
[Public housing]	−11.116	-	15.534	***	−17.216	-	10.127	-	5.531	**	−3.514	-
[Replacement housing]	−10.097	-	−11.259	**	15.138	-	−6.016	-	3.005	-	4.885	***
Socio-economic variables												
[Education = College]	1.257	-	−1.327	*	0.257	-	1.412	**	0.384	-	0.905	-
[Employment status = Unemployed]	−0.312	*	1.125	**	−0.803	-	0.824	-	1.877	**	−1.127	*
Household size	−0.548	-	−0.419	-	−0.616	-	0.315	-	−0.521	-	0.803	**
Household annual income (log10)	1.102	-	−2.326	-	1.987	**	0.895	*	3.010	*	1.411	-
Household car ownership	0.827	-	−1.101	**	1.153	**	0.502	***	−2.119	**	−0.911	-
House living space (m ²)	0.025	-	−0.128	-	0.547	***	0.024	*	−0.132	*	0.058	-
Physical environment variables (5Ds)												
Density Residential density (10,000 ppl/km ²)	1.311	-	−0.295	***	0.127	-	−2.011	-	−1.594	**	−0.702	-
Diversity Land-use mix (0–1)	0.128	-	−0.192	-	0.131	*	0.284	*	−0.487	-	−0.245	-
Design Sidewalk completeness (0–1)	0.051	*	−0.097	*	0.004	-	−0.196	-	−0.076	*	−0.0007	-
Destination Amenity accessibility (per km ²)	0.486	*	−0.736	**	0.396	-	−0.564	-	−0.323	*	−0.111	-
Distance Distance to the nearest transit stop (km)	0.197	-	−0.106	*	0.091	-	−0.325	-	−1.121	*	−0.628	-

Notes: 1. The reference category for personality is organizer. 2. The reference category for lifestyle is family-oriented. 3. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Physical environment characteristics are found to affect the formation of residents' socio-psychological dispositions significantly. Specifically, higher residential density results in people being less lonely and going through a less frustrating lifestyle. An environment with a higher land-use mix tends to shape people to be sensation-seekers with a status-seeking lifestyle. Similarly, sidewalk completeness and amenity accessibility results in people being gentle and patient, as well as less lonely and less likely to be frustrated within their lives. The distance to the nearest transit stop has a similar effect. In summary, a physical environment with characteristics of higher population density and land-use diversity, better pedestrian-friendly design, and more complimentary amenities tends to result in its inhabitants having a healthier socio-psychology. This indicates the role of living and transportation facilities that are essential to residents' daily lives in influencing people's dispositions and modes of life.

Overall, housing types, along with socio-economics and physical environment, significantly influence residents' socio-psychological disposition (i.e., personality and lifestyle).

4.2.2. Association between Socio-Psychological Disposition and Residential Satisfaction

Table 6 presents the model results on the association between housing type, socio-psychological disposition, and residential satisfaction, accounting for socio-economic and physical environment characteristics. Compared to commodity housing, residents in public and replacement housing have significantly lower residential satisfaction. This could be interpreted by the fact that public and replacement housing are mostly built in peripheral urban areas with less access to public facilities and amenities, and these residents were moved involuntarily with little to no choice in terms of resettlement. Moreover, although public housing and replacement housing are generally bonded together, residents in replacement housing are much more unsatisfied with their residential conditions than their counterparts in public housing, with a much higher but negative coefficient. Overall, non-choice movers (public and replacement housing residents), on average, feel less satisfied with their residences than their counterparts with more residential choice (work-unit and commodity housing residents). This supports the findings of a previous case study in Shanghai [32]. This finding is in conflict with the general assumption of planners, which is that relocated households should be much happier as their physical

living conditions have been improved after their relocation from low-quality housing into much better accommodation.

Table 6. Tobit model of residential satisfaction.

Explanatory Variables		Residential Satisfaction	
		Estimate	Sig. (<i>p</i>)
Housing types			
	[Work-unit]	−0.25	−
	[Public]	−1.02	**
	[Replacement]	−1.48	***
Socio-economic variables			
	[Education = High School]	−0.54	−
	[Education = College]	−0.81	**
	[Employment = Employed]	1.04	**
	Household size	−0.46	**
	Household annual income (log10)	1.52	**
	Household car ownership	0.65	−
	House living space (m ²)	0.03	***
Physical environment variables (5Ds)			
Density	Residential density (10,000 ppl/km ²)	0.08	−
Diversity	Land-use mix (0–1)	0.95	***
Design	Sidewalk completeness (0–1)	0.54	*
Destination	Amenity accessibility (per km ²)	0.78	***
Distance	Distance to the nearest transit stop (km)	−0.89	*
Socio-psychological conditions			
Personality	[Calm-tempered]	0.41	−
	[Loner]	−1.07	***
	[Sensation-seeker]	−0.59	**
	[Status-seeking]	−0.78	**
Lifestyle	[Unaccomplished]	−0.52	***
	[Workaholic]	0.29	−

Notes: 1. For the explanatory variables, the reference categories are [Housing type = Commodity], [Education = Below college], [Employment = Unemployed], [Personality = Organizer], [Lifestyle = Family-oriented].
2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Socio-economic characteristics are found to significantly affect residential satisfaction. Interestingly, people with higher levels of educational attainment are less satisfied with their residential conditions. This may partly be attributed to the fact that the higher a person's level of education, the higher the quality of the living environment they expect. Employed people have significantly higher residential satisfaction than those who are unemployed. Household size also has a significantly negative effect on residential satisfaction, meaning that families with more members are less satisfied with residential conditions. Car ownership is found to positively affect residential satisfaction, but not significantly. Unsurprisingly, residents living in larger housing spaces have higher residential satisfaction. Physical environment characteristics are also found to be significantly associated with residential satisfaction. Specifically, residents living in an environment with larger land-use diversity, better pedestrian-friendly design, and higher accessibility along a rail transit line have increased levels of residential satisfaction. This is quite understandable as such an environment provides residents with an abundance of public facilities, amenities, and services, supporting their daily lives through increased convenience.

All else being equal, people with the personality types of “Loner” or “Sensation-seeker” are more likely to feel dissatisfied with their residential conditions. Loners tend to avoid seeking out human interaction or social relations, which easily leads to despair about life. Sensation-seekers are usually adventurous, and they like to chase things that are exciting, risky, and add variety to their lives. Therefore, they might more likely be dissatisfied with their current living conditions. Likewise, residents with a lifestyle that is “Status-seeking” or “Unaccomplished” have lower residential satisfaction. Status-seekers

tend to be ambitious and sociable, and they value the use of expensive products that symbolize wealth and respected services that indicate social status. Therefore, residents of this type have a strong sense of vanity and are not easily fulfilled or satisfied in life. People who have an unaccomplished lifestyle tend to feel cynical, disappointed, or defeated because they have not achieved the results they wanted or their marriage or relationship has failed. Thus, they might be shrouded in frustration and feel dissatisfied with their current residential conditions.

Overall, physical environment characteristics, along with socio-psychological dispositions that are shaped by the housing types, significantly affect residential satisfaction. That is to say, housing types matter.

5. Discussion

This study attempted to explore the geographical regionalization of social-psychological health at the neighborhood level and its impact on residential satisfaction in Shanghai, an economically and culturally representative metropolis in China. The study aimed to provide new insight into the neighborhood-level socio-psychological health distribution of developing countries and to derive applications for more livable and healthier community planning in cities undergoing rapid urbanization. The study found that socio-psychological characteristics are distributed unevenly at the neighborhood level across housing types and have a significant impact on residential satisfaction, suggesting that socio-psychological factors should receive serious attention in future housing development practices.

First, greater attention should be given to public and replacement housing, as a large portion of these residents tend to be loner personality types and thus lead frustrated lifestyles. They are often socially disadvantaged groups with relatively low levels of education and income. Residents of public housing cherish their existing community life and are more willing to participate in community public affairs compared to those in replacement housing, where people are more dissatisfied with community life and less enthusiastic about participating in community activities. Public housing is a more closed community with greater neighborhood-level social cohesion, which facilitates neighborhood social interaction and the psychological formation of community identity. In contrast, replacement housing is made up of a more diverse community—residents from different parts of the city coming together—making it more difficult to form a cohesive community. For the socio-psychological contexts in these two housing types, it is necessary for the relevant government departments, developers, and community organizations to work together to seek out appropriate benefit compensation mechanisms or to modify the current resettlement compensation schemes.

In particular, it is important to note that residents of replacement housing are people who have been forced to relocate as a result of urban housing demolition. Many of them are living a frustrated lifestyle and bear a grudge against the government, constituting a major source of social conflict in Chinese cities. Therefore, in addition to improving the physical environment through a more equitable provision of public facilities and amenities, humanistic care services and social welfare coverage within the community must be strengthened to reduce social exclusion and to improve residential satisfaction. In particular, the personal dignity of households in replacement housing should be protected in urban housing demolition programs, which is a crucial factor influencing happiness and self-identity. Local governments should pay serious attention to this in the process of conducting urban housing demolition activities. Moreover, residents must be provided with psychological counseling services to address the trauma of such an experience and improve their psychological health. In this regard, neighborhood councils (*juweihui*) should make full use of their role as grassroots organizations to connect residents with subdistrict governments.

Third, creating a compact and friendly physical environment is another key component in improving residential satisfaction and promoting healthy communities. Housing reform has led to the co-existence of different housing types and has broken up the original social fabric of neighborhoods. Different housing types occupy different areas of the city with

different levels of accessibility to public facilities, amenities, and services. Therefore, it is crucial that the local government consider improving neighborhood design by means of the equal distribution of public facilities and services. Additionally, it is necessary to connect people in different housing types, with different socio-psychological dispositions and socio-economic compositions, through the mixed development of diversified housing types to promote more diverse communities and alleviate socio-psychological segregation.

In brief, future policies and practices regarding sustainable development should consider the regionalized geographical effect on socio-psychological health and the corresponding impact on residential satisfaction.

6. Conclusions

This study examined the geographical distribution of socio-psychological health at the neighborhood level and investigated its implications for residential satisfaction across diversified housing types in Shanghai. We found that a considerable proportion of residents in public and replacement housing suffer from serious trauma, which impacts their social-psychological health. Moreover, they experience quite low levels of residential satisfaction. We also found that physical environment characteristics in conjunction with socio-psychological disposition are significantly associated with individuals' residential satisfaction. Our findings suggest that housing development should pay attention to its effect on regionalizing the distribution of socio-psychological dispositions. To promote healthy communities, planners should combine socio-psychological initiatives with improvements to the physical environment. Overall, this study shed new light on urban health from a socio-psychological perspective, delivering important implications for improved policies and practices for better lives.

Compared to previous studies on urban health, this study exhibits new insight into the distribution of urban health from a socio-psychological perspective and its impact on residential satisfaction, contributing to the research community in two ways. First, this study provides local governments and policymakers with guidance for future urban housing development. Second, this study offers an applicable framework for similar studies in other parts of the world, such as South Korea, Singapore, and Central and Eastern Europe, which have also experienced housing reform and have existing diversified housing types.

This study has several limitations. First, it does not consider the role of residential self-selection, that is, whether the participants with a specific socio-psychological disposition choose to reside in the residential neighborhoods with the characteristics that match their preferences and desire [38,39]. This would confound the relationship between housing types and socio-psychological health. Future progression from this point of view will suggest a randomized experiment to achieve a more reliable result. Second, the survey was conducted through self-reports, which may contain social desirability bias. This can interfere with the actual range of individual differences and tendencies as well as the interpretation of model results. Future investigation should utilize long-term observation based on the panel setting, with longitudinal analysis. Third, although the study sheds new insights onto the literature regarding socio-psychological health patterns for residents going through housing reform, the socio-demographic and geographic scope may limit the general applicability of the findings.

Our findings advise some avenues for future studies. First, public and replacement housing residents are vulnerable groups receiving social welfare from the government but are suffering socio-psychological issues. This is a significant potential menace to the public and to social stability. Thus, further research should investigate the connection between social housing and social welfare regimes to avoid radical regional divergence. Second, the regionalization of housing has resulted in a conspicuous landscape in urban China, representing evident spatial segregation. Future studies are required to understand how public and replacement housing communities can be blended into the urban fabric to improve social cohesion, sustainability, and resilience. Third, residential satisfaction is positively correlated with prosocial giving and helping others, which are presented

distinctly differently in commodity and social housing. However, the relationship between individual aspects of life satisfaction and prosocial behavior remains unclear. From this point of view, further research is needed to investigate whether prosociality is a significant predictor of residential satisfaction within the context of diversified housing types.

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