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ORIGINAL

Residential satisfaction in social housing in northwestern Mexico

Satisfacción residencial en vivienda de interés social del noroeste de México

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ABSTRACT

Social housing produced in Mexico over recent decades has been questioned for its size, location, services and abandonment, yet residents' satisfaction is rarely measured with instruments supported by validity evidence. Using the preliminary data cut from the pilot survey of project FZ-HAB-0028 on the Factoriza UAS platform, this study described the initial behaviour of a fifteen-item scale with three dimensions, Satisfaction with the dwelling, Physical conditions of the dwelling and Services and surroundings of the housing development, in social housing developments of Mazatlán, Sinaloa, Mexico. With a cross-sectional design, 16 cases out of a target of 100 were analysed while data collection remained open. Descriptive statistics, Cronbach's alpha, McDonald's omega total, exploratory factor analysis and Spearman correlations between dimensions were estimated. Satisfaction with the dwelling showed high internal consistency (α = .887; ω = .901), whereas Physical conditions (α = .523) and Services and surroundings (α = .567) were low. The factor analysis, with KMO = .148 and a nearly singular correlation matrix, suggested a general factor. The three dimensions were positively associated (ρ from .570 to .687). Indoor temperature, abandoned houses and insecurity received the lowest ratings. The findings do not yet provide structural validity evidence and point to revisions of the instrument.

Keywords: residential satisfaction; social housing; habitability; psychometric evidence

RESUMEN

La vivienda de interés social producida en México durante las últimas décadas enfrenta cuestionamientos por su tamaño, su localización, sus servicios y el abandono, pero la satisfacción de sus habitantes rara vez se mide con instrumentos con evidencias de validez. Este estudio describió, en el corte preliminar del levantamiento piloto del proyecto FZ-HAB-0028 de Factoriza UAS, el comportamiento inicial de una escala de quince reactivos con tres dimensiones: Satisfacción con la vivienda, Condiciones físicas de la vivienda y Servicios y entorno del fraccionamiento, en fraccionamientos de Mazatlán, Sinaloa. Con diseño transversal, se analizaron 16 casos de una meta de 100, con el levantamiento abierto. Se estimaron descriptivos, alfa de Cronbach, omega total, análisis factorial exploratorio y correlaciones de Spearman entre dimensiones. Satisfacción con la vivienda mostró una consistencia interna alta (α = .887; ω = .901), mientras que Condiciones físicas (α = .523) y Servicios y entorno (α = .567) fueron bajas. El análisis factorial, con KMO = .148 y una matriz cercana a la singularidad, sugirió un factor general. Las tres dimensiones se asociaron de forma positiva (ρ de .570 a .687). La temperatura interior, las casas abandonadas y la inseguridad fueron los aspectos peor valorados. Los resultados no aportan todavía evidencias de validez estructural y orientan la revisión del instrumento.

Palabras clave: satisfacción residencial; vivienda de interés social; habitabilidad; evidencias psicométricas

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INTRODUCTION

During the first two decades of this century, Mexico produced social housing at an unprecedented scale, in housing developments built by private developers with financing from public housing agencies. The policy reduced the housing deficit, but it did so unequally and with costs that are visible today: small dwellings, developments far from urban centers, insufficient services, and a high number of abandoned homes, which the federal government itself acknowledged in 2020 and which various studies link to an expansive policy that did not address the needs of its inhabitants (Hernández Ilizaliturri et al., 2025). The question of the satisfaction of those who live in these homes is, therefore, a direct way to evaluate the habitability that the policy produced.

Residential satisfaction is understood as the assessment that people make of their housing and its surroundings in relation to their needs and expectations. Recent reviews describe it as a multidimensional construct, in which functional, environmental, economic, social, and psychological factors intervene, both of the housing unit and of the neighborhood (Alaie et al., 2022; Saleem and Alchalabi, 2025). In northwestern Mexico, studies with users of social interest housing have found moderate levels of satisfaction, associated with the housing complex where each dwelling is located (Valdivia Haro et al., 2023), and have documented, in Culiacán, that most residents declare themselves satisfied with their housing although they consider its spaces insufficient and perceive it as very hot (Barraza-Bracamontes et al., 2022).

Mazatlán, a warm-climate city in the northwest of the country, has social housing developments such as those studied in the pilot survey, but no recent studies were identified that measure residents' residential satisfaction with an instrument that distinguishes overall satisfaction, the physical conditions of the dwelling, and the services and environment of the development. Without an instrument with evidence of validity, evaluations of social housing in the region depend on ad hoc surveys whose results are not comparable with each other or over time.

The FZ-HAB-0028 project of the Factoriza UAS platform set out to study residential satisfaction in social interest housing in northwest Mexico, with an initial pilot survey in Mazatlán, using a 15-item scale organized into 3 dimensions: Satisfaction with the home, Physical conditions of the home, and Services and surroundings of the housing development. This article reports the results of that pilot in a preliminary, very small sample, so its scope is the initial review of the instrument and not the estimation of population parameters or generalization to northwest Mexico.

The general objective was to describe the initial performance of a residential satisfaction scale in the preliminary stage of its pilot survey in social housing developments in Mazatlán, Sinaloa. The specific objectives were, first, to describe the distribution of responses to each item; second, to estimate the internal consistency of each dimension using alpha and omega coefficients; third, to assess the feasibility of an analysis of internal structure with the available sample size; and fourth, to explore the relationship among the scores of the three dimensions. The project did not state hypotheses; therefore, the study has a descriptive and exploratory scope.

DEVELOPMENT

Residential satisfaction as a multidimensional construct

Research on residential satisfaction has sought to identify which housing and environmental conditions are associated with a favorable evaluation. Saleem and Alchalabi (2025) systematically reviewed 40 studies and highlighted the quality of architectural design, environmental sustainability, and socioeconomic conditions, grouping the factors into 12 categories that interact with each other, ranging from functional and technical to cultural, psychological, and public policy factors. From the perspective of social sustainability, the review by Alaie et al. (2022) organized housing indicators into 5 dimensions—functional, semantic-perceptual, physical, environmental, and economic—that range from services and social interaction to the scale of the housing unit and neighborhood, natural surveillance, and affordability.

Studies using structural equation models have shown that satisfaction depends on both the built and social environments. In eleven subsidized housing complexes in Guangzhou, China, Tang et al. (2024) found an intermediate level of satisfaction, with management and security as weak points, and associated higher satisfaction with larger dwellings, well-equipped neighborhoods, close neighborhood ties, and community activities; subjective perception of the built environment mediated the effects of objective conditions and expectations. In the Chinese-language literature, Liu et al. (2022) constructed a resident satisfaction evaluation system in three dimensions, parti-

cipation, management and services, and living environment, and applied it to compare communities in Tianjin. In the Gaza Strip, Sabah (2023) found moderate satisfaction with housing funded by international organizations and identified space sufficiency as the most relevant predictor of overall satisfaction.

The Housing Satisfaction dimension of the instrument studied captures the overall assessment: satisfaction with the housing (R1), fulfillment of expectations upon acquiring it (R2), desire to change housing (R3, reverse-coded), willingness to recommend the subdivision (R4), and intention to stay (R5). Unlike the other two dimensions, its items do not describe specific conditions but rather evaluative judgments and behavioral intentions, which makes it possible to study their relationship with physical and environmental conditions.

Physical conditions of social housing in warm climate

The physical conditions of Mexican social housing have been criticized for the reduction in floor areas, the quality of materials, and thermal performance. In the Urbi Villa del Cedro housing development in Culiacán, Barraza-Bracamontes et al. (2022) combined a questionnaire with thermal, acoustic, and lighting measurements, and found that most of the dwellings were within a comfort range calculated for the city, but that their inhabitants described them as very hot and kept the air conditioning running; they concluded that minimum-size housing policies affect habitability. In Hermosillo, with a hot-dry climate, Muñoz López et al. (2023) compared the energy consumption and emissions of the predominant social housing with those of a dwelling built in accordance with energy-efficiency standards, and found higher emissions in the former.

The Physical Conditions of the Dwelling dimension brings together the sufficiency of size for the family (R6), the resistance of the materials (R7), the presence of cracks in the walls (R8, reverse-coded), the indoor temperature (R9), and the possibility of expanding the dwelling if the family grows (R10). Its items combine judgments about sufficiency, construction quality, thermal comfort, and flexibility, facets that the literature associates with satisfaction but that do not necessarily vary together.

Services, Environment, and Abandonment in Housing Developments

The peripheral location of social housing complexes is accompanied by limited access to employment, transportation, and services. In Mexico City, Reyes (2023) found that residents of a peripheral housing development had much longer travel times than those of an informal community closer to the center and with a consolidated local commercial economy. Housing abandonment is another expression of the problem: in southeastern Ciudad Juárez, Holguín Ávila and Maycotte Pansza (2024) documented that the presence of uninhabited and squatted dwellings is accompanied by insecurity, lack of public spaces, and social isolation, and Rodríguez Sosa et al. (2022) identified difficulties in social organization for the maintenance of multifamily units as a risk for the acceptance of social housing in that same city.

The Services and environment dimension of the housing development includes proximity to public transport (R11) and schools (R12), the presence of abandoned houses (R13, inverse), safety when walking through the housing development (R14), and the stability of the water service (R15). These items combine accessibility to facilities, the physical and social condition of the development, and the quality of a basic service, so their covariation will depend on whether the studied housing developments present these conditions jointly. From a cross-sectional design, the relationships between satisfaction, physical conditions, and services must be understood as associations and not as dependency relationships.

METHODOLOGY

Design

A quantitative, non-experimental, cross-sectional study was carried out with a descriptive and exploratory scope. The data correspond to the survey LEV-0033, “Mazatlán Pilot · Social Interest Housing”, from the FZ-HAB-0028 project of the Factoriza UAS platform, and to the frozen dataset DST-0031, with a cut-off date of June 16, 2026. The survey constitutes an independent sample and is the only one of the project.

Population, sample, and data cutoff

The project population was defined as individuals aged 18 years or older living in social interest housing in northwestern Mexico; the pilot survey was conducted in Mazatlán, Sinaloa, in social interest housing subdivisions selected by the project lead, so the selection of subdivisions was not probabilistic. According to the Factoriza registry, 32 individuals opened the questionnaire and 16 completed it; no cases were excluded for quality control, so 16 cases were analyzed (Table 2).

The analyzed data cut is preliminary: it includes 16 cases out of a target of 100, and the survey remained open, in field status, as of the cut-off date. With 16 cases for 15 items, the ratio is 1.1 cases per item, so the inter-item correlation matrix is at the limit of being singular. Data and sample adequacy is the first condition that the methodological literature requires verifying in item factor analysis (Ferrando et al., 2022; Goretzko et al., 2021).

Instrument

A 15-item scale was administered with a 5-point response format, from Strongly disagree (1) to Strongly agree(5), organized into 3 dimensions of 5 items each: Satisfaction with housing (R1 to R5), Physical conditions of housing (R6 to R10), and Services and environment of the housing development (R11 to R15). 3 items are worded in the reverse direction—R3 (“If I could, I would change my home”), R8 (“The walls of my home have cracks”), and R13 (“There are abandoned houses in my housing development”)—and are recoded in the data matrix. After recoding, a higher score indicates greater satisfaction, better physical conditions, and better services and environment. Table 1 presents the code, the dimension, the text, and the direction of each item.

Table 1. Structure of the instrument.

Code	Dimension	Reagent	Inverse
R1	Satisfaction with housing	I am satisfied with the housing where I live	No
R2	Satisfaction with housing	My home meets what I expected when I acquired it	No
R3	Satisfaction with housing	If I could, I would change my home	Yes
R4	Housing satisfaction	I would recommend this residential development to a family member	No
R5	Satisfaction with housing	I intend to continue living in this dwelling for the next few years	No
R6	Physical conditions of the dwelling	The size of my home is sufficient for my family	No
R7	Physical housing conditions	The materials in my home are resistant	No
R8	Physical conditions of the housing	The walls of my home have cracks	Yes
R9	Physical conditions of the dwelling	The temperature inside my home is pleasant	No
R10	Physical conditions of the dwelling	My home can be expanded if the family grows	No
R11	Services and surroundings of the subdivision	Public transportation is available near the subdivision where I live	No
R12	Services and environment of the housing development	Schools are located near my housing development	No
R13	Services and environment of the subdivision	There are abandoned houses in my subdivision	Yes
R14	Services and environment of the subdivision	I feel safe walking in my neighborhood	No
R15	Services and surroundings of the subdivision	The water service in my residential development is reliable	No

Note. 5-point response scale (Strongly disagree, Disagree, Neither agree nor disagree, Agree, Strongly agree). Reverse-coded items are already recoded in the delivered matrix. Source: Factoriza UAS, project FZ-HAB-0028, survey LEV-0033, dataset DST-0031.

Procedure

Responses were collected through the survey questionnaire managed in Factoriza UAS, which records express online informed consent before the first item and does not collect identifying data. Factoriza froze the DST-0031 dataset with a cryptographic fingerprint, generated the matrix with the reverse-coded items recoded, and produced the descriptive and internal consistency analyses (runs RUN-00179 to RUN-00185). The complementary analyses were run with the data file and item dictionary exported by the platform.

Data analysis

In a first stage, Factoriza UAS calculated the mean, standard deviation, skewness, kurtosis, and response percentages at extreme values for each item, as well as the internal consistency of each dimension using Cronbach's alpha (Cronbach, 1951), with the corrected item-total correlation and alpha if the item was deleted. In a second stage, the program analisis_psicometrico.py, version 1.0, was run in Python 3.13.16 (Python Software Foundation, 2026), with NumPy 2.5.3 (Harris et al., 2020), SciPy 1.18.1 (Virtanen et al., 2020), and pandas 3.0.5. The program applies fixed and declared procedures, without manual intervention in the calculations.

The program estimated McDonald's total omega(McDonald, 1999/2013)for each dimension from a one-factor model, without inverting items; when any item is negatively correlated or charged with respect to the rest of its dimension, the program does not report the omega because the coefficient is no longer interpretable. The internal structure was explored by exploratory factor analysis on the Pearson correlation matrix of the fifteen items, after verification of the Kaiser-Meyer-Olkin sample adequacy measure(Kaiser, 1974),the adequacy by reagent(Lorenzo-Seva & Ferrando, 2021) and the Bartlett sphericity test(Bartlett, 1950).The number of factors was determined by parallel analysis(Horn, 1965)with 100 simulations and seed 2026; extraction was by minimal residue and, when more than one factor is retained, rotation is oblimin. Finally, the program estimated the relationship between the mean scores of the dimensions with Spearman's coefficient and its 95% confidence interval, using Fisher's transformation with the standard error ofBonett and Wright (2000).

Reference values for interpreting the indices, such as the 0.60 value for the KMO, are treated as guidelines and not as decision rules (Ferrando et al., 2022). No item was eliminated; the program flags problematic items and leaves the decision to the authors. Confirmatory factor analysis was not performed, which is proposed as future work.

Ethical considerations

Participation was voluntary and anonymous. Factoriza UAS records explicit informed consent online and does not collect names, email addresses, or other identifying data. In one study on housing acquired with credit, anonymity protects respondents from any consequences in their relationship with the creditor institution, the developer, or the subdivision administration.

Statement on the use of artificial intelligence

During the preparation of this manuscript, the Factoriza UAS platform was used for data management and descriptive and internal consistency analyses; a Python analysis program with fixed and validated procedures, for omega, exploratory factor analysis and correlations between dimensions; and the Claude Opus language model (Anthropic), to run that program, the assisted literature search, the drafting of a draft and the assembly of the document based on the results. The authors reviewed, corrected and approved the entirety of the text, verified each reference and assume full responsibility for the content of the article.

RESULTS

Sample composition

Table 2 summarizes the case flow. Of the 32 people who opened the questionnaire, 16 completed it and were analyzed, with no exclusions due to quality control. Half of those who started the questionnaire did not complete it, which should be reviewed in the field application. All analyzed cases answered the 15 items.

Table 2. Sample composition.

Indicator	Value
Individuals who opened the questionnaire	32
Completed questionnaires	16
Cases excluded during quality control	0
Cases analyzed	16
Items	15

Note. Survey “Mazatlán Pilot · Social Interest Housing” (LEV-0033); population: individuals aged 18 years or older who live in social interest housing in northwestern Mexico, with a pilot in Mazatlán; territory: Mazatlán, Sinaloa, in social interest housing developments selected by the project lead. Dataset DST-0031, fingerprint 59d1e22631bde2a5. Source: Factoriza UAS. Preliminary cut: n = 16 of a target of 100, with the survey open.

Descriptive statistics

Table 3 and Figure 1 present the descriptive statistics. In Satisfaction with housing, the highest mean was that of R1, satisfaction with housing (M = 3.94, SD = 1.18), with 44% of responses at the maximum value, and the lowest was that of R3, desire to change housing in its recoded version (M = 2.75, SD = 1.48), with 31% of responses at the minimum value; that is, an appreciable portion of the surveyed people would change housing if they could, although most declare themselves satisfied. Expectation fulfillment (R2) obtained M = 3.25 (SD = 1.29).

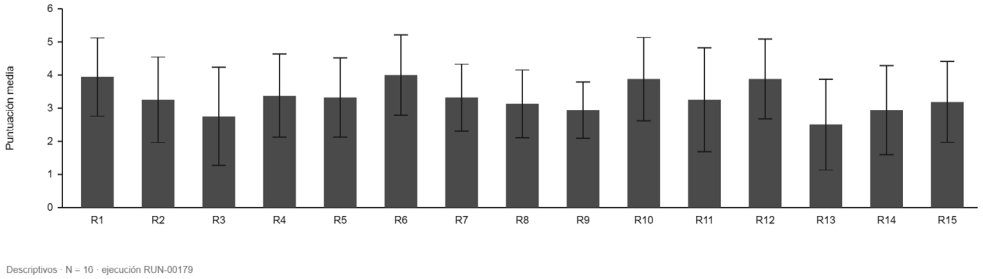
In Physical conditions, the highest mean in the set corresponded to R6, the sufficiency of the dwelling size for the family (M = 4.00, DE = 1.21), followed by R10, the possibility of expanding it (M = 3.88, DE = 1.26), and the lowest to R9, the pleasant temperature inside the dwelling (M = 2.94, DE = 0.85). In Services and surroundings, the highest mean was that of R12, proximity to schools (M = 3.88, DE = 1.20), and the lowest were those of R13, the presence of abandoned houses in its recoded version (M = 2.50, DE = 1.37), which was the lowest mean in the set, and R14, safety when walking through the housing development (M = 2.94, DE = 1.34). Proximity to public transport (R11) showed the greatest dispersion (DE = 1.57), suggesting marked differences between housing developments or between people.

Table 3. Descriptive statistics of the items.

Item	M	OF	Asymmetry	Kurtosis	Floor	Ceiling
R1	3.94	1.18	-0.97	0.75	6%	44%
R2	3.25	1.29	-0.32	-0.64	13%	19%
R3	2.75	1.48	0.07	-1.47	31%	13%
R4	3.38	1.26	-0.60	-0.17	13%	19%
R5	3.31	1.20	-0.70	0.08	13%	13%
R6	4.00	1.21	-1.29	1.20	6%	44%
R7	3.31	1.01	-0.29	0.88	6%	13%
R8	3.13	1.02	-0.70	-0.86	6%	50%
R9	2.94	0.85	0.86	0.88	31%	6%
R10	3.88	1.26	-1.11	0.39	6%	38%
R11	3.25	1.57	-0.00	-1.74	13%	38%
R12	3.88	1.20	-0.78	-0.91	25%	38%
R13	2.50	1.37	0.72	-0.59	25%	13%
R14	2.94	1.34	0.32	-0.96	13%	19%
R15	3.19	1.22	-0.16	-0.10	13%	19%

Note. N = 16. Floor and ceiling indicate the percentage of responses at the minimum and maximum values. The item-total correlation column across the 15 items is omitted because it combines three dimensions; the item-total correlation by dimension is presented in Table 4. RUN-00179 execution by Factoriza UAS. Preliminary cut: n = 16 out of a target of 100, with the survey open.

Figure 1. Mean scores per item with one-standard-deviation bars.



Note. N = 16. Scale from 1 to 5; reverse items R3, R8, and R13 are shown recoded. Execution RUN-00179 by Factoriza UAS. Preliminary cut: n = 16 of a target of 100, with data collection open.

Internal consistency

Table 4 presents the item analysis by dimension calculated by Factoriza, and Table 5 presents the coefficients from the supplementary program. The alpha values coincided in both calculations. Housing satisfaction reached α = .887 and ω = .901, with corrected item-total correlations from .525 to .856; the least consistent item was R3, whose removal would increase alpha to .917. Services and environment of the housing development obtained α = .567 and ω = .620; R11, public transportation, was the most consistent item (.536), and R14, security, the least consistent (.206). Physical conditions of the housing obtained α = .523, and omega is not reported because R8, the presence of cracks in its recoded version, correlated negatively with the rest of the dimension (-.027); its removal would increase alpha to .635.

Table 4. Item analysis by dimension.

Dimension	Item	corrected item-total r	α if the item is removed
Satisfaction with housing	R1	.769	.855
Satisfaction with housing	R2	.856	.832
Satisfaction with housing	R3	.525	.917
Satisfaction with housing	R4	.813	.843
Satisfaction with housing	R5	.727	.864
Physical conditions of the dwelling	R6	.509	.300
Physical conditions of the dwelling	R7	.439	.376
Physical conditions of the dwelling	R8	-.027	.635
Physical conditions of the dwelling	R9	.226	.502
Physical conditions of the dwelling	R10	.355	.421
Services and surroundings of the housing development	R11	.536	.362
Services and surroundings of the subdivision	R12	.380	.485
Services and surroundings of the residential development	R13	.281	.537
Services and surroundings of the subdivision	R14	.206	.577
Services and surroundings of the subdivision	R15	.247	.552

Note. N = 16. The corrected item-total correlation excludes the item itself from its dimension total. Cronbach's α for the complete dimension, with 5 items each: Satisfaction with housing = .887 (execution RUN-00180); Physical conditions of the housing = .523 (RUN-00182); Services and environment of the housing development = .567 (RUN-00184). Source: Factoriza UAS, Tables 4, 6, and 8 of the package, compiled without modifying values. Preliminary cut: n = 16 out of a target of 100, with data collection open.

Internal structure

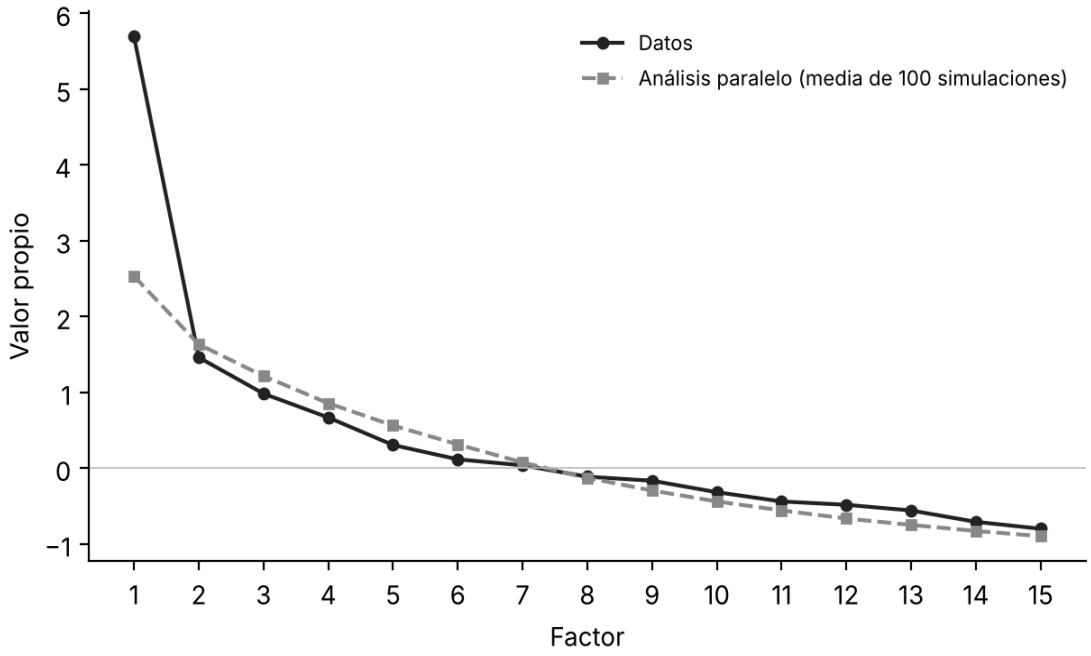
Exploratory factor analysis could be estimated, but the data conditions were highly unfavorable. With 16 cases for 15 items, the correlation matrix is close to singular, and the overall measure of sampling adequacy was KMO = .148, well below the guideline reference of 0.60; no item reached acceptable individual adequacy (Table 7). Bartlett's test yielded $\chi^2(105) = 299.04$, $p < .001$, but with a determinant so close to zero the statistic is inflated and is not sufficient to justify factoring. Parallel analysis indicated the retention of a single factor (Figure 2), with a sum of squared loadings of 5.70 and 37.97 % of the variance (Table 6).

Table 5. Internal consistency by dimension.

Dimension	Reagents	n	α	ω	Observation
Satisfaction with housing	5	16	.887	.901	
Physical conditions of the dwelling	5	16	.523	n/a	Reverse-scored items: R8; ω not interpretable
Services and surroundings of the housing development	5	16	.567	.620	

Note. α = Cronbach's alpha; ω = McDonald's total omega based on a single-factor minimum residual model, without reverse-scoring items. Complete cases per dimension. Source: prepared by the authors with analisis_psicometrico.py 1.0 (Python 3.13.16), dataset DST-0031_FZ_HAB_0028. Preliminary cutoff: n = 16 out of a target of 100, with data collection ongoing.

Figure 2. Scree plot with parallel analysis.



Note. Eigenvalues of the reduced data matrix versus the mean of 100 simulated matrices of the same size (seed 2026). Source: own elaboration with analisis_psicometrico.py 1.0 (Python 3.13.16), dataset DST-0031_FZ_HAB_0028. Preliminary cut: n = 16 of a target of 100, with data collection ongoing.

In the single factor (Table 7), the satisfaction items loaded with high values, R4 (.915), R2 (.869), R1 (.778) and R5 (.726), together with 2 physical condition items, material resistance, R7 (.813), and size sufficiency, R6 (.750), and with public transport, R11 (.625). Loadings were lower in R12 (.568), R14 (.478), R9 (.418), R10 (.362) and R15 (.325), and insufficient in R13 (.215) and R8 (-.077). The solution therefore describes a general assessment of housing from which the 2 reverse items referring to physical and environmental problems depart; given the conditions of the analysis, it does not constitute evidence on the dimensionality of the instrument.

Table 6. Variance explained by the factors.

Factor	Sum of squared loadings	% of variance	Cumulative %
1	5.70	37.97	37.97

Note. KMO = .148; Bartlett's test of sphericity: $\chi^2(105) = 299.04$, $p < .001$. Number of factors by parallel analysis: 1. Source: authors' own elaboration with analisis_psicometrico.py 1.0 (Python 3.13.16), dataset DST-0031_FZ_HAB_0028. Preliminary cut: n = 16 out of a target of 100, with open data collection. With KMO far below the reference and 1.1 cases per item, the correlation matrix is close to singular; the solution is presented only to document the behavior of the items.

Table 7. Factor loadings of the exploratory factor analysis.

Reagent	Dimension	Factor	h^2	MSA	Observation
		1			
R1	Satisfaction with housing	.778	.605	.191	Low MSA
R2	Satisfaction with housing	.869	.755	.224	Low MSA
R3	Satisfaction with housing	.585	.342	.141	Low MSA
R4	Satisfaction with housing	.915	.837	.235	Low MSA
R5	Satisfaction with housing	.726	.528	.175	Low MSA
R6	Physical conditions of the dwelling	.750	.563	.192	Low MSA
R7	Physical conditions of the dwelling	.813	.661	.201	Low MSA
R8	Physical conditions of the dwelling	-.077	.006	.034	Insufficient loading; opposite sign; low MSA
R9	Physical conditions of the dwelling	.418	.175	.093	Low MSA
R10	Physical conditions of the dwelling	.362	.131	.092	Low MSA
R11	Services and surroundings of the subdivision	.625	.391	.216	Low MSA
R12	Services and surroundings of the residential development	.568	.322	.145	Low MSA
R13	Services and surroundings of the residential development	.215	.046	.051	Insufficient loading; low MSA
R14	Services and surroundings of the subdivision	.478	.229	.111	Low MSA
R15	Services and environment of the residential development	.325	.106	.076	Low MSA

Note. Pattern matrix. Minimum residual extraction and oblimin rotation (γ = 0) on the Pearson correlation matrix; 16 complete cases. h^2 = communality; MSA = measure of sampling adequacy per item. All loadings are shown. Source: own elaboration with analisis_psicometrico.py 1.0 (Python 3.13.16), dataset DST-0031_FZ_HAB_0028. Preliminary cutoff: n = 16 out of a target of 100, with data collection ongoing. All items show low sampling adequacy; the matrix does not constitute evidence on the dimensionality of the instrument.

Relationship between the dimensions

Table 8 presents Spearman's correlations between the mean scores of the three dimensions, with 16 cases. The three relationships were positive and their intervals excluded zero: Physical Conditions and Services and Environment, ρ = .687, 95% CI [.233, .895], p = .003; Satisfaction and Physical Conditions, ρ = .609, 95% CI [.115, .862], p = .012; and Satisfaction and Services and Environment, ρ = .570, 95% CI [.061, .843], p = .021. The intervals are very wide and their lower limits are close to zero, as befits such a small sample.

Table 8. Correlations between dimensions.

Pairs of dimensions	n	ρ	IC 95 %	p
Housing satisfaction and physical housing conditions	16	.609	[.115, .862]	.012
Satisfaction with housing and with services and environment of the subdivision	16	.570	[.061, .843]	.021
Physical conditions of the dwelling and of services and surroundings of the subdivision	16	.687	[.233, .895]	.003

Note. Spearman's ρ between the mean scores of each dimension (cases with all items from both). Interval via Fisher transformation with the Bonett and Wright standard error. Cross-sectional design: associations, not effects. Source: prepared by the authors using analisis_psicometrico.py 1.0 (Python 3.13.16), dataset DST-0031_FZ_HAB_0028. Preliminary snapshot: n = 16 out of a target of 100, with data collection ongoing.

DISCUSSION

The purpose of this study was to describe the initial behavior of a residential satisfaction scale in social interest housing in Mazatlán. The central result is that the Satisfaction with Housing dimension behaved as a homogeneous scale, with high internal consistency, whereas Physical Conditions and Services and Environment showed low consistency and items that did not covary with the rest. With 16 cases, all coefficients are provisional: the simulation literature on alpha and omega coefficients has been developed with much larger samples (Malkewitz et al., 2023), and high consistency in such a small sample may be partly due to a few cases with extreme responses.

The positive associations among the three dimensions are consistent with the literature that conceives residential satisfaction as an assessment integrating the housing unit and its surroundings (Alaie et al., 2022; Saleem and Alchalabi, 2025) and with studies that find higher satisfaction when the housing is larger and the neighborhood is better equipped (Tang et al., 2024). The fact that size sufficiency and material durability loaded together with the satisfaction items on the single factor is consistent with evidence indicating that space sufficiency is a relevant predictor of overall satisfaction (Sabah, 2023). The cross-sectional design prevents, in any case, establishing the direction of these relationships.

The descriptive statistics offer a nuanced portrait of habitability. Overall satisfaction and size adequacy received favorable ratings, but some respondents would change housing if they could; indoor temperature was the poorest-rated physical aspect, and the presence of abandoned houses and insecurity were the aspects of the environment with the lowest ratings. This pattern is consistent with what has been documented in Culiacán, where residents reported being satisfied with their housing but perceived it as very hot (Barraza-Bracamontes et al., 2022), with the higher emissions of the predominant social-interest housing in warm climates (Muñoz López et al., 2023), and with the relationship among vacant dwellings, insecurity, and isolation described in Ciudad Juárez (Holguín Ávila & Maycotte Pansza, 2024). Housing abandonment, which the literature links to housing policy in recent decades (Hernández Ilizaliturri et al., 2025), thus emerges as a feature of the environment perceived by those who remain in the housing developments.

The two items that did not covary with their dimension, R8 and R13, are worded in the opposite direction and describe the presence of a problem—cracks in walls or abandoned houses—rather than a quality. Their behavior may be due to the presence of these problems being independent of the other ratings, to the difficulty of responding to reverse-coded items, or to incorrect recoding. Scales with items worded in both directions require more careful reading, and some people respond inconsistently to positive and negative items of the same dimension (Steinmann et al., 2022); detecting such responses can appreciably reduce wording effects (García-Batista et al., 2021).

Finally, the quality of the responses must be reviewed before the final analysis, because in small samples careless or extreme response patterns can noticeably distort correlations and produce an artificial general factor (Ward and Meade, 2023).

CONCLUSIONS

The study met its objective within the scope allowed by a preliminary sample of 16 cases. The residential satisfaction scale of project FZ-HAB-0028 showed, in its pilot survey, high internal consistency for Satisfaction with housing (α = .887; ω = .901) and low internal consistency for Physical conditions of housing (α = .523) and for Services and environment of the subdivision (α = .567; ω = .620). The exploratory factor analysis, with very insufficient sampling adequacy (KMO = .148) and a correlation matrix close to singularity, suggested a general factor from which the reverse-coded items R8 and R13 depart. The 3 dimensions were positively associated with each other. The results do not yet provide evidence of structural validity, but they indicate that the global satisfaction dimension is promising and guide the review of the other two.

The limitations are substantial. The sample of 16 cases, against a target of 100, with 1.1 cases per item, prevents stable estimation of the internal structure and renders all statistics unstable; the survey was still open and half of those who started the questionnaire did not complete it. The pilot was conducted only in Mazatlán, in subdivisions selected by the project manager, so the results cannot be generalized to northwestern Mexico, which defines the project population. No information is available on the subdivisions, tenure, or length of residence. The cross-sectional design prevents establishing dependency relationships, and no confirmatory factor analysis was performed.

These results give rise to decisions for the authors. The first is to verify the recoding of R3, R8, and R13 and, if it is correct, to assess whether the items that describe the presence of a problem

should be reformulated or treated as separate indicators. The second is to review the composition of Physical conditions, in particular R8, R9, and R10, and of Services and environment, in particular R13, R14, and R15, and to assess whether safety and abandonment constitute a facet of the environment in their own right. The third is to record the fractionation, tenure, and length of residence of each person surveyed. None of these decisions was made in the present analysis, which retains the fifteen original items.

As future lines, it is proposed to complete the survey up to the planned goal, extend it to other cities in the northwest as independent samples, repeat the exploratory factor analysis with the final cut-off and then evaluate the resulting structure by confirmatory factor analysis in an independent sample. The measurement could be complemented with physical temperature measurements and with the registration of uninhabited houses in the subdivisions, to contrast the perception with the observed conditions. An instrument with documented evidence of validity would allow the habitability of social interest housing in the region to be evaluated and provide information to housing policy.

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CONFLICT OF INTEREST

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