

PRODUCT SATISFACTION EXPLAINED BY SATISFACTION AND COMPLAINTS REGARDING PRODUCT CHARACTERISTICS

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ABSTRACT

The study related consumer satisfaction/dissatisfaction with product characteristics to overall product satisfaction, based on Lancaster's theory of consumer demand (1966a; 1966b; 1971). The household durable good studied was mattresses, a higher priced, utilitarian product which is a necessity and which receives substantial daily use. Findings may provide feedback on market performance and identify problem areas in selecting a product which best fits consumer needs.

Sales invoices of cooperating retailers in the Salt Lake City metropolitan area provided the study sample. There were 405 respondents to a mailed questionnaire. Multiple regression equations were used to analyze the data. Overall product satisfaction was high, but 27% of the sample had some complaint about the product purchased. Satisfaction with comfort was the primary explainer of satisfaction with the product as a whole. Implications are drawn for consumer selection procedures, manufacturer/seller information for consumers, and other actions by manufacturers, sellers, and consumers.

INTRODUCTION

This study considered consumer satisfaction with one household durable good, mattresses, as explained by satisfaction/dissatisfaction with characteristics of that good. Mattresses are a necessary and utilitarian product often purchased at times of household formation, as children grow, and when household furnishings are being replaced or upgraded. Frequently, the purchase of a mattress occurs at a time when demands on the family budget are already substantial. The product also receives substantial use--about 8 hours per day, year around--and the quality of rest provided contributes to the user's health and activity level (Innerspring Strongest...1985).

Consumers are faced with a number of

challenges when purchasing a mattress. A major goal is finding a comfortable mattress Consumer Reports states that mattresses vary widely in firmness and in the way they conform to the body. The magazine adds that only consumers can tell, by experimenting, how much firmness and conformity they will find comfortable. Additionally, the firmness of a mattress may vary with a person's weight. Product testers at Consumer Reports found that some innerspring mattresses became progressively firmer while others actually lost firmness as heavier weights were applied to the mattress (Innerspring Mattress...1986). Furthermore, manufacturer labels stating the firmness of the mattress are only helpful within a brand, since different manufacturers measure firmness in different ways (Innerspring Mattress...1986).

Although mattresses are not a complex product, the fabric ticking conceals the inner materials and construction from consumers, just as a package conceals its contents. Some manufacturers supply cutaway models to retailers to overcome this problem. And, with the approximately 14 year life expectancy of an innerspring mattress, plus innovations in construction and materials, the consumer's past experience provides few guidelines for current purchase.

The purpose of this study was to identify product characteristics which contributed to satisfaction/dissatisfaction (S/D) with mattresses, a purchased home furnishings durable good. Consumer S/D with the mattress as a whole and with mattress characteristics will provide feedback on market performance; it may also identify problems in product quality or in consumers' ability to select mattresses which have the characteristics they desire. The relationship of characteristic satisfaction to product satisfaction should identify those characteristics most important to consumers as they evaluate their recent mattress purchase. The S/D of other consumers with their

mattress purchases may alert those currently shopping for a mattress to potential problems in selecting a product to best fit their needs. The findings may be generalized to other home furnishings, particularly those where family use is important.

RELATED LITERATURE

Consumer S/D has been thought of largely as a summary measure of performance or utility for a product or service. However, some have measured S/D in a more detailed way. Instead of a rough overall measure, several factors or dimensions which may contribute to an overall consumer S/D score were measured (see A. Pfaff 1976; M. Pfaff 1977). This multidimensional approach may be traced back to economics as well as multi-attribute models of consumer behavior. Ratchford (1975) and Krishnan and Gronhaug (1980) have pointed out the similarities between the economist's set of characteristics, as in Lancaster (1966a; 1966b; 1971) and consumer behaviorist's multi-attribute models. More important, such multi-attribute or characteristic approaches may be useful in identifying factors that could improve the overall performance of a product.

In Lancaster's model of consumer demand, consumers do not want market goods in and of themselves, but for the bundle of characteristics those goods possess. Lancaster assumed the consumer has a preference ordering over all possible characteristics, as well as a goal to attain the most desirable bundle of characteristics, subject to situational constraints. The consumer's demand for goods and satisfaction from those goods are derived from the fact that goods are necessary to obtain characteristics (Lancaster 1966a; 1966b; 1971).

Lancaster (1966a; 1966b; 1971) states that typical consumption activities have a single input, or good, and joint outputs, or characteristics. A single good may have more than one characteristic and a single characteristic may be obtainable from more than one good. The consumer would choose the good with the most preferred bundle of characteristics that yielded the highest utility or satisfaction level.

According to Lancaster, a consumer's choice

should not be viewed as their revealed preference for characteristics because they may merely have made an inefficient choice. Such inefficiency in consumption can be primarily due to ignorance and the lack of managerial skill. Producer and seller advertising is not likely to remove consumer ignorance, since advertising stresses particularly desirable characteristics but makes less effort to inform consumers of other product characteristics (Lancaster 1966a). However, organizations such as Consumers Union have provided more objective information on characteristics of goods than are easily available elsewhere. In Lancaster's model, consumers who paid for information which assisted them in selecting their most efficient bundle of characteristics were acting rationally (1966a).

Consumer satisfaction with a wide range of goods and services has been studied, including food products, clothing, household goods, housing, cars, medical services, and small claims courts. One previous study, which measured overall product satisfaction, included innerspring mattresses among the household goods and clothing purchases surveyed. Questionnaires were mailed to households in a large midwestern city and findings were reported for frequently purchased items (Hughes 1977). Of the 115 respondents who purchased an innerspring mattress, 81% were completely satisfied; the remainder were either fairly or not too satisfied. Innerspring mattresses ranked 21st in overall product satisfaction; 20 other products ranked higher in the percentage who were completely satisfied--including automatic dryers, automatic washers, and color television sets--and 15 products ranked lower--including draperies, curtains, refrigerators or freezers, bedspreads, vacuum cleaners, living room furniture, carpeting and kitchen stoves. Innerspring mattresses were eighth highest in price paid. No significant difference occurred in mean price paid between those who were completely satisfied and those less satisfied.

A different approach to measurement of consumer satisfaction was taken in a nationwide survey of food products (Handy and M. Pfaff 1975). Satisfaction with foods was measured at four levels of generalization: food products overall, food product groups, individual food products, and characteristics of individual food products. Two-thirds of the respondents said they

were always or almost always satisfied with food products overall. At the food product groups level, more than half of the respondents were always or almost always pleased with each of the seven major food product groups, yet satisfaction did vary with the particular food product group. When considering the more specific levels of individual foods and their characteristics, satisfaction decreased. Price was the characteristic which emerged as the chief complaint against all individual food products. Other specific sources of dissatisfaction varied from product to product (Handy and M. Pfaff 1975). A tentative conclusion drawn from the Handy and Pfaff study was that the level of generalization at which products were studied influenced the level of satisfaction reported. As satisfaction was measured at decreasing levels of generalization, the degree of satisfaction reported also decreased (Ackerman 1980).

Consumer satisfaction with a number of goods and services, excluding mattresses and other home furnishings, was reported by A. Pfaff (1976). The aggregate category, appliances, rated highest at 2.25 on a 7-point, 1=very satisfied and 7=not at all satisfied scale. On that same scale, cars rated 2.62, houses owned 2.81, food 2.91, clothing 2.94, house/apartment rented 4.08, and all products 2.73. Anita Pfaff's study also measured consumer satisfaction with autos and with housing at two levels, the product as a whole and characteristics of the product. Satisfaction scores on product characteristics ranged from higher to lower than the satisfaction mean scores on the products as a whole.

METHODS

The Sample

The study sample was obtained from the sales invoices of cooperating retailers in the Salt Lake City metropolitan area. The retailers ranged from home furnishings and bedding to warehouse and factory-retail merchants. The merchants sold national and local brands in a wide range of prices and varied from high to medium in sales volume. Sales invoices written in the fall and winter of 1985-86 indicating the purchase of one or more new mattresses provided purchaser names and

addresses.

Purchasers of the three most common types of mattresses--innerspring, foam, and waterbed--were included in the sample. Purchasers of crib, youth, and cot size mattresses, as well as daybeds and sofabeds, were excluded because of their small percentage of U.S. sales.

Data Collection

Data were collected by mailed questionnaire in the spring of 1986. Following two pilot tests and interim revision of the questionnaire, mailings were delivered to a sample of 794. The first mailing consisted of an introductory letter, the questionnaire, and a postage paid return envelope. Follow-up mailings were a reminder/thank you postcard to the entire sample one week after the initial mailing, a letter and replacement questionnaire sent to nonrespondents three weeks after the initial mailing, and a final reminder letter to nonrespondents six weeks after the initial mailing. The letters asked the purchaser of the mattress to complete and return the questionnaire. Usable questionnaires were returned by 405 respondents, yielding a response rate of 51%. The sample analyzed here was further reduced to a varying 379 to 397 respondents due to off-scale responses to one or more S/D questions.

Variables

Satisfaction was measured on the seven-point delighted-terrible scale developed by Andrews and Withey (1976) and used by a number of CS/D & CB researchers (Hausknecht 1990). The scale also included one off-scale category, no opinion. The dependent variable "How do you feel about the mattress as a whole?" was the first S/D question. The eight characteristic S/D questions followed, concerning the surface fabric color and design, fabric soil/stain resistance, quality of workmanship, quality of inner materials, mattress size, type of mattress, sleeping comfort, and price paid. The remaining explainer variable was complaints about or dissatisfactions with the mattress and was not limited to complaints voiced elsewhere, in an effort to obtain redress. Complaints were categorized as comfort, quality, other, and none based on responses to an open-

ended question: "Can you tell us anything that is not satisfactory to you about this mattress?"

Data Analysis

Frequencies were used to describe the sample and their mattress purchases. Two multiple regression equations, with all variables entered at one time, were used to relate S/D with product characteristics to satisfaction with the product as a whole. Both equations used dummy variables to control for the type and size of mattress actually purchased. The first equation related S/D with characteristics to product S/D. The second equation added dummy variables regarding complaints about product characteristics to those variables included in the first equation. A correlation matrix was used to assess multicollinearity. No correlation coefficients of .80 or more were found, so multicollinearity was not a problem. Residuals were reviewed, outliers were removed, and the analyses repeated.

The dependent variable, satisfaction with the mattress as a whole, was measured by a seven-point Likert scale. It is an ordinal variable. There are two alternatives when conducting multivariate analysis with an ordinal variable. One alternative is to collapse that variable to a two-value measure, losing a good deal of the detail provided in the 7-point scale. The other alternative is to treat the ordinal variable as an interval variable and interpret the results conservatively. The latter alternative was used here, based on the extensive literature on this topic (Blalock 1979; Kim 1977; Labovitz 1967, 1970). There is ample precedent for treating such an ordinal variable as an interval variable (Andrews and Withey 1976; Herzog and Rodgers 1986; A. Pfaff 1976). However, the results are likely to be somewhat overstated and should be interpreted with caution (Boneau 1960; Labovitz 1967; Loether and McTavish 1988).

The cautions are that the measurement is not precise and the results are likely to be overstated. An example is the R-square, it seeks the best fit or the largest R-square even when an interval measure is used. It may be somewhat more overstated when an ordinal measure is used. Additionally, the significance of the *t*-test may be somewhat high, up to 150% of its usual value (Boneau 1960). The F-statistic and the *t*-test are

related measures and the same cautions may apply to the F-statistic.

In the multiple regressions, the off-scale response of "no opinion" was treated as missing data. The number of off-scale responses was less than three percent for most characteristics, but more than six percent for one characteristic.

When a substantial loss of cases would occur if the listwise deletion of missing data is used, the pairwise procedure is recommended (Bohrnstedt and Knoke 1988). Therefore, pairwise deletion of missing data was used.

THE RESPONDENTS AND THEIR PURCHASERS

Demographic Characteristics

Demographic characteristics of the sample, along with comparisons to the U.S. population, are found in Table 1. Respondents were 56% female, 79% married, and 70% employed. The mean household size was 3.71 persons; median household income fell in the \$30,000-39,999 category. Respondent's median age was between 35-54, with some college as the median education. The sample was similar to the U.S. population in sex distribution and housing status. The sample, however, tended to be younger, more educated, lower income, and larger in household size than the U.S. population; it was more similar to state averages than to national averages. However, it is possible that recent mattress purchasers may also tend to differ from the total population in these same characteristics.

The Product Purchased

Respondents reported the type of mattress purchased was predominantly innerspring mattresses, 79%, although 7% purchased foam mattresses and 14% waterbed mattresses (see Table 2). This is quite consistent with findings from a Gallup survey of more than 1,000 adult Americans. Overall, the poll found that 78% of the respondents slept on innerspring mattresses, 11% slept on a waterbed and 7% slept on foam mattresses (Innerspring Strongest...1985). The most frequently purchased mattress size was queen size, 39%, with 16% to 24% purchasing each of

Table 1
Description of the Sample,
with U.S. Population Comparisons

<u>Descriptors</u>	<u>Sample</u>	<u>U.S. Population</u>
Sex		
Male	44%	48% ^a
Female	56%	52% ^a
Age		
Less than 25 years	8%	6% ^{b,d}
25-34 years	33%	10% ^b
35-54 years	43%	49% ^b
55 and over	16%	35% ^b
Education		
High school or less	24%	60% ^b
Vocational/technical	12%	--
Some college	30%	18% ^b
College degree	25%	12% ^b
Advanced degree	9%	
Family Income		
Less than \$20,000	15%	31% ^a
\$20,000-29,999	22%	27% ^{a,c}
\$30,000-39,999	25%	--
\$40,000-49,999	19%	20% ^{a,c}
\$50,000 or more	19%	20% ^a
Marital Status		
Currently married	79%	69% ^b
Never married	11%	
Widowed, divorced, separated	10%	31% ^b
Employment Status		
Respondent employed	70%	53% ^{c,f}
Respondent not employed	30%	47% ^{c,f}
Spouse employed	57%	72% ^{c,g}
Spouse not employed	22%	28% ^{c,g}
No spouse present	21%	na
Mean household size	3.71	2.63 ^b
Housing status		
Home owner	77%	64% ^b
Renters, other	73%	36% ^b

^a Information Please Almanac, 1988, (1987) (41st edition).

^b Bureau of the Census (1990), Household & Family Characteristics.

^c Bureau of Labor Statistics (1989), Handbook of Labor Statistics.

^d Ages 20-24 only.

^e Income categories are \$20,000-34,999 & \$35,000-49,999.

^f Percent of women, age 16 and over, 1988.

^g Percent of men, age 16 and over, 1988.

Table 2
Characteristics of the Product
and Purchase

<u>Characteristic</u>	<u>Sample Percent</u>
Mattress Type	
Innerspring	79
Foam	7
Waterbed	14
Mattress Size	
Twin	24
Full/double	16
Queen	39
King	21
Primary Reason for Purchase	
Owned none	8
Additional family member	15
Replacement mattress	42
Wanted different size	11
Wanted different type	16
Other	8

the other three sizes. The primary reason for purchase was to replace a mattress, 42%, with 8% to 15% each buying a mattress for an additional family member, wanting a different size or type of mattress, or buying a first mattress.

RESULTS

Generally, satisfaction with the product was high. Mean satisfaction was 5.92, which fell above 5, "mostly satisfied," and near 6, "pleased". Mean satisfaction with product characteristics ranged from a high of 6.12 for size of mattress, through 6.01 for comfort and 5.90 for mattress type to lows of 5.20 for inner materials quality and 4.89 for fabric soil/stain resistance (see Table 3).

While 73.4% of the sample had no complaints about the product purchased, 8.5% had comfort complaints, 6.8% had quality complaints, and 11.3% had other complaints. Typical comfort complaints were too soft, too firm, not enough support/firmness, sags or sinks into a hole in the middle, has low and high spots, too warm (foam top), and too cold (waterbed). Typical quality complaints were seams tore, sewing bad, ticking wrinkles, poor ticking quality, mattress edges go down funny, breaking down already, wires poking

out, the springs squeak, and inadequate padding--can feel the springs. Among other complaints, the predominant problem was sheets do not fit and stay on, mattress too thick for sheets, and sheets that fit are hard to find or expensive. Remaining complaints in the other category included damaged in delivery; mattress does not stay put--it slips and isn't heavy enough; the mattress size is too short, too small, or so thick it makes the bed too high; the waterbed bladder is hard to fill with water, waterbed is expensive to heat, and foam layer does not insulate the waterbed adequately, it must still be heated.

Table 3
Levels of Satisfaction/Dissatisfaction

Variable	Mean ¹	Std. Dev.
Product Satisfaction	5.92	1.01
Characteristic Satisfaction:		
Size	6.12	.90
Comfort	6.01	1.08
Type	5.90	1.26
Workmanship quality	5.65	1.34
Fabric color & design	5.52	1.72
Price paid	5.44	1.14
Inner materials quality	5.20	2.03
Fabric soil/stain resistance	4.89	2.28
Characteristic Dissatisfaction	Percent	
Comfort (too soft/hard or cold)	8.5	
Quality	6.8	
Other complaints	11.3	
No complaints	73.4	

¹ Satisfaction was measured on the 7 point delighted-terrible scale, where 7=delighted, 6=happy, 5=mostly satisfied, 4=mixed, 3=mostly dissatisfied, 2=unhappy and 1=terrible.

Because the size and type of mattress might influence overall product satisfaction, the regression equations controlled for the size and type of mattress actually purchased. Mattresses purchased were twin, full/double, queen or king size and were innerspring, foam, or waterbed mattresses. In the preliminary equation, where

mattress size and type control variables were the only independent variables, the adjusted R-square was .010 and the F-statistic was 1.72 ($p = .129$). This indicated the very limited and nonsignificant role of size and type purchased in product satisfaction.

The first regression equation related S/D with product characteristics to S/D with the product as a whole. The adjusted R-square was .711 and four of eight characteristics--comfort, type, workmanship quality, and size--were statistically significant at the .05 level or less (see Table 4). The most important characteristic explaining product S/D was sleeping comfort, with a beta of .725. Other significant characteristics, in order of decreasing betas, were mattress type, .110, workmanship quality, .108, and mattress size, .074.

Table 4
Product Satisfaction Explained by
Characteristic Satisfaction

Characteristic	Beta	t-test	Prob.
Control variables			
Purchased type: waterbed	.011	.24	.811
Purchased type: innerspring	.034	.72	.472
Purchased size: twin	-.039	-1.04	.302
Purchased size: full/double	.008	.22	.824
Purchased size: queen	-.045	-1.17	.243
Satisfaction with:			
Comfort	.725	19.50	.001***
Type	.110	3.03	.003**
Workmanship quality	.108	2.76	.006**
Size	.074	2.26	.025*
Inner materials quality	-.050	-1.34	.183
Price paid	-.022	-.67	.503
Fabric color & design	.017	-.50	.616
Fabric soil/stain resistance	.008	.23	.815
Adjusted R-square = .711			
F-statistic = 67.46 ($p = .001$)			
Degrees of freedom = 13 & 339			

* $p < .05$ ** $p < .01$ *** $p < .001$

The second regression equation added product complaints to the control variables and s/d with eight characteristics as explainers of variation in S/D with the product as a whole. Three types of complaints which occurred in adequate numbers

for analysis--comfort, quality, and other complaints--were entered as dummy variables; no complaint was the omitted category. Again, comfort, type, and workmanship quality were the first three S/D characteristics entering the equation; their betas were .686, .114, and .106, respectively (see Table 5). Comfort, other, and quality complaints were the final three significant measures to enter the equation. They were inversely related to product S/D, with betas of -.092, -.081, and -.066 respectively.

Table 5
Product Satisfaction Explained by
Characteristic Satisfaction
and Dissatisfaction

Characteristic	Beta	t-test	Prob.
Control variables			
Purchased type: waterbed	.011	.24	.807
Purchased type: innerspring	.042	.92	.364
Purchased size: twin	-.059	-1.56	.120
Purchased size: full/double	-.012	.32	.753
Purchased size: queen	-.048	-1.24	.216
Satisfaction with:			
Comfort	.686	16.80	.001***
Type	.114	3.21	.001***
Workmanship quality	.106	2.76	.006**
Inner materials quality	-.067	-1.80	.073
Size	.063	1.83	.068
Fabric color & design	.033	1.00	.318
Price paid	-.018	-.56	.577
Fabric soil/stain resistance	-.010	-.28	.781
Complaints about:			
Comfort	-.092	-2.78	.006**
Other	-.081	-2.62	.009**
Quality	-.066	-2.22	.027*
Adjusted R-square = .721			
F-statistic = 57.91 (p. = .001)			
Degrees of freedom = 16 & 336			
* p. < .05 ** p. < .01 *** p. < .001			

DISCUSSION

While satisfaction with the product as a whole is rated quite highly--a mean score just below "pleased"--the previous study by Hughes (1977) suggests that caution be used in interpreting this finding. He found that 81% of purchasers of an

innerspring mattress were completely satisfied with their mattress, yet they were less satisfied with this product than they were with 20 of 37 other products purchased (Hughes 1977).

The major contributor to overall product S/D for mattresses is satisfaction with the characteristic, comfort. With complaints added to the equation, the complaint category with the highest beta, which reduced satisfaction with the product, is complaints about comfort. Complaints about comfort included statements that the mattress was too soft, too firm, sagged, was bumpy, too warm, or that waterbeds were too cold.

S/D with the size and type of mattress also explained product satisfaction, even with variation in the size and type of mattress actually purchased controlled for in the analysis. In fact, some respondents reported their primary reason for the purchase of a new mattress was to obtain a different type, 16%, or a different size, 11%. The other category of complaints included stated dissatisfactions with mattresses which were too small or too short.

The lowest mean scores were found for quality of inner materials and mattress ticking soil/stain resistance. Characteristics negatively related to mattress satisfaction, although they were not significant, were quality of inner materials, price paid, and fabric soil/stain resistance.

Implications

The major contributor to product satisfaction is comfort. However, 8.5% of the respondents had complaints about comfort. These findings may be partially due to differences in consumer preferences and in effort or ability to judge comfort when selecting a mattress. The findings confirm the value of the frequently given advice that shoppers test the mattress by lying down on it in the store prior to purchase. In fact, Consumer Reports recommends:

The only way to find a comfortable mattress is to lie down on the job. You have to try out model after model to find out what level of firmness and conformity is right for you. Do a lot of sitting down, lying down, and rolling

over on the mattress. Try out your favorite sleeping position. If you share a mattress with someone, you should both do the testing (Innerspring Mattress...1986, p. 187).

Shoppers should be encouraged to do such testing; educational materials should also encourage such testing. Educational information should be offered on the softness/firmness resulting from use of different mattress materials and construction techniques. It would also be helpful to have standardized measures of firmness used in firmness labeling throughout the industry. To generalize to other upholstered home furnishings, shopper testing of the comfort of chairs, couches, etc., by all family members who will be using the product should be an important consideration in the purchase decision.

The incompatibility of some mattress depths to fitted sheet sizes was the most frequently stated problem in the other complaints category. Consumer Reports also mentioned this problem, stating the edge depth of innerspring mattresses varied from six to eight inches. The magazine warned that consumers who purchased an 8-inch deep mattress might find their old sheets did not fit and that new 8-inch deep sheets might be hard to find (Innerspring Mattress...1986). Should manufacturers restrict themselves to one uniform mattress depth? Or should sheet manufacturers provide different fitted sheet depths to incompatibility varying mattress depths? Sheets made specifically for waterbeds are available. At a minimum, labels on fitted sheets should state the depth of mattress they will fit.

The fabric soil/stain resistance characteristic received the lowest mean satisfaction score. Manufacturers might choose to improve fabric soil/stain resistance and consumers might consider this characteristic when shopping. As an alternative, consumers might use a mattress cover or other protection to prevent soil and stains to the mattress ticking.

While this study found that overall satisfaction with mattresses is high, it did identify a number of problems in the ability of consumers to select a mattress which best fits their needs, and suggested actions which the industry might consider to

improve consumer satisfaction.

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