EFFECTS OF CONSUMER INFORMATION AND
EDUCATION ON COGNITION AND CHOICE

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FOR DISCUSSION PURPOSES ONLY

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ABSTRACT

Consumer information and education do have an impact on decision processing. Experimental results indicate that education increases dimensional complexity but that the subjective value of central dimensions remains intact. The combination of information and education improves the consumer's ability to assess product performance, but each is ineffective alone.

INTRODUCTION

The need for federally mandated programs forcing firms to disclose information to consumers has been a controversial subject for some time. Recently, this debate has reached something of an impasse, with the interested parties divided into two camps. Supporters of these programs argue that a gap exists between consumers' information requirements and the information actually available in the marketplace (Thorelli 1977; Maynes et. al 1977). Among the purported consequences of this are poor decision making by consumers, a high degree of consumer dissatisfaction (Buskirk and Rothe 1970; Day and Aaker 1970), and inefficiencies in the operation of the market economy. The critics of these programs, however, have questioned their implicit policy objectives (Wilkie 1975b) and whether an information gap actually exists (Westbrook and Newman 1978). They are also concerned about program efficacy, noting that consumers may not use the information (Nourse and Anderson 1973; Jacoby, Chestnut, and Silberman 1977) and may actually "overload" when too much information is provided (Jacoby, Speller, and Berning 1974).

Of the several issues associated with these disclosure requirements, the problem of nonuse has probably received the most attention in the literature. This problem has been examined from a number of perspectives including: (1) the stimulus characteristics of the disclosure that may affect use, (2) individual differences between consumers that may influence use, and (3) problems in the measurement of information use. The major conclusions and limitations under each of these headings are summarized in Table 1. On balance, this literature suggests various conditions that are favorable for information usage but provides little guidance on how to create them.

TABLE 1

SELECTIVE LITERATURE REVIEW OF FACTORS INFLUENCING INFORMATION USAGE

Stimulus Issues	Conclusions	Limitations
Amount of information; information overload (Jacoby, Speller, and Berning 1974).	Consumers may cognitively overload if too much information is provided. Of necessity, they may ignore much of the data.	Findings of overload were strongly disputed (Russo, 1974; Wilkie, 1974; Summers, 1974).
Format of the disclosure; whether the data should be organized by brand or by attribute (Bettman 1975; Bettman and Kakkar 1977).	Information acquisition patterns are strongly affected by disclosure format.	Limitations imposed by the product category may preclude presenting the data in the most desirable format.
Brand name may serve as an information chunk (Jacoby, Szybillo, and Busato-Schach 1977).	Explains tendency of subjects to acquire little information in experimental choice situations.	Unrealistic to eliminate brand name as an information cue in the marketplace.
Level of data aggregation (Winter 1975; Day 1975).	Data should be aggregated but not to the point that much information is lost or consumers are misled.	Deciding how to collapse the data into summary measures. Deciding how to weight the underlying dimensions.

Individual Differences	Conclusions	Limitations
Demographic factors (Thorelli 1971; Newman and Staelin 1972; Thorelli, Becker, and Engledow 1975; McEwen 1978).	Better educated and higher income consumers tend to be more information-conscious, althouth the relationship may not be monotonic.	Consumers of lower socioeconomic status probably need the information the most.
Consumer sophistication (Sproles, Geistfeld, and Badenhop 1978).	Consumer sophistication plays a mediating role in information handling.	Not clear how to increase the level of consumer sophistication.
Consumer Motivation (Mittelstaedt 1972; Burnkrant 1976).	Usage will be highest when uncertainty is perceived to exist, when it is perceived as involving a potential loss, and when the new information is perceived as helping to reduce this uncertainty.	Not clear how to change these perceptions.

Methodological Issues	Conclusions	Limitations
Failure to account for a hierarchy of effects (Day 1976).	The greatest impact of information disclosure is likely to be observed at the initial stages of the hierarchy.	If no change in choice behavior results, there may have been little point to disclosing the information in the first place.
Measuring decision quality (Jacoby, Speller, and Berning 1974; Russo 1974; Wilkie 1974; Summers 1974; Scammon 1977; Jacoby 1977).	A subject's "best" choice should be defined ideographically.	Problems exist in finding an appropriate model.

There has been some discussion recently of a possible interface between consumer information and consumer education, as a means of encouraging information use. Jacoby, Chestnut, and Silberman (1977), for example, find that consumers tend to acquire little nutrition information in experimental choice situations and tend to understand even less. The authors are led to conclude that "a necessary prerequisite for effectively interpreting and using (consumer) information is prior relevant (consumer) education." It is the nature of this information/education interface that is the focus of the present paper. The research objectives are (1) to determine the effects of education on information use and (2) to determine the combined versus separate effects of information and education on consumer decision making. The purpose, then, is to analyze the four distinct public policy strategies shown below.

	Consumer Education (CE)	
Consumer Information (CI)	Yes	No
Yes	Strategy 1	Strategy 3
No	Strategy 2	Strategy 4

This research should be helpful to public policy makers who are attempting to assess the benefits versus costs of implementing programs similar to strategies 1 through 4. The research should also be helpful to marketers who wish to have some influence on policy formulation and who must ultimately live with the effects of these policy decisions.

A CONCEPT OF CONSUMER EDUCATION

Unlike the CI topic, consumer education has received little attention in the literature of marketing or consumer behavior.[1] While the two concepts of CI and CE are different, they clearly complement each other.

Thorelli (1977) draws a distinction between the two policy alternatives of consumer information and education. According to Thorelli, the more generic the data are in terms of product or consumer characteristics, the more likely that consumer education is the proper term. He feels it is appropriate to speak of consumer information when the data relate to individual offerings.

Some examples of CI might include labels attached to products indicating tire tread life, carpet wear performance, cereal nutrition content, and vehicle fuel economy. All of these provide indiographic data[2] that pertain to a specific product model (e.g., the fuel economy of a Ford Pinto) but do not generalize between purchase alternatives.

Examples of CE might include training in how to identify a radial tire, training in how to judge carpet wearability from the deepness and density of the pile, and instruction on the meaning of various dietetic terms. All of these provide nomothetic data[3] that generalize between alternatives at the product, brand, or model levels (e.g., how fuel economy relates to the horsepower of a car's engine).

Using this framework, it seems appropriate to treat various types of communication about the nature and use of CI as a form of consumer education.

THE RESEARCH ORIENTATION

There are numerous possible ways to measure the effects of CI and CE. However, these approaches might be characterized as emphasizing either cognitive or behavioral dependent variables. Wilkie (1975b) criticized the use of choice behavior as a dependent variable on the grounds that this criterion violates the avowed "neutrality" of public policy. Instead, an emphasis on consumer cognitions was thought to be consistent with public policy

that attempted to "inform" but not "persuade." While this argument may have

some merit, the fact remains that both CI and CE could have behavioral conse-

quences. Only when these behavioral consequences are assessed can proper

public policy be formulated. Thus, our analysis includes measures of both

cognitive and behavioral effects of CI and CE.

The concept of a "hierarchy of effects" was used by Day (1976) who also

advocated an emphasis on cognitive dependent variables. Day was concerned

that early research in this area failed to detect information usage because

the wrong dependent variable, namely behavior, was used. The hierarchy of

effects notion implies that cognitive change is an antecedent condition for

behavioral change and may be stronger and more easily detected.

A research approach utilizing an expectancy-value (E-V) model of indi-

vidual choice gives consideration to both cognitive and behavioral variables.

Such models are employed in economics (von Neumann and Morgenstein 1944),

psychology (Locke 1975; Fishbein and Ajzen 1975), organizational behavior

(Connolly 1976), and marketing (Lutz and Bettman 1977). According to these

models, choice depends on the person's expectations about the outcomes or

consequences of selecting an alternative weighted by the value of those out-

comes to the person.[4]

This study considered the effects of CI and CE on the components of an

E-V model, which is essentially a static or structural approach. The struc-

tural approach has been criticized by Wilkie (1975a) on the grounds that it

is input-output research that does not measure actual processing. On the

other hand, Lutz (1978) has argued that structural models may be of diagnostic

value in understanding information-processing activities. In essence, they

provide a "snapshot" of cognition. By noting changes in cognition over time

or by comparing experimental groups on certain cognitive characteristics, it is possible to make inferences about actual processing.

DEVELOPMENT OF HYPOTHESES

Within this expectancy-value framework, it is possible to make some predictions about the impact of CI and CE on cognition and choice. Of particular interest are any effects dealing with (A) the number of dimensions used in judgment, (B) the expectancy component of the E-V model, (C) the value component, or (D) behavioral intention.

Psychologist who work outside of the consumer behavior field have noted that individuals differ in the cognitive complexity of their social judgments (Bieri 1966; Schroder 1971). Cognitive complexity is a multifaceted concept that deals with the number of dimensions employed in judgment, the differentiation of the dimensions from each other, the ability to discriminate levels within dimensions, and the manner in which dimensions are integrated. Cognitive complexity may have application outside the realm of social judgment and may be important in product and brand decisions.

There are two theoretical positions relating to cognitive complexity. One holds that cognitive complexity is a general personality trait that is manifested in different behavioral domains. There has been some support for this argument in consumer behavior (Tan and Dolich 1979). A second position holds that cognitive complexity is domain-specific and tends to be affected by the individual's experience, familiarity, and knowledge about the relevant stimuli (Zajonc 1968).

It is easy to imagine that effective programs of CE could be developed to increase consumers' knowledge about particular classes of products (i.e., sets of stimuli). If such programs were implemented, what effect might this

have on the complexity of the consumer's judgments about these products? According to the personality position, little impact would be predicted. On the other hand, CE should result in more cognitively complex judgments if complexity is a domain-specific construct. One possible manifestation might be greater dimensional complexity, which refers to the use of more salient dimensions in decision making (Schroder 1971).

If CE is capable of increasing dimensional complexity, it is unlikely that all product aspects would be equally affected. Rather, more dimensions are likely to become salient in those areas where consumers perceive their factual knowledge to be deficient but critical. This would seem to imply an increase in the salience of functional dimensions relating to durability, performance, reliability, etc., where consumers will admit to a lack of technical knowledge. Little change is predicted in the number of salient aesthetic dimensions used because most consumers seem satisfied with making broad, impressionistic judgments about these product aspects (e.g., "I know what I like but don't ask me why!").

For the sake of argument, the domain-specific position will be adopted and the following hypothesis proposed:

H1: One effect of CE will be to increase the cognitive

complexity of consumers' product judgments. This

will be detectable as an increase in the number of

product dimensions of a functional nature that are salient.

In addition to a possible effect on the number of dimensions considered, CE might also have an impact on the value attached to certain dimensions. A rationale for this is provided by Vroom (1964), who draws a distinction between valence and value in work-related expectancy models. His notion is that valence refers to anticipated satisfaction while value refers to experienced

satisfaction. The distinction is considered critical for infrequent choices and those involving outcomes that extend over a long period of time. In the case of a durable good, for example, the concept of valence is probably more applicable. Valence is based on the consumer's expectation as to what needs will be relevant during consumption. CE could possibly affect this assessment by drawing attention to certain (future) needs that consumers may tend to overlook. Again, these are likely to be the "rational" needs, such as durability, reliability, low cost of maintenance, etc.

In contrast to this line of reasoning, other theorists would argue for the inherent stability of the value component. For example, Lutz (1978) claims that attribute weights (similar to the value component) are part of the person's identity or self-concept and not easily changed. He feels that change, when it occurs, is more likely to result from an emotional appeal than from a logical appeal. Given that CE is basically logical in nature, little impact on value would be predicted. Lutz's argument is compelling since it is widely recognized that consumers select products to enhance their self-concept. The self-concept, in turn, is subject to many powerful influences including culture, social class, family, and previous life experiences, all of which are far more important than CE. This conclusion, however, may be limited to those dimensions that are "central" to the person's identity.

The second position is probably the one subscribed to by most marketers. It is virtually the essence of the "marketing concept." Under the marketing concept it is assumed that consumers know what they want and that the role of the organization is not to change those perceived needs but to adapt to them. The second hypothesis to be considered assumes that point of view:

H2: The exposure to CE will have little impact on the

subjective value of various dimensions, as long as

these dimensions are relatively central to the

individual.

With regard to the expectancy component of the E-V model, it seems fairly

clear what public policymakers hope to accomplish in requiring the disclosure

of CI. Under ideal circumstances, consumers would be exposed to the informa-

tion stimulus, their attention would be drawn to it, the meaning of the infor-

mation would be correctly comprehended and accepted, and the data would be

integrated into cognitive structure. If the disclosure program was successful

and prospective buyers cognitively integrated the CI, this would tend to

lessen any discrepancy between their performance expectations and actual prod-

uct performance.[5] It is reasonable to hope for such an effect, since pre-

vious research has already demonstrated that expectations can be modified by

information disclosure (Lutz 1975). Therefore, without further elaboration,

it is hypothesized that:

H3: Specifically targeted CI will improve the correspond-

ence between objective product performance on an

evaluative dimension and consumers' expectations of

performance on that dimension.

Consumer education might be viewed as an alternative strategy for achiev-

ing this same result. Rather than attempting to rate each product offering,

consumers could be educated in the general principles that are necessary for

judging product performance on a particular dimension. In the long run, this

policy approach might prove less costly, since products would not have to be

retested each time there was a model change. On the other hand, the cognitive

task is probably more difficult for consumers than just using CI. Not only do

the CE principles have to be encoded and stored in memory, but they have to be

properly retrieved and applied to the product being evaluated. This would

seem to involve more potential for errors in judgment. Despite this drawback,

CE is hypothesized to have the same effect as CI:

> H4: Specific training through CE will improve the corre-
>
> spondence between objective product performance on an
>
> evaluative dimension and consumers' expectations of
>
> performance on that dimension.

Should the policymaker elect to use a combined strategy, it is possible

that part of the influence of CE might actually work through the CI. This

refers mainly to the stimulative effect of education on information use. One

reason for expecting this effect is that CE could make consumers more

information-conscious, thus creating the right sort of "mental climate" to

get maximum use out of the CI. For example, CE might accomplish this by in-

creasing the perceived opportunity cost of not using the information

(Mittelstaedt 1972). Another reason is that CE might decrease the chance of

consumers "overloading" on too much CI, since they would understand more about

it. Finally, CE might minimize the chance of consumers' misinterpreting the

CI disclosed to them. This leads to the next hypothesis:

> H5: The provision of both CI and CE will have a synergistic
>
> effect on the strength of association between objective
>
> performance and expectations.

It is probably safe to assume that many public policymakers would be in-

clined to judge the effectiveness of an information or education program

according to some behavioral criterion. For example, they might want to see

an improvement in the odds that consumers would select products with superior

performance characteristics on objectively measurable dimensions of some

policy interest (e.g., energy efficiency). Although a more appropriate criterion might be to help consumers choose products that are more likely to satisfy their needs, such a measure of "decision quality" has yet to be developed.

Despite this interest in behavioral results, the fact remains that CI and CE could have an impact on cognition but have no influence on behavior (the notion of a hierarchy of effects). Whether behavior is affected depends on several factors. One critical factor is whether the aspect of cognition affected is actually am important determinant of behavior. Another critical factor is the absence of multiple cognitive effects that may serve to cancel each other at the behavioral level.

For the purposes of this study, the question of a behavioral impact will be treated as an empirical issue, and the following hypothesis is proposed:

H6: Consumers will be more likely to choose products with

superior performance characteristics, and will be more

likely to avoid inferior products, as the result of

being given CI and/or CE.

METHOD

In order to investigate how consumers' product perceptions and choice behavior could be affected by education and/or information, an experiment was conducted among a sample of homeowners. The experiment was conducted in the home and usually with both the husband and wife. Subjects were asked to evaluate varieties of wall-to-wall carpeting, in a simulated purchase, and to select one for a designated high traffic room in their homes. Consumer education and information were the manipulated variables in the experimental design.

Choice of a Product Class

The decision to use carpeting as the test product was based on several factors. Among the factors considered were that carpeting is a high-priced durable good, that it involves significant "hidden qualities," and that carpet manufacturers may be required to disclose wearability information to consumers in the future. In addition, carpet samples whose performance characteristics had been prejudged by a panel of experts using physical test reports were available. Carpets were rated as suitable for I = light traffic, II = moderate traffic, III = fairly heavy traffic, and IV = heavy traffic. These ratings were assumed to closely approximate "objective reality." In the experiment, subjects were asked to evaluate and choose between five varieties of carpeting. Five varieties were used so that an individual level of analysis could be performed (Nakanishi and Bettman 1974).

The Sample

The sampling frame for this study was Ann Arbor (Michigan) residents who had purchased a home in 1976 or 1977. The data were collected in the spring of 1978. It was felt that the population of new homeowners would have a relatively high incidence of persons who had recently purchased carpeting or had plans to do so. Subjects were selected systematically from city tax records on an every n-th name basis and recruited over the telephone. About 40 percent of those so contacted agreed to participate. In all, forty-nine decision-making units (DMUs) were included in the experiment. The forty-nine DMUs included forty-three couples and six single individuals, for a total of ninety-two subjects.

Subjects were recruited with a personalized letter and a follow-up telephone call. During the telephone screening, each subject's carpet knowledge,

purchase experience, and demographic background were determined. Carpet

knowledge was measured by means of an eight-item scale constructed for this

study. The subjects also indicated who in the family would be involved in a

carpet purchase, and this defined the DMU.

Subjects' responses to the telephone screening were analyzed and each

DMU was categorized into a carpet knowledge/experience stratum. The treat-

ments were then randomly assigned within strata. This was done to ensure

similar distributions on these two key background variables within each cell

of the experimental design. As a result of these sample control procedures,

there were no significant differences between the treatment groups in terms

of prior knowledge or experience regarding carpeting.

Experimental Design and Treatments

Consumer information and consumer education were manipulated in a 2x2

factorial design. For both factors, the two levels represented the presence

or absence of the treatment. Subjects were distributed among the treatment

conditions as follows:

	CE		NO CE	
	CI	NO CI	CI	NO CI
DMUs	13	12	12	12
MALES	10	11	12	11
FEMALES	13	12	11	12

The consumer information (CI) treatment consisted of disclosing to half

of the subjects the experts' performance ratings on labels attached to the

back of the carpet samples. The ratings were expressed in both verbal terms

(e.g., "heavy traffic") and numerical terms (e.g., "IV"). The expression

"Mark of Performance" was used as a title for these ratings. The 8-1/2 x 11 inch labels also included information on the price of the carpet ($9 or $12/ sq. yd.), the fiber content (all 100 percent nylon), and the style (saxony, twist, or cut and loop).

The consumer education (CE) treatment consisted of literature which subjects were asked to read. To maintain external validity, an attempt was made to secure CE material that was representative of the carpeting literature presently available to consumers. To this end, virtually all CE publications on carpets were reviewed and analyzed as to content. This process led to the development of a comprehensive list of topics for possible inclusion in the treatment. Ultimately, a decision was made to have subjects read "Carpets and Rugs," which is a publication of the General Services Administration of the federal government. This pamphlet was selected because its scope encompassed most of the topics in the comprehensive list ant the pamphlet was easy to read. In addition, this CE material placed about equal emphasis on the aesthetic and performance aspects of carpeting. It included a discussion on the basics of interior design as well as more technical information.[6]

A written description of a rating system said to appear on the labels of some carpets now being sold was appended to the GSA publication. The rating system was attributed to a neutral source. The discussion included a description of how the ratings were determined and how they could be used in choosing a carpet. This discussion provided the interface between the CI and CE.

Procedure

Subjects in the CE treatment were asked to read the educational materials as a first step in the procedure. Since it was anticipated that there might be some danger in administering the CE treatment and measuring key items of

data collection in a single session (thus creating potentially serious demand

effects), the CE was administered prior to the experimental session. This was

accomplished by mailing or hand delivering the CE materials about one week

before the scheduled interview with instructions that the literature be read

immediately by both husband and wife.

The experimental session itself began with a posttest of carpet knowledge

using the same battery of questions asked in the pretest. This served as a

manipulation check on whether the CE treatment was effective. There was a

significant (p < .001) increase in knowledge between pretest and posttest only

for subjects receiving the CE.[7]

The salience of evaluative dimensions was the next item of measurement in

the experimental session. Husbands and wives were jointly asked the following

questions:

> If you were buying carpeting for this room today what attributes
> or characteristics would you be looking for in your choice of
> carpets? What properties would you want the carpet to have and
> not to have?

This was administered as a joint item of data collection which helped to es-

tablish rapport and subject involvement with the experiment. Verbal responses

to the question were recorded by the experimenter.

In the next stage of the experiment subjects worked independently and

completed a rating form for the five carpets. Expectations were measured for

the evaluative dimensions of: fit with interior decor (Appearance), ease of

care and maintenance (Care), and comfort to the touch and underfoot (Comfort).

The experimenter maintained a neutral role during this process. After com-

pleting the ratings, subjects were asked to evaluate the likelihood that they

would buy each of the five carpets, for use in the specified room. This was

the measure of Behavioral Intention. At that point, the information labels

were removed and the subjects were not allowed to examine the carpets any

further.

In the final phase of the experiment, subjects were asked to evaluate the five carpets as to the perceived level of wear performance (Wearability), which is another expectation measure. Since they could no longer examine the carpets, these judgments had to be based on physical cues previously detected or information previsouly acquired from the labels. Subjects then gave their evaluations of the four dimensions: Appearance, Care, Comfort, and Wearability.

Timing of the Wearability Measures

The fact that this procedure called for the measurement of Wearability perceptions separate from the other dimensions deserves special attention. While it would seem only natural to measure Wearability perceptions concurrently, this might have resulted in an upward bias in the tendency of subjects to use the rating information (when available). In short, a serious demand artifact would have been created because of the isomorphic relationship between the dimension and information. To circumvent this problem, questions about wearability were asked after the carpets and labels were no longer available for inspection. In this manner, it was hoped that subjects would recall whatever wearability judgments were in place when behavioral intention was measured rather than to acquire cues and form such opinions when demanded by the questionnaire to do so.[8]

OPERATIONALIZING THE MODEL

As just discussed, an important part of this experiment was measuring subjects' perceptions on four key dimensions. The set of dimensions to use was determined from in-depth interviews with a small preliminary sample of consumers drawn from the same population as the experimental sample. The

four dimensions of Appearance, Care, Comfort, and Wearability derived from these interviews represent a large portion of the conceptual domain of salient dimensions for this class of products.

In this study, the E-V model was modified slightly to more clearly distinguish between the cognitive elements. The modification involved dividing each dimension i into j categories reflecting different levels of the continuum. This is similar to the Vector Preference Model (Ahtola 1975) and the Part Worth Function Model (Green and Shrinvasen 1978). This modification has the advantage of separating the content from the strength of belief and affords the greatest flexibility in the shape of the value function. The model can be expressed as:

$$BI = \sum_{i=1}^{n} \sum_{j=1}^{g(i)} E_{ij} V_{ij}$$

where:

BI = behavioral intention of choosing an alternative

E_{ij} = expectancy that choice of the alternative will lead to category j of dimension i

V_{ij} = subjective value of category j of dimension i

$g(i)$ = number of categories in i

n = number of relevant dimensions.[9]

This model stipulates both a combination rule and a choice procedure. The combination rule is linear compensatory. Even if some subjects actually employed a noncompensatory rule, the linear model may provide a reasonable approximation of their decision making. The choice procedure is to select the highest value alternative, which implies that consumers seek to maximize their utility/value.

Each of the four evaluative dimensions was divided into three or four categories that seemed to have a clear and stable meaning to subjects and collectively exhausted the whole concept continuum (Ahtola 1975). Table 2 lists the categories and descriptions used.

TABLE 2

CATEGORY LABELS

Dimension	Categories
Appearance	1. Enhances interior decor of the room
	2. Goes with interior decor
	3. Detracts from interior decor
Convenience of Care	1. Easy to care for
	2. About normal to care for
	3. Difficult to care for
Comfort	1. Very soft and comfortable
	2. Somewhat soft and comfortable
	3. Not at all soft and comfortable
Wearability	1. Suitable for light traffic
	2. Suitable for moderate traffic
	3. Suitable for fairly heavy traffic
	4. Suitable for heavy traffic

Measures

The method of measuring expectations (E_{ij}) was similar to the methods used by Ahtola (1975) and Woodruff (1972). For each dimension-carpet combination, subjects were asked to distribute ten "confidence points" over the

dimension categories as though they were placing bets on which categories best described the carpet. The value (V_{ij}) associated with each category was measured with a seven-point bipolar scale. Subjects were asked to indicate whether they would feel "very good" or "very bad" if a carpet they bought had the characteristics in question (or resulted in the outcome).[10] Finally, behavioral intention (BI) was measured using a purchase probability scale. The PPS required subjects to estimate the likelihood that they would buy each carpet variety by distributing 100 "purchase probability points" among the five alternatives.

An attempt was made to determine whether this operational version of the E-V model had some predictive validity. An individual level analysis was performed where the $\Sigma\Sigma E \cdot V$ component was correlated with the BI component across the five carpets for each subject. These r's were than normalized using Fisher's r→z transformation (Hays 1973) and an average $\bar{z}$ was computed for the ninety-two subjects, then the transformation was reversed ($\bar{z}→\bar{r}$). This gave the value $\bar{r}$ = .65, which compares favorably with tests of the Extended Fishbein Model (Ryan and Bonfield 1975). Likewise, Ahtola (1975) claimed that .71 was a "high" correlation in testing the Vector Preference Model.

ANALYSIS AND RESULTS

Hypothesis 1

According to Hypothesis 1 it was expected that a larger number of functional dimensions would be salient for subjects given CE. Frequency of mention in a free elicitation task is the most common method of measuring salience in marketing (Olson, Kanwar, and Mudderrisoglu 1979). The frequency of mention criterion was used in this analysis.

As discussed in the Method section, the free elicitation task was administered to DMUs (mostly couples) at the beginning of the experimental session. The joint administration of a free elicitation task is somewhat uncommon, but it appeared to be the proper approach in this experiment. First, it provided greater opportunity for detecting any CE effect, since the social interaction of husband and wife tended to stimulate the recall of more dimensions. Second, this approach seemed more realistic. In an actual purchase situation, couples are likely to discuss what they are looking for in the product. Only one DMU in this study listed more than nine dimensions, so it is probably safe to assume that all dimensions mentioned were salient.[11]

One difficulty in applying the frequency of mention criterion to any free elicitation data is the large number of dimensions that can be used to describe a product and product performance. DMUs in this study, for example, mentioned 50 to 100 different dimensions of carpeting even after allowances were made for different ways of expressing the same concept. Comparisons between the treatment and the control group become difficult when there is such a large number of dimensions on which they might differ, and when any one experimental unit mentions only a few dimensions.

In an attempt to overcome this problem, the dimensions mentioned in the free elicitation task were grouped at a relatively high level of generality. Other researchers have demonstrated that attributes can be divided into sets according to the basic services which the consumer expects the product to provide (Geistfeld, Sproles, and Badenhop 1976). For carpeting, these services seemed to be: (1) ease of care and maintenance, (2) wearability or appearance retention, (3) appearance in relation to the interior decor, and (4) comfort. Two other sets of dimensions also seemed to be of interest to subjects, although they did not clearly represent services. These were:

(5) issues relating to the initial purchase price, and (6) physical characteristics of the product that could not be classified since they were associated with more than one desired service. Examples of dimensions classified in these six sets appear in the Appendix.

Based on Hypothesis 1, as operationalized by the frequency of mention criterion, it was expected that DMUs given CE would mention more dimensions relating to Care (the Convenience of) and Wearability than DMUs not given CE. Summary statistics on the number of dimensions mentioned within each of the six sets were computed for the treatment and the control group and are reported in Table 3. DMUs given CE mentioned more dimensions relating to Care, Wearability, Comfort, and those Unclassified. DMUs not given CE mentioned more dimensions relating to Appearance and Price.

TABLE 3

THE EFFECTS OF CE ON THE SALIENCE OF DIMENSIONS
(Frequency of Mention in Free Elicitation)

NUMBER OF DIMENSIONS MENTIONED THAT PERTAIN TO...	DMUs GIVEN CE (N=25)		DMUs NOT GIVEN CE (N=24)			PROBABILITY
	$\bar{x}$	STD. DEV.	$\bar{x}$	STD. DEV.	F-STAT	(2-TAIL)
CARE	1.52	1.45	1.04	.62	3.74	.05 - .06
WEARABILITY	1.28	.68	1.08	.65	1.07	N.S.[a]
APPEARANCE	.76	.78	.88	.61	.33	N.S.
COMFORT	.44	.77	.25	.44	1.11	N.S.
PRICE	.32	.56	.42	.58	.35	N.S.
UNCLASSIFIED	1.40	1.19	1.04	1.04	1.25	N.S.

[a]NS = not significant at the 95% confidence level.

Care = .04 (FPRE)+.04(FEXP)+.10(MPRE)-.13(MEXP)+.29*(CE)

R^2 = .11

* = $\beta \neq$ at p < .10

Table 3 also shows the results of a series of one-way ANOVAs performed on the data. Applying standard confidence levels, it was possible to reject the null hypothesis of no difference only in the case of Convenience of Care. On the average, DMUs given CE mentioned 1.52 care-related dimensions compared to 1.04 by those not given CE. This difference was significant at very near the 95 percent confidence level. This finding provides some support for Hypothesis 1, that CE tends to increase the salience of performance-related dimensions.

It would seem that the increased product knowledge gained through CE increased subjects' cognitive complexity in this stimulus realm. A question that might arise concerns the relative influence of CE on cognitive complexity versus prior knowledge and experience with the product. To answer this question, the number of care-related dimensions mentioned was regressed on the education variable (=CE), the pretest measure of carpet knowledge (=PRE), and the measure of purchase experience (=EXP) for both husband (=M) and wife (=F). The best fitting equation is shown at the bottom of Table 3. The only independent variable in the equation with a beta coefficient significantly different from zero ($p < .10$) was CE. Similar results were obtained on the other product aspects.

Hypothesis 2

This hypothesis stipulated that subjects' evaluations of the dimensions would not be affected to any great extent by the provision of CE. This hypothesis was drawn from Lutz's argument that the value component reflects an individual's self-concept and it not easily manipulated by logical communication like CE. It was assumed that the four higher level dimensions used in this E-V model were probably "central" to many subjects. The basis for this

assumption was that the four dimensions seemed general enough that they could easily be applied to a wide variety of products.

This and all the remaining hypotheses were tested at the individual subject level of analysis rather than at the DMU level. In addition, the responses of males were analyzed separately from those of females for two reasons. First, there was little assurance that men and women would be looking for the same thing in carpeting or that they would process information in an identical manner, given sex role differences and possible differences in personality and cognitive functioning. Second, it did not seem appropriate to pool the responses of husbands and wives, since they did not represent independent observations.

The mean evaluations of all the dimension categories are reported in Table 4. When contrasting the treatment and the control groups it is important to keep in mind that a few differences of fairly substantial magnitude should be expected on a chance basis alone, given the large number of comparisons that can be made.

The evaluations of the three or four categories of each dimension can be considered related measurements made on each of two groups: those given CE and those not given CE (holding sex constant). Hotelling's T^2 can be used as a single test of the null hypothesis that the two populations have the same means with respect to all the measurements (Snedecor and Cochran 1969). It is not necessary to specify how the means are expected to differ on an a priori basis. This multivariate t-test is made from an analysis of variance of the linear discriminant function into "between groups" and "within groups." As indicated in Table 4, Hotelling's T^2 test was not significant for any of the dimensions for men or for women. Separate one-way ANOVAs performed on each category also failed to reveal any significant effects. These results lend support to Hypothesis 2.

TABLE 4

THE EFFECTS OF CE ON THE EVALUATION OF DIMENSIONS (Vij's)

DIMENSIONS AND CATEGORIES	COMPARISON OF MEANS[a] (MALES)			COMPARISON OF MEANS (FEMALES)		
	CE (N=21)	NO CE (N=23)	HOTELLING'S T^2	CE (N=25)	NO CE (N=23)	HOTELLING'S T^2
APPEARANCE						
ENHANCES DECOR	2.48	2.57	$T^2=1.02$	2.80	3.00	$T^2=6.48$
GOES WITH DECOR	1.38	1.35	$F = .33$	1.40	.96	$F =2.06$
DETRACTS FROM DECOR	-2.67	-2.48	$P = NS^b$	-2.36	-2.78	$P = NS$
CONVENIENCE OF CARE						
EASY TO CARE FOR	2.38	2.44	$T^2=2.03$	2.84	2.83	$T^2=3.37$
NORMAL	1.10	1.43	$F = .64$	1.56	1.35	$F =1.07$
DIFFICULT TO CARE FOR	-2.38	-2.13	$P = NS$	-2.32	-2.83	$P = NS$
COMFORT						
SOFT	2.48	2.30	$T^2=4.04$	2.56	2.65	$T^2=7.36$
SOMEWHAT SOFT	1.24	1.17	$F =1.28$	.68	1.48	$F =2.35$
NOT SOFT	-2.52	-1.91	$P = NS$	-2.28	-2.30	$P = NS$
WEARABILITY						
HEAVY TRAFFIC	2.38	2.13	$T^2=2.31$	2.76	2.22	$T^2=7.60$
FAIRLY HEAVY	1.71	2.00	$F = .54$	2.20	1.65	$F =1.78$
MODERATE	-.14	.52	$P = NS$	-.16	.52	$P = NS$
LIGHT	-1.62	-1.26		-2.00	-1.65	

[a] Evaluations were scaled from +3 ("Very Good") to -3 ("Very Bad").

[b] Not significant at the 95% confidence level.

The data contained in Table 4 may also reveal something about the relative "importance" of the dimensions to the subjects. One measure of importance might be the difference in evaluation of categories at either end of a dimension continuum. For example, Wearability would have an "importance score" of 2.38-(-1.62)=4.00 for men given CE. When such computations were made, it was found that Appearance had the highest importance score for all four groups of subjects and Wearability the lowest. The average "pooled" importance scores were: Appearance = 5.29, Care = 5.05, Comfort = 4.75, Wearability = 4.02.

Hopotheses 3, 4, and 5

These hypotheses were concerned with the effects of CI and CE on the correspondence between performance expectations and actual product performance. It should be clear that the CI in this study was targeted specifically at the evaluative dimension of Wearability. In addition, the CE treatment included instruction on how to judge wear performance from intrinsic product cues (surface texture, pile density, etc.) and extrinsic product cues (price, label information, etc.). To understand the following analysis, it may be helpful to think of future product performance as a construct (in the present time period) and to think of the MOP (=Mark of Performance) ratings as serving a dual role. First, the ratings represent a highly reliable indicator of this performance construct. Second, they represent the content of a communications message, namely the CI. Because of this dual role, the MOP ratings provide a standard for determining the effectiveness of both the CE and CI. If CE has the effect of increasing the association between performance expectations and actual performance, this should be reflected in a higher correlation between subject's Wearability expectations and the MOP ratings across carpets (ref. the construct indicator role of the ratings). Likewise, if subjects acquire,

comprehend, and integrate the CI this should also be reflected in a higher correlation between subjects' Wearability expectations and the MOP ratings across carpets (ref. the communications message role of the ratings).

The $\Sigma E \cdot V$ term relating to Wearability was used as the wear performance expectation in this analysis.[12] Correlations between the Wearability expectations and the MOP ratings are plotted in Figure 1 by treatment condition and by sex. These correlations were computed at the subject level of analysis, across the five carpet varieties evaluated by each subject. Because there is skewness in the distribution of r (Hayes 1973), r cannot be used as a dependent measure in its raw form. Fisher's $r \rightarrow Z_r$ transformation was used to normalize the correlations and the Z_r values were treated as dependent variables in multiple regression. The indepent variables were CI, CE and CIxCE coded in the following fashion:
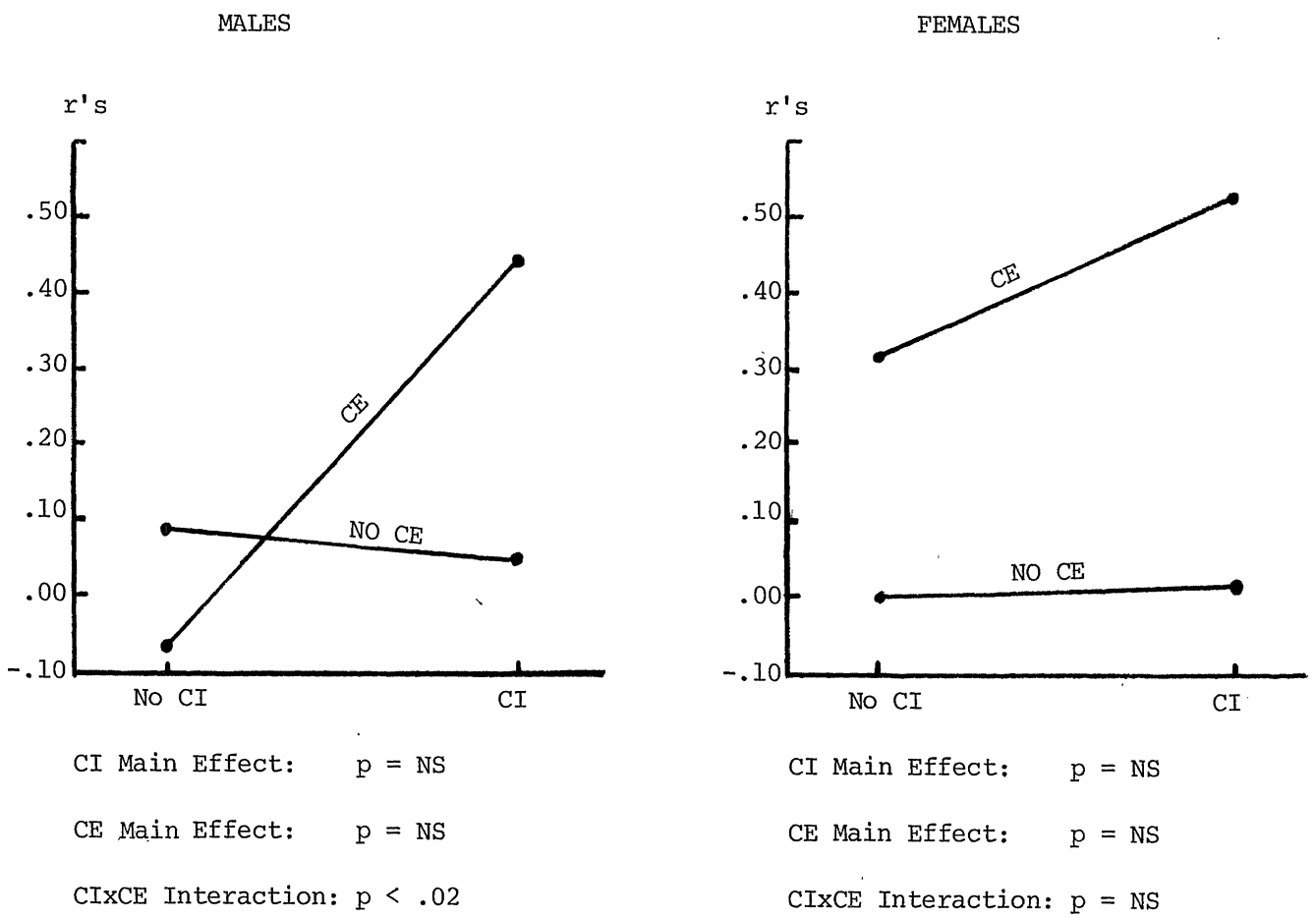
Treatment Group	CE	CI	CIxCE
CE-yes, CI-yes	1	1	1
CE-yes, CI-no	1	0	0
CE-no, CI-yes	0	1	0
CE-no, CI-no	0	0	0

It should be noted that the treatment group means in Figure 1 represent the average Z_r values transformed back from $\overline{Z_r} \rightarrow \overline{r}$.

Among males, an average correlation of .44 was obtained between the $\Sigma E \cdot V$ value and the MOP ratings for subjects given both CI and CE. Average correlations for the other male treatment groups appeared close to zero. The regression analysis for men indicated that the CIxCE interaction was significant at $p < .02$ and that the CI and CE main effects were not significant. This provides support for Hypothesis 5, that a synergistic relationship exists between CI and CE, but does not support either Hypothesis 3 or Hyptohesis 4, which predicted independent CI and CE effects.

FIGURE 1

CORRELATION BETWEEN MOP RATINGS AND

WEAR PERFORMANCE EXPECTATIONS ($\Sigma E \cdot V$)

MALES

FEMALES

CI Main Effect: p = NS

CE Main Effect: p = NS

CIxCE Interaction: p < .02

CI Main Effect: p = NS

CE Main Effect: p = NS

CIxCE Interaction: p = NS

Among the women, there were also substantial differences in the treatment group means for the Wearability dimension. Female subjects given both CI and CE had an average correlation of .52, those given only CE had a correlation of .32, and the other groups had correlations near zero. Due to a high degree of within-cell variation, however, neither the main nor the interaction effects were significant for women. These findings do not support Hypotheses 3, 4, or 5.

Data on the recall of the MOP ratings provided some evidence that men acquired and used the CI to a greater extent than the women. Correct recall exceeded the chance rate for men given both CI and CE ($p < .10$) and those given just CI ($p < .05$). Correct recall by the women did not exceed the chance rate in either treatment group that had information available.

The findings presented so far for men given CI but not CE are somewhat paradoxical. On the one hand, on the basis of the recall measure, these subjects seem to have acquired the information. On the other hand, judging from the correlational measure, the information did not seem to have been integrated into their Wearability expectations. One explanation is that the information was simply rejected. Another explanation is that the information missed its target. The data shown in Figure 2 favor the second explanation. Here the MOP ratings are correlated not with the Wearability expectation but with the Convenience of Care expectations. The CI main effect was statistically significant at the 99 percent level, and the highest average correlation ($\bar{r} = .40$) was for men given CI but not CE.
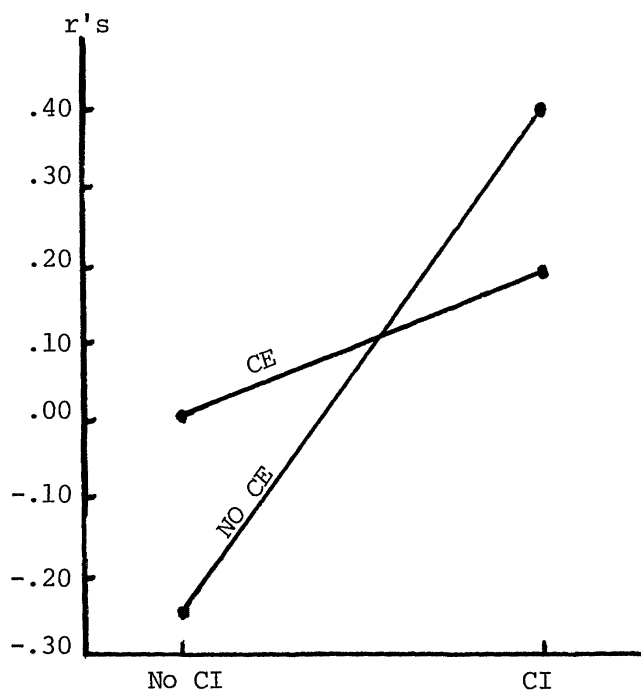
Hypothesis 6

It was hypothesized that CI and CE would ultimately have an effect on behavioral intention. Again, it was not just "any" CI or CE effect that was of interest, but rather the influence of these treatments on subjects'

FIGURE 2

CORRELATION BETWEEN MOP RATINGS

CONVENIENCE OF CARE EXPECTATIONS

MALES

CI Main Effect: p < .01

CE Main Effect: p = NS

CIxCE Interaction: p = NS

preferences for better-performing products. For that reason, the analysis continued to focus on the correlational criterion relating behavioral intention (BI) to the MOP ratings. Figure 3 reports the data that deal with this hypothesis.

As shown, no significant main or interaction effects were obtained on this correlational criterion for men or for women. For men, the direction of the means was at least consistent with the notion of a CI effect, but such was not the case for the women. In any event, the null hypothesis cannot be rejected on the basis of these data.
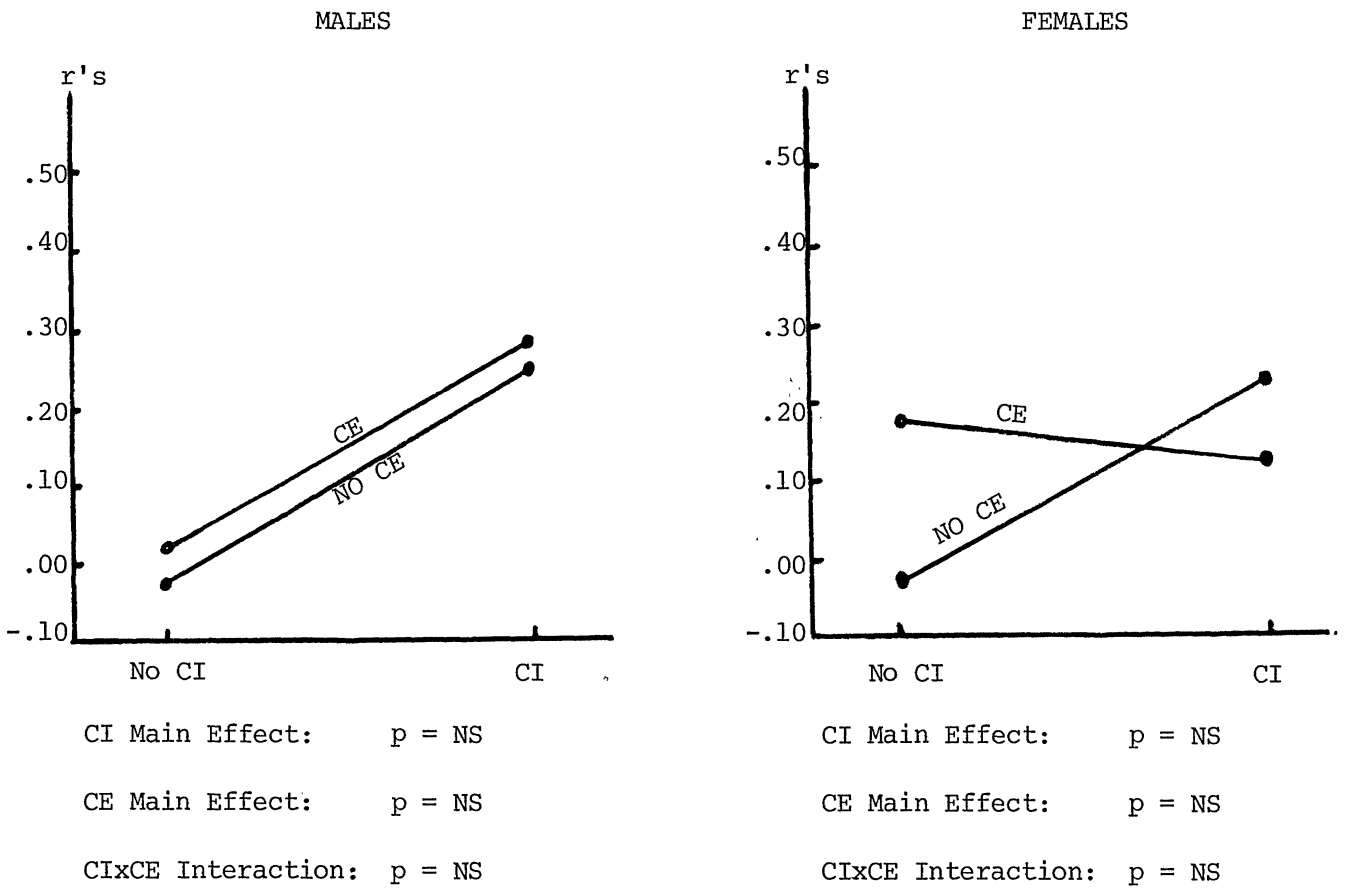
DISCUSSION

At least with regard to Convenience of Care, the data provided support for Hypothesis 1, that CE increases the number of utilitarian dimensions that are salient. However, comparable results were not obtained for the Wearability dimension, which is also utilitarian in nature. This difference may be due, in part, to the difference in the "importance" of these two dimensions. There was some indication in Table 4 that subjects tended to view Wearability as the least important of the four dimensions. Perhaps this tendency predisposed subjects to ignore some of the CE material pertaining to those aspects of the product.

It is also interesting the CE seemed to have an impact on cognitive complexity, while previous knowledge and experience with the product did not. This may be due to a difference in the nature of conceptual and experiential learning. Perhaps conceptual learning such as CE conditions consumers to think about products and make judgments on a dimensional basis. Perhaps experiential learning is more episodical in nature and lacks the same degree of integration.

FIGURE 3

CORRELATION BETWEEN MOP RATINGS

AND BEHAVIORAL INTENTIONS

MALES

FEMALES

CI Main Effect: p = NS   CI Main Effect: p = NS

CE Main Effect: p = NS   CE Main Effect: p = NS

CIxCE Interaction: p = NS   CIxCE Interaction: p = NS

The positive finding, that CE increased the salience of care-related dimensions, may have important implications for the manner in which durable goods are marketed. It suggests that educated consumers will pay more attention to the function-in-use aspects of products. They will be more inclined to select brands that interface well with their life styles and to consider usage circumstances rather than brands that are sold solely on an image basis. For example, with the trend toward an increase in the number of working women who have less time for household chores, it is probably not surprising that subjects in the experiment paid particular attention to CE on the maintenance aspects of carpeting.

In general terms, if CE programs become more common, marketers will probably need to do more research on the nature of the consumer-product interface. This research would focus on the performance of the product in relation to the behavior of consumers during the period of product consumption. A change in promotional methods might also be in order, with less emphasis on the immediate aspects of purchase and more emphasis on the satisfactions of ownership. In addition, more knowledgeable consumers would necessitate better trained and more competent salespeople.

As predicted by Hypothesis 2, CE did not seem to have much impact on the subjective value of the dimensions. Confirmation of this hypothesis helps to establish the desirability of "informative" rather than "persuasive" CE in this experiment. Whether or not there was an overt attempt to convince subjects that certain product characteristics ought to be considered more important than others, subjects continued to be guided by their own preferences and desires. On the other hand, confirmation of this hyothesis does not necessarily imply that subjective value is impervious to the influence of CE or that it should be. Perhaps if the nature of the V_{ij} construct was better

understood it would be clear whether CE has a legitimate role to play in the formation of this evaluation. It may be the case that consumers do a poor job of assessing their future needs and could use help in this area. Improper need assessment might lead to an undervaluation at the time of purchase of certain dimensions which would become more desirable during consumption. This is likely to be more of a problem for durable than nondurable goods, with the former being consumed over a considerable period of time.

The results concerning Hypotheses 3, 4, and 5 are central to this experiment and deserve special consideration. A noteworthy result was the lack of significant findings for women on either the correlational measure or on recall, compared to some positive findings for the men. This suggests that female subjects did not acquire and use the CI information to the same extent the male subjects did. One explanation for this might be sex differences in the perceived need for the information. It was discovered that men, in comparison to women, expected to find greater quality differences between carpets, expected to have a harder time judging quality, and scored lower on the carpet knowledge pretest. Although none of these differences was statistically significant, together they may have exerted an influence on the propensity to use the information.

Regardless of sex, the findings did not support Hypotheses 3 or 4, which predicted independent CI and CE effects for the correlational measure dealing with Wearability. On the surface, the lack of a significant CI effect confirms the findings of other researchers that there is a usage problem associated with information disclosure. As for CE, the lack of a significant effect suggests that consumers had difficulty applying the principles they learned through CE. Possibly a more involved CE training session involving didactic methods, practice, and feedback could have produced stronger results.

However, training of that kind would be more difficult to implement in the "real world."

At least for the men, the data provided strong support for a synergistic effect between CI and CE. Given that the CE training and the experimental sessions were separated in time, and given that the CE materials discussed much more than just the existence and use of the CI, this finding goes far beyond a simple demand effect--i.e., telling subjects what behaviors are smart and then seeing whether they engage in them. This finding confirms Jacoby's argument that a necessary precondition for information usage is prior consumer education. This finding also points to an inherent weakness in the design and conclusions of past studies of information use that did not include any CE training.

The need to educate consumers in information use was also evident in what seemed to be a misinterpretation of the MOP ratings by men given CI but no CE. Their recall data showed some degree of information acquisition, but there was no evidence that the information was integrated into Wearability expectations. There was an indication, however, that this information was integrated into Care expectations. This probable misinterpretation stems from the broad title given to the ratings themselves (i.e., a Mark of Performance) and the lack of education defining the meaning and use of the CI.

The lack of significant results regarding Hypothesis 6 seems to support Day's notion of a hierarchy of effects in regard to information disclosure. For example, among men given both CI and CE there was clear evidence of some cognitive impact (i.e., a significant CIxCE interaction on Wearability expectations). However, even among this group, there were no demonstrable effects at the behavioral intention level. Apparently, the information disclosed involved a dimension that was not of overriding importance to the subjects.

CONCLUSION

The point was made that the four cells of the experimental design could be considered alternative policy approaches that government might use to improve the consumer information environment and, in the process, add to the welfare of consumers and society. Only under the combined strategy of consumer information and education (Strategy 1) was there an improvement in consumers' decision processing. From a practical standpoint, this would also be the most costly strategy to implement. Unfortunately, the intermediate strategies of information only or education only, while probably less costly to implement, did not seem to have any beneficial effects on decision processing.

APPENDIX

EXAMPLES OF DIMENSIONS CLASSIFIED

INTO GENERALIZED SERVICE SETS

(1) Ease of Care and Maintenance = Care

Doesn't retain smells, resists stains/spots/spills, doesn't show lint/
hair/soil/dirt, doesn't pill or fuzz, easy to remove stains, easy to
vacuum, easy to shampoo, seldom needs professional cleaning, etc.

(2) Wearability or Appearance Retention = Wearability

Doesn't show traffic pattern, doesn't shed fibers, abrasion-resistant,
doesn't snag, snags don't unravel rows, sturdy construction, won't fade,
moth-resistant, mildew-resistant, won't mat, retains pattern definition,
etc.

(3) Appearance and Fit with Interior Decor = Appearance

Attractive, beautiful, luxurious-appearing, lustrous, does/doesn't shade,
doesn't show footprints, prestigious-looking, etc.

(4) Comfort

Soft to touch, soft to walk on, resilient, doesn't accumulate static
electricity, etc.

(5) Purchase Price

Cheap, not cheap, on sale, a deal, good value, inexpensive, expensive,
etc.

(6) Unclassified

Specific colors (red, yellow, etc.), solid color, mix of colors, surface
texture (twist, shag, etc.), fiber content, dense pile, deep pile, pile
weight, degree of twist, thickness of yarn, type of yarn, backing
material, etc.

FOOTNOTES

[1]Staelin (1978) is a recent exception.

[2]def.: pertaining to the close study of an individual case.

[3]def.: pertaining to the study of general principles.

[4]In a strict sense, the E-V models are built around the expected behavioral "outcomes" of choice. While clear conceptually, the distinction between an outcome and an attribute is not always clear to consumers. Therefore, the more general term "dimension" is used in this paper.

[5]This assumes that performance can be objectively measured and that there is an isomorphic relationship between the CI and a salient evaluative dimension.

[6]Obviously, a more comprehensive CE treatment involving hours of instruction and practice could be designed, although it is doubtful that such a program could easily be applied in the "real world." The present treatment might be viewed as a "module" in a more comprehensive program, and should therefore generalize to CE.

[7]To safeguard the integrity of the CE treatment, the eight-item pre/posttest battery included items that were not themselves of an instructional nature. Primarily, subjects were asked to define terminology. Any residual instruction inherent in the test would affect the treatment groups equally, since all ninety-two subjects completed the pre/posttest. Because the analysis is concerned with differences between groups, any constant effect would be of little importance.

[8]It is possible that the separate measurement of Wearability perceptions could have biased responses to the following set of questions (value measurements) to a small extent. Fortunately, this bias (to the extent it exists) would affect all treatment groups equally.

[9]The subscripts i and j will be assumed in future references to this model and the simpler notation $\Sigma E \cdot V$ and $\Sigma \Sigma E \cdot V$ will be used instead.

[10]In preliminary tests, this method of measuring value was compared with an approach using conjoint measurement. The average intrasubject correlation with the part worths was .80.

[11]As a rule of thumb, the first five to nine dimensions mentioned are usually assumed to be salient (Fishbein and Ajzen 1975).

[12]The relationship of actual interest here is that between E_{ij} and the MOP ratings and not that between $\Sigma E \cdot V$ and the MOP. However, multiplication by the value component has little impact on the correlations except to improve the scaling of the expectation variable. The reason is that, for any given subject, the same set of V_{ij}'s is used for all five carpets.

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