THE MEASUREMENT OF QUALITY IN HOUSING AND ITS RELATIONSHIP TO HOUSING SATISFACTION

Christine M. Harris

All societies have norms or expectations of behavior to which people react in their housing behavior. A normative deficit occurs when the housing of a family or individual is below prescribed levels of attributes considered necessary for the fulfillment of housing norms. The deficits can be viewed as the main determinants of the level of housing satisfaction. It follows then that a measure of deviations from housing quality norms would be related to levels of housing satisfaction (Morris and Winter, 1974; Speare, 1974).

The purpose of this paper is to analyze the influence of housing quality on housing satisfaction. It is hypothesized that satisfaction with housing quality is significantly and positively related to housing quality. To test this hypothesis, the relationships between quality and satisfaction are analyzed within various levels of some control variables.

The market value of the house may be considered the best single indicator of housing quality, especially with controls for location and the number of rooms. The determinants of market value, however, involve an overlapping of many attributes of the dwelling, especially space, structure type, and neighborhood, as well as supply, demand, and price factors.

A scale of housing quality could be based on a summed index of components describing the facilities within a home and the levels of housekeeping and maintenance (Morris, Woods, and Jacobson, 1972). It would be desirable to give attention to the various attributes which the typical household thinks contributes to quality. Personal subjectivity is evident when individuals are asked to define housing quality. Not everybody thinks of the same items, and not everybody desires the same set of components.

Due to an absence in the literature of widely recognized norms prescribing the levels of quality in housing, one could temporarily assume that some point or range within the summed scale of quality was the normative quality level. The present analysis treats the mean existing level of quality for the scale developed below as the societal norm for housing quality. The primary

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[2]Christine M. Harris is currently doing housing research for a management research firm in Chicago.

assumption is that all families have basically the same level of aspirations for quality, but low income families seek lower housing quality due to the budget constraint.

Selection of the Data and Development of the Variables

The data for this study were drawn from a recently completed study of 455 households in Fort Dodge, Iowa, conducted by Iowa State University with the cooperation of the city of Fort Dodge. A stratified random sample was selected from the city's nineteen census enumeration districts. The final results were weighted to allow for underenumeration in some districts, resulting in a weighted sample size of 530. The respondent for each household was either the head of the household or the wife of the head of the household.

The survey was completed in two stages. In the first stage, the interviewer completed an intensive questionnaire with the respondent. In the second stage, the interviewer completed an exterior survey of the dwelling covering seven aspects of exterior dwelling condition.

Two subscales were developed to comprise the scale of housing quality: (1) a summed index of interior quality consisting of housing conditions and the presence of certain amenities (conditon of the floors, interior walls, windows, roof and ceiling, heating and plumbing systems; presence of freezer, built-in oven, microwave oven, clothes dryer, water softener, color television, stereo, and fireplace) and (2) a summed index of exterior conditons (condition of plants and shrubs, lot fixtures, exterior roof, siding, porch, doors and windows, and foundation). The items were coded with a higher score if the answer indicated a contribution to quality (see Tables I and II). The indexes for interior quality and exterior quality were then summed to form a total quality scale (see Table III). It is this total scale of housing quality which will be referred to throughout the remainder of the study.[3]

Table I

Scaled Interior Quality

Item	Score (% frequency)
(All items scored as 0 or 1.)	0 (defective)
Condition of:	
1. Floors	4.7
2. Walls	5.0
3. Windows	8.1
4. Ceiling	8.0
5. Heating system	3.9
6. Plumbing system	8.5
	0 (not present)
Presence of:	
1. Freezer	57.8
2. Built-in oven	89.8
3. Microwave oven	97.6
4. Clothes dryer	34.9
5. Water softener	52.3
6. Color television	28.0
7. Stereo	41.8
8. Fireplace	83.7

Satisfaction with housing quality was focused upon in this study as a component of overall housing satisfaction; thus, the scale for satisfaction with housing quality was summed from component items which measured satisfaction with specific housing attributes: floor plan, physical condition of housing, house comfort, house style, house image, landscaping, and number of baths. Each of the seven component satisfaction items had a range from one (very dissatisfied) to four (very satisfied) resulting in a quality satisfaction scale with a range of seven to twenty-eight. A correlation matrix was prepared on the satisfaction

[3]The formulation of the interior and exterior scaled variables was completed for several reasons, the most important being the possible theoretical value of having quality as both an interior and exterior scale and also as base scales in reliability testing of the quality variable. The results of this testing show the variable to be quite reliable and are available from the author on request.

Table II

Scaled Exterior Quality

Item	Score (% frequency)					
	1	2	3	4	5	Missing
1. Lot fixtures	1.8	10.1	19.1	29.6	37.9	1.6
2. Lawn—shrubs	0.4	1.7	9.1	30.8	56.3	1.6
3. Roof	0.4	3.6	14.7	33.4	46.3	1.6
4. Siding	0.5	2.2	15.5	27.9	52.3	1.6
5. Porch—entry	2.1	5.2	13.4	32.1	45.4	1.6
6. Doors—windows	0.0	3.9	13.2	37.6	43.7	1.6
6. Foundations	0.5	3.0	15.3	30.0	49.6	1.6

Values:

1—Dilapidated: warrants removal and total rebuilding
2—Salvagable: major replacement or rehabilitation
3—Sound: minor rehabilitation or repair
4—Good condition: cosmetic refurnishing
5—Excellent condition: no repairs or refurnishing needed*

*For a more complete description of the item contact the author.

Table III

Measures of Central Tendency

Variable	Mean	Median	Range	(Possible Range)
Interior quality	8.93	8.86	14.00	(14.00)
Exterior quality	30.81	30.89	27.00	(28.00)
Total quality	38.33	39.59	38.00	(42.00)

components and the total satisfaction scale (see Table IV).

The results of these correlations show that the item correlations fall in a moderate range from .21 to .58, indicating some relationship to one another. These relationships were expected as all the components are assumed to be measuring an aspect of housing satisfaction. Further, the component items show strong relationships to the scale of housing quality satisfaction, ranging from .52 to .79.

Hypotheses Testing

The basic hypotheses were that housing quality is an independent variable used in predicting two measures of satisfaction: (1) housing quality satisfaction and (2) a more general measure of housing satisfaction which will be referred to as overall housing satisfaction. The overall housing satisfaction variable is a single item to the question: "How satisfied are you with your housing?". The two hypotheses were tested by running the

Table IV

Product Moment Correlations of Satisfaction With Housing Quality and Its Component Items

Variable	Scaled Total	1	2	3	4	5	6
Satisfaction with:							
1. Landscaping	52						
2. Floor plan	70	22					
3. House comfort	78	27					
4. House style	77	25	54	56			
5. House image	76	33	41	51	58		
6. Number of baths	55	21	29	37	30	29	
7. Physical condition of unit	79	28	50	62	51	58	21

(all correlations significant at .001)

correlation coefficients between quality and each of the satisfaction variables.

The results of the tests of the two hypotheses are as follows:

Housing Quality —(r = .41, p<.001)→ Housing Quality Satisfaction

Housing Quality —(r = .22, p<.001)→ Overall Housing Satisfaction

Both hypotheses can be accepted at a 1 percent level. It can be noted that the correlation between quality and housing quality satisfaction is much higher than the correlation between quality and overall housing satisfaction. The lower correlation coefficient between housing quality and overall housing satisfaction is not surprising when one considers all other potential normative effects on overall housing satisfaction, such as tenure, space, structure type, and neighborhood, as well as other unknown and undefined family and social norms which might affect the response to housing quality. Further, the correlation between housing quality satisfaction and overall housing satisfaction is .40. There is a significiant explained variance between these two variables of 16 percent (F=95.74). Thus, one of the components of overall satisfaction arises from satisfaction with quality. Therefore, the remainder of the study will focus specifically upon the relationship of quality and quality satisfaction by introducing various controls which may further explain this relationship.

The initial regression of quality satisfaction on housing quality alone results in an R^2 (proportion of variance explained) of 0.17. Then race, sex of the head of the household, marital status of the head, age of the head, education level of the head, and annual total income of the household were added as control variables.

Some problems were encountered with these controls due to the nature of the sample and the percentage of missing values. Approximately 25 percent of the data on household income was missing. Sex of the head of household was given a value of one for a male-headed household and two for a female-headed household. Marital status was given a value of zero for not married and one for married. Other variables, such as age of the head, household income, and education level, are continuous.

Using a multiple regression framework of satisfaction on housing quality and the control variables simultaneously, the significance levels were computed (see Table V).

Table V

Regression of Housing Quality Satisfaction With Quality and Six Control Variables

Variable	Beta	F
Quality	.33	34.91
Age of head	.20	15.41
Household income	.13	5.75
Education of head	.10	3.39
Marital status of head	-.07	.68
Sex of head	-.05	.42
Race	.01	.01

For the model: $R^2 = .22$
$F = 14.23$
$df = (7,354)$

The regression results can be interpreted as meaning that for any given level of quality, the older the household head, the more satisfied the respondent was with housing quality. It can also be concluded that satisfaction increased with income and education of the head when quality is held constant. Marital status, sex of head, and race have no significant effect. The relative importance of each of the independent variables in explaining satisfaction with housing quality is shown by the beta statistics.[4] The inclusion of the six control variables increased the proportion of variance explained by the model from 17 percent to 22 percent.

Marital status, sex of head, race, and education are not significant at the .05 level, although education of head is significant at the .10 level. The relative importance of each variable and the inclusion of these variables along with the other controls and quality increase the amount of explained variance.

Further analysis of age of head, household income, and education of head was conducted by crosstabulation using gamma[5] to clarify specific ranges or levels within the sample which would most or least support the original hypothesis. Table VI shows the rank correlations (gammas) between quality and satisfaction with housing quality for households within various ranges of the control variables.

When income was tested as a control in the original relationship, the gamma in the lower and middle groups tended to repeat and reinforce the original relationship (.37). That is, for those households whose income was less than $16,000, the higher the quality level, the higher the housing quality satisfaction level. The higher income group gamma (.19) is a considerable drop from the gamma of the first two income groups.

The weak relationship for the high income group may be due to a threshold effect—once a high level of quality is reached, perhaps further increases in quality do not increase satisfaction very much. An alternate explanation of the weak relationship is that the quality index used in the survey does not adequately reflect quality differences in higher quality housing.

There was a very strong relationship between housing quality and satisfaction with housing quality for families with a head who had an eighth-grade education or less (gamma=.61). The relationship was weaker for families whose heads had more education, with virtually no relationship for those with several years of college education.

When age of the head of the household is used as a control variable, all age groups with the exception of the 30 to 44 year range are similar in the strength of their relationships and similar although somewhat stronger to the original relationship.

[4]The betas are the standardized regression coeffieients, representing the contribution to the explanation of satisfaction variables have been controlled.

[5]A measure of ordinal correlation described in F.C. Freeman: *Elementary Applied Statistics for Students in Behavioral Science*. John Wiley and Sons, Inc. New York. 1965.

Table VI

Rank Correlation with Control Variables

Quality (Independent Variable) → Housing Quality Satisfaction (Dependent Variable) Gamma = .37

Control Variable		Ranks				
Annual income	Range	(<8000)	(8000-15999)	(>15999)	(Missing)	
	Gamma	.50	.42	.19	.26	
	N	(134)	(133)	(93)	(122)	
Education of the head	Years	(2-8)	(9-11)	(12)	(13-15)	(>15)
	Gamma	.61	.33	.36	.19	.04
	N	(85)	(74)	(176)	(87)	(122)
Age of head	Age	(17-29)	(30-44)	(45-64)	(65-88)	
	Gamma	.54	.24	.42	.40	
	N	(90)	(115)	(161)	(113)	

For all age groups except the 30 to 44 year-old age group, the level of quality in housing increases the level of satisfaction with housing quality.

In considering the specific groups of age, education, and income that have insignificant gammas, one must further analyze the relationships of these variables directly to the dependent variable, housing quality satisfaction. The resultant gammas are insignificant for this sample, although they indicated a slight increase of quality satisfaction in housing as income, age, and education levels increased. (Note for these particular tests the missing data in the income category were deleted, explaining the low N in this category.)

Based on this analysis, the quality scale appears to be a reliable measure of quality and appears to be usable as an index of a normative quality deficit. The lower relationships in the higher levels of both income and education between quality and housing quality satisfaction may be due to quality norms not captured by the survey data. Alternately, these results could also lead one to view the quality variable as having a threshold; that is, as groups reach high levels of housing quality, they derive little additional satisfaction from further increases in housing quality.

TABLE VII

Rank Correlation of Housing Quality Satisfaction with Control Variables

Quality → Housing quality satisfaction
Gamma =.37
(N=482)

Annual household income → Housing quality satisfaction
Gamma=.19
(N=388)

Education of Head → Housing quality satisfaction
Gamma=.18
(N=519)

Age of head → Housing quality satisfaction
Gamma=.19
(N=517)

Conclusions of the Hypotheses Testing and Control Variables

The following conclusions may be drawn for this sample.

1. Quality in housing affects overall housing satisfaction but is only a small component of

overall satisfaction in housing.

2. Quality in housing significantly affects housing quality satisfaction, which is one of the components of overall housing satisfaction.
3. The positive effect of housing quality on housing quality satisfaction is replicated among those families whose head has an educational level between ninth and twelfth grade and is especially strong among the lower and middle income groups and all age groups with the exception of the 30 to 44 years.
4. The effect of housing quality on housing quality satisfaction is weak among those families whose head has at least some college education, families with a high annual income, and families with a head of the household in the age category of 30 to 44 years.
5. The relationship of housing quality to housing quality satisfaction is especially strong within the group with an educational level under the ninth grade.
6. Race, sex of head of household, and marital status do not affect the relationship of housing quality to housing quality satisfaction.

Summary and Suggestions for Further Research

The present study is not intended to be a final analysis of the relationships among quality, housing quality satisfaction, and overall housing satisfaction. The quality scale needs further development. In addition, the ideas of quality held by interior designers, architects, and realtors related to those held by consumers could be investigated.

Saliency could be measured relative to component items for both the quality scale and the housing quality satisfaction scale. If the possession of a certain item or certain features of a home are not important to an individual, such as the floor plan or number of baths, or alternatively, if a person cares very much about an item or feature, a system of weights might be devised to form a quality scale or a quality housing satisfaction scale that could be an estimate of how well a certain combination of housing characteristics meets individual and family needs.

Several control variables could have been included in this study that might have improved the predictive level of the relationships. For example, structure type, tenure, socio-economic status, and number of children may have provided some additional explanation of the various levels of housing quality satisfaction.

The study can be carried a step further in many directions by discovering the various adaptations families make from the various levels of housing quality dissatisfaction, for example, mobility or residential adaptation. One could also look for other consequences of the level of quality in housing, such as physical or psychological disorders.

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