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Survey on Theoretical and Methodological Challenges of Assessing Residents' Satisfaction with Physical Changes; Tusca Neighborhood and Ahu Neighborhood, Mahmoudabad City

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ABSTRACT

When it comes to objective-subjective issues, such as physical changes, it seems difficult to measure satisfaction through direct questions and quantitative methods. Question of the present study is to explain the methodological challenges of evaluating residents' experience of the severity of physical changes based on the satisfaction criterion. The research method is content analysis, which is accompanied by a logical argument and inferential model, obtained from the study of previous models, in the first phase of the research. Accordingly, residents' motivations and individual characteristics, dynamic nature of adaptation and satisfaction over time and finally, lack of contextual framework are some of the challenges in this field, and indicators such as individual characteristics, level of adaptation, emotional and cognitive assessment that leads to mental perception, have a cyclical relationship with each other over time. In the second phase of the research, a quantitative questionnaire is developed through extracting indicators from the study context, and reviewed by five experts using formal content method, in order to validate the proposed framework. Then, the snowball sampling method was applied to select 34 residents of both men and women with more than 25 years residency in Tusca neighborhood, as a target neighborhood, and Ahu neighborhood, as a control neighborhood in Mahmudabad city. In Tusca neighborhood, the indicators are extracted based on a semi-structured questionnaire. The results obtained from both neighborhoods indicate the validity of the questionnaire and its preparation process. The dependency of answers on residence place allows to achieve more precise results of residents' satisfaction with physical changes. Therefore, attention to the cognitive-perceptual experience of residents in a cyclical process and using a method based on qualitative-evaluative exploratory analyses, makes it possible to obtain real criteria for residents' satisfaction with the severity of changes.

Keywords: Methodological Challenges, Severity of Physical Changes, Satisfaction, Mixed Research, Residential Environment, Mahmoudabad.

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1. INTRODUCTION

Attention to physical attributes and how they change over time is one of the most important issues in the design of residential environments. Assessing the level of satisfaction with the residential pattern includes a wide and varied range of physical, environmental, social and economic components. Residential satisfaction may be considered as part of life satisfaction in general (Turkoglu, Terzi, Salihoglu, Bolen, & Okumuş, 2019). Factors and effects of changes in the referential framework of physical changes in the minds of residents that cause satisfaction or dissatisfaction cannot be obtained only from objective analyses.

Investigating the scope of attention of approaches common in assessing the quality of residential environment with satisfaction approach and appropriate method of continuous assessment of residents' satisfaction with the severity of physical changes are the main objectives of the present study. For this purpose, analytical and critical review of theoretical texts and typology of satisfaction measurement approaches and models were performed in order to explain the key indicators related to the severity of physical changes. Then, a proper conceptual framework was introduced, which makes it possible to obtain the real experience of the residents in order to measure their satisfaction with the scope and severity of physical changes. Then, it was validated in two target and control neighborhoods in Mahmudabad city.

The present article seeks to answer the above questions in seven sections. In introduction section, the research topic is discussed and the research questions and research method are described. In the theoretical background section the concepts related to satisfaction were introduced as an indicator for human evaluation of physical changes in the environment. Then, common approaches to measuring satisfaction in the residential environment are introduced and categorized. Thus, theoretical and methodological challenges related to measuring satisfaction with the severity of physical changes are determined and in the next section, some criteria are developed to formulate an appropriate approach. In the fourth section, a conceptual framework tailored to the topic, criteria and requirements of applied methodology are presented in order to apply it in the studied areas. After sampling residents and testing the questionnaires in neighborhoods of Mahmoudabad City, the findings and proposed model are discussed to complete the existing theoretical models. Finally, the conclusion was made according to the procedural and process requirements.

2. RESEARCH BACKGROUND

Concepts related to satisfaction have been studied as an indicator for human evaluation of physical environment in quantitative research.. Gifford, meanwhile, with an emphasis on individual characteristics affecting satisfaction, refers to demographic, personality, value traits, expectations, and ideals of individuals (Gifford, 1999). Some studies suggest that mediators, such as ethnicity, play a role in satisfaction with residential environment (Riazi & Emami, 2018). The evaluation procedure in environmental psychology has been studied in the form of two concepts; affective qualities of place (AQP) and place attachment (PA). About the third sense of satisfaction, i.e. behavioral, little research has been done (Bonaiuto and et.al, 2002). A number of studies have also shown that citizens' sense of belonging to their local community, which refers to the identity of the local community, is influenced by their attitudes toward themselves (Lofland, 1991; Cuba and Hummon, 1993; McCool and Martin, 1994; Huang and Stewart, 1996; Wiesenfeld, 1996; Cited in Van Poll, 2011).

To more accurately review the background related to the topic, studies can be categorized based on their expected goals as follows:

2.1. Understanding the Factors Influencing the Formation of Human-Residence Environment Relationship and Its Evaluation

In a study in which six residential complexes in Denmark, Sweden and the Netherlands were analyzed, Chloe Cooper Marcus examined the interactions between the physical environment and the sense of local community (Cooper, 2000, p. 163). William Yansi also studied the effect of the physical environment design on people's behavior in the Pruitt–Igoe housing project, and in Brown and Werner's research, the relationship between the physical environment and social solidarity was considered (Brown & Werner, 1985; Cited in Van Poll, R. 2011).

The results of such studies indicate the impact of the physical environment and its changes on the evaluation of residents' behavior, affecting social solidarity and the sense of local community.

2.2. Determining and Ranking Indicators Affecting Satisfaction with the Residence Environment

An example ranking of indicators based on different types of tissues is observed in Maran and his colleagues' research on 4 neighborhoods that were different in terms of growth patterns, socio-spatial traits and types of houses (Maran, Oktay, & Rustemli, 2009). The results of this study indicate that satisfaction with the neighborhood was not necessarily related to attachment to place, but there is a positive relationship between it and feeling about it as a home.

2.3. Assessing the Effects of Physical Changes on Residents' Satisfaction with the Residence Environment

In a study by Hur, the assessment of satisfaction with physical characteristics was performed with special attention to spatial analyses in residential tissues with a morphological approach (Hur, 2008).

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2.4. Utilizing the Experiences of Residents in Planning for Changes

In a study conducted in Chicago by Stewart and colleagues, people's opinions were used in the planning process to change the landscape (Stewart, Liebert & Larkin, 2004). The results show that although due to informal social processes, socio-local identities are related to tangible environments, events and material history, individual attitudes are formed based on how residents think about themselves and interact with the local community. Table 1 presents the research and key individuals related to the main research question.

Table 1. Research and Key Individuals Related to the Research Topic

Experts	The Most Important Concepts
Marans, R. W	Model of satisfaction with adaptive urban life Converting objects into mental images based on each person's standards of comparison The resulting model of different realms Satisfaction and morphological differences
Whitehand, J. W. R	Assessing the gradual change of the residence environment Chronologies of change Producing a gradual form on a small scale
Weidemann, S	Satisfaction, predictor External satisfaction variables: cognitive, emotional, and behavioral Adaptive behavior
Maria Amerigo	The process of transforming objective attributes into subjective ones Referential framework patterns Behavioral perspective of satisfaction measurement Systematic model of residential satisfaction Satisfaction measurement methodology
Van Poll, R	Multi-level hierarchical model
Bonaiuto, M	Social-psychological experience of place model Different intensities of physical changes and satisfaction Cognitive, emotional and behavioral dimensions
Jansen, S. J	Resistance to new elements Satisfaction and history of residence

3. TYPOLOGY OF COMMON APPROACHES TO MEASURING SATISFACTION WITH THE RESIDENTIAL ENVIRONMENT

Dominant views applied in studying satisfaction with residential environment can be categorized in two groups of perceptual and behavioral approaches. Preliminary studies on satisfaction emphasized perceptual dimensions. The perceptual approach assesses the quality of life over time with an emphasize on perceived residential environment quality and residents' emotional assessment of their residential environment. Accordingly, residents, according to the set of needs and aspirations they have, evaluate the status quo of their residence, including their houses and neighborhood (Michelson, 1996). High perceptual values combined with historical meanings have a significant relationship with satisfaction with residential environment (Nasar, 1998). Among those who have examined the residents' satisfaction with their residential environment from a behavioral point of view are Amerigo and Aragonese, who have sought behavioral models that are significantly related to people's satisfaction level. The results of their studies show that people who do not seek to improve and change the conditions of their residence place, are more satisfied. Participation in neighborhood-related activities and having more contact with neighbors also indicate greater satisfaction of residents (Amerigo & Aragones, 1997). Therefore, it can be said that researchers, with perceptual and behavioral perspectives, have considered satisfaction as a general criterion for assessing the desirability of residential environment from the residents' point of view.

3.1. Satisfaction Assessment Models and Conceptual Frameworks

Satisfaction assessment models either studied residents cognitively and behaviorally or examined the role of environmental attributes and characteristics. According to Wiesenfeld, researchers have slightly organized variables in a single model to examine the relationship between them (Amerigo, 1997; Cited in Amerigo & Aragones,1997). Obtaining residents'

real experience of changes in environment in areas such as adaptation to change, person- environmental fit, and purposive evaluation of place has led to some models. In this regard, frames of reference formed by individuals' previous experiences are very important in judging environmental variables. In addition, historical experiences are very important, both individually and socially. In most models that have dealt with the process of affective appraisal of the environment, the results of the assessment have been considered in the form of satisfaction or adaptive behavior. In some of these models, such as Canter's (1983)model, special emphasis has been placed on the purposive evaluation of places as a facet approach. Weidmann, Anderson, and Francesco (1989) also sought a comprehensive relationship between satisfaction, environment, and behavior and examined the effect of external variables on measuring satisfaction and, on the other hand, considered it in interacting with most of them in creating constructive attitudes. According to a survey by Widman and Anderson, in some studies, satisfaction is considered as a dependent variable. The theoretical framework of this group of research is represented in the works of researchers such as (Marans & Rodgers, 1975.Cited in Van Poll, 2011), (Galster, Hesser, 1981; Cutter, 1982; Gifford, 1987). But in studies on residence variability, satisfaction has been considered as a predictor of behavior and therefore, an independent variable. Spear's (1974) theoretical model is a good example of this type of research (Weidemann & Anderson, 1985). The comparison of the above models in terms of constructive factors, evaluation method and concepts is summarized in Table 2.
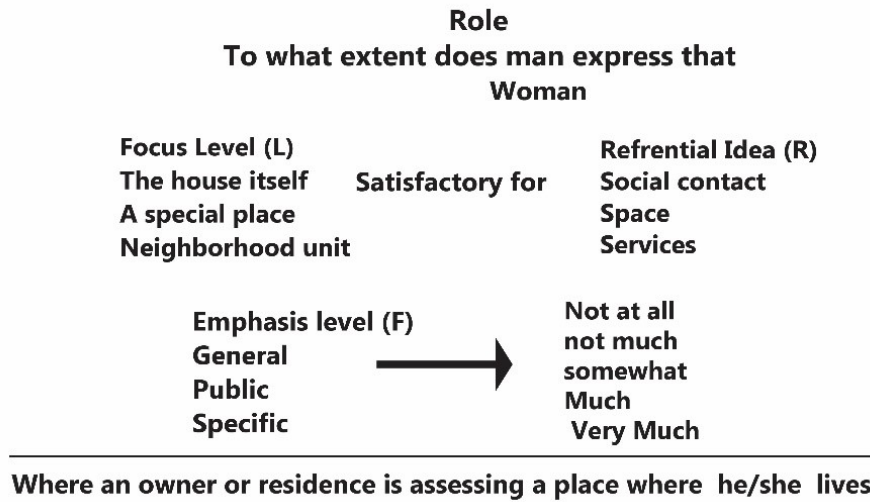
Table 2. Models Related to Measuring Emotional Assessment and Satisfaction

Emotional Assessment and Satisfaction Models			
Title	**writer**	**Constructive factors**	**Evaluation methods and concepts**
The purposive evaluation of places: A facet approach	David Canter,1983	Environmental comfort Cultural identity Social opportunities Space facilities and services	Satisfaction assessment using residents' opinions as evaluative responses. Satisfaction with social, spatial and public interactions in general or in particular at three levels: residential unit, neighborhood and district.
Evaluating the built environment from the users' point of view: an attitudinal model of residential satisfaction	Weidemann, Anderson & Francesco 1989	External variables Predictors Criteria Behavior	External objective, demographic, and individual variables become cognitive, effective, and behavioral variables, respectively, and lead to the satisfaction with residential environment in the form of predictors such as attitudes, mental norms, beliefs, and desires.
Person-environment fit theory	Kaplan,1987	Environmental-individual objective factors Environmental-individual subjective factors	Turning the objective issues of the individual and environment into mental perceptions in contact with facts and self-assessment
Toward an understanding of community satisfaction	Marans and Rodgers, 1975	Individual characteristics and standards of comparison related to the realms of measurement	Converting objectives into mental images based on each person's standards of comparison
Multi-level hierarchical model	Van Poll, 1997	District Neighborhood residential unit	Determine the value of indicators at each level separately

With general terms, David Canter evaluates place based on three concepts. 1. Attention level, including the house, place and neighborhood;2. Focus level, including general, public and specific focus, and 3. Referential idea, including social contact, space and services. (Canter, 1983) (Fig. 1).
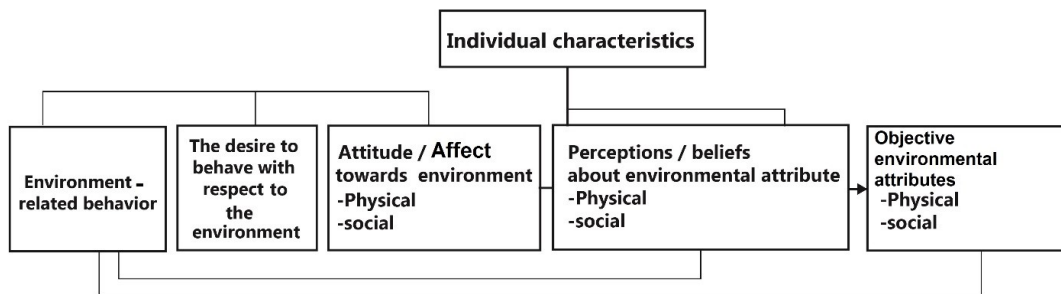
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Map of residents' expression to residential satisfaction

Role
To what extent does man express that
Woman

Focus Level (L)
The house itself   **Satisfactory for**   **Refrential Idea (R)**
A special place   Social contact
Neighborhood unit   Space
                                                  Services

Emphasis level (F)   **Not at all**
General   **not much**
Public   ⟶   **somewhat**
Specific   **Much**
                                           Very Much

Where an owner or residence is assessing a place where he/she lives

Fig. 1. Canter's Model of Targeted Place Assessment
(Canter, 1983)

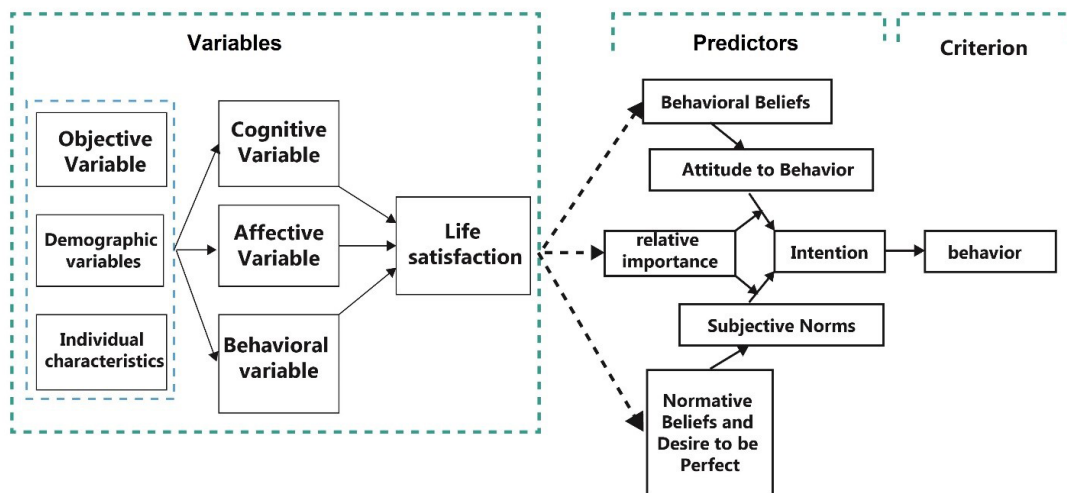In the second half of the 1990s, Weidmann and Anderson, Francesco et al., presented an integrated theoretical framework as an attitudinal model of residential satisfaction. They sought to assess the built environment from the user's point of view (Fig. 2).

Individual characteristics

| Environment – related behavior | The desire to behave with respect to the environment | Attitude / Affect towards environment -Physical -social | Perceptions / beliefs about environmental attribute -Physical -social | Objective environmental attributes -Physical -social |

Fig. 2. An Attitudinal Model of Residential Satisfaction
(Weidemann & Anderson, 1985; Francescato, Weidemann, & Anderson, 1989)

Among the external variables, including cognitive, effective, and behavioral variables, which are the variables of satisfaction, there are some predictors that are rooted in the attitudes and subjective norms of the residents. Behavioral evaluation also reflects adaptation to changes (Fig. 3).

Variables   **Predictors**   **Criterion**

Objective Variable — Cognitive Variable
Demographic variables — Affective Variable → Life satisfaction
Individual characteristics — Behavioral variable

Behavioral Beliefs
Attitude to Behavior
relative importance
Intention → behavior
Subjective Norms
Normative Beliefs and Desire to be Perfect

Fig. 3. The Model Proposed by Weidmann, Anderson and Francesco
(Weidemann & Anderson, 1985)

Pendar, H.

In Maran and Rogers's model, individual characteristics and standards of comparison derived from individual
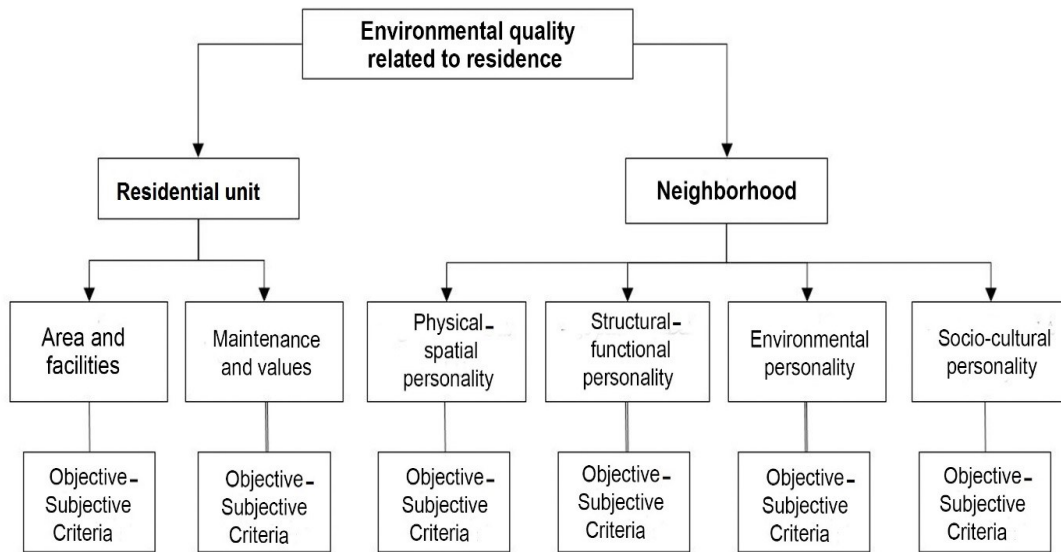
characteristics also appear to be measurable in relation to each domain. (Fig. 4).
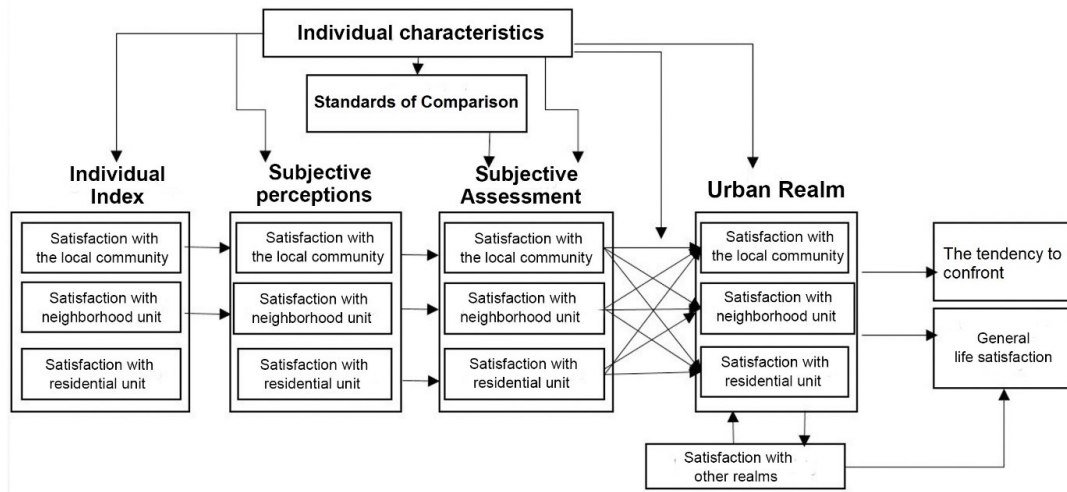
Fig. 4. The Model of Satisfaction with Adaptive Urban Life
(Marans & Rodgers, 1975)

In Van Poll'S model, the satisfaction with the residential environment is defined as a concept with
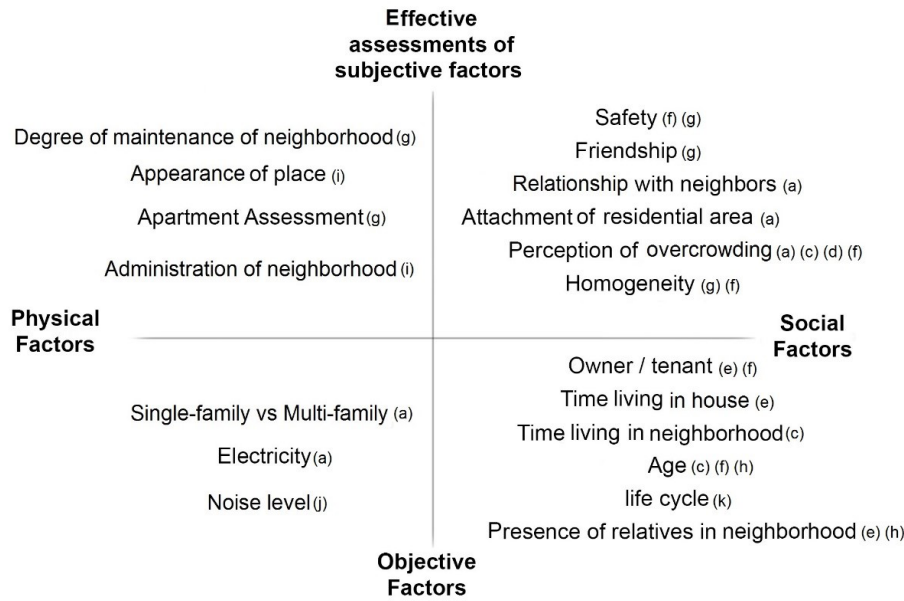
multiple features. (Van poll, 1997) (Fig. 5).

Fig. 5. Multi-Level Hierarchical Model
(Van Poll, 1997)

In order to investigate the objective and subjective effect of a wide range of socio-physical indicators, the

following diagram is obtained, which is the result of basic studies and researches in this field. (Fig. 6).

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**Effective
assessments of
subjective factors**

Degree of maintenance of neighborhood (g)

Appearance of place (i)

Apartment Assessment (g)

Administration of neighborhood (i)

Safety (f) (g)
Friendship (g)
Relationship with neighbors (a)
Attachment of residential area (a)
Perception of overcrowding (a) (c) (d) (f)
Homogeneity (g) (f)

**Physical
Factors**

**Social
Factors**

Owner / tenant (e) (f)
Time living in house (e)
Time living in neighborhood (c)

Single-family vs Multi-family (a)

Electricity (a)

Noise level (j)

Age (c) (f) (h)
life cycle (k)
Presence of relatives in neighborhood (e) (h)

**Objective
Factors**

Some predictors of residential satisfaction. (a) Aragones and Corraliza (1992); (b) Christensen et al. (1992); (c) Bonnes et al. (1991); (d) Aragones, Amerigo and Sukhwani (1992); (e) Rent and Rent (1978); (f) Loo (1986); (g) Weidemann et al. (1982); (h) Amerigo and Aragones (1988); (i) Anthony, Weidemann and Chin (1990); (j) Miller et al. 1980); (k) Hourihan (1984) (l).

Fig. 6. The Results of Experimental Studies of Factors of Satisfaction in a Framework of Socio-Physical Factors in Objective and Mental Dimensions
(Amerigo & Aragones, 1997)

In the recent satisfaction models, the personality and individual characteristics of the residents and the personality of the environment, including the character of the neighborhood, character of housing, social facilities and social environment, have been identified in the formation of satisfaction (Huang, 2015 Ibemand Ayo-Vaughan, 2019) (Fig. 7).

Housing character

Neighborhood Character

Social facilities

Social environment

satisfaction with residence

Residents' attributes

Residence comparison

Accommodation, Land tenure
The overall layout
of the neighborhood

Fig. 7. The Process of Formation of Satisfaction Based on the Character of Environment and Individuals
(Huang, 2015; Ibemand Ayo-Vaughan, 2019)

In another model presented by Landgren et al., Socio-demographic characteristics were introduced as the starting point for the formation of satisfaction or lack of it, and two parallel processes of environmental traits and residence assessment by residents, as well as spatial attributes and spatial assessments led to the gradual formation of the satisfaction concept (Lundgren & Wallentin, 2016). Based on the review of the above models, the content challenges studied in the relevant theoretical literature and the procedural challenges resulting from the review of the process and the validity of the results are summarized in Table 3.

Table 3. Summary of the Theoretical and Methodological Challenges Obtained from the Review of Previous Models

Methodological Challenges Theoretical Challenges	Inefficiency of Quantitative Methods	Attention to Appropriate confrontational Approach
Individual characteristics and motivations	- Reflecting residents' views on the real situation - Assessment of residential social climate	-The relationship between adaptation type and degree of controllability with individual and personality characteristics -The distance between the ideal residence of inhabitants and the reality
The process of affective appraisal and the level of adaptation	- Relativism in conceptualizing the impact of environmental stimuli on residents' satisfaction - The range of physical variables effective in forming and changing the level of adaptation and paying attention to the time scale of the analysis	- Using an emotion-based adaptation approach instead of a problem-oriented one - Lack of control over physical changes

4. THEORETICAL AND METHODOLOGICAL CHALLENGES

Based on the content analysis of key concepts derived from previous models, the followings were extracted as theoretical and methodological challenges.

4.1. Inefficiency of Quantitative Methods

Preliminary studies have measured the residential satisfaction with experimental methods using Residential Environmental Satisfaction Scale. In most experimental models, the satisfaction with the residential unit and the neighborhood was addressed directly and the individual, social, economic, cultural characteristics,so on were indirectly addressed (Galster & Hesser, 1981). Reflecting the residents' views on the real situation seems to be one of the advantages of this approach. But assessing satisfaction through quantitative and experimental methods is not easy and has little validity (Campbell, 1983). Studies on the efficiency of quantitative methods have shown more significant results in assessing the residential social climate, which is one of the multiple areas related to residential satisfaction (Adriaanse, 2007). In this regard, many quantitative studies have measured life satisfaction in general, not satisfaction with residence and related physical qualities.

4.2. Possibility of Obtaining Real Assessment of Residents According to Different Personal Motivations and Characteristics

The question raised in some research and addressed in relation to effective evaluation is how we can measure the satisfaction of people whose ideal residence is far from reality. People are satisfied with their residence through their background, experiences and preferences obtained in the residential environment (Tansen, 2012). The less the gap between the ideal imaginary housing and the real one, the greater the satisfaction. Therefore, finding a direct relationship is largely difficult and the role of cognitive-emotional mediators needs to be analyzed.

4.3. Change of Assessment and Level of Adaptation

Understanding people's affective appraisal process of their residential environment requires applying an adaptation level theory. The process of adaptation, as a multilevel problem, is complex. Understanding the concept of adaptation, especially under the influence of adaptation level theory, may place special emphasis on affective and cognitive judgment of the environment and lead to naive relativism in conceptualizing the effects of environmental stimuli on residents' satisfaction (Wolhwill & Kohn, 1973). The use of adaptation level theory can be a promising tool for understanding and to some extent, predicting these differences in evaluation. In Helson's (1964) theory, the relationship between the adaptation level and individuals' preferences is not properly determined.

That's why McClelland and his colleagues developed it theoretically. Based on butterfly theory, they assumed that based on which small difference from a stimulus located on which part of the path of adaptation level, the larger deviation is formed progressively (Pollock, 2013). Accordingly, in order to know the optimal level of physical changes, it is important to be aware of the process of adaptation of residents and on which part of the route and how much the changes are made compared to the frames of reference.

4.4. Dynamic Nature of Satisfaction Over Time

Another problem with satisfaction assessment is the definition of the residential environment and its dynamic nature, which leads to changes in reference patterns or subjective standards over time. The concept of life span is one of the variables affecting residents' assessment of environment. For this purpose, the concepts related to the formation and change of people's awareness and spatial knowledge of the environment are discussed, relying on the concept of life span. Residents experience different environments in the process of gradual evolution of their residence place; so their mental patterns are different (Kerppner, 1989). What is remarkable about this is the difference in the patterns of the inhabitants who live in the same place as the neighborhood at the same time, because the environment they experience is different depending on which period of the development they are in.

4.5. The Need to Pay Attention to the Appropriate Confrontational Approach

Adaptability is a way to deal with environmental issues, whether by emphasizing the cause of problem and reducing its consequences (problem-focused coping) or by resolving the resulting effects (emotion-focused coping). Since gradual changes in the physical environment are not in the control of the residents, it seems that the problem-focused coping approach is not very effective and the emotion-focused coping approach is more capable (Lazarus & Folkman, 1984).

5. SUGGESTED MODEL

The numerical evaluation of residential satisfaction and its physical factors, which has been very common in the literature of housing studies, has been proven ineffective in some studies and different approaches have been proposed for scrutinizing it methodologically (Morrone Piscitelli, & D'Ambrosio, 2019). Therefore, it is of great importance to provide a list of indicators affecting perceptual quality of a residential environment. It should also rely on approaches and methods of urban residential environmental quality assessment (Van poll, 2000). The effects of physical changes have led to residents' effective cognitive and affective responses induced in relation to environmental values and their adaptation level. Effective cognitive and affective responses are influenced by the satisfaction of residents that results from being in the environment and experiencing

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the general and dominant conditions (Nasar, 2011). Accordingly, the conceptual framework required to obtain the level of satisfaction with the experience of

the severity of physical changes is introduced based on the objective-subjective process (Fig. 8).
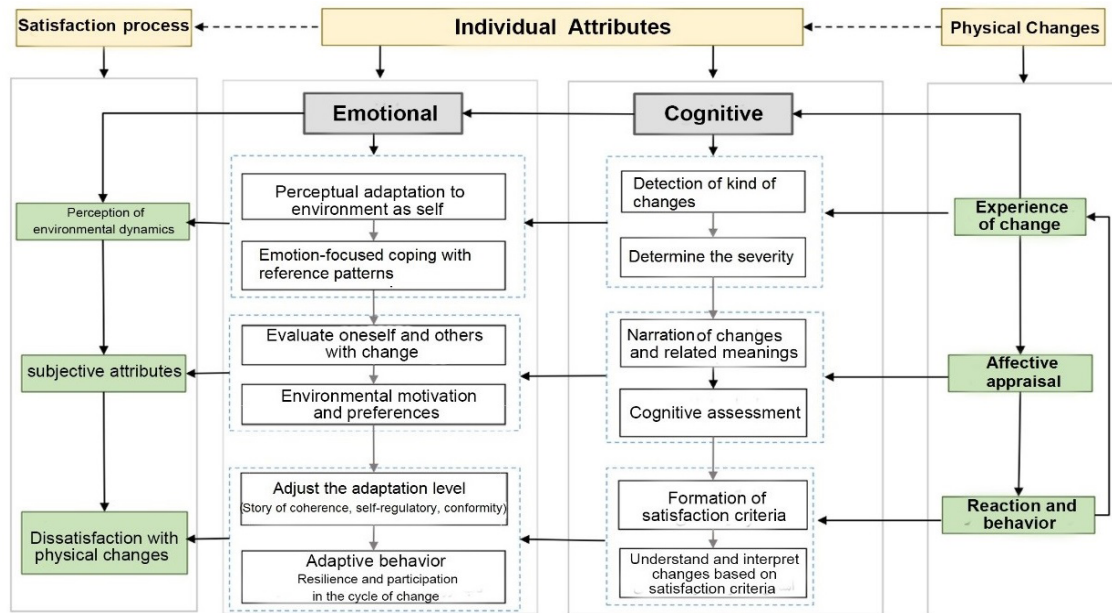
Fig. 8. Suggested Conceptual Framework for Assessing Satisfaction with Gradual Physical Changes
(Pendar & Zekavat, 2017)

6. CASE STUDY

The selected neighborhoods have undergone almost the same development process and are among the primary neighborhoods of Mahmudabad city. In addition, the similarity between the neighborhoods in the dominant economic and social characteristics of has made it possible to compare them.

6.1. Research Methodology

In the first phase of the research, based on the content analysis of the previous models, the main concepts were extracted and placed in the proposed process, which was explained in response to the identified challenges. In the second phase, in order to test and validate the proposed framework in relation to assessing residents' satisfaction with the severity and process of physical changes, the obtained questionnaire was applied in the two aforementioned neighborhoods of Mahmudabad by selecting 34 residents, from both female and male

genders, with more than 25 years of residence history, using snowball sampling method, and the results were discussed after retesting (Fig. 9). Based on the proposed model and by applying the semi-structured questionnaire in Tusca neighborhood, the indicators of the quantitative questionnaire were extracted in each of the stages of experience of, evaluation of and satisfaction with the severity of the changes. For this purpose, 6 questions related to the three-step process of experience of, evaluation of and satisfaction with the severity of physical changes were asked from 5 residents selected using the snowball sampling method. After reaching theoretical saturation, study and analysis of the topics and their coding, quantitative questions were developed and filled out by 18 residents of Tusca neighborhood. In order to measure the validity of the findings, this doing was repeated among 16 residents of Ahu neighborhood as the control neighborhood and the results were analyzed.

Fig. 9. Location of the Studied Neighborhoods of Mahmudabad City, Based on Information Obtained in 2016

6.1.1. Face Validity and Test-Retest Reliability of Quantitative Questionnaires Based on Conceptual Model

To evaluate the content validity, experts' opinions on the matching between the content of the measuring instrument and the research goal were used. The face validity is part of the content validity. This type of assessment includes whether the appearance of the tool is properly designed to assess the purpose or not. To determine the face validity qualitatively, the level of difficulty, degree of inappropriateness and ambiguity were examined and modified. For this purpose, a qualitative method was used and the proposed questions were given to five experts (2 people in urban design, 1 person in urban planning and 1 person in architecture) and they were asked to check the quality of the tool and provide the necessary feedback to correct the tool based on it. In addition, to examine its comprehensibility, the questionnaire was provided to 5 residents who had a specialization in urban planning (students and graduates of urban planning). Finally, the questionnaire was provided to residents.

6.1.2. Study Area

Tusca neighborhood, with an approximate population of 1860 people, as one of the first neighborhoods created in Mahmudabad city, plays an important role in meeting people's commercial needs due to its proximity to the market, the economies induced by its proximity to the city center and having high accessibility,. This neighborhood is located in the south of the main east-west axis of Mahmudabad city and, also the south of the big fish market of this city (Fig. 10).

Fig. 10. Mass-Space Map of Tusca Neighborhood, Based on Information from 2016

Ahu Neighborhood has an approximate population of 2,150 and is located in the southeast of the city. The buildings in it are mostly old and worn-out, and a very small number of them are apartments with more than 4 floors (Fig. 11).

Fig. 11. Mass-Space Map of Ahu Neighborhood, Based on Information From 2016

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7. RESEARCH FINDINGS

After analyzing the qualitative data, a quantitative questionnaire with closed questions was developed to test the validity and reliability of the results. Pilot examples of questionnaires made it possible to modify and finalize their content. This questionnaire has 28 items and designed based on 5-point Likert scale.

7.1. Retest of Questionnaire

For each question, Pearson's correlation coefficient and the intra-class correlation coefficient were calculated. The greater matching between the responses with each other implies a good reliability. The mean values of Pearson's correlation (r) and the intra-class correlation coefficient (ICC) between the variables are as follows, which shows the very good reliability of low, medium and high speed questionnaires and acceptable reliability of the altered alleys questionnaire (Table 4).

Table 4. Test of Questions in Relation to the Six Indicators of the Conceptual Model

Indicators	Re-test	The Average Pearson's correlation	Intra-Class Correlation Coefficient (ICC)
detection of kind of changes and their associated anchor points Experience Detection (ED)	ED.1	0.809524	0.766667
	ED.2	0.622543	0.641026
	ED.3	0.903696	0.888
	ED.4	0.915249	0.755814
	ED.5	0.888635	0.843284
Ranking of the severity of changes Experience Severity (ES)	ES.1	0.898479	0.86
	ES.2	0.872872	0.818182
	ES.3	0.912727	0.898058
	ES.4	0.846154	0.822785
	ES.5	0.917482	0.882353
Story of changes based on stimuli, time periods and sensitivity to initial conditions Affective Story (AS)	AS.1	0.87089	0.876471
	AS.2	0.947698	0.809091
	AS.3	0.868243	0.794118
	AS.4	0.83205	0.611111
	AS.5	0.912075	0.896296
	AS.6	0.377964	0.363636
Factors affecting coordination and adaptation to changes Affective Adaptation (AA)	AA.1	0.837029	0.820513
	AA.2	0.636364	0.674419
	AA.3	0.852266	0.785714
	AA.4	0.912146	0.889764
Formation of the criteria affecting satisfaction with physical changes Satisfaction Factors (SF)	SF.1	0.816497	0.822785
	SF.2	0.839181	0.794118
	SF.3	0.94337	0.943089
	SF.4	0.829787	0.849462
Understanding and interpretation of the satisfaction with changes based on criteria Satisfaction Interpretation (SI)	SI.1	0.848026	0.833333
	SI.2	0.880141	0.888
	SI.3	0.695608	0.623656
	SI.4	0.915493	0.902098
	Average	0.872283	0.872283

The following diagrams show the comparison between the target and control groups in the results of the six indicators (Fig. 12).
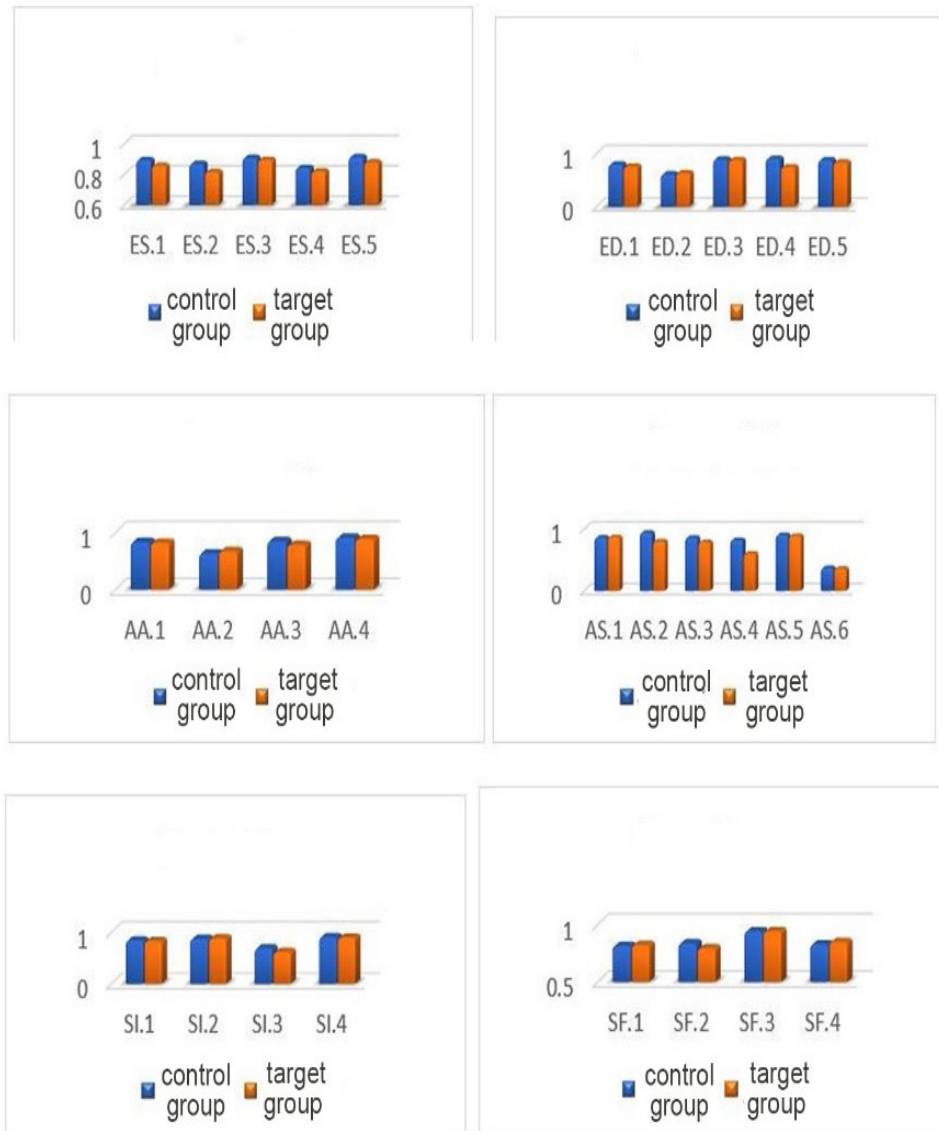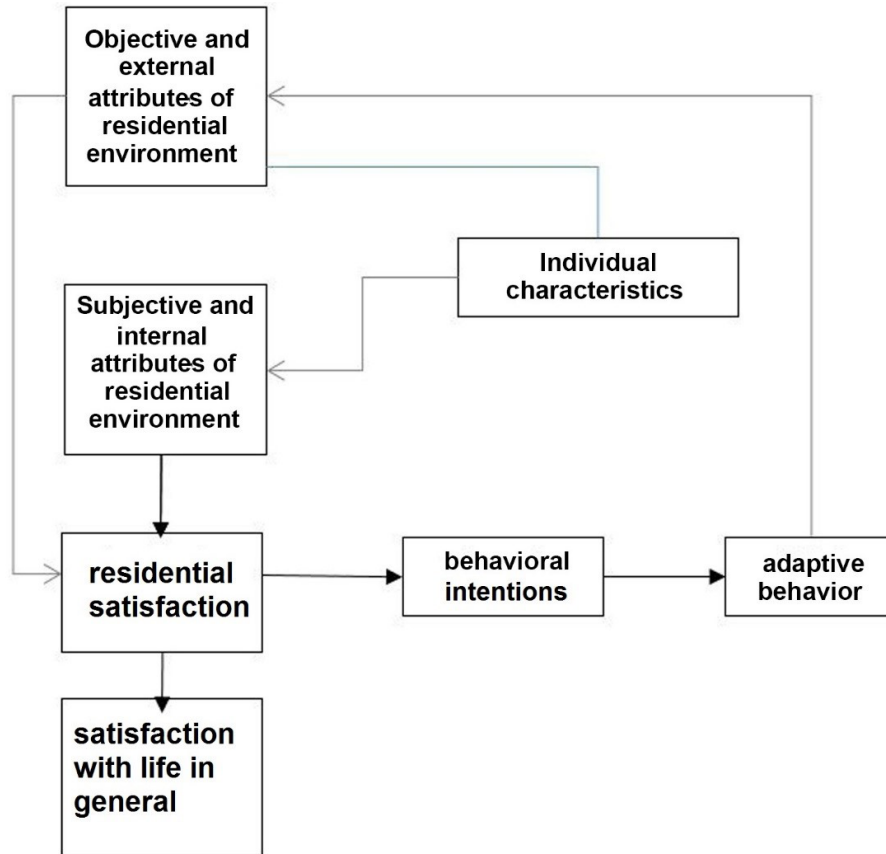
Fig. 12. Comparison between the Target and Control Groups in the Results of the Six Indicators

8. DISCUSSIONS AND SUGGESTIONS

Some studies have addressed multi-layered descriptive models of issues such as urban location and residential satisfaction, and have examined the factors influencing its persistence, such as physical changes, depending on mixed studies performed over time, time of formation and stabilization, or change of satisfaction (Wang, Webster, & Zhang, 2019). In the proposed model of the present study, affective appraisal has been introduced in the context of behavior and reaction (as a result of evaluation). In the framework proposed in the present study, the transformation of objectives into mental attributes and consideration of individual characteristics and standards of comparison derived from individual characteristics are also based on the study of adaptive behavior of residents and understanding and interpretation of mental changes and inferences that can be evaluated by qualitative methods. In Amerigo's model, behavioral, affective, and cognitive elements play a role in model interaction and structuring empirical data. According to this model, the objective characteristics of the residential environment, become subjective when being evaluated by an individual and lead to a degree of satisfaction. On the other hand, the subjective characteristics of the environment are influenced by individual characteristics such as personal and socio-demographic characteristics. The quality of the residential environment is considered as a normative criterion by which a person compares his real and ideal mental quality (Amerigo & Aragones, 1997) (Fig.13).

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Fig. 13. Systematic Model of Residential Satisfaction
(Amerigo & Aragones, 1997)

Compared to Amerigo's quality model and in order to expand it, paying attention to the user's point of view (based on the concepts of adaptation level and attitude adjustment) and combining it with an objective view in any analysis of the phenomenon of change require attention to the context based on the contextual model to perform analyses based on that stage of the evolution or transformation the environment is in. Thus, it is required to pay attention to influential factors such as individual characteristics, adaptation level, affective and cognitive evaluation that lead to mental perception of objective perceptions, "adaptation of the perceptual environment to the environment as self" and "self-assessment and assessment of others with changes", which are in line with maintaining distinction and continuity, in the proposed conceptual framework. On the other hand, it is required to discuss the changes the frames of reference, based on the "self-confidence" and "self-efficacy" of residents, in identification. According to the conceptual framework of the present study, in order to understand how residents experience physical changes (Figure 14), it is required to pay special attention to their mental analysis of changes and adaptation to its objective aspects, which leads to the regulation of residents' attitude. Any change in attitude affects the objective experience of new changes in the first step and perception of them in the next step. This process is repeated cyclically over time and at different stages of the manufacturing cycle in each component on a component scale and cycles of changes in confinement and continuity, density and height that constitute the qualities of the residents' perception of the entire alley and neighborhood.
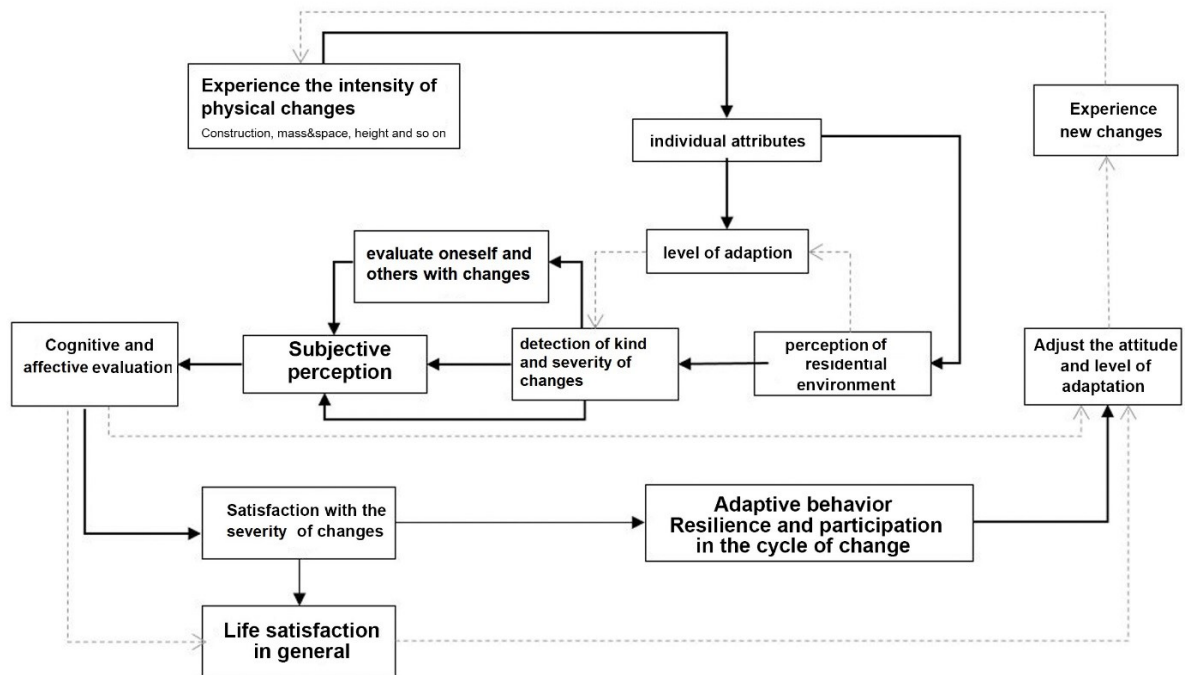
Fig. 14. Suggested Conceptual Framework for Assessing Satisfaction with Gradual Physical Changes

9. CONCLUSION

The results of the present study show that the evaluation of the scope and severity of physical changes indirectly requires the study of a set of subjective and objective factors and the analysis of the relationships between them that needs a holistic and systematic perspective. Due to the complicated nature and quality of the phenomena related to the severity of the change in the physical environment, why and how the phenomenon are discovered only by qualitative method, because the assessment of real-life events is so complex and beyond the capability of survey research (Yin, 2003). Based on the results of the study and in the proposed model, the relationships between residents' qualitative perception of physical changes and objective facts from quantitative data can be evaluated and analyzed. In terms of the validity of

the results and their accuracy, assessing satisfaction with the severity of physical changes requires the use of qualitative methods such as in-depth interviews and systematic observation, due to its contextual nature. Using the framework proposed in the present study, it is possible to compare the residents' assessment of the process of changes with the objective process resulting from morphological studies over time and to determine the contextual indicators. In other words, considering both subjective and objective dimensions provides the platform for surveying residents' opinions on the scope and severity of physical changes with a semantic view, and makes it possible to theorize the screening and proving of residents' views. Accordingly, applying the mixed research method, i.e. combination of qualitative and quantitative methods based on the conceptual framework obtained from contextual studies, seems necessary.

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