Predictors of Personalization in a Case of Iranian Affordable Housing: The Impacts of Housing Statuses, Dwelling's Physical Characteristics, and Household Demographics

Akram Hosseini[1*], Sarah Rahmani[2]

[1]Faculty of Architecture and Urbanism, Ferdowsi University of Mashhad, Mashhad, Iran

[2]Department of Civil Engineering, Architecture and Urbanism, Sadjad University of Technology, Mashhad, Iran

Abstract

Background Mass housing with standardized repetitive design has been a prevalent trend of housing provision for low-income families in Iran for the past two decades. One way forward for architecture to overcome such a monotonous environment is to facilitate residents' personalization which can transform ready-made, uniform dwellings to distinctive, original ones. Thus, this article investigates the various factors that can predict personalization behavior in affordable housing

Methods Factors of personalization are categorized into three groups, including housing statuses, dwelling's physical characteristics, and household demographics. Personalization, as the dependent variable, is also studied according to its three aspects; functions, elements, and settings. The sample consists of 133 households of a case of affordable housing located in Mashhad, Iran. The data are collected mainly through interviews and observation and, then, go through multivariate analysis.

Results The results demonstrated that the highest impact on personalization was left by housing statuses, among which anticipated residence was generally the main predictor while being interrelated with ownership type and length of residence. Dwelling's physical characteristics ranked second except for the preventive function of personalization for which they comprised the principal predictors. Also, household demographics produced minimal effects, merely on instrumental personalization.

Conclusions Architecture may rely on personalization and facilitate it in places that are under a resident's full control, used for essential daily activities, are spacious for intervention, and have high visibility and/or accessibility from outside. Even when these conditions are met, personalization could be strengthened only if the residents have high expectations for a place's use time.

Keywords Personalization, Affordable Housing, Iran

*Corresponding author: Akram Hosseini (akram.hosseini@um.ac.ir)

Citation: Hosseini, A., & Rahmani, S. (2020). Predictors of Personalization in a Case of Iranian Affordable Housing: The Impacts of Housing Statuses, Dwelling's Physical Characteristics, and Household Demographics. *Archives of Design Research, 33*(3), 89-107.

http://dx.doi.org/10.15187/adr.2020.08.33.3.89

Received : May. 12. 2020 ; **Reviewed :** Jun. 16. 2020 ; **Accepted :** Jun. 19. 2020
pISSN 1226-8046 **eISSN** 2288-2987

1. Introduction

One inexpensive way of housing provision for low-income families is through the mass housing scheme, which is the prevalent trend in Iran.[1] Of the measures residents take to address the monotonous design of such standardized homes is to perform various interventions, defined as personalization, which would change a ready-made dwelling to a more distinctive one, more congruent with their character, expectations, and lifestyle (Habraken, 1972; Rapoport, 1982; Bently *et al.*, 1985; Tipple, 2000). This study, thus, investigates such behavior in a certain mass housing complex to present planners and architects with helpful feedback to both addressing the concerns of low-income residents and taking steps to provide a presonalizer-friendly environment.

1. 1. Aspects of Personalization

Previous research has investigated personalization in three respects, including its function, the type of employed elements, and its setting. As this behavior is largely considered to be a basic mechanism of territoriality, its main function would be to boost defense and regulate social interactions (Altman, 1975; Edney, 1976; Gifford, 1987). Greenbaum and Greenbaum (1981) made a distinction between two almost opposite functions of territorial personalization; preventing unwanted social contact and facilitating social interaction. The preventive function is strongly evident in measures taken to prevent robbery and invasion, provide a sense of security (Newman, 1973; Brown & Altman, 1983), express ownership and legitimate occupation (Sommer & Becker, 1969), and provide privacy, especially visually (Pastalan, 1970; Tames, 2004). These would be accomplished in a way that simultaneously serves the facilitative function, too. For example, the decoration of an entrance space might both welcome friends and warn burglars (Brown, 1985). However, we might distinguish those personalization acts which are mainly performed to increase the beauty and attractiveness of a place and, at the same time, convey resident's tastes, preferences, and interests. These self-expressive instances elicit individual and communal identity, with the primary concern of winning others' approval. Comparing a standard door guardrail, installed to prevent robbery, with a handmade wreath flower on the front door to welcome visitors can show this distinction between preventive and facilitative functions of personalization.

Personalization, despite its territorial function gaining more prominence in previous studies, inherently involves instrumental and structural interventions to adjust a given space for use, too. This third function acquires considerable significance in affordable housing as its inhabitants might not be able to relocate if the current dwelling was not congruent with their lifestyle and requirements (Tipple, 2000). For example, the way to deal with housing pressure in mass housing is sometimes to extend a house to its adjacent outdoor area instead of moving to a larger dwelling (Brand, 1995; Tipple, 2000; Tames, 2004). Therefore, affordable housing experiences such interventions as extension, transformation, subdivision, rearrangement, and the like, for its practicality to improve.

Beside function(s), each act of personalization is performed through some type of element, and in a physical setting. Built on the concept of the three features of elements of space by Hall (1969), including fixed-feature, semifixed-feature, and informal/nonfixed-feature elements, personalization elements are mainly placed under the category of semifixed ones

(Rapoport, 1982; Brown & Altman, 1983; Kopek, 2006). This is because while collective sociocultural meanings can be better conveyed by fixed elements, semifixed ones serve to express personal meanings, as well, which is significant in the study of personalization (Ahrentzen, 2002). Nonfixed elements, on the other hand, are bound up with the non-verbal behavior of occupants in determination of distance and proximity (Hall, 1969; Rapoport, 1982) rather than physical markers of personalization. Therefore, we deem them inapplicable in the study of personalization and focus on fixed and semi-fixed elements.

Concerning the setting for personalization, we refer to the definition of three types of territories by Altman (1975), including primary, secondary, and public. As primary territory is permanently owned and expresses a close link among privacy monitoring, mechanism of territoriality, and self-identity (Altman, 1975), it could be more susceptible to personalization in comparison with the other two. As an example, Abu-Ghazzeh (2010), comparing flat housing with detached ones in Jordan, indicated that the residents showed a tendency to mark either owned areas or places over which they had legitimate control more than public territories. Secondary territory, also, witnesses several acts of personalization, especially in the proximity of entrance space, such as greenery, embellishment, paving, etc. (Abu-Ghazzeh, 2010; Tames, 2004; Werner, Peterson-Lewis & Brown, 1989). Types of personalization in the public territory, though, are somehow different from the instances recited in this introduction, as they generally involve short-term occupation of space (Becker, 1973) without any lasting influence on the environment.

In sum, personalization is expected to vary according to its three aspects, including function (preventive, facilitative, and instrumental), element (fixed and semi-fixed), and setting (primary, secondary, and public territories). This paper, thus, takes all three into account during investigation and discussion.

1. 2. Factors of personalization

1. 2. 1. Housing statuses

Ownership type. As one major function of personalization is to claim a place as one's own and increase control over it (Heidmets, 2014), we may assume that owners engage in more territorial personalization than renters. Greenbaum and Greenbaum (1981) supported this notion as their research in a Slavic-American neighborhood demonstrated that, regardless of inhabitants' ethnicity, owners were likely to engage in more self-expressive interventions with semifixed elements than renters were. However, Edney (1972b) found no correlation between the type of ownership and the amount of personalization that served a preventive function. Ownership might be influential on instrumental personalization, especially with fixed elements, since acquiring permission for interventions generally lowers its frequency (Gifford, 1987) and renters do require the permission of owners for heavier interventions, such as subdivision and transformation.

Length of residence. Since personalization tends to be an ever-developing issue (Edney, 1972b), the longer an individual resides at a place, the more they might boost their territorial behavior. Moreover, given that personalization positively affects the sense of belonging to the place (Kopek, 2006) and that this feeling contributes to the increased length of residence (Kasarda & Janowits, 1974), it is logical to infer a direct relationship between the amount of territorial personalization and length of residence. This has been confirmed by Esquer & Eugenia (1986) in the investigation they carried out into personalization in the front yards

of some Mexican houses, which covered both fixed and semifixed elements. The effect of the length of the past residence on territorial defense with semifixed elements was also shown by Edney (1972 a). Greenbaum and Greenbaum (1981), however, showed that even though the length of the past residence did not independently influence facilitative personalization, it would make a change in it through a three-way relation with ownership type and ethnic identity.

Anticipated residence. A limited number of studies have investigated the rise in the amount of personalization when dwellers intended to remain at the same house. The two studies Edney undertook in 1972 on a certain number of university graduates and single-detached dwelling households in Connecticut, the U.S.A, acknowledged that as future residency was more anticipated, space claim of the owner rocketed and more territorial personalization was taken, respectively. His inventory checklist covered semifixed elements with preventive function. Altman's social isolation studies (1971), although yielding no significant relationship between territorial behavior and anticipated residence, demonstrated that those individuals showing this behavior at the early times of residing in an environment were able to remain there longer than those who did not.

1. 2. 2. Dwelling's physical characteristics

Current research has shown certain features of a house contribute to alteration in the rate of personalization. Most prominently, the size of space can affect facilitative personalization as larger spaces accommodate more furniture, decorative elements, and the like (Skjaeveland & Garling, 1997). On the contrary, Tipple (2000) found out that, in dealing with housing pressure, as the size of a house and the number of its habitable rooms decreased, more instrumental interventions occurred, with both fixed and semifixed elements implemented, to provide space household members required. Regarding the open space, both Tipple (2000) and Brand (1995) showed that due to its dispensable function, a large private outdoor space allows inhabitants to extend and enlarge their original dwelling and, thus, encourages more instrumental personalization with fixed elements. Moreover, open space adjacent to a dwelling, private or public, is shown to have facilitated actions such as growing plants, decorating, and maintaining (Tames, 2004; Abu-Ghazzeh, 2010; Esquer & Eugenia, 1986). Tames (2004), especially, showed that an open space adjacent to the entrance of a dwelling is an ideal setting for facilitative personalization. Another contributing factor is defined as the level of space. As one function of personalization is to provide privacy, those houses which are on the lower floors are more exposed to passers-by's scrutiny (Skjaeveland & Garling, 1997) and, consequentially, are in greater need of preventive personalization.

1. 2. 3. Household demographics

Limited research, conducted on the influence of household size, age, and gender on personalization, has often focused on the instrumental function of interventions. Tipple (2000) suggested that inhabitants with larger household sizes as well as those with at least two adult children with the opposite sex are more likely to transform their house to provide adequate space and privacy. Enlarging small dwellings to relieve a large family from housing pressure is also shown by Carmon (2002) and Avogoa et al. (2017). The former, also, suggested that middle-aged heads of a family with above-high school education are more

likely to engage in such interventions.

Resident's income can also be considered as a factor because interventions may require financial ability (Gifford, 1987; Jusan & Sulaiman, 2005). However, this factor has not introduced a stark difference in the functions and types of elements of personalization.

Evans et al. (2003) found out that all financial groups employed semifixed elements to express their territorial feeling in Amarillo, Texas. Though, low and average-income neighborhoods used signs as a means of personal identity and the right to ownership expression while well-to-do families showed a strong tendency towards greenery and statuary. Janz (1992), having investigated two vicinities with dissimilar incomes, also showed that although distinctive elements regarding the type, material, and color were employed, both groups exploited semifixed elements. He also showed that the low-income families undertook personalization in the territory adjacent to their dwellings to convey both individual and group identity while this was limited to the concepts relevant to group membership, in the case of high-income families.

1. 3. Aims and Hypothesis

The general aim of the current study is to investigate the possible relationships between the three aspects of personalization in mass housing and residents' housing statuses, dwelling's physical characteristics, and household demographics. Based on the findings of sections 1.2.1 to 1.2.3, the following correlations may be hypothesized.

First, preventive personalization may correlate with those housing statuses which involve the length of residence, past or future, as well as with physical characteristics that increase the likelihood of visual and/or physical intrusion into a dwelling, including floor, presence of a private outdoor space especially adjacent to the dwelling's entrance.

Second, facilitative personalization may be correlated with housing statuses, such as ownership type and length of residence, that promote the feeling of identity and belonging and with physical characteristics, like indoor and outdoor space size, number of rooms, and presence of open space adjacent to a dwelling's entrance, that provides space and opportunity for self-expression.

Third, instrumental personalization, based on the housing pressure theory (Tipple, 2000), may correlate with dwelling's physical characteristics and household demographics which prompt a family to transform, subdivide or enlarge their habitable spaces, including indoor and outdoor space size, number of bedrooms, presence of private outdoor space, number of children, age, and gender.

Fourth, the majority of personalization is expected to be employed with semifixed elements; however, the use of fixed elements may correlate with housing pressure and therefore, become affected by the same predictors as of instrumental personalization.

Fifth, the primary territory is anticipated to be the main setting of personalization, whenever a factor affects it, though the interventions in the secondary territory may be correlated with those physical characteristics which indicate the immediate adjacency of a dwelling's primary territory to the public one, such as the floor number.

Based on our five hypotheses, we developed a set of factors of personalization and used their measurements as predictors of its three aspects in multiple regression analyses. There are, also, some intervening factors, such as residents' personality, preferences, life experience,

and the like, which might affect the personalization behavior, though they are not included in this cross-sectional study.

2. Method

2. 1. Research setting and participants

Of the subsidized affordable mass housing developments in Mashhad, Iran is Armes complex whose construction was concluded in 2005 and released for occupation till 2007. It is selected mainly because it includes households with higher variation in the length of residence (up to 11 years) comparing with other local instances. As no pre-registration and assignment process was followed by its funding source at the time, the ready-made flats were offered with low-interest loans to those families who proved not to own another property. These families were at liberty to choose a flat most suited to their resources and requirements, due to the variety of flats' physical specifications, such as size, number of rooms, level, and type of private outdoor space. We found this variation beneficial for this study as it allowed us to examine the effects of a dwelling's physical characteristics on personalization in combination with residents' housing statuses and household demographics.

Armes is comprised of 756 flats divided into four identical clusters (see supplementary appendix 1 for the location and the aerial view of the Armes complex in Mashhad). We surveyed personalization instances in one of these clusters, comprising 189 households out of whom 133 families could be reached. Other inhabitants either did not answer the doorbell or refused to fully participate in the research. Each of the four clusters consisted of eight blocks ranging from three to five floors. Ground-floor flats enjoyed a separate front door, followed by a front yard, while other floors each consisted of two to seven flats being accessed by common stairs and a hallway. The flats, with areas ranging from 43 to 106 square meters (mean=72.36 m^2), had between one to three bedrooms. Of surveyed flats, 85.7 percent had a private outdoor space in the form of a front yard, balcony, or rooftop terrace, with a mean area of 32.86, 6.11, and 41.25 m^2 respectively (Figures 1 and 2).

Figure 1 A general view of the surveyed area.

Figure 2 A three-story block comprising 16 apartments, with either a front yard, a terrace, or a rooftop terrace.

The interviews were conducted with the female head of each households[2], who provided us with their demographic data. Due to the different number of children in different households, we used the age of each interviewee as an indicator of the age of her children, as older mothers normally have older children. The variation in their financial ability, due to their reluctance to provide accurate information, was recorded using the same method Evans et al. (2003) employed, using housing value as its index. These values, estimated by the help of a local realtor, were categorized in ten levels and used as dwellers' financial ability (Table 1).

Table 1 The demographic characteristics of interviewed households (n=133)

	Age of the female head of household	Household Size	No of Children	Financial Status or Apartment Value (US Dollars)
Mean	37.97	3.17	1.30	–
Minimum	21.00	1.00	.00	15,475–16,665
Maximum	65.00	6.00	4.00	32,140–34,520

Note. One US Dollar equaled 42000 Iranian Rials by the governmental rate at the time of the survey (summer 2018).

2. 2. Measurements

Concerning independent variables, the data on housing statuses were collected through interviews, similar to demographic data. It included ownership type as two categories of owners (54.9 percent) and renters (45.1 percent); length of residence as a continuous variable (from one month to 11 years; mean= 4.15 years) and anticipated residence as an ordinal variable with five levels, including near-term (16.5 percent), short-term (44.4 percent), medium-term (15.0 percent), long-term (17.3 percent), and life-time residence (6.8 percent).[3] Furthermore, each of the dwelling's physical characteristics was collected based on architectural documents of the complex. They were measured as continuous variables, using the metric system when applicable, excluding the adjacency of a private outdoor space to the dwelling's entrance which was registered as a dichotomous variable (0 as no, 1 as yes). As this condition only applied to the ground floor flats with front yards adjacent to their entrances, we named it the front yard entrance. Also, instead of the number of habitable rooms in each flat, the number of bedrooms was registered, since all households possessed one great room (living and dining room).

In registering dependent variables, what we called an instance of personalization was according to the type of each intervention, or simply its name, such as flowerpot, tree, guardrail, etc. (see supplementary appendix 2 for a list of instances of personalization and their frequency).

Initially, if each of these was recognized as a post-occupation intervention, it was counted as one instance, regardless of its number, volume, and the like. Afterward, for each instance, three measurements were made. Its category in the elements as well as settings of personalization was checked and counted as dichotomous variables, such as one fixed element and one primary territory. Then, the function of each instance was determined based on what the interviewee stated as her or his primary motive for implementing it, such as providing visual privacy which was registered as the preventive function of personalization. Although having observed that some personalization elements served more than one purpose, e.g. climbing plants both beautified the place and provided privacy, we recorded the one the dweller announced as the primary motive for employment. Afterward, through observation, we measured this function on a 5-degree ordinal scale from very low to very high according to the extent to which that instance affected and changed the character of its surroundings (Figure 3).

Figure 3 Each of these two examples of personalization with climbing plants in front yards was recorded as one primary territory, one architectural semi-fixed element, and facilitative personalization as its function. However, this function for the one on the right was measured five and the one on the left, two.

During the investigation, we found out that the category of semifixed elements included two subcategories. One consisted of those personalized items whose employment either demanded any kind of construction work and/or eventually became a part of the architecture of a house, like paving, painting, a replaced door, a tree, etc. The instances of the other subcategory, though, could be easily carried around the house or moved to another flat, such as flowerpots, shoe rack, free-standing cabinets, and wooden partitions. Therefore, we divided semifixed elements into two subcategories of immovable semifixed and movable semifixed ones.

2. 3. Procedure

Data were collected through observation and, at the same time, interview. Primarily, we prepared a form for recording and measuring the variables. A team of two trained female research assistants, then, went door to door, and following explaining the research objective and acquiring the permission of the dweller, filled a separate form for each household and took photos, if allowed, of personalization instances both inside and outside each flat. Female assistants were chosen as their same-sex with the interviewees could be instrumental in promoting trust and inclination to participate in the research. Also, their working together as a team prevented the error in the subjective measurement of personalization functions. They visited the complex and collected data on weekends so that they could contact both housewives and women with jobs. In each interview, following demographic questions, they asked the interviewee about the interventions the family had done in their flat, as well as their secondary and public territories, after occupation. They, then, observed and recorded these instances, according to the measurement guidelines described in section 2.2.

Overall, 49 types of personalization with Cronbach's alpha of 0.711 were recorded. Each type included three aspects concerning its function, element, and setting. As each of these three had their own three variables, nine sets of numbers were determined as dependent variables. Also, for the total amount of personalization performed in each flat to be determined, the three measurements of personalization functions were summed which produced the tenth dependent variable. But since no act of personalization was performed in the public territory, nine dependent variables remained, for each of which we performed nine separate stepwise regression analysis. There were a total of 12 independent variables in each test, including housing statuses (ownership type, length of residence, and anticipated residence), dwelling's physical characteristics (indoor space size, outdoor space size, number of bedrooms, floor, front yard entrance), and household demographics (age of the female head of a family, household size, number of children, and financial ability) (table 2). For a regression analysis with 12 independent variables when a medium-size effect is expected, our sample size (n=133) was just above the minimum required number, based on Field's estimation (2013).

Table 2 Stepwise multiple–regression predicting personalization and its three aspects

Model	Dependent Variables	Significant Predictors	B	SE	Beta	P	Adjusted R^2	R^2 change
1	Overall Personalization	(Constant)	−8.197	3.031		.008		
		Anticipated residence	3.307	.606	**.389*** **	.000		.171
		Front yard entrance	6.767	1.545	**.312*** **	.000		.155
		Indoor space size	.141	.036	**.278*** **	.000	0.333	.023
							F= 22.919***	F change = 4.448*
	Functions of Personalization							
2	Preventive Personalization	(Constant)	2.032	.688		.388		
		Front yard entrance	4.626	.682	**.510*** **	.000		0.260
		Financial ability	0.273	.112	.197*	.016	0.282	0.033
							F= 26.909***	F change = 5.983*

3	Facilitative Personalization	(Constant)	−3.774	1.490		.013*		
		Anticipated residence	1.418	.298	**.361*** **	.000		.148
		Indoor space size	.065	.018	**.279*** **	.000		.079
		Front yard entrance	1.835	0.759	0.183*	0.017	0.243	0.033
							F= 15.123***	F change = 5.841*
4	Instrumental Personalization	(Constant)	−4.344	1.506		.005		
		Anticipated residence	2.356	.389	**.458*** **	.000		.251
		Household Size	1.077	.403	**.202****	.008	0.279	.039
							F= 26.510***	F change = 7.161**
	Elements of Personalization							
5	Fixed elements	(Constant)	−.302	.149		.044		
		Anticipated residence	.214	.053	**.331*** **	.000	0.102	0.109
							F= 16.069***	F change = 16.069***
6	Immovable Semifixed	(Constant)	.093	.483		.848		
		Anticipated residence	.926	.168	**.406*** **	.000		0.168
		Front yard entrance	2.044	.430	**.351*** **	.000	0.281	0.123
							F= 26.743***	F change = 22.642***
7	Moveable Semifixed	(Constant)	−1.243	.731		.092		
		Anticipated residence	.453	.132	**.277*** **	.001		.093
		No of Bedrooms	.563	.226	**.201***	.014		.044
		Age	.031	.014	**.175***	0.032	0.148	.030
							F= 8.656***	F change = 4.698*
	Personalization Settings							
8	Primary Territory	(Constant)	0.70	0.812	**.467*** **	.129		
		Anticipated residence	1.628	.264	**.226****	.000		.204
		Outdoor space size	0.57	.019		.003	0.244	.051
							F= 22.289***	F change = 8.901**
9	Secondary Territory	(Constant)	−0.162	.188				
		Anticipated residence	0.154	.052	**.247****	.390		
			0.042	0.020	**.172***	.004		.063
						.042	0.079	0.029
							F= 6.640**	F change = 4.222**
10	Public Territory	–						

Note. N= 133. B, unstandardized regression coefficient. SE, standard error. Beta, standardized regression coefficient. P, probability. R^2, proportion variance. F, F test. *, p< 0.05; **, p< 0.01; ***, p< 0.001. All statistics are from the final step, excluding R^2 change. The variable front yard entrance was coded 1 for those apartments with a private open area adjacent to their entrance, and 0 for those without. The variable ownership type was coded 1 for owners, and 0 for renters.

During the analysis, we saw that some independent variables that had shown a significant bivariate correlation with the dependent one at the first stage of the test had been omitted from the final results. For example, although ownership type showed a 0.307 correlation ($p<0.001$) with the overall personalization, it did not appear in the results as a significant predictor because of its interrelationship with anticipated residence, a stronger predictor. Therefore, we repeated the same analysis twice more, but each time, we removed one significant predictor and observed what new predictors would appear. This process enabled

us to determine which variables had been concealed behind the stronger influence of another predictor, which we called substitute predictors (see supplementary appendix 3 for substitute predictors).

We expected generally medium-size effects, though finally, this only applied to some first row predictors while the majority of significant correlations showed low-size effects. As this low-size effect calls for larger sample size, the possibility of type 2 error in our results increased. To mitigate this problem and raise the probability of the reported effects, we showed that the P-value for most correlations was lower than 0.001. Also, those correlations with the effect size less than 0.2 and $p>0.01$ were excluded from our discussion.

3. Results and Discussion

Tables 2 shows the final results in 10 models. The variation in overall personalization measurement was mainly explained by housing statuses, followed by a dwelling's physical characteristics, while household demographics left the weakest effects (Table 2, model 1).

According to model 2, the first part of our first hypothesis, expecting a positive correlation between preventive personalization and permanence was rejected, though its second part about the effect of growth in public intrusion on raising preventive measures was confirmed. The highest level of exposure was observed in the front yards of the ground floor flats, which were immediately communicated to the public territory, fully exposed and accessible to strangers, and more vulnerable to robbery than dwellings on the higher floors. This shows that preventing others from invading private property and preventing unwanted social communication are so critical that all residents, regardless of their residential or demographic conditions, may similarly carry out personalization. Therefore, the Edney proposal (1972 a; 1972 b), expecting an increase in protection measures with a higher expectation of future habitation, is not generalized here. However, the importance of preventive personalization in the front yard is also seen in Brown and Altman (1983), and Brown (1985). On the other hand, the dominant use of high-rigid walls and fences in combination with opaque plates instead of symbolic barriers in this case, was inconsistent with Patterson (1978), who correlated these real obstacles with the degree of fear of theft and crime in the complex environment, since residents were generally satisfied with the state of security of the environment.4 We believe that using actual boundaries in this sample can be related to the culture of the inhabitants as well as the affordable nature of the sample. On the one hand, in an Iranian typical house, if the yard is not completely closed, it cannot be used by the family (especially females) and, gradually, turns into a parking lot and storage area. On the other hand, due to the lack of space in affordable housing, the effective use of the yard to expand the internal activities is of higher necessity (Figure 4).

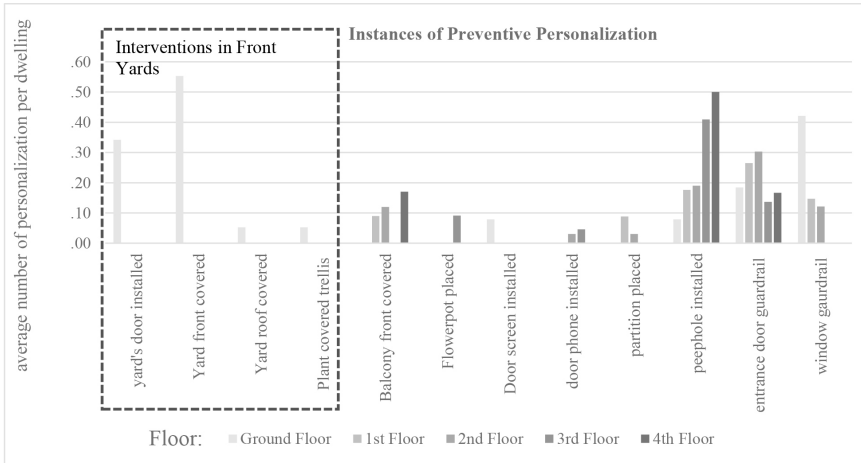

Figure 4 Instances of preventive personalization according to Floor.

Upon removal of front yard entrance form the test, preventive personalization showed a positive correlation with the size of private outdoor space, but a negative one with the floor. It shows that the larger the area of the private open space, i.e. lying on the lower floors, the greater exposure. The fact that these two increase the preventive personalization measures is consistent with the views of Skjaeveland and Garling (1997). Instead, in a shared hall on higher floors, a lower level of communication, activity, social control and, consequently, creation of a sense of insecurity can cause residents to monitor this area and check the guests through the peep-hole before opening the door (See supplementary appendix 4 for Instances of preventive personalization according to private outdoor space size).

Based on model 3, the first part of the second hypothesis which, based on Greenbaum & Greenbaum (1981) and Esquere and Eugenia (1986), expected facilitative function to correlate with ownership type and length of residence, was adjusted to include anticipated residence as the main drive. The second part of this hypothesis, focusing on the effect of space and opportunity on facilitative acts, was confirmed as this function was weakly influenced by indoor space size. Given that facilitative personalization has an output-input relationship with self-expression, personality, and sense of belonging to a place, it can be concluded that an increase in the prediction of residence length can accelerate the formation of this reciprocal relationship (Figure 5). Also, if a resident finds more chance and space inside her house to showcase objects that are consistent with her taste and character, they can perform facilitative personalization more easily, more efficiently, and more quickly, as Skjaeveland & Garling (1997) predicted. Given that, in the case of preventive personalization, outside space was more substrate, but in the case of facilitative, the increase in interior compared to the exterior personalization could be due to more time and continuity (in all seasons) spent indoors by residents and their guests (see supplementary appendix 5 for Instances of facilitative personalization according to indoor space size).

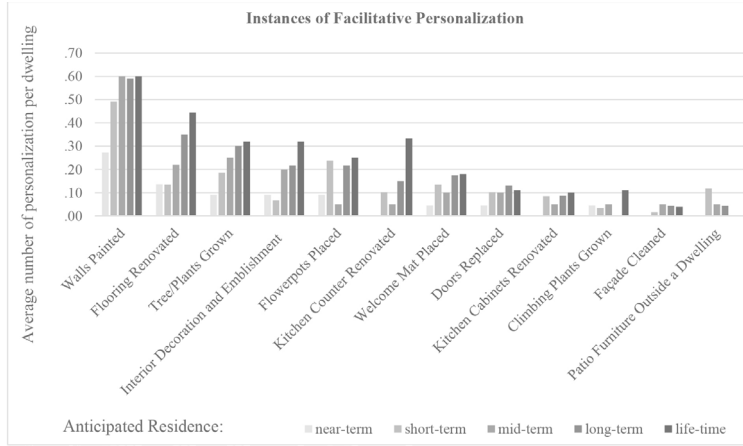

Figure 5 Instances of facilitative personalization according to anticipated residence of a family.

Contrary to the third hypothesis, model 4 shows that higher numbers of instrumental personalization were moderately correlated with longer anticipated residence. Furthermore, instrumental personalization was the only function that was predicted by a variable of household demographics but not by any physical characteristics. The main impact of the future residency program on instrumental personalization may be due to the low financial ability of the residents and their predominant tendency to relocate (more than 60% of the people had a near-term and short-term residency program); it means that in deciding to improve their home space to match their needs and lifestyle, residents may be more likely to have considered a longer-term use of the capital they spend than the inconvenience they have suffered. Furthermore, the prevailing type of instrumental personalization was not to increase, add, or transform the use of home spaces, as presented in Tipple (2000) and Tames (2004); rather it was light aiming to make the house roomier and to add to the comfort of the residents (Figure 6).

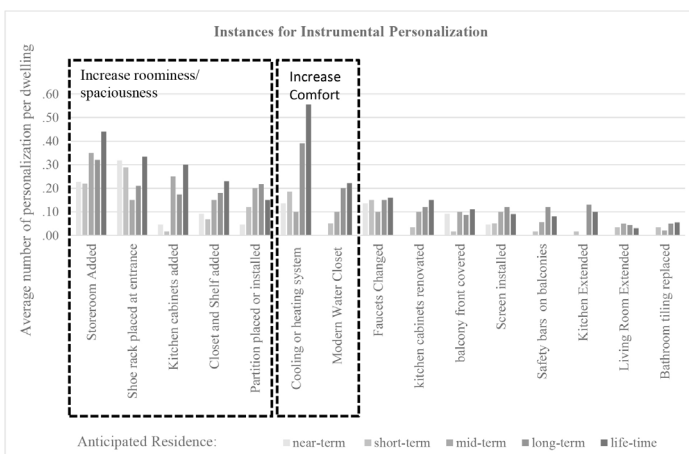

Figure 6 Instances of Instrumental personalization according to anticipated residence.

Meanwhile, inconsistent with the prediction made by Tipple (2000) and Brand (1995), in this sample, despite the combination of two factors of the insufficient space and the high household size, along with the presence of a private open space with a suitable area,

the expansion of the interior space to the outside was performed by merely a handful of families[5]. It could be concluded that other determining factors, including the rigorous laws of the municipality regarding the observance of the roofed and unroofed area at the time of sale or rental, combined with the dominant tendency to change the home, as well as the low financial ability, as a deterrent against fundamental changes, can cause a failure to predict instrumental personalization through physical and demographic factors. The only demographic factor with a weak impact was the size of the household and, more importantly, the presence of children. But the type of instrumental interventions that had been changed by this factor indicated that even with an increase in family members, the spatial separation and regulation of the territory of individuals inside the home was marginally a motive in personalization. These interventions were largely focused on improving the climatic comfort of residents and convenience in tidying the house where children live (Figure 7).

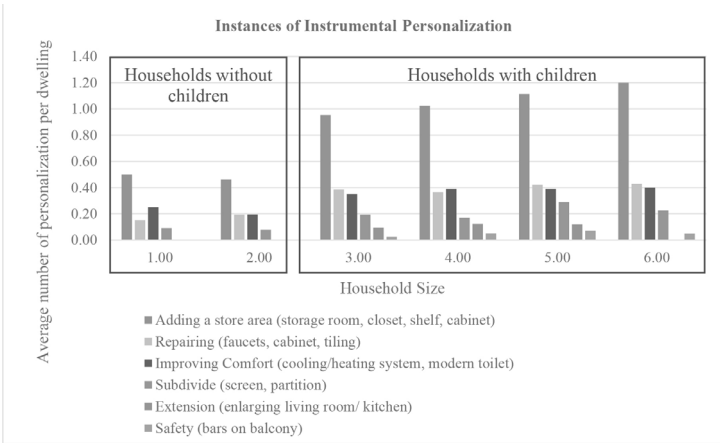

Figure 7 Instances of instrumental personalization according to household size.

The first part of hypothesis four was confirmed since 95.6 percent of all instances of personalization was performed using semifixed elements. Also, in accordance with this hypothesis, the anticipated residence was the primary predictor of the employment of fixed elements, but it predicted the other two categories of semifixed ones, too (Table 2, models 5 to 7). This factor was substituted with ownership type and length of residence subsequently. This could be due to the maximum use of the budget spent by a low-income family, rather than housing pressure as suggested by Tipple (2000). The higher effect of housing statuses on the application of immovable semifixed elements compared to movable ones can further support this claim (Figure 8). This is because employing the former demands more money and effort than the latter and may have no economic justification for the low-income families who are planning to leave. Moreover, landlords enjoy more stability in their homes than tenants and suffer less from the concern of leaving the house in case of unexpected conditions such as inflation, rent increase, or impulsive desires of the landlords. Thus, the application of moveable semifixed elements should not have been affected by anticipated residency, since these elements can be moved to the next house. However, the marginal recorded impact shows that, as with the facilitative personalization, with the prediction of longer-term residence, residents may have emotionally, and financially, invested more so that they employed these elements based on their tastes and needs yet cautiously and hesitantly

to benefit from a suitable environment in the future (see supplementary appendix 6 for Instances of movable semifixed elements according to the anticipated residence).

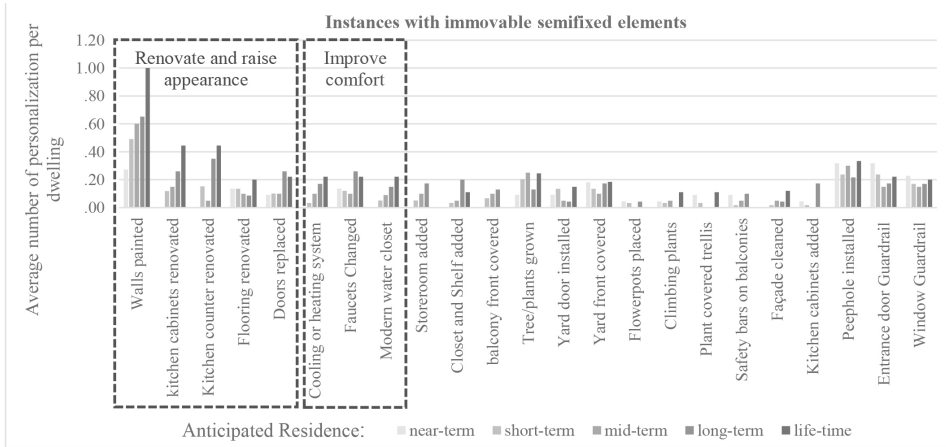

Figure 8 Instances of immovable semifixed elements according to the anticipated residence.

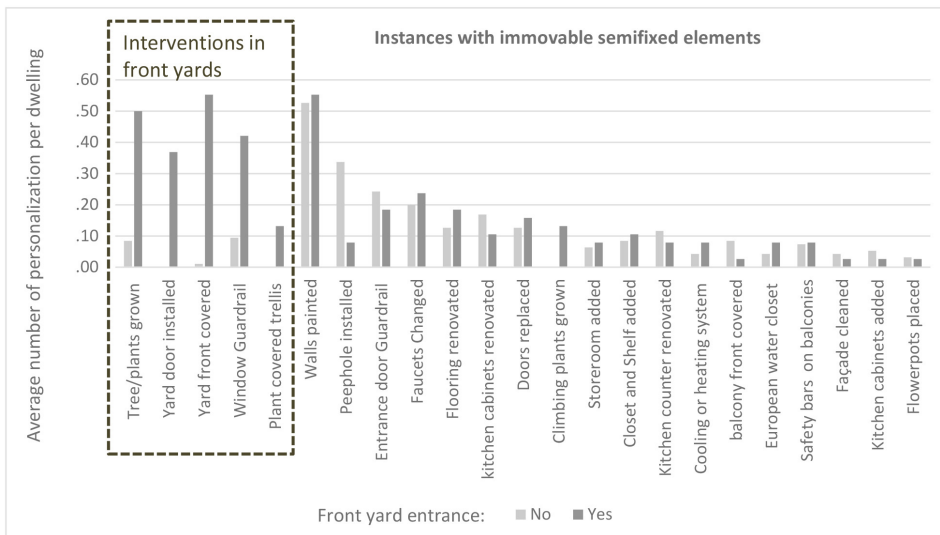

Figure 9 Instances of immovable semifixed elements according to the factor front yard entrance

Following the impact of anticipated residence, employment of immovable semi-fixed elements in the front yards increased, which showed the ability of these elements to provide deterrence and to create visual and physical privacy in areas of high exposure while moveable elements could have been trespassed leading to shorter-term privacy. Therefore, the less application of immovable elements on the higher floors with less private open area and, consequently, less exposure and robbery could be justified (Figure 9). On the other hand, movable semifixed elements used in the personalization of this sample were often more affordable and sought a facilitative purpose. Comfortable employment of these elements, without need for planning, prior allocation of funds, specialist work, or parent supervision, can increase their application based on personal interests of each member of the family, even children. This may be due, although marginally, to the number of bedrooms- that is, the privacy and the identity expression of the children- and age, whose increase to puberty lead to more self-expression

(see supplementary appendix 7 for Instances of movable semifixed elements according to the number of habitable rooms in each dwelling).

The supposition in the first part of hypothesis five that primary territory is the most personalized setting was confirmed as this setting allocated 91 percent of registered instances (678 out of 742) to itself. On the contrary, the second part of this hypothesis was rejected because personalization on secondary territory was not influenced by any physical characteristics of a dwelling, only weakly correlated with anticipated residence (Table 2, model 9). Besides, the public territory was eliminated as one of the settings of personalization. On the one hand, no durable elements were found in this territory, which corroborates Becker (1973) that personalization in this territory is carried out with personal belongings that are moved as the residents move, thus leaving temporary effects. On the other hand, regular monthly payments for public territory maintenance were compulsory thus unable to show the level of sensitivity or attention of residents to the situation in this space. Even the secondary territory, when there was an open space in front of the entrance to the houses, did not act as a suitable platform for personalization, contrary to Tames (2004). The front yards of the ground-floor flats, which, according to Greenbaum and Greenbaum (1981), Esquer and Eugenia (1986), Brown (1985), and many others, could have acted as the secondary territory to regulate the privacy and social interactions of the inhabitants were closed and turned into the primary territory. The board of the complex was assigned responsibility for the open space (sidewalk and garden) behind it. This, coupled with a very marginal number of personalization measures in the front door area of the higher-floor flats, can indicate the importance of protecting personal belongings and not spending money on joint spaces that are not legally owned by a person and fully under control.

4. Conclusion

The overall layout of main predictors and their successors suggests that, firstly, even the smallest personalization measure can depend on the prediction of its use time and be strengthened by increasing the possibility of utilizing financial and emotional investment. Therefore, stable residence and full control over personalized elements were the keys affected by the anticipated residence and ownership type. Even a rise in the length of past residency could have been affected by the permanent expectation of some residents to leave the environment at the time of higher financial ability and have prevented affecting the formation of the sense of belonging or expressing it, if any. Secondly, personalization requires an opportunity to take place, and this opportunity should be perceived by the resident. Therefore, spaces that are continually used for essential and daily activities of the family and are more exposed and accessible are more likely to undergo personalization if they are spacious. Such spaces have often been found on front yards of ground-floor flats, where a major part of personalization measures seeks to deter robbery and provide privacy. Although personalization to primarily and originally deter invasion seems to have a compulsory nature, yet these measures are capable of expressing residents' identity and play a role in shaping

the personality of the environment and its diversification. Thirdly, the marginal impact of some demographic characteristics on personalization, especially instrumental measures, can show that even when a family is under housing pressure, willingness to relocate and rigidity of Municipality regulations can prevent the expansion of the interior space outward so that it would be the family that adjusts itself to the house rather than the house to the family.

The study has implications for both policy-making and the design of affordable housing. Above all, it suggests that to rely on personalization as a way to overcome the repetitive standardized design of mass housing schemes, policies need to be formulated to increase the occupants' duration of residence. There are also clues in the discussion of frequent interventions for architects as to how to produce a personalizer-friendly design. While a low number of studies are dedicated to such an aim, we believe that building upon this knowledge might be a way to achieving decent and distinguished yet inexpensive housing.

Endnotes

1. In Iran's government's latest program to support affordable housing, called "Maskan-e-Mehr" (started in 2009), more than four million housing units were initially planned to be constructed in the form of mass housing projects. (Ministry of Roads and Urban Development of the Islamic Republic of Iran, 2020).
2. We interviewed female heads of households, whenever possible, mainly because of their longer average time spent at home, their higher possibility of participating in personalization and recalling their purposes.
3. The anticipated residence is recorded in five categories, including 1) ⟨1 year: near-term residence, 2) 1 to 4 years: short-term residence, 3) ⟩4 to 7 years: medium-term residence, 4) ⟩7 to 10 years: long-term residence, and 5) ⟩ 10 years: lifetime residence.
4. In a follow-up study, performed on 123 of the original interviewees, 107 (86.9 percent) expressed satisfaction with their residential environment's security, of whom 73 (68.2 percent) pointed to the guards, stationed at complex entrances, as the primary reason for their sense of security.
5. Of all 133 observed flats, 60 (45.1 percent) had at least two children sharing a room, of whom 27 (45 percent) had access to a large private outdoor space (with minimum 19 m2 size). Though, merely three of them extended their living room to the adjacent private outdoor area.

References

1. Abu-Ghazzeh, T. M. (2010). Environmental Messages in Multiple-family Housing: Territory and personalization. *Landscape Research, 25*(1), 97–115.
2. Ahrentzen, S. (2002). Socio-behavioral qualities of the built environment. In R. E. Dunlap, & W. Michelson (Eds), Handbook of Environmental Psychology. Westport: Greenwood Press.
3. Altman, I. (1971). Ecological Aspects of Interpersonal Functioning. In *Behavior and Environment: The Use of Space by Animals and Men* (pp. 291–306). Boston, MA: Springer.
4. Altman, I. (1975). *The environment and social behavior: privacy, personal space, territory, crowding*. Michigan: Brooks/Cole.
5. Avogoa, F. A., Wedamb, E. A., & Opokuc, S. M. (2017). Housing transformation and livelihood outcomes in Accra, *Ghana. Cities, 68*, 92–103.
6. Becker, F. D. (1973). Study of spatial Markers. *Journal of personality and Social Psychology, 26*(3), 439–445.
7. Bently, I., Alcock, A., Murrain, P., McGlynn, S., & Smith, G. (1985). *Responsive environments: A manual for designers*. Oxford: Routledge.
8. Brand, S. (1995). *How Buildings Learn: What Happens After They're Built*. Penguin Publishing Group.
9. Brown, B. B. (1985). Residential Territories: Cues To Burglary Vulnerability. *Journal of Architectural and Planning Research, 2*(4), 231–243.
10. Brown, B. B., & Altman, I. (1983). Territoriality, Defensible Space and Residential Burglary: An Environmental Analysis. *Environmental Psychology, 3*(3), 203–220.
11. Carmon, N. (2002). User-controlled Housing: Desirability and Feasibility. *European Planning Studies, 10*(3), 285–303.
12. Edney, J. J. (1972a). Place and space: The effects of experience with a physical locule,.Experimental *Social Psychology, 8*(2), 124–135.

13. Edney, J. J. (1972b). Property, Possession and Permanence: A Field Study in Human Territoriality. *Journal of Applied Social Psychology, 2*(3), 275–282.
14. Edney, J. J. (1976). Human Territories: Comment on Functional Properties. *Environment and Behavior, 8*(1), 31–47.
15. Esquer, F., & Eugenia, M. (1986). *Territorial Personalization Of Front yards In A Mexican Public Housing Project* (Master's Dissertation). University of Arizona.
16. Field, A. (2013). *Discovering Statistics Using IBM SPSS Statistics* (4th ed.) London: Sage Publication Ltd.
17. Gifford, R. (1987). *Environmental Psychology: Principles and Practice*. Massachusetts: Allyn and Bacon.
18. Greenbaum, P. E., & Greenbaum, S. D. (1981). Territorial Personalization: Group Identity and Social Interaction in a Slavic-American Neighborhood. *Environment and Behavior, 13*(5), 574–589.
19. Habraken, N. J. (1972). *Supports: an alternative to mass housing* (B. Valkenburg, Trans.). London: The Architectural Press.
20. Hall, E. T. (1969). The Hidden Dimension. New York: Anchor Books-Doubleday.
21. Heidmets, M. (2014). The Phenomenon of Personalization of the Environment: A Theoretical. *Journal of Russian & East European Psychology, 32*(3), 41–85.
22. Janz, W. R. (1992). The Extension Of Identity Into Home Fronts: Two Milwaukee, Wisconsin Neighborhoods. *Architectural and Planning Research, 9*(1), 48–63.
23. Jusan, M. B., & Sulaiman, A. B. (2005, April). Personalization As a Sustainable Approach to Mass Housing: The Fundamental Theory. In *Proceedings of Conference on Sustainable Building South East Asia, Malaysia*, (pp.11–13).
24. Kasarda, J. D., & Janowits, M. (1974). Community Attachment in Mass Society. *American Sociological Review, 39*, 328–339.
25. Kopek, D. (2006). *Environmental Psychology for Design*. NewYork: Fairchild Publications, Inc.
26. Ministry of Roads and Urban Development of the Islamic Republic of Iran. (2016). Physical progress of maskan-e-Mehr (in Persian). Retrieved 17 June 2020, from Ministry of Roads and Urban Development of Islamic Republic of Iran: http://www.mrud.ir
27. Newman, O. (1973). *Architectural design for crime prevention*. Michigan: National Institute of Law Enforcement and Criminal Justice.
28. Pastalan, L. A. (1970). Privacy as an expression of human territoriality. In L. A. Pastalan, & D. A. Carson (Eds.), *Spatial Behavior of Older People* (pp. 88–101). Ann Arbor: University of Michigan Press.
29. Patterson, A. H. (1978). Territorial Behavior and Fear of Crime in the Elderly. *Environmental Psychology and Non-Verbal Behavior, 2*(3), 131–144.
30. Rapoport, A. (1982). The Meaning of the Built Environment: A Nonverbal Communication Approach. Arizona: Sage Publications.
31. Skjaeveland, O., & Garling, T. (1997). Effects of Interactional Space on Neighboring. *Environmental Psychology, 17*, 181–198.
32. Sommer, R., & Becker, F. D. (1969). Territorial Defense And The Good Neighbor. *Personality and Social Psychology, 11*(2), 85–92.
33. Tames, E. (2004). Use, Appropriation and Personalization of Space in Mexican Housing Projects and Informal Settlements. *Traditional Dwellings and Settlements Review, 15*(2), 33–48.
34. Tipple, G. (2000). *Extending Themselves: User-initiated transformations of government-built housing in developing countries*. Liverpool: Liverpool University Press.
35. Werner, C. M., Peterson-Lewis, S., & Brown, B. B. (1989). Inferences About Homeowners' Sociability: Impact of Christmas Decorations and Other Cues. *Journal of Environmental Psychology, 9*, 279–296.