

Looking through the Models: A Critical Review of Residential Satisfaction

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Abstract: The study of residential satisfaction has gained importance mainly for its recognition as an important constituent of quality of life. Several studies have investigated the cognitive and behavioural characteristics of inhabitants or the physical and social characteristics of residential environments to understand and evaluate residential satisfaction. However, only a small number of researchers have structured these variables into models to study and analyse the relationships among them. This paper reviews residential satisfaction through the primary models used to study residential satisfaction in order to critique their strengths and weaknesses. The majority of the models discussed in this paper employ subjective and objective attributes to evaluate residential satisfaction. The paper also points out that researchers should clearly define the physical limits of proposed models and the relationships between residents and their residential environments when developing a residential satisfaction model to avoid conceptual ambiguity. The findings of this paper could contribute to a conceptual and theoretical framework of current research on residential satisfaction, as well as providing suggestions for using models in practice and recommendations for future research.

Keywords: residential satisfaction; model; housing; environment



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1. Introduction

Residential satisfaction is essentially multifaceted due to its complex nature, and it is a topic most often researched in the built environment and various other disciplines. The multifaceted nature of residential satisfaction is governed not only by when and where an assessment is taking place and what the rationale is for the assessment but also by the value system of the assessor [1]. Many empirical studies have researched residential satisfaction, predominantly examining residents' sociodemographic and behavioural characteristics, including housing and neighbourhood characteristics [2–4]. Residential satisfaction can be perceived as residents' assessment of their dwelling environment based on their needs, expectations and achievements [5,6], and on the perception of their feelings and consciousness about the place where they live [7]. Residential satisfaction also varies with the physical and non-physical attributes of the residential environment [8,9] and is a significant variable in understanding residential mobility [10]. In their review paper, Emami and Sadeghlou defined residential (dis)satisfaction as “the positive or negative psychological outcome of the evaluative process between what is perceived and what is expected whereby socio-physical attributes of the living place at various levels of scale are assessed by the individual's mental reference” [11] (p. 529). This operational definition is quite comprehensive as it combines the works of many researchers in this field, e.g., [12–18].

Residential satisfaction study is important as it is essential to a person's overall quality of life. Most people consider housing to be the most significant expenditure in their lifetime [19] as people usually find shelter, rest and satisfaction at home [20]. Over the years, a number of indicators have been proposed to evaluate housing performance. Amongst them, the concept of satisfaction has been used extensively to measure the performance of residential environments of all types [21]. The majority of these indicators were developed

during the 1980s and 1990s. Satisfaction is considered a constructive measure for housing evaluation due to its ability to measure inhabitants' cognitive and affective responses. Researchers should not only be engaged in developing theories but also in providing solutions to specific problems in any fully mature field of study [22], but some authors [23] believe that research information has conventionally been utilised either for theory development or as the basis for solving specific problems. A multidisciplinary approach has also been suggested for understanding residential satisfaction's complexity and emergence through different theories [24].

There are few theories available for evaluating the built environment compared to the number of evaluation techniques and applications because evaluation is real-world work concerning the performance of existing environments that are in use. It is challenging to construct a complete explanatory theory when there is an insufficient body of knowledge. However, developing models can clarify the theoretical alignment and expectations behind a research approach and eventually help to form an explanatory theory. Models can create direct or indirect connections to works from other fields of study, provide a structural means to understand the strengths and weakness of a study and detect any overlaps or their absence [25]. Anderson and Weidemann [23] (p. 295) suggested that "though models are important to develop a conceptual framework and hypothesis, it is also important to relate that information to the real world". Most residential satisfaction studies have implemented a range of variables. However, few researchers have organised these variables into models to study and analyse their relationships [14]. In this regard, this critique of the primary models used to study residential satisfaction aims to highlight their strengths and weaknesses. Additionally, this critique could contribute to a conceptual and theoretical framework of current research on residential satisfaction, provide suggestions for using models in practice and create a roadmap for future research. Therefore, this paper aims to contribute to a conceptual and theoretical framework of ongoing research on residential satisfaction by critiquing the primary models used to study residential satisfaction. Thus, the research questions raised were as follows:

- What is the model attempting to explain?
- How are the claims of the model demonstrated in studies?
- How can the model be used in a practical way?
- What are the strengths and limitations of the models used in residential satisfaction studies?

The first three questions are discussed in the Residential Satisfaction Models section and the final question is addressed in the Discussion section. This paper's findings are expected to progress our understanding of these theoretical models and their applications, uses, strengths and limitations in studying residential satisfaction.

2. Understanding Residential Satisfaction

The literature indicates two basic empirical perspectives on residential satisfaction [6,11,21]. The first is the "purposive approach", where residential satisfaction is conceived to measure how an environment facilitates or obstructs the user's goals. Researchers can understand which environmental components and individual roles contribute to satisfaction through this approach. The second is called the "aspiration gap approach". Here, residential satisfaction is conceived to measure residents' actual and aspired needs. Through this approach, researchers can compare what users have and what they want to have in order to determine residential satisfaction. Francescato et al. [25] developed a third approach that perceives residential satisfaction from an attitudinal point of view, which is composed of affective, cognitive and conative factors [6,21,26,27] and thus, is multifaceted. Residential satisfaction is perceived as a "criterion of assessing residential quality" [14]; therefore, it is methodologically a dependent variable and a "predictor of behaviour", thus an independent variable [11,28].

In residential satisfaction studies, little consensus exists among researchers about understanding residential environments and how to delineate them empirically [14]. Since

studies on residential satisfaction generally consider houses and neighbourhoods, there seems to be a problem defining their physical limits. For instance, a neighbourhood is evaluated as an intermediate zone between macro- and micro-neighbourhoods [29]. On the other hand, it has been argued that neighbourhoods should not be precisely defined and they should be considered as what the residents think them to be [14].

A bibliographic study [30] identified four ways of understanding residential satisfaction: (i) as a predictor of an individual's perception of their quality of life; (ii) as an evaluation technique for housing construction; (iii) as an indicator for livelihood quality; (iv) as an individual's perception of their residential environment. A number of theories have been developed on residential satisfaction due to its expansive nature; for example, the idea of "housing needs" [31]. One author posited that homeowners evaluate residential conditions based on their needs and aspirations. To conceptualise residential (dis)satisfaction, the idea of "housing deficit" was brought in [32,33]. Authors hypothesised that cultural, familial and individual norms play a vital role for individuals in assessing their housing conditions. In his "housing adjustment" theory, another author asserted that if a resident's present housing meets their norms, they exhibit a high level of satisfaction [34]. Galster's [35] "psychological construct" theory proposes that people evaluate their residential environment based on a cognitive reference that depends on their self-assessed needs and aspirations [11].

Francescato et al. [36] conceived satisfaction as being influenced by affective, cognitive and behavioural variables. The affective components are "global representation of the affective responses of people to the social-physical environment in which they live" [15] (p. 156). On the other hand, the cognitive components include perceptions and beliefs about physical environments or other residents, while the behavioural components apprise behavioural intentions (for example, moving decisions or recommending someone) [37]. Therefore, it can be argued that residential satisfaction must be conceived and interpreted as a multi-faceted construct. Amole [21] pointed out that various attributes (e.g., social/psychological, management/organisational and physical) of housing to which users respond concerning satisfaction can be categorised in terms of cognitive, affective and conative dimensions. The construct of attitude has the advantage of having been studied extensively in social psychology [38]. Therefore, it allows links to be made between research into residential satisfaction and studies conducted in an established area of work over a long period of time. Canter [39] hypothesised two cognitive processes related to residential satisfaction. One process is assumed to be purposive, implying that residential satisfaction may vary in its levels, referent and focus. The second process refers to the residents' use of different comparison standards (e.g., recent housing experiences).

The above discussion shows that residential satisfaction is a complex and multidimensional entity. Approaches focusing on residential satisfaction are only helpful when interest is limited to a clearly defined evaluation perspective. An evaluation of housing in terms of residential satisfaction tends to deal with the tangible portions of residential environments. Moore [40] pointed out that most theoretical constructs in the environment-behaviour field are good examples of either middle-range explanatory theories or models. Therefore, models can provide ways to represent and investigate residential satisfaction. An essential consideration of residential satisfaction as a criterion variable is the ability to treat models empirically and thus, sharpen our understanding of the interrelationships among the various aspects of the total housing system for a given group of people at a specific time and location.

3. Method

In order to identify scholarly studies containing models that evaluate residential satisfaction, database searches of EBSCOhost, Google Scholar, ProQuest, Scopus and Web of Science were conducted using selected keywords. Since keywords are words that capture the essence of a paper, they need to be selected in a way that signifies key concepts, is descriptive, reflects the collective understanding of a topic and helps online search

engines and indexes tag papers in the most relevant manner. Therefore, the keywords used for our database searches included residential satisfaction, resident's satisfaction, house satisfaction, housing satisfaction and model.

The search strategy was explicitly set up to gather only scholarly studies that contained models for the assessment of residential satisfaction. Therefore, all satisfaction-related keywords used in this paper were searched with the keyword "model", using the search operator "and" (e.g., residential satisfaction and model, resident's satisfaction and model, etc.). Furthermore, to refine the search, it was limited to full texts published in English. The initial search yielded 254 studies published between 1965 and 2021. After removing duplicates from the results, 79 studies were selected. A preliminary check for the relevance of the studies was carried out using a title and bibliographic data search, which left 43 studies. A further check excluded 10 studies due to their relevance to the current study. The review papers on residential properties written by Moghayeddi et al. [41] and Wang et al. [42] were also checked to confirm whether any relevant papers were missing from the analysis.

The selected studies were thoroughly scrutinised in the next step, based on inclusion and exclusion criteria. In line with the research aim and questions, the inclusion criteria considered studies that focused on models to evaluate the predicting factors of residential satisfaction. The exclusion criteria excluded studies that discussed models that lacked generalisability, i.e., models explicitly related to a particular geographical context or specific housing type (e.g., an integrated conceptual model of residential satisfaction [43]). Models pertaining to neighbourhood or community satisfaction were beyond the scope of the current study and hence, were excluded from further analysis (e.g., Hourihan's [44] path model of residential satisfaction and Marans and Rodger's [29] model). Studies were also excluded when residential satisfaction was considered a minor or non-essential concept and when they merely worked on residential satisfaction's consequences or used them as variables to predict other concepts (e.g., the housing adjustment model [32], the habitability model [45], etc.).

Several relevant residential satisfaction-related studies were found in journals and book chapters outside of the database searches by applying a cross-referencing method. Finally, 10 models were selected based on the above criteria. The DEA structure was used to evaluate all models. "D" stands for "description", i.e., what is the model attempting to explain? How does it explain the model, key terms and concepts? Therefore, description offers a cogitated and balanced review that includes a logical argument, factor or hypothesis. "E" represents "evidence", i.e., factual information used as proof to support a claim or belief that can vary in strength, quality and appropriateness for the intended purpose. Here, evidence was how the claims of the model were demonstrated in studies. Finally, "A" exemplifies "application", which is the act of putting something into operation or use. Application helps describe and guide the process of transforming research into practice. In this paper, the term application was used to understand how and when the model has been used in a practical way. The Discussion section highlights the strengths and limitations of all selected models, followed by the paper's conclusions and limitations.

The following section evaluates the 10 selected residential satisfaction models based on the criteria described in the Methods section.

4. Residential Satisfaction Models

Residential satisfaction can be evaluated through different models, which can be either empirical or theoretical. Empirical models exemplify the actual relations between various concepts. On the other hand, theoretical models denote hypothetical relationships between concepts [46]. Both can work together as conceptual models can be formulated and empirically tested from a theoretical framework. Francescato et al. [47] mentioned that models can be used as reference frameworks when interpreting the results of a study. They can also indicate areas for future research to elucidate relationships between aspects. According to Moore [40] (p. 13), "Models can show us how a domain of phenomena works,

without explaining why it works this way. That is, models are descriptive articulations of dynamic relations among variables and constructs. They can predict future events, but they are not explanatory, that is, they do not call upon higher-order abstract concepts and principles to explain the phenomena". Therefore, to understand the theoretical framework for the concept of residential satisfaction, a number of models from the environment-behaviour field are presented in this paper.

4.1. Francescato et al.'s Path Model of Residential Satisfaction

4.1.1. Description

When developing their model (Figure 1), Francescato, Weidemann, Anderson and Chenoweth perceived that residential environments involve physical objects and human behaviours, along with all the complexity this implies. In turn, both the physical and behavioural domains are composed of many interacting variables that, to complicate matters even further, interact in different ways for different people, each of whom has different values, expectations and perhaps even needs. Therefore, Francescato et al. portrayed these aspects and the hypothesised relationships among them in the form of a model (Figure 1). The model interprets the interrelationships between these aspects, which appear to be powerfully connected with residential satisfaction. In the model, residential satisfaction acts as a dependable variable that relies on several determinants: "amenities", "convenience", "satisfaction with management", "pleasant appearance", maintenance, "similar neighbours", "satisfaction with other residents" and "perceived economic value". The model demonstrates both direct and indirect predictors of satisfaction. The direction of each arrow represents the direction in which changes in one aspect affects changes in another aspect (i.e., the direction of causality). The thicker the arrow, the stronger the causal relationship.

4.1.2. Evidence

Francescato et al.'s model was derived from path analysis and illustrates that three aspects influence residential satisfaction directly. In order of importance, these are "satisfaction with other residents", "pleasant appearance" and "perceived economic value" [48]. Other variables influence these three aspects. For example, "satisfaction with other residents" is influenced by neighbours with similar sociodemographic dimensions and, to a lesser extent, the level of maintenance of the development. On the other hand, "perceived economic value" is influenced by the appearance of the development, satisfaction with management and the amenities and convenience. Finally, "pleasant appearance" is influenced by amenities, maintenance, privacy, the lack of crowding and a sense of self-esteem.

4.1.3. Application

The authors investigated 37 publicly assisted multifamily housing developments in the USA, using residential satisfaction as an evaluation criterion. The model shows the complexity of the network and begins to identify the paths of cause-and-effect relationships that are likely to occur when interventions in one or more aspects are carried out. This model also suggests that a few aspects relevant to residents' satisfaction may be influenced by factors that are not likely to be altered by design or management interventions. Thus, the model can be characterised as a causal model. One implication of the model is that it suggests ways to improve the performance of a housing development. For instance, if a project's economic value is perceived to be low, then improvements in the aspects of appearance, management and amenities and convenience could increase its perceived economic value. The model assumes that there are individual differences in the perception of residential satisfaction, though these individual differences are collapsed into common factors perceived by the majority of residents.

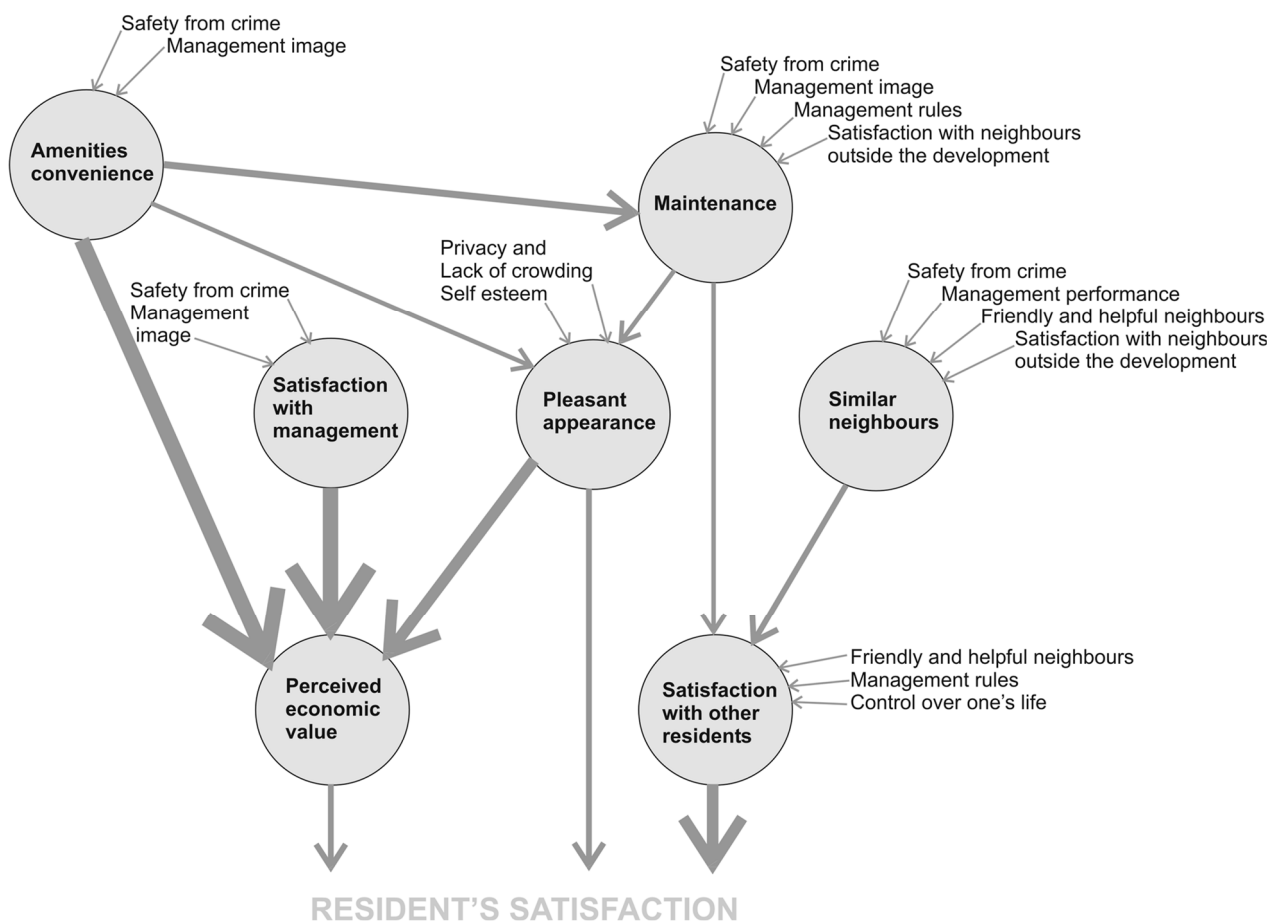


Figure 1. Francescato et al.'s [46] path model of residential satisfaction.

4.2. Marans and Spreckelmeyer's Conceptual Model of Residential Satisfaction

4.2.1. Description

The model by Marans and Spreckelmeyer (Figure 2) implies that a person's residential satisfaction is subject to their evaluation of several characteristics of the environment in which they live [49]. In this model, satisfaction is perceived as a consequence of residents' perceptions and assessments of objective environmental qualities that are predictors of behaviour; therefore, it is an independent variable. The model is essentially denoted by direct and indirect associations between "objective environmental attributes", an individual's subjective responses to these attributes, overall environmental satisfaction and certain behaviours.

4.2.2. Evidence

In this model, the objective attributes of a specific environment influence an individual's satisfaction as a result of that individual's perceptions and assessments of that environment, thus clearly recognising the physical environment [15]. The model hypothesis is that "objective environmental attributes", "perceptions and assessments of objective environmental attributes" and "overall environmental satisfaction" can affect behaviour [25].

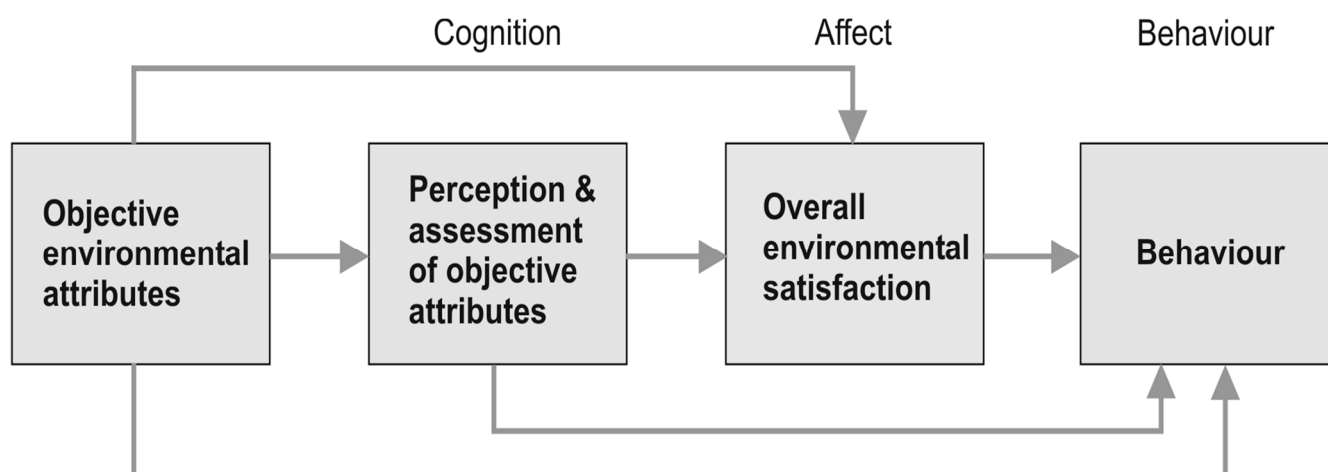


Figure 2. Marans and Spreckelmeyer's conceptual model of residential satisfaction.

4.2.3. Application

The model shows the interrelationships between data collected as part of a study evaluating the Ann Arbor Federal building in Michigan, USA. The model for this study partially came from a framework that was previously developed by one of the authors [29] to investigate residential satisfaction and its associations with objective attributes and subjective experiences [49]. Satisfaction is able to function both as a measure for assessing residential environmental quality and as a predictor of behaviour [15]. One characteristic of Marans and Spreckelmeyer's [49] model is that it directly indicates causal linkages between different components. Therefore, it is also a causal model. The model acknowledges individual differences and assumes that there are many interrelationships within any environmental context that require examination. Therefore, the model's primary objective is to understand the associations between a physical environment and its specific characteristics, including people's behaviour and how they subjectively respond to that physical environment.

4.3. Canter and Rees's Facet Model of Residential Satisfaction

4.3.1. Description

Canter and Rees developed a facet model of residential satisfaction (Figure 3) and claimed that "this model is developed from the premise that the evaluation of housing by the inhabitants is a reflection of the degree to which the inhabitants feel it helps them to achieve their goals" [16] (p. 185). These goals denote people and their physical environments. In this model, questions regarding housing satisfaction can either be generic or specific to referents and assumes that any query can be categorised in several different ways simultaneously. Level, referent and focus, as the three content facets of the model, are generated from the view that a user indicates the extent to which a place contributes to achieving their place-related objectives when evaluating that place. The authors adopted a purposive approach to study residential satisfaction and in their model, residential satisfaction is regarded as a dependent variable.

4.3.2. Evidence

This model contains three components (or facets) of satisfaction. They are:

- (i) The level of interaction (e.g., house, location, neighbourhood). "All these different levels of scale should be considered in relation to each other by bearing in mind that any place can only be clearly defined in relation to those other places of which it is composed and those of which it is a part" [50] (p. 36).
- (ii) The referent of interaction (e.g., social context, spatial provisions, services). People's association with a place depends on the nature of the referent of that association. For

instance, a house can be assessed “socially” or “environmentally” by considering different referents.

- (iii) The degree of focus of the referent (e.g., overall evaluation or particular evaluation). Theoretically, this facet can adjust the referent of the interaction facet. The “degree of focus” can vary in relation to a particular object, thereby helping to identify what is central to the goals of the individuals in any given place.

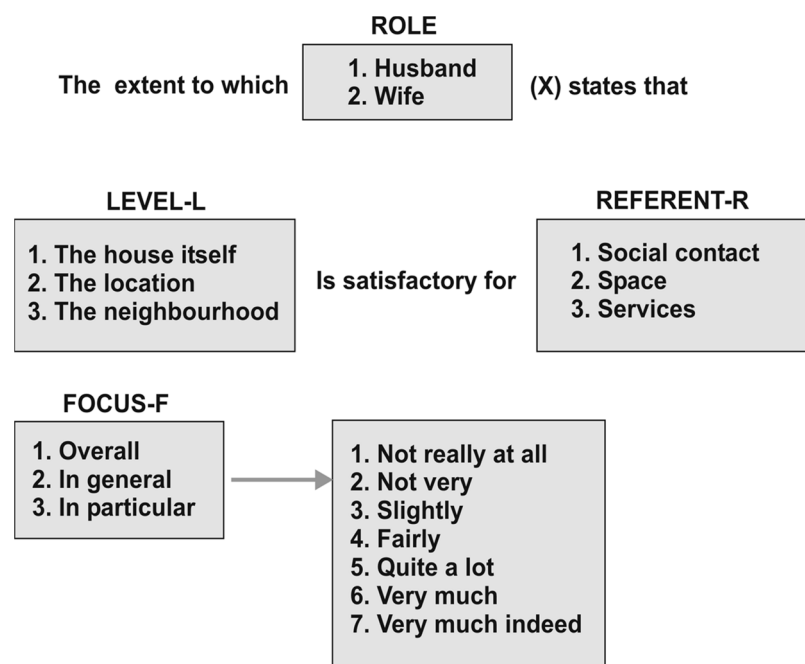


Figure 3. Canter and Rees’s facet model of residential satisfaction.

4.3.3. Application

When developing this model, an open-ended survey of 140 households was conducted in Guildford, UK. A questionnaire was developed from their comments about their satisfaction with their houses. Two copies of the questionnaire were sent to 2000 households with the instruction to be completed by the husband and wife individually. The authors [16] discussed and presented empirical evidence for all facets of their study and established a broad residential satisfaction model that identifies satisfaction components and their interrelationships. The authors also argued that these facets could theoretically be driven by a purposive view of satisfaction, through which people interact with their environment to attain a set of qualitatively distinct goals. The facet model demonstrates that it could play a part in developing a theory of person–place interactions.

4.4. Weidemann and Anderson’s Integrated Model of Resident Satisfaction

4.4.1. Description

The integrated model (Figure 4) developed by Weidemann and Anderson [15] represents the relationships that are significantly related to residential satisfaction. The model uses a behavioural intention variable to intervene and reduce the differences between perceptions and behaviours. The relationships between different components (i.e., affect, cognition, behavioural intentions and behaviours) in this model are multidirectional with no casual linkages because any variable can influence the other variables in the diagram. In the model, personal characteristics play an important role. Objective environmental attributes are another essential component of the model, which generate perceptions about environmental attributes. Therefore, the only causal link is hypothesised to exist between these two attributes. The authors conceived residential satisfaction as an independent variable from the aspiration gap approach.

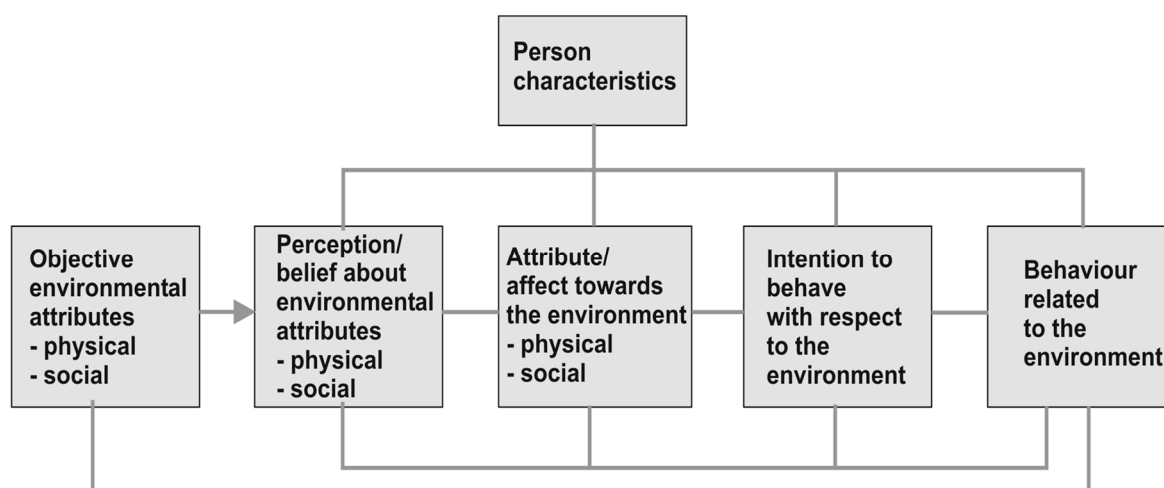


Figure 4. Weidemann and Anderson's integrated model of resident satisfaction.

4.4.2. Evidence

This resident satisfaction model comprises lines connecting various components that suggest theoretical multidirectional relationships. Therefore, the model can be characterised as a non-directional correlational model. However, the model presents two unsolved issues: (i) objective environmental attributes and acuity on environmental attributes only have one causal link and (ii) instead of considering cognitive, affective and conative variables to interpret satisfaction, their interpretation of satisfaction is purely affective.

4.4.3. Application

The model contains beliefs, affect and behaviour, which are elements of the response trilogy, and is restricted to portraying relationships between perceptions. The model does not show any associations with behaviour. It also illustrates a realist stance and supports that the world is real and knowable through empirical means and deduced general principles. It also follows that survey research methods suit this interactional worldview. The inclusion of information about objective environmental attributes is a significant aspect of the model as, in many cases, social and behavioural scientists tend to neglect it.

4.5. Francescato, Weidemann Anderson's Attitude Model of Resident Satisfaction

4.5.1. Description

Francescato, Weidemann and Anderson's [25] attitude model of residential satisfaction (Figure 5) was derived from the attitude–behaviour model developed by Ajzen and Fishbein [51]. The model is composed of several external variables and predictors. Predictors are more powerful and have more stable relationships with criteria, while external variables do not improve prediction accuracy. The model is founded on external variables, such as the demographic and personal characteristics of respondents and objective environmental variables. In this model, beliefs, emotions and behavioural intentions mediate between satisfaction and objective environmental variables and it establishes that these variables are not strong predictors of satisfaction. The predictors in the model involve cognitive, affective and conative aspects that include beliefs, emotions and behavioural intentions. The model considers satisfaction as an external variable [25].

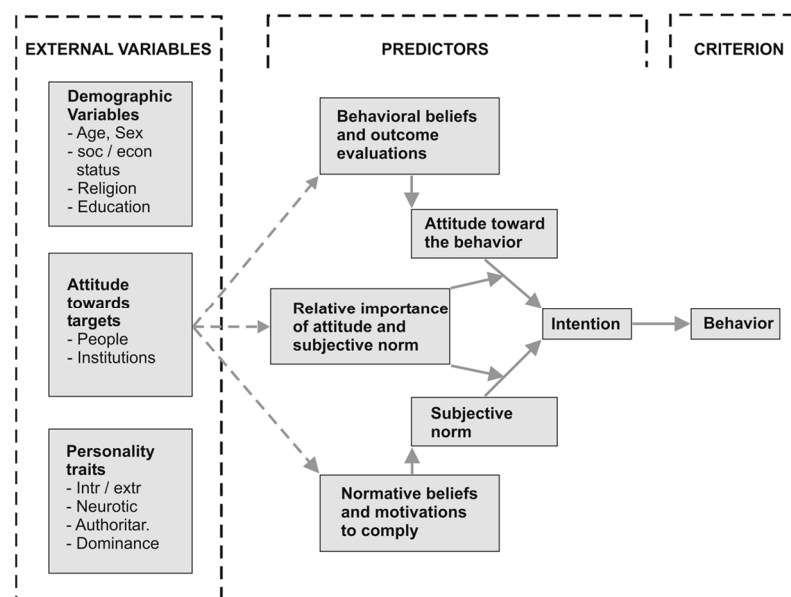


Figure 5. Franciscato, Weidemann and Anderson's attitude model of residential satisfaction.

4.5.2. Evidence

The model shows strong interactions between objective environmental attributes and other external variables. Due to differences in user demographic and personal characteristics, overall satisfaction within the same environmental conditions may vary significantly but not the variable of residential satisfaction [25]. Therefore, the model highlights the collective predictive strength of the variables instead of the strength of the individual variables that comprise the premise of the study, which is a significant issue in evaluation research.

4.5.3. Application

Residential satisfaction in this model is considered as an attitude towards a system made up of people, institutions and physical objects but not as an attitude towards behaviour [25]. However, intentionality can strongly influence behaviour because intentions are directly affected by "attitudes towards behaviour", "subjective norms" and "relative importance attributed to attitude and subjective norms" by an individual or group. The model indicates that objective environmental characteristics are not strong predictors of satisfaction. The model can be used for post-occupancy evaluation (POE).

4.6. Amérigo's Interactional Model of Residential Satisfaction

4.6.1. Description

Another model of residential satisfaction (Figure 6) was developed by Amérigo [52], which presents a structure for interpreting the concept of residential satisfaction and portrays residential satisfaction as the predecessor to satisfaction with life as a whole. It can be considered an interactional residential satisfaction model, wherein residential satisfaction is perceived to be based on the interactions between several variables. In the model, "objective attributes of the residential environment" contribute to the formation of residential satisfaction in three possible ways. The first is the connection between "objective attributes of the residential environment", which directly forms some level of residential satisfaction. At the same time, another component of residential satisfaction is formed when the "objective attributes of the residential environment" are filtered through an individual's "personal characteristics". Thirdly, "objective attributes of the residential environment" are filtered through the individual's "personal characteristics" to create "subjective attributes of the residential environment" and determine residential satisfaction. In this model, residential satisfaction is considered as an independent variable as it can predict behaviour.

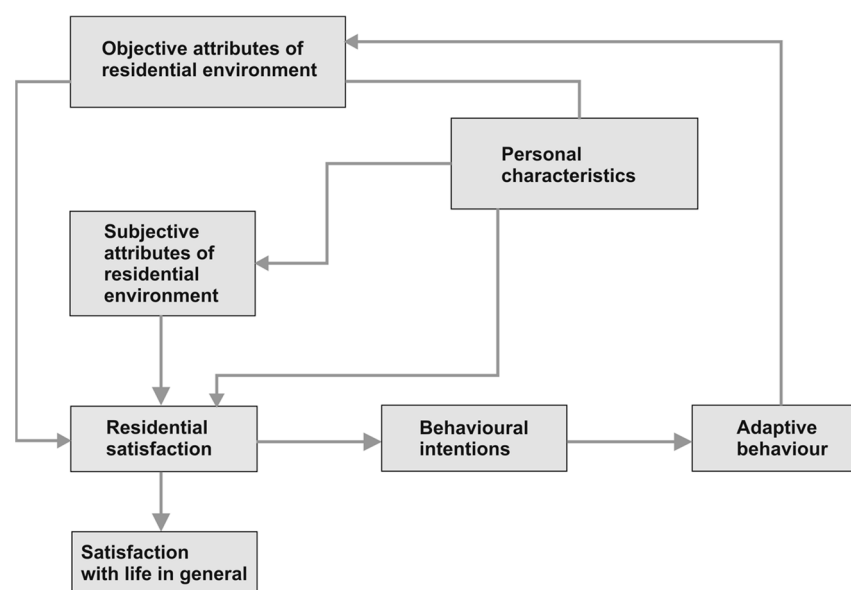


Figure 6. Amérigo's interactional model of residential satisfaction.

4.6.2. Evidence

In the model, the subjective aspects of a residential environment are influenced by the residents' personal characteristics, including their personal and sociodemographic attributes and the residential quality patterns, which, according to the authors, offers a standardised way in which residents can weigh up the actual and ideal residential environments [14]. These personal characteristics also help determine the evaluative process when the objective attributes of a residential environment turn out to be subjective, resulting in individuals experiencing a degree of satisfaction. The behavioural intention leads people to be more congruent with their residential environment, which can modify the objective residential environment. This model can be referred to as systemic as it has no end. The components provide feedback to one another as they interact within the residential environment.

4.6.3. Application

The model was developed using data from over 1000 respondents from a council housing in Madrid, who were mostly housewives. The model assumes that residential satisfaction is a positive affect that residents experience towards their residential environments, i.e., it respects individual differences. The model is not an environmentally deterministic model; instead, it predicts residential satisfaction as a complex function of cognitive, affective and behavioural variables. The model affirms that observers can make sense of phenomena without being part of them and still understand the situation. This research model used surveys as the research method, while questionnaires were used as the research instrument. The model can be tested with respect to cognitive and affective elements of residential satisfaction.

4.7. Amole's Residential Satisfaction Model

4.7.1. Description

Another residential satisfaction model was developed by Amole [21]. In this model (Figure 7), "objective variables", "subjective variables" and demographic characteristics have a bearing on residential satisfaction. Objective variables constitute objective measures of physical attributes, while subjective variables include subjective measures of physical, social/psychological and management attributes. Residential satisfaction in this model is dependent on both subjective and objective variables and hence, can be termed a dependent

variable. The objective and subjective variables are considered as independent variables. The demographic characteristics used in the model act as mediating variables.

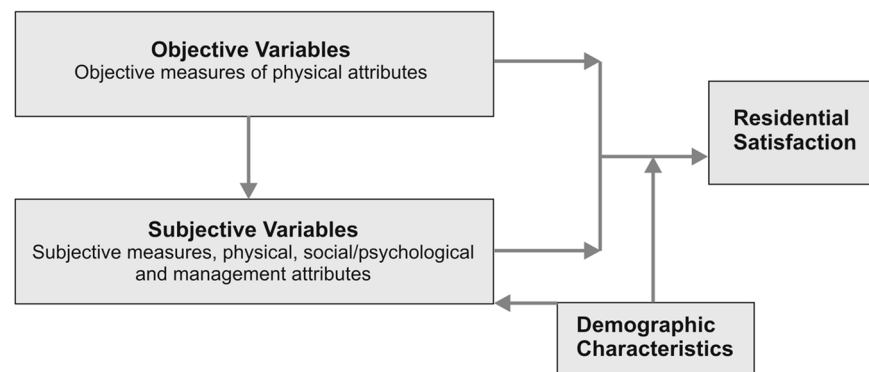


Figure 7. Amole's model of residential satisfaction.

4.7.2. Evidence

The arrows in the model indicate whether residential satisfaction is directly or indirectly influenced by the objective variables. The model was influenced by Francescato et al. [25], who viewed satisfaction as a multifaceted construct.

4.7.3. Application

This model was developed to predict residential satisfaction using data from student housing in Nigeria. Using this model, the study examined whether the form and structure of halls of residence could influence satisfaction.

4.8. Oliver's Expectation–Disconfirmation–Performance Model of Satisfaction

4.8.1. Description

Oliver's [53] expectation–disconfirmation–performance (EDP) model (Figure 8) of satisfaction elaborates on the perception and preference approach in residential satisfaction research. In the EDP model, performance and expectation can both have direct, indirect or combined effects on satisfaction. However, there is also an independent effect of disconfirmation (e.g., [54]), namely, the degree to which the performance outcomes deviate from expectations based on objectives and goals [55]. Satisfaction acts as a dependent variable in this model.

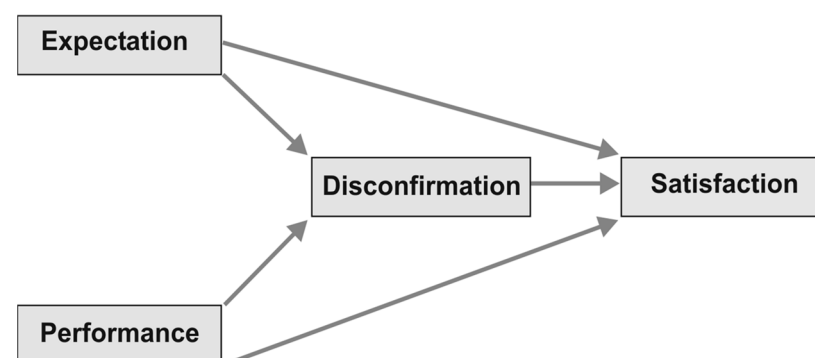


Figure 8. Oliver's expectation–disconfirmation–performance (EDP) model of satisfaction.

4.8.2. Evidence

Oliver et al. [56] mentioned that a performance outcome that is better than the expectation (positive disconfirmation) increases satisfaction, while an outcome that is worse than the expectation (negative disconfirmation) decreases satisfaction and no difference between the outcome and expectation (confirmation) has no effect. Therefore, residential satisfaction

can be conceived as resulting from recurrent episodes of positive or negative disconfirmation of people's expectations of the performance of their residential environments.

4.8.3. Application

This model is a psychological decision-making model of residential satisfaction and explains the process of satisfaction. It assumes that performance outcomes (good or bad) directly influence satisfaction. Changes in perceptions or adaptations may prevent residential dissatisfaction. For example, people search for new homes or make personal changes when residential satisfaction declines.

4.9. Gärling and Friman's Decision-Making Model of Residential Satisfaction

4.9.1. Description

The decision-making model (Figure 9) developed by Gärling and Friman [55] illustrates that moving to a new residence is the result of a sequence of previous decisions made by families or individuals. At an aggregate level, sociodemographic factors, such as family life cycle, influence the decision to move. The model illustrates that the decision to move instigates a search for alternative housing, which in turn involves decisions about where to search and when to stop searching. Evaluations of housing alternatives also control the search process. Eventually, a choice is made to accept (move) or reject (not move). In the model, when the decision to move is considered as a dependent variable, residential satisfaction affects the decision to move; therefore, it is considered as a moderating variable.

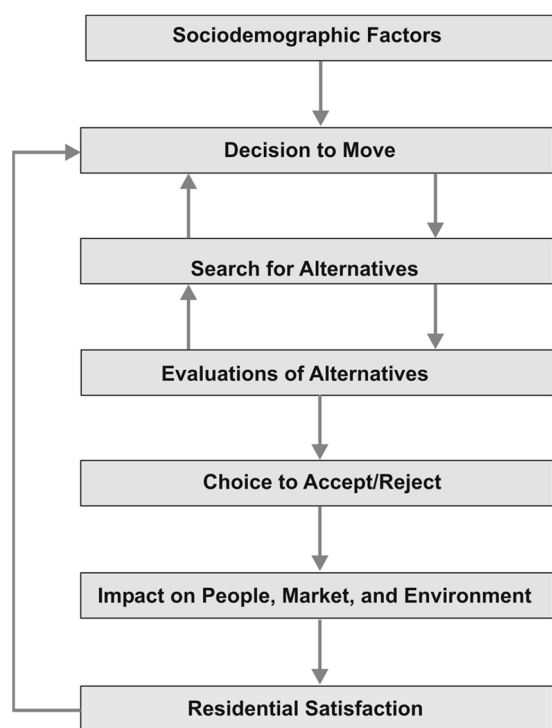


Figure 9. Gärling and Friman's decision-making model of residential satisfaction.

4.9.2. Evidence

This model is not a straightforward model of residential satisfaction, unlike the other models discussed in this paper. However, the approach adopted by the model can be considered as a “predictor of behaviour” because residential satisfaction is one of the consequences that have an impact on future decisions to move. Therefore, by moving or adjusting present households or locations, residents can reduce any incongruence between their needs, aspirations and current residential status.

4.9.3. Application

Therefore, this is another decision-making model, which is found predominantly in the social–geographical field. The model describes the process of deciding whether to stay or move to increase residential satisfaction. The model does not have the capacity to identify the predictors of residential satisfaction.

4.10. Speare's Residential Mobility Model

4.10.1. Description

The final model (Figure 10) discussed in this section is one of the earliest models related to residential satisfaction, which was developed by Speare [57]. Taking inspiration from the “stress threshold model”, this is a residential mobility model in which residential satisfaction operates as a moderating variable that affects the decision to move. However, not all mobility decisions start with dissatisfaction; for example, people may consider moving due to job transfers, marital breakups, the destruction of their household (fire/flood) or even eviction. Therefore, they search for alternatives and choose which is best for them. Dissatisfaction can result from changes in household needs or changes in the social and physical facilities at the location. However, the author argued that although dissatisfaction is necessary for mobility, it can be eased by adjustments to local conditions.



Figure 10. Speare's residential mobility model.

4.10.2. Evidence

This model explains how the determinants of moving (i.e., “individual/household characteristics”, “location characteristics” and “social bonds”) influence the decision to move. Therefore, a person's or household's decision to move depends on their relative satisfaction with their current location. The model assumes that satisfaction can be measured comparatively to an individual's threshold for dissatisfaction [57].

4.10.3. Application

This model was developed by extensively studying residential mobility and migration in Rhode Island, USA. The arrows in the model suggest that residential satisfaction depends on the “individual or household characteristics”, “location characteristics” and “social bonds” between household members and other people, which may lead to the decision to move. However, the author argued that the proposed model is not an alternative to the “cost–benefit model” because the first part of the model separates the population into being

either satisfied or dissatisfied with their current residence. Only dissatisfied people carry out cost–benefit analyses to consider moving.

5. Discussion

This section discusses the strengths and limitations of the models presented in the previous section.

In their model, Francescato et al. [48] used residents' satisfaction as a criterion for evaluating residential environments. The model also illustrates that the cognitive component (i.e., belief) is considered a determinant of the affective component (i.e., satisfaction). The model indicates causal links between various components of residential satisfaction, both direct and indirect, and reinforces the multifaceted character of housing environments. This model also suggests that residential satisfaction can be perceived on the residential, social and housing levels [43]. One criticism of the model is that it does not include the values and behaviours of residents. The various scales of physical environments (e.g., homes, neighbourhoods, etc.) are also absent from the model. Although the Francescato et al. model indicates a direct functional relationship between residential, social and housing environments, in reality, these relationships may be more complex and mutual. For example, cognition is generally treated as a determinant of affect when considering the relationship between cognition and affect [15].

Marans and Spreckelmeyer [49] introduced their model to understand and guide research on relationships between residential satisfaction, objective circumstances and subjective experiences. An affective component (satisfaction) is present in Marans and Spreckelmeyer's model, which is determined by the "perceptions and assessments" of the attributes of objective environments. Marans and Spreckelmeyer's model suggests that behaviour is directly affected by three factors: the perception and assessment of objective environmental attributes, overall environmental satisfaction and the attributes themselves. However, the model fails to acknowledge the role of intentionality, which is a significant predictor of behaviours as cognitive and contextual factors can be significantly mediated by intentions. Francescato et al. [25] asserted that intentionality can significantly mediate the effect of cognition and contextuality on behaviour, which also supports MacIntyre's argument [58] (p. 192) that "We cannot . . . characterize behaviour independently of intentions, and we cannot characterize intentions independently of the settings which make those intentions intelligible both to agents themselves and to others".

Canter and Rees's model brings together issues covered by several other studies (e.g., [59,60]). The primary referent of the model (i.e., people and physical environment) can be used for houses or the neighbourhoods in which houses are located. Individuals evaluate places based on level, referent and focus; hence, these content facets became the foundations of the model and help contribute to the place-related objectives. In the evaluation process, the opinions of husbands and wives can be significantly different, which is taken into account by this model. On the flip side, if the Canter and Rees's facet model is viewed as a model at all, it is very general because it proposes that people evaluate residential satisfaction at the house or neighbourhood scale by focusing on overall, general or particular aspects. Another criticism of the model is that although the model acknowledges that the perception of satisfaction varies based on gender, it only considers husbands and wives as respondents. Since society has become more pluralistic, the concept of family has changed and the application of this model is no longer valid in many instances. Furthermore, the current model does not accommodate the views of other household members.

Weidemann and Anderson's model possesses internal consistency and a much broader scope than the preceding models as it consists of various scales and social components of residential environments. The model unequivocally contains personal and social information, which is ignored by many researchers and can be considered as a notable advancement compared to the previous models, but it also has its own weakness. Firstly, the model recognises only one causal link between objective environmental attributes and perceptions/beliefs about objective environmental attributes. The rest are interconnected

but their hierarchy and the directions of their effects are unclear. Secondly, in the model, the authors proposed an understanding of satisfaction that is entirely in affective terms, ignoring cognitive and conative variables. A structural weakness of Weidemann and Anderson's model is that it is difficult to directly identify residential satisfaction as it does not incorporate an indication of satisfaction.

In the attitude model of Francescato et al. [25], beliefs, emotions and behavioural intentions function as mediating variables, suggesting strong interactions among objective environmental variables, demographic variables and personal characteristics. Although there are several implications of using this model, can satisfaction be intentional? The concept of intention has relevance for behaviour but not for emotions or affective states, such as residential satisfaction.

Amérigo's [52] interactional model evaluates the environments in which individuals reside. The model indicates that objective residential environments become subjective after user evaluations. A user's own personal characteristics stamp their character on their residential environment, making it distinctive and allowing the user to feel a certain affection or satisfaction towards it. Due to this affective state, individuals engage in certain adaptive behaviours or undergo psychological mechanisms that guide them into states of stability or congruence with the place in which they live. Subjective attributes rest on how a person comprehends or values their objective residential environment, which also depends on their sociodemographic and personal characteristics and their standards for comparison. The scope of the model is greater than all preceding models. It includes "satisfaction with life in general", in which the author argued that the residential environment is but one domain in which individuals feel, evaluate and move, and as such, it is only a part of the set of events that happens in their lives [61]. The model lacks internal consistency. A structural weakness of this model is that the objective attributes of residential environments can bypass subjective attributes of the residential environment and can impact residential satisfaction, resulting in a dual notion of satisfaction. Though the model includes "satisfaction with life in general", Amérigo ignores or does not present any other components of satisfaction related to life in general.

Amole's [21] model was developed from Francescato et al.'s [25] model, in which residential satisfaction is conceived as a multifaceted attitudinal dependent variable with affective, conative and cognitive dimensions. Structurally, the model is quite comprehensive as it includes subjective and objective variables of residential environments. The literature indicates the influence of demographic characteristics on predicting residential satisfaction (e.g., [6,62–64]), which the model adequately covers. Another strength of this model is that it can be applied at both the housing and neighbourhood scales simply by changing the subjective and objective variables according to the level. The model could benefit those who conceptualise satisfaction as an attitude and a complex construct. The model's only limitation is that it ignores behavioural attributes when predicting residential satisfaction.

Drawing on the limitations of the early theories of consumer satisfaction, Oliver's expectancy–disconfirmation paradigm has become the most promising theoretical framework for assessing customer satisfaction [65]. Oliver's EDP model describes the associations between performance, expectations and consumer research. The EDP model points out that since Oliver perceived satisfaction as a fulfilment that assumes the existence of something to be fulfilled (such as a goal, need, desire or aspiration), expectations and performance can directly influence satisfaction, while disconfirmation has an indirect effect on satisfaction. However, the model does not explain any other attributes of residential satisfaction. For example, it does not explain the effect of physical, social or environmental variables on predicting residential satisfaction. Another limitation is that the model cannot describe the dynamic nature of expectations.

Gärling and Friman's model highlights the profound relationship between choice and residential satisfaction. They argued that residential satisfaction depends mainly on residential choice, which deals with residential behaviour through the decision to move. Therefore, this model views residential satisfaction as a predictor of behaviour.

The emphasis on housing attributes in residential choice showcases the importance of life values based on the preference for available alternatives [66]. This model could benefit researchers who want to investigate residential mobility. The major criticism of this model is that not all decisions to move are instigated by sociodemographic factors. Changes in living conditions, e.g., entering into higher education, job changes or preference for a better dwelling, can also initiate decisions to move and bypass the issue of residential satisfaction altogether.

Speare's residential mobility model combines the components of the cost–benefit model and the stress threshold model. The model represents a major contribution to the theory and understanding of local mobility and applies to all forms of voluntary mobility [57]. Nevertheless, the model illustrates residential satisfaction as the critical determinant of whether someone moves or stays at their present location and can predict future mobility by assuming that the level of satisfaction tends to remain constant over time. One of the limitations of Speare's model is that not all mobility decisions begin with dissatisfaction. Sometimes the decision to move is made due to other reasons, such as job transfers, change of marital status or family growth, the physical deterioration of the dwelling unit or neighbourhood, etc. In such cases, individuals or households are forced to seek out alternatives and choose among them. It can be argued that dissatisfaction may be necessary for considering moving but it is not a sufficient condition. Adjustments in local conditions can lessen some sources of dissatisfaction.

The following table (Table 1) shows a summary of the characteristics of the residential satisfaction models identified in the Discussion section.

Table 1. The strengths and weaknesses of the selected residential satisfaction models.

Model	Strength	Weakness
Francescato et al.'s path model of residential satisfaction	- Indicates causal links between various components of residential satisfaction. - Direct and indirect links reinforce the multifaceted character of housing environments.	- Does not include the values and behaviours of residents. - The various scales of physical environments (e.g., homes, neighbourhoods, etc.) is also absent from the model.
Marans and Spreckelmeyer's conceptual model of residential satisfaction	- Suggests that behaviour is directly affected by the perceptions and assessments of objective environmental attributes, overall environmental satisfaction and the attributes themselves.	- Does not acknowledge the role of intentionality.
Canter and Rees's facet model of residential satisfaction	- Brings together issues covered by several other studies [59,60]. - The primary referent of the model can be used for houses and neighbourhoods.	- Does not consider the views of other household members other than the husband and wife. - Application is no longer valid in many instances.
Weidemann and Anderson's integrated model of residential satisfaction	- Strong internal consistency. - Much broader scope than the preceding models.	- Only one causal link, the rest are interconnected but their hierarchy and the directions of their effects are unclear. - Satisfaction is entirely understood in affective terms, ignoring cognitive and conative variables.

Table 1. Cont.

Model	Strength	Weakness
Francescato, Weidemann and Anderson's attitude model of residential satisfaction	- Beliefs, emotions and behavioural intentions function as mediating variables, suggesting strong interactions among objective environmental variables, demographic variables and personal characteristics.	- The question of intentionality in the model. The concept of intention has relevance for behaviour but not for emotions or affective states, such as residential satisfaction.
Amérigo's interactional model of residential satisfaction	- Objective residential environments become subjective after user evaluations. - Subjective attributes also rest on how a person understands objective residential environments. - The scope is greater than all preceding models.	- Lacks internal consistency. - A structural weakness can be observed in perceiving residential satisfaction.
Amole's residential satisfaction model	- Structurally very comprehensive as it includes subjective and objective variables of residential environments. - Can be applied on both the house and neighbourhood scales.	- Does not include behavioural attributes when predicting residential satisfaction.
Oliver's expectation–disconfirmation–performance model of satisfaction	- Describes the associations between performance, expectations and consumer research.	- Does not explain social and environmental variables when predicting residential satisfaction. - Cannot describe the dynamic nature of expectations.
Gärling and Friman's decision-making model of residential satisfaction	- Highlights the profound relationship between choice and residential satisfaction. - Views residential satisfaction as a predictor of behaviour. - Benefits researchers who want to investigate residential mobility.	- Not all decisions to move are instigated by sociodemographic factors and may bypass the issue of residential satisfaction altogether.
Speare's residential mobility model	- Represents a major contribution to the theory and understanding of local mobility and applies to all forms of voluntary mobility.	- Not all mobility decisions begin with dissatisfaction. Sometimes the decision to move is made due to other reasons.

6. Conclusions

Given that residential satisfaction is a subjective phenomenon [67], residents' perspectives and thoughts about their residential environments are central to a comprehensive understanding of residential satisfaction [68]. The selected satisfaction models can explain this phenomenon quite well as a dynamic system incorporating physical, social and psychological factors [14].

Database searches were conducted to evaluate the residential satisfaction models. In total, 10 models were selected from 79 studies after applying inclusion and exclusion criteria. The “description”, “evidence” and “application” structure was used to evaluate each selected model. The key conclusions of this paper include the following:

- The diversity of the models in this paper demonstrates many the ways to conceptualise residential satisfaction. Consequently, no clear guidelines exist about which models should be used in certain contextual perspectives. Furthermore, it is possible that the authors may have used the same terms with different meanings.
- The majority of the models concerning residential satisfaction bring together subjective and objective aspects to evaluate residential satisfaction.
- It is crucial for researchers to have a clear theoretical understanding of whether to consider residential satisfaction as a dependent or independent variable.
- Testing some conceptual models is practically impossible due to the high level of abstraction, while empirically explorative models can be used as the foundation for theory building and thus, have heuristic value [46].
- It is worth considering two issues when developing a residential satisfaction model: (i) due to the different opinions on defining residential environments, we suggest that researchers clearly define the physical limits in their proposed model to understand residential satisfaction; (ii) the problem of the relationships between residents and their residential environments, which are dynamic in nature. Each individual has a clear benchmark of residential quality to which to compare their tangible environment. Given the complexity of these interactions, it is impossible to derive cause–effect relations. Therefore, using residential satisfaction models to determine the causes that generate satisfaction and effect they imply might be a significant problem.

In conclusion, it can be said that residential satisfaction needs considerable further study due to its complex nature, processes and measurement criteria. Models may be considered as part of the operationalisation of theory as they communicate the dynamic mechanisms among organised bodies of findings. The models discussed in this paper offer ways of incorporating residential environment research and open up new and reliable paths for the subsequent and deeper study of the subject. Models can positively help organise the existing literature, thereby helping us to understand the many different relationships between variables. In practice, empirically tested models can identify factors that govern residential satisfaction. Subsequently, designers, planners and other stakeholders can be advised as to how to improve satisfaction by judiciously considering the factors determining residential satisfaction when planning new housing developments.

7. Limitations

Although the present paper critiqued the primary models used to study residential satisfaction with the aim of contributing to the ongoing research on residential satisfaction, it had certain limitations. Some papers may have been overlooked due to the search strategy as it was focused on specific keywords. For example, studies concerning residential dissatisfaction were beyond the scope of the paper. The paper also did not include any conference papers or papers published in a language other than English, and it was limited to academic papers published in legitimate journals, including book chapters, related to residential satisfaction models. However, the quantity and variety of the selected papers were comprehensive enough to fulfil the aim of the paper.

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Abbreviations

EDP	Expectation–disconfirmation–performance
DEA	Description–evidence–application
POE	Post-occupancy evaluation

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