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CONSUMER RESPONSE TO A LEGITIMATED BRAND APPEAL: A PRELIMINARY REPORT*

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INTRODUCTION

In many product markets the buyer has little to choose from in terms of significantly differentiated products. This is particularly true for frequently purchased, branded products. The manufacturers of such products often seek to generate preference for their own brand via promotional appeals that claim that their brand tastes better, is more healthful, or will make the user smell better longer. After years of such claims and counter claims of product superiority, the believability of such appeals is likely to be in serious question. In any case, it would seem that buyers have learned to discount many product claims as manufacturer's exaggeration.

What would happen if the claimed effectiveness of one brand in a market were to be legitimated in a meaningful way and this could be transmitted to the consumer as part of the brand's promotion? What would characterize the individuals who would respond? Could behavioral science theory and results provide a useful framework for specifying a prior model of the salient characteristics of the buyers who would respond to such a legitimated appeal? This paper presents our preliminary analysis of such a situation and indicates our plans for a more refined and complete analysis.

THE PROBLEM

On August 1, 1960, Crest toothpaste was officially recognized by the American Dental Association as "an effective decay-preventive dentifrice..." This unprecedented endorsement gave Crest an unusual differential appeal in an otherwise relatively homogeneous market. Crest's promotional appeals subsequent to the endorsement, were, in a sense, legitimated by this endorsement from what appears to be an independent professional association.[1]

Crest had been on the market for approximately five years prior to the A.D.A. endorsement. Initially, Proctor and Gamble advertised heavily that

Crest, with stannous fluoride, was effective in preventing tooth decay. Of course, other brands used similar claims. Our impression is that such claims did not carry a great deal of "believability".

This impression is consistent with P & G's reported reduction of Crest's advertising budget from twenty million to five million dollars between 1956 and 1960, with Crest's dropping from eighteen percent to twelve percent of the market during this period, and with Bliven's commentary on the endorsement in the New Yorker.[2] The fact that an impartial, expert organization validated Crest's claims changed the believability of Crest's claims.

The A.D.A. endorsement of Crest received widespread coverage. Procter and Gamble used full page newspaper ads in several hundred markets to thank the A.D.A. for its contribution to public service. The promotional budget for Crest was increased in order to take advantage of the endorsement. The joint product of this heavy P & G advertising campaign and the legitimation of its brand appeal by the A.D.A. was a dramatic gain in market share for Crest. In the four and one-half years it had been on the market prior to the endorsement, its market share had risen to 18% only to fall to about 12% by July 1960. However, in the period after the endorsement Crest rapidly became the market leader with a share of about 35%. This gain came at the expense of virtually every other brand and it came in spite of heavy dealing activity by other brands. Thus the dentifrice market at this period of time provides us with an example in which we may study consumer behavior in a market undergoing substantial change.

Our objectives in this study are twofold. The first objective relates to the evaluation of buyer attitudes as a type of panel information that might be useful to firms marketing new products, penetrating new markets,

promoting new product attributes, or trying to achieve a better notion of the types of customers it presently has and how it might better appeal to certain market segments. Secondly, we were interested in ascertaining whether we could specify, by prior reasoning, certain salient characteristics of the consumers who responded to the Crest endorsement. If we can prespecify a model of the situation based upon behavioral theory and results, we may then use our data to test the model. Should our prespecified model be found to be valid in this situation, our confidence in our ability to predict on the basis of this theory will be enhanced to a greater extent than if we simply used an empirical approach.

There are several additional factors which make the Crest situation particularly interesting and useful in the study of buyers' market behavior. In the first place, data on market response are available on a family-by-family basis from the Market Research Corporation of America's National Consumer Panel.[3] Secondly, about three months prior to the A.D.A. endorsement, MRCA administered a social-psychological quiz to nearly four thousand families in the National Consumer Panel.[4] This quiz gathered data on buyer's self-designated interest and opinion leadership on a rather broad range of topics. It also asked the buyer to assess her likely response to seven hypothetical, but plausible, new products. She was asked to designate where she felt she would fall on a scale from "try immediately" to "never". Data were also gathered on media habits and preferences, and social contacts.[5] These data seem especially interesting in that they represent measures of the buyer which would seem to have fairly direct relevance to market behavior. Should these measures prove to be useful predictors of market behavior in the present case, it would seem that commercial panel operators such as MRCA might find it useful to gather such data from their panels on a continuing basis. Thirdly,

Crest was widely distributed at the time of the endorsement and was relatively inexpensive. Consequently, it was readily available to buyers.[6] Finally, response to this legitimated brand appeal is intrinsically interesting as a behavioral and market phenomenon.

PRIOR THEORY

An interesting way to view the A.D.A. endorsement is in terms of information theory. Products were very rarely endorsed by an independent, professional association.[7] One may reason that the occurrence of such an endorsement for Crest represented the occurrence of an event considered highly unlikely by most consumers. Consequently, the endorsement contained a great deal of product "information".[8] Crest was probably viewed as "new" by much of the market subsequent to the endorsement in that it now had a major additional product attribute -- a legitimated claim of decay preventive effectiveness.

The notion that Crest was probably viewed as "new" subsequent to the endorsement led us to consider the possibility that the literature on the diffusion of innovations might yield useful insights in constructing a prior model. Our concern at this point was whether or not we could develop a reasonable prior model to predict who would try Crest after its endorsement. Since our interest was centered upon response to the legitimation of the brand appeal, attention was focused upon those buyers who were not Crest purchasers in the period immediately preceding the endorsement. It should be noted at this point that consumer response to the legitimation of the Crest brand appeal is confounded with the response to P & G's increased promotion of Crest and competitive response to the endorsement. These confounding effects should tend to operate in opposite directions on our response measure. A further confounding aspect of this situation is the

intervening variable of the family dentist. His reaction to the Crest endorsement may well have determined the response of a family in many cases. Unfortunately, our data base does not furnish this information.

Rogers [1962] has summarized research relating to the diffusion of innovations.[9] From this research he has tried to develop a tentative theory on the diffusion of innovations. At the present time the theory consists of a loosely related set of conceptual variables which have been found to be useful in distinguishing early adopters from late adopters or non-adopters.

Rogers found that the perceived characteristics of the innovation were important determinants of response. He identified the following five characteristics as being important: relative advantage, cultural compatibility, complexity, divisibility, and communicability. Of these, relative advantage seems particularly salient in terms of predicting individual response to the A.D.A. endorsement. The remaining four do not appear to be especially important in the present case.

Rogers also reports that early adopters and innovators tend to rate higher in terms of opinion leadership and venturesomeness. In addition, impersonal information sources were found to be important at the awareness stage while personal sources were important at the evaluation stage. These results suggested to us that we ought to incorporate relative advantage, venturesomeness, opinion leadership, and exposure to mass communication and personal sources of information within the framework of our prior model.

The prior model specified below draws upon Roger's summary of salient variables in the diffusion of innovations. In our models, we are interested in ascertaining whether conceptual variables developed in other behavior areas will prove useful in predicting response in this market.

The most relevant previous research on diffusion of a new product is the

work by Frank and Massy (1963). This study attempted to distinguish those who purchased Folger's coffee in the Chicago market during the 62 weeks after the product was introduced from those who didn't purchase (measures of "degree" of Folger purchasing were also used). Twenty-five socio-economic and purchasing variables were used as independent variables. The study was of a descriptive rather than predictive nature. A follow-up report by Frank, Massy, and Morrison (1965) indicates that the attempt was rather unsuccessful and that an unbiased coin would have been just as useful for predictive purposes.

Bylund (1963) used socio-economic and questionnaire data to differentiate between high and low triers of various new food products. While the data were interesting, the use of gross cross-classifications results in much confounding of effects and makes the study difficult to analyze.

Prior Model I: Conceptual Variables

Our purpose in this model is to identify a set of conceptual variables which seem relevant, a priori, to the identification of triers of Crest subsequent to the A.D.A. endorsement. These variables are:

R: Relative Advantage: what advantage does the product have for the the consumer?

I: Interest: how interested is the consumer in the product class?

V: Venturesomeness: is the consumer willing to experiment with products of this type?

OL: Opinion Leadership: do others ask the consumer for information on the product class?

G: Gregariousness: does the consumer have a lot of social contacts?

E: Exposure to Mass Communication: does the consumer receive a relatively high amount of information from mass communication sources?

Notice that we have added interest to the conceptual variables drawn from Rogers. While Katz and Lazarsfeld [1955] found interest to be related to opinion leadership, it seemed to us that it might also exert an independent

effect on consumer response. Thus it was included, even though there was danger of a high degree of collinearity.

The conceptual variables outlined above form the basis for a rather primitive model. Taking each variable separately, we would predict that a high score of each variable should be positively related to the trial of Crest in the post A.D.A. period.

'rior Model II: A Hierarchy of Effects

Model I might be carried to a more detailed (and more tentative) level by assuming, for the moment, that

a) perfect measures are available for each conceptual variable,

b) the conceptual variables form a hierarchy with a contribution from each preceding variable a necessary condition to succeeding variables having an effect on the response,

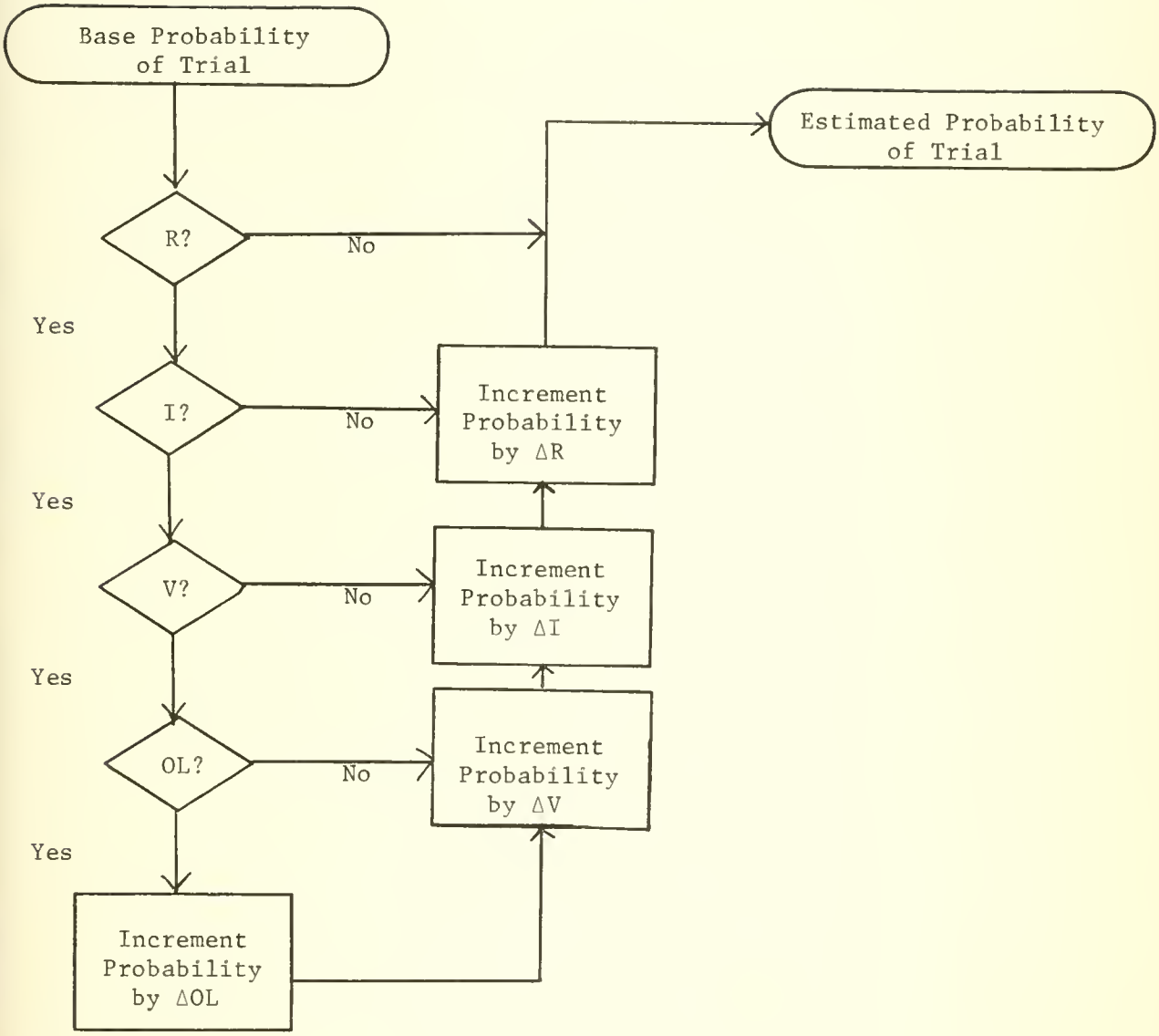
c) each conceptual variable either has a fixed effect or no effect on the response depending upon its presence or absence in a given household and depending upon the occurrence of preceding effects in the hierarchy.

ur response measure in this model will again be a trial of Crest subsequent to he endorsement.

Our prior specification of a hierarchy of effects is illustrated in the low diagram in Figure 1. The hierarchical hypothesis assumes that a buyer as some base probability of trying Crest. If Crest has a relative advantage or him, his base probability is incremented by a fixed amount. If not, his robability remains the same. Notice that if he does not have a relative dvantage for Crest, the other variables make no contribution to his probability f trying Crest. Thus each preceding variable is viewed as a gate for ucceeding variables to contribute to the probability of a trial. This model s obviously oversimplified. It has been expressed in "black and white" terms ithout concern for degrees in the effects or in the variables and it assumes o measurement error.

Figure 1

Hierarchy of Effects



What, beyond the goal of understanding, might be gained from the use of a hierarchy of effects? A principal benefit is that one can better cope with causal priorities in the data. This can be useful in deciding how the data should be analyzed. The present hierarchical model is rather tentative and only limited use will be made of the hierarchy of effects in this progress report.

In the above models we have specified what we believe will be relevant variables on the basis of prior analysis. In the second, more tentative model, we have been more explicit about the relationships among the variables. A key point in the above approach is that we are not "fitting" the models -- rather we propose to test them. Such a strategy gives us greater power to generalize from our results.

SOME EMPIRICAL RESULTS

Before we may test our prior models, it is necessary to develop operational measures for the variables. In this initial test of the models we have used rather gross measures of many of the variables. We anticipate being able to suggest somewhat more refined approaches in the near future. We will first consider our operational measures of the conceptual variables. This discussion will be followed by a consideration of the response measure, the other variables in the analysis, and the data screening procedures which were used. We will then turn to the empirical results.

Operational Measures

In the case of Crest it seemed that the presence of children would give Crest a relative advantage for that family. It was felt that the critical years for tooth decay occur during childhood and adolescence and, further, that adults are more likely to be concerned with the question of tooth decay for their children than for themselves. Thus, our operational measure of

relative advantage was taken to be the presence of children (through age 17) in the household.

In the discussion below we develop several indices as weighted combinations of certain measures. The weights, while ad hoc, represent our prior notions about the relative contribution of these measures. The procedure used to develop these prior weights was first to agree on the measures to use and then for each of us to assess independently the rank order importance of these measures to the indices we were developing. Our rankings were in agreement and were used as the weights in the indices.

Interest and opinion leadership measures were developed from a weighting of responses to questions on health, raising children, and buying food. The housewife was asked to rate her interest in each of these three topics in terms of whether she saw herself as less interested, as interested, or more interested than most other women she knew.[10] The three response alternatives were coded 1, 2, and 3, respectively, with the highest response number signifying the greatest topical interest. The interest index was then taken as:

I = (3) (Interest Score on Health) + (2) (Interest Score on Raising Children) + (1) (Interest Score on Buying Food).

The opinion leadership index was developed in a similar fashion.

The venturesomeness measure was the result of the housewife's response to the following question:

"An effective pill for the prevention of colds and minor respiratory ailments is about to come on the market. Would you:

1. Try it as soon as possible.
2. Wait until a few friends have tried it.
3. Wait until it is in common use.
4. Probably never try it."

This measure was used to ascertain a housewife's self-perceived "venturesomeness" in a health related product class. Her score on the venturesomeness index is the number which corresponds to her response to this question.[11] Note that a score of 1 corresponds to maximum venturesomeness while a score of 4 corresponds to the least.

The conceptual variable "gregariousness" relates to the number of social contacts which the housewife has. Operationally this was defined as a weighted combination of the following measures:

1. The number of persons, excluding immediate family, with whom she had a telephone conversation during the preceding three days.

2. The number of times she had visitors at her house the past seven days.

3. The number of times she was invited out for an evening visit or dinner with friends.

ince we felt that the latter two categories were relatively more important n the measure of gregariousness, we formed an index as:

$$G^2 = (1\ )\ (\text{Telephone Calls in Past Three Days})$$
$$+ (2\ )\ (\text{Visitors During Past Seven Days})$$
$$+ (2\ )\ (\text{Evening Invitations to Visit During Past Seven Days})$$

n the regression formulation discussed in the next section we used G, the quare root of the above index.

Media exposure data for the panel households were available from a revious study run in the spring of 1959. In this study households kept a eekly diary of their magazine, daytime television, and evening television xposure. A household's score on one of these indices, say daytime television, as determined by the quartile of the entire sample group of households into hich it fell. Our operational definition of exposure to mass communication hannels was taken as:

M = (2) (Magazine Quartile) + (1) (Daytime TV Quartile) + (1) (Evening TV Quartile).

As has been discussed, attention in this paper is focused upon buyers who tried Crest subsequent to the endorsement. A trier is defined as any buyer who tried Crest in one of her first twenty-five purchases after the endorsement.[12] A non-trier is one who did not try Crest in one of her first twenty-five trials or in the period of the analysis.[13]

The lack of perfect measures of each variable led us to introduce a new variable. It was postulated that the theory would show up more clearly in cases where the buyers were loyal to one brand. If one were to view brand choice as a probabilistic process, loyal buyers are less likely to purchase Crest by "chance".

As an operational measure of brand loyalty we used the proportion of purchases devoted to the household's most frequently purchased brand in the period prior to the endorsement. In summary, then, the theory should show up significantly more for people who had been brand loyal prior to the endorsement while the low brand loyalty group is expected to contain a higher percentage of people who tried Crest.[14]

In a similar manner we defined a measure of dealing behavior as the proportion of purchases made on a deal in the period before the ADA endorsement. A buyer having a relatively high proportion of deal purchases might be considered "deal prone". Since Crest was involved in considerable dealing after the ADA endorsement and in view of the large number of trials and the extended time period over which we are defining the trying response, we would expect this measure to relate positively to trying Crest.

In order to be included in the analysis, a household had to meet the following criteria:

1. It had to have been on the active list of the National Consumer Panel every month in 1960;

2. It had to have at least two purchases of dentifrice in the period before the ADA endorsement and at least four purchases after; and

3. It must not have purchased Crest on the two purchases immediately preceding the endorsement.

From the original subsample of 1918 households, 998 satisfied the above criteria.

These households represent our analysis sample. This sample will be used for testing and revising our models as well as for developing empirical descriptive models. Another sample of 1917 households is being held for a later evaluation of the reliability and validity of the models developed on the analysis sample.

Testing the Models

It has become fairly common to analyze household purchase data by means of regression analysis. The results of such analyses have not been encouraging if one judges them in terms of R^2, the amount of variance explained.[15]

There are a number of reasons why regression analysis is not ideal for testing our model -- or, more generally, for dealing with household data:[16]

1. There is a substantial amount of measurement error in all variables. Random measurement errors in the predictor variables will lead estimates of the coefficients to be biased toward zero.

2. There are problems from the interaction among the variables in the model. For example, the relationship between venturesomeness and trial is expected to be dependent upon the level of interest.

3. Causal priorities may exist among the variables as discussed above under the hierarchical model.

4. There are scaling problems for some of the variables (for all those variables except the dummy variables). This violates the implicit assumption that interval measurement exists.

5. Multicollinearity generally exists among the predictor variables making it difficult to evaluate the separate contribution of each variable.

6. The assumption is generally made that the relationships between the dependent and independent variables can be expressed in terms which are linear in the parameters.

There are ways of dealing with some of the above problems within the regression framework. However, a simple way of avoiding these problems is to use a tree type of analysis.[17] Tree analysis is also subject to certain limitations. For example, tree analysis places heavy burdens on sample size, enerally requires judgment in forming category boundaries, and will result in a loss of sample information whenever a variable which is interval scaled is converted to a categoric measure for the tree analysis. Both regression and tree analysis will be used in the analysis of Prior Model I. This strategy will yield some comparative insights into the application of these techniques in the analysis of household data.

Results: Prior Model I

In this section, the concern will be with Model I -- i.e., how well have the conceptual variables (as operationalized) performed? Two approaches have been used here. One approach utilizes the regression model while the other uses the splitting or tree procedure. Tables 1 and 2 present the results of the analysis.

Prior Model I specified that the signs for the operational measures of R, I, OL, G, and D should all be positive and those for L, V, and M should all be negative. From the regression results in Table 1, one can see that these predictions on signs hold up for all variables except for opinion leadership (which was highly collinear with the interest measure).[18] The probability of obtaining 7 out of 8 signs correct is less than 5% -- assuming a binomial process with a 50-50 chance of being correct.[19]

If one is to judge the performance of the model based upon its adjusted R^2, however, it then appears that the model is "statistically significant" but

Table 1

Results from Regression Model on Triers*

$$T = 0.814 - 0.503L + 0.135R + 0.010I - 0.008V - 0.009(OL) + 0.002G$$

(-7.88) (4.16) (1.10) (-0.52) (-1.10) (0.12)

$$-0.004M + 0.055D$$

(-0.87) (0.82)

Where T = 1 if tried during 25 trials after endorsement; zero otherwise

L = Brand Loyalty

R = Relative Advantage

I = Interest

V = Venturesomeness (Low score = high venturesomeness)

OL = Opinion Leadership

G = Gregariousness

M = Mass Communication (Low score = high communication)

D = Dealing Behavior

R^2 (corrected for degrees of freedom) = 0.088

*The figures in parentheses are the corresponding t statistics for 989 degrees of freedom.

Tree Analysis of Triers:

High Brand Loyal Purchasers (453/998 = 0.454)

Total Households	209/453 = .461 [e.g., $\frac{\text{triers}}{\text{sample size}}$ = percent of triers]															
Relative Advantage	High 141/279 = .506								Low * 68/174 = .391							
Interest	High 49/84 = .583				Low* 92/195 = .472				High 19/38 = .500				Low 49/136 = .360			
Venture	High 30/48=.625		Low * 19/36=.528		High 41/98=.418		Low 51/97=.527		High 7/17=.412		Low 12/21=.572		High 19/54=.352		Low 30/82=.365	
Opinion Leadership	High* 18/25 =.720	Low* 12/23 =.522	High 11/21 =.500	Low 8/15 =.533	High 5/14 =.357	Low 36/84 =.428	High 7/13 =.538	Low 44/84 =.523	High 3/7 =.429	Low 4/10 =.400	High 7/9 =.778	Low 5/12 =.416	High 1/7 =.143	Low 18/47 =.383	High 4/11 =.363	Low 26/71 =.366
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

Key: Most splits were made at about the mean response; high brand loyal were purchasers devoting .70 or more purchases to their favorite brand; high relative advantage -- indicates the presence of children; high interest was any score 13 or greater; high venture was scores of 1 or 2; high opinion leadership was any score 11 or greater.

*Designates "terminal categories" which are discussed in the text.

Tree Analysis of Triers:

Low Brand Loyal Purchasers (545/998 = 0.546)

Total Households	377/545 = .691															
Relative Advantage	High 273/364 = .749								Low* 104/182 = .572							
Interest	High 89/122 = .729				Low * 184/241 = .762				High 22/35 = .628				Low 82/147=.557			
Venture	High 57/76=.750		Low* 32/46=.695		High 100/132= .758		Low 84/109=.770		High 12/19=.632		Low 10/16=.725		High 45/72=.625		Low 37/75=.493	
Opinion Leadership	High* 31/43 =.720 A'	Low* 26/33 =.788 B'	High 19/26 =.730 C'	Low 13/20 =.650 D'	High 17/21 =.808 E'	Low 83/111 =.748 F'	High 14/18 =.778 G'	Low 70/31 =.770 H'	High 7/13 =.538 I'	Low 5/6 =.833 J'	High 7/11 .637 K'	Low 3/5 .600 L'	High 10/15 .667 M'	Low 35/57 .613 N'	High 5/6 .833 O'	Low 32/68 .463 P'

not terribly relevant in that it accounts for only 8.8% of the variance in the response measure. In the tree analysis presented below it will be seen that this is an unwarranted conclusion. The operationalized versions of the conceptual variables do, indeed, have a significant impact on a consumer's likelihood of trying Crest subsequent to the endorsement.

The results of the tree analysis enable us to obtain another test of Prior Model I.[20] Pairwise comparisons were made between cells which were the same on all dimensions but one. There were 16 of these pairwise comparisons which could be made for each of the variables in the tree analysis.[21] The predictions of which member of the pair should dominate as far as percentage of triers is concerned was unambiguous on the basis of Prior Model I.

Variable	Number of Comparisons Without Ties	Number of Correct Predictions	Probability[22]
Brand Loyalty	15	14	.001
Relative Advantage	16	13	.011
Interest	16	10	.227
Venturesomeness	16	6	.671
Opinion Leadership	15	10	.151

From the tree analysis, it is apparent that venturesomeness contributes little to the model. Our ability to explain this failure of the model on a post hoc basis is rather strong. Due to the purchasing span which was used -- twenty-five trials -- the lack of venturesomeness was not sufficient to prevent households from trying Crest. The impact of this variable should show up more clearly for a shorter purchasing span.

In summary then, the results on Prior Model I indicate that the variables are related to trial as predicted -- with some exceptions relating to venturesomeness and opinion leadership. The strengths of the relationships are strong for brand loyalty and relative advantage but rather weak for

interest, mass communication, and deals, and negligible for gregariousness.

Results: Prior Model II

Our tests of Model II are rather limited. Table 2, the tree procedure results, will be used in the analysis.

If the hierarchy of effects holds, one could define terminal categories. These categories are starred in Table 2. Prior Model II yields an unambiguous ranking of the five terminal categories within a brand loyalty class. In addition, we expect the theory to show up in a stronger fashion in the higher brand loyalty group.

Kendall tau rank correlation coefficients were computed for each brand loyalty group. For the high brand loyal group, tau was equal to +1.00 which is significant at $p<.01$. For the low brand loyal group tau was +0.27 which was only significant at $p<.25$. These results are reasonably consistent with Prior Model II.

Additional Tests of Prior Model I

By considering pairwise comparisons of each cell at the bottom of the table within each brand loyalty group, the final categories may all be ranked along a continuum of predicted percent of triers.[23] This procedure leads to a number of ties. All cells which were tied were collapsed into single cells so that five groupings were obtained. For the high brand loyal group tau was +1.00 ($p<.01$). For the low brand loyal group tau was +0.40 ($p<.10$). Once again, the results are consistent with Prior Model I.

To show that the results are consistent with the model is a necessary condition for having a useful model -- but hardly a sufficient condition. The question now becomes "how useful is the model?" This leads to the question of "useful compared to what?" For comparison, we used a naive model which said that all potential buyers have the same probability of trying

Crest. To evaluate the power of our model we looked at maximum contrast groups.[24]

The tests of statistical significance are presented in parts A and B of Table 3. While a high level of statistical significance was achieved for the differences between the maximum contrast groups for both high and low loyal buyers, a measure of importance is more relevant to our objectives. This can be seen from Table 2 where the cell on the extreme right may be compared with the cell on the extreme left (the same information is also available, of course, in the X^2 tables). The data indicate that, for high brand loyals, 72.0% of the high RIVOL group tried while only 36.6% of the low RIVOL group tried. In other words, households in the high RIVOL group were about twice as likely to be triers of Crest. The results for the low brand loyals were almost as strong with 72.0% of the high RIVOL group but only 46.3% of the low RIVOL group trying.

Tables 3C and 3D present another interesting comparison between maximum contrast groups. From the first table we see that trying is independent of past brand loyalty for those individuals who rate high on RIVOL. Table 3D indicates that past brand loyalty might make a slight difference for individuals low on RIVOL. In this case the difference is in the expected direction since the low brand loyal group had a somewhat greater propensity to try Crest.

Conclusions

On the basis of a prior analysis of relevant variables and hierarchical effects, two models were developed -- the second being a more specific extension of the first. These models were used to predict triers of Crest after its endorsement by the ADA.

Two analysis methods were used -- one based on multivariate regression

Table 3

TRIERS IN MAXIMUM CONTRAST GROUPS*

A. High Brand Loyals

	Tried	Did Not Try		
High on RIVOL	18	7	25	$\hat{\chi}^2 = 9.31$
Low on RIVOL	26	45	71	$p < 0.01$
	44	52	96	

B. Low Brand Loyals

	Tried	Did Not Try		
High on RIVOL	31	12	43	$\hat{\chi}^2 = 8.05$
Low on RIVOL	32	37	69	$p < 0.01$
	63	49	112	

C. High on RIVOL

	Tried	Did Not Try		
High Brand Loyal	18	7	25	$\hat{\chi}^2 = 0$
Low Brand Loyal	31	12	43	
	49	19	68	

D. Low on RIVOL

	Tried	Did Not Try		
High Brand Loyal	26	45	71	$\hat{\chi}^2 = 1.355$
Low Brand Loyal	32	37	69	$p = 0.25$
	58	82	140	

*NOTE: RIVOL stands for Relative advantage, Interest, Venturesomeness, and Opinion Leadership.

and the other on trees. These approaches were in substantial agreement on their support of the selected variables as being relevant to the determination of who will try Crest. Support was gained for the use of behavioral concepts; strong support was shown for relative advantage, mild support was shown for interest and mass communication, and very weak support was shown for opinion leadership, gregariousness, and venturesomeness.[25] The use of previous purchasing behavior was also related to trying Crest. Brand loyalty was very strong, as might be expected from the operational measure used for trials, while dealing behavior was rather weak.

The test for the existence of causal priorities was not a strong one -- but the results were fairly consistent with the prior model.

The overall predictive power of the prior model was rather encouraging -- in view of the many gross assumptions required for the development of this model. This predictive ability showed up much more clearly in the tree analysis than in the regression analysis. The superiority of trees for analysis was not surprising since this approach makes far fewer assumptions about the data.

Since the model was based solely on prior information (i.e., information which would have been available prior to the endorsement of Crest), the ability to generalize from our results is rather great. On the other hand, the results presented in this paper are of a preliminary nature. We have not yet demonstrated construct validity nor have we provided sufficient measures of the reliability of the results. In general, construct validity will be approached through the use of different operational variables while reliability will be assessed by use of the second sub-sample.

While the results to date have been encouraging, we are not yet in a position to advocate the routine collection of data on the attitudes of marketing panel members. In the next section, we will outline some of the

analyses which must be carried out to get at this question.

FUTURE WORK

As was mentioned above, work is now being carried out to establish the construct validity and reliability of the model. When this effort is complete, emphasis will then shift to the possibility of revising the model. This approach is more descriptive than predictive; the gain in descriptive ability comes at the expense of a loss in ability to generalize.

The descriptive approach will involve the creation of new indices. These indices will be specified on an a priori basis but will then be revised in the light of factor analyses on the predictor variables. When we are satisfied with these new indices, an attempt will be made to assess their usefulness in a predictive sense.

Consideration will also be given to the combined use of trees and regressions for analysis. Each technique has its advantages and disadvantages and the optimal approach probably involves some combination of these techniques. The long term objective would be to develop a generalized analysis program which forces the user to incorporate prior knowledge and then allows for tree analysis and regression analysis under the same framework. Such an analysis program should have capability for both model testing and model building. The latter objective would indicate that some searching capabilities should be available -- such as those available under the BMD Stepwise Regression and Factor Analysis Programs [1965], and the AID program by Sonquist and Morgan [1964].

The work to date has been more in the nature of basic research on buyer behavior. Since the model seems to show some promise, an attempt may be made to extend the results so that they may be useful for decision making. In a sense, the model has segmented the buyers into cells (or clusters) on the

basis of prior analysis.[26]

As an example of how our approach might be used for market clustering or segmentation, one can analyze the maximum contrast groups to determine how they differ on measures which have some relevance to marketing policy decisions. This might include demographic, sociological, or information source measures.

Given that the groups differ on the above measures, the next step is to demonstrate that the model does a better job of market segmentation than any alternative models can do. What alternative models are available? Perhaps our model could be matched against marketing managers in the dentifrice market. That is, the managers could be given the same prior data and would be asked to segment the market to identify who would try Crest. Comparisons could then be made between the success of the marketing managers and that of the behavioral model. With this type of information we would then be in a position to evaluate, at least partially, whether attitude measures on panel members would be useful.

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Footnotes

[1]The Yale communication studies of source credibility would seem to lend indirect support to the notion that the endorsement enhanced the believability of these appeals. See [Hoveland, et al, 1953].

[2]See [Bliven, 1963].

[3]We are indebted to Dr. I. J. Abrams of M.R.C.A. for making these data available at nominal cost.

[4]Peter Rossi of the National Opinion Research Corporation and Elihu Katz of the University of Chicago were consultants to M.R.C.A. on the development of this attitude survey.

[5]The data gathered on this quiz are outlined in the operational measures section.

[6]There did, however, appear to be a number of dealer "stockouts" immediately after the endorsement was announced.

[7]No prior endorsement of a dentifrice had occurred although Kolynos had been the first dentifrice permitted to advertise in the American Dental Association's journal. Kolynos was allowed to claim "fine cleansing qualities" in such ads.

[8]See J. A. Howard (1965), pp. 122-6 for a further discussion of information concepts in marketing.

[9]Information on diffusion research is kept current at the Diffusion Research Documents Center at Michigan State University.

[0]Note that the responses from the housewife are used as it was felt that she was most likely to be the family "gatekeeper" for dentifrice products.

[1]Some evidence on the validity of this measure is available in the Magazine Advertising Bureau reports referenced in the bibliography.

[2]In retrospect, this time span and number of trials was probably too large. The conceptual variables should have greater power when the trials for this response variable is reduced.

[3]The after ADA endorsement data period extends up to April, 1963, at which time dentifrice was deleted from the panel.

[4]The reliability of this measure between the before and the after endorsement periods was $r = 0.49$; however, this estimate of reliability is expected to be low since the Crest endorsement introduced change into the second time period.

[15]Low measures of R^2 seem to result on most cross-sectional studies where the sample points are individual households. We know of one researcher who has bragged about achieving an R^2 of .14 -- and his study was of a descriptive nature using a large number of predictor variables.

[16]Morgan and Sonquist (1963) provide an excellent discussion of these problems. Their presentation of an alternative technique (Sonquist and Morgan, 1964) is not, however, useful for our objective of model testing.

[17]Other names for this simple type of analysis are "configurational analysis" [Rogers, 1962, pp. 292-5] or "multilevel cross tabulations".

[18]$r = 0.52$.

[19]Little attention has been paid to the absolute sizes of the t statistics. The sample size (998) is very large -- and as the sample size goes to infinity all variables will become "statistically significant".

[20]The tree analysis includes fewer variables due to limitations resulting from sample size.

[21]The 16 comparisons result from the fact that binary splits were performed with five variables.

[22]Assuming a binomial process with null hypothesis at $p = 0.50$.

[23]These rankings may be obtained in a rather simple fashion by scoring a "1" for each variable on which that group is rated as high and a "0" otherwise. The groups are then ranked according to their total scores across all variables. In essence, we are assuming that the effect of each variable is equal. A more powerful test could have been made had we made a prior specification on importance.

[24]These are groups A, A', P, and P' from Table 2.

[25]Recall that opinion leadership was highly intercorrelated with interest and that our use of twenty-five purchases may well have masked the effect of venturesomeness.

[26]Earlier in this conference, some consideration was given to the use of statistical criteria as bases for this clustering.

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