Knowledge and confidence were more sensitive than attitudes or intentions, among . . .

# **Responses to Advertising a New Car**

### Donald R. Lehmann

Assessing the effectiveness of advertising is difficult, especially in the case of an introductory campaign. Moreover, whereas for frequently purchased products sales may be considered a measure of the success of the introductory campaign, sales are not as useful a measure for a durable product where the sales effects are often delayed. This paper presents an empirical example of an attempt to assess the effectiveness of advertising during the introduction of a new major consumer durable.

### The Data

This study is concerned with the introduction of a new small car. In order to monitor the success of the introduction, a special phone panel was created of individuals who passed two screening questions that indicated some interest in buying the general type of product being introduced.

Because many questions were to be asked about each alternative, it was not considered feasible to ask each respondent's opinion about all eight closely competing alternatives. The sample, which numbered 1,681 on the first wave, was, therefore, split into four groups, each group being asked about three of the alternatives. For purposes of this study, all four groups were used together since differences among the groups were slight (Lehmann, 1973). The timing of waves in relation to the activity in the market was as follows:

- Prewave 1: No specific information about the product was available; product was referred to as Company A's new X.
- Wave 1-Wave 2: Product named, but not distributed.
- Wave 2–Wave 3: Major introductory campaign was launched; product became available just after wave 3 was collected.
- Wave 3-Wave 4: Production shortages occurred.
- Wave 4–Wave 5: Production was up to satisfactory levels.

The initial interview required about 40 minutes, and subsequent interviews were shortened so that wave 5 took about 20 minutes. Of the 1,681 respon-

dents to the first wave, at the end of wave 5, 623 remained who responded completely to all five waves of the study and who were used for the analysis in this paper.

Because of the nature of the product. few of the members of the panel would be expected to actually purchase the product. For this reason, attitudinal variables are primarily used as the measure of the advertising campaign's success. The four variables used in this paper, which are often associated with buyer behavior models (Engel et al., 1973; Howard and Sheth, 1969; Nicosia, 1966) and which proved useful in a test-market situation (Farley, Howard, and Lehmann, 1974), were

- (1) perceived knowledge about the product;
- (2) attitude toward the product;
- (3) intention to buy the product;

The author wishes to thank Jerrold P. Katz for his computational assistance and William Brandt for his helpful comments. Partial financial support was provided by the Columbia University Graduate School of Business Research Fund. (4) confidence in ability to judge the product.

These variables were measured on 10point bipolar adjective scales. In addition to these measures, whether the individual had shopped for the product was also measured on waves 4 and 5.

In order to correlate advertising with the values of these variables, an index of advertising exposure was created for each individual. Since the national advertising campaign focused on magazine and television, separate indices were developed for both magazine and television exposure that are essentially the expected number of advertising messages to which the individual was exposed in each media during the introductory campaign. More specifically, the index of exposure to advertising for each of the media was:

Exposure Index =  $\Sigma$ (probability of exposure to a particular TV show/magazine) • (number of times an ad appeared in the TV show/magazine).

This index thus represents expected rather than actual exposure since some individuals may have read a magazine or watched a TV show without seeing the ad for the new durable, and, hence, considerable variation between actual and expected exposure is likely. Nonetheless, this essentially objective measure seems preferable to subjective ratings by the subjects of how many ads they were exposed to, which would undoubtedly be biased by their attitude toward the new durable.

For purposes of further analysis, the exposure levels were divided into three categories: low, medium, and high. Thus, each individual fell into one of nine possible combinations of advertising exposure. The breakdown of the sample by exposure pattern may be seen in Table 1.

### **Analysis of Means**

As a first step in the analysis, the average values of the four key attitudi-

	Table 1				
Maga-ine	Television Viewing				
Readership	Low	Medium	High		
Low	72	74	61		
Medium	66	78	65		
High	58	84	64		

nal variables plus the per cent of the individuals who shopped for the car in waves 4 and 5 were calculated for each of the nine possible categories of advertising exposure. Examination of the results, which are partially reproduced as Table 2, led to several interesting conclusions.

1. First, it appears that people who are heavily exposed to media have more favorable values of the attitudinal measures even before the advertising campaign begins. For example, individuals who have high exposure to both magazine and television media have significantly higher knowledge and confidence than those individuals with low exposure to both media on wave 2, before the advertising campaign began. This is a very interesting finding which suggests that people who are heavily exposed to media are, in general, more favorably disposed to such a new durable than those who are not as heavily exposed.

2. Higher advertising exposure gen-

# Table 2 Average Level of Key Variables versus Advertising Exposure

		wave 2			Wave 1	
Knowledge						
runo in leage	Overal	l Average:	1.59	Overall	Average:	4.28
	1.29*	1.38	1.48	3.90	3.84	3.75
	1.45	1.77	1.68	3.65	4.23	4.91
	1.66	1.69	1.88	4.59	4.68	4.98
Attitude						
	Overal	l Average:	3.92	Overall	Average:	5.71
	3.94	4.14	3.75	5.64	5.32	6.00
	3.44	4.15	4.22	5.41	5.82	5.91
	3.62	3.96	3.94	5.71	5.76	5.89
Intention						
	Overal	l Average:	1.70	Overall	Average:	1.77
	1.92	1.68	1.48	1.76	1.50	2.23
	1.32	1.73	1.94	1.29	1.73	1.78
	1.81	1.57	1.91	1.88	1,79	2.03
Confidence						
	Overal	l Average:	2.74	Overall	Average:	5.02
	2.21	2.59	3.30	4.79	4.49	4.75
	2.18	2.87	2.63	4.26	5.00	5.57
	2.47	3.27	3.03	5.24	5.40	5.69
Shopping						
				10%	15%	9%
				6%	7%	26%
		NA		13%	13%	21%

\*All sections of this table follow this form:

Magazine Exposure	TV Exposure			
	Low	Medium	High	
Low			+ 11 pm	
Medium				
High				

erally leads to higher values of the key variables, as can be seen in Table 2. For example, the average value of the four variables is higher (more favorable) for people with both high magazine and television advertising exposure than for people with low exposure to both magazine and television advertising in 14 of 16 cases (4 waves  $\times$  4 variables) studied, with 11 of 16 significantly greater at the 95-per-cent confidence level.

3. Advertising exposure seems to affect confidence and knowledge most, attitude somewhat, and intention very little. This is consistent with hierarchical models of buyer behavior (Howard and Sheth, 1969; Lavidge and Steiner, 1961).

4. Both magazine and television advertising exposure seem to increase the values of the variables. It is not apparent which one affects the variables more strongly. Hence for this durable, both media seem to have a useful role to play in the advertising plan.

5. Advertising exposure increases shopping for the product, especially in wave 4. Since this product is one for which personal selling is very important, the ability of the advertising to increase shopping must be considered as a major accomplishment of the campaign.

Thus, advertising exposure and favorable values of the key variables are positively related. In order to see if changes in the values of the variables were also related to advertising exposure, the changes between waves in the values of the variables were calculated for all nine possible combinations of advertising exposure. These results were most dramatic for the change between waves 2 and 3, which was the period during which the introductory campaign was conducted. The results (presented in Table 3), point to several conclusions.

1. Major changes occur in confidence and knowledge, some change occurs in attitude, and very little change occurs in intention over the period of the study. This, again, suggests that intention is not a sufficiently sensitive measure to use in evaluating an introductory campaign for a consumer durable.

2. Advertising exposure seems to affect knowledge and confidence most,

Table 3Changes in Key Variables: Wave 2 to Wave 3					
	Low	Medium	High		
Knowledge	Low	1.68	1.32	1.90	
U U	Medium	1.19	1.50	1.61	
	High	1.89	2.30	2.70	
Attitude	-	1.41	0.27	1.56	
		1.76	0.98	0.96	
		1.47	1.77	1.95	
Intention		-0.03	-0.13	0.27	
		-0.02	0.08	-0.46	
		0.19	0.37	0.06	
Confidence		1.50	1.48	0.95	
		1.27	1.98	1.92	
		1.67	1.87	2.05	

attitude somewhat, and intention not at all. This is, again, consistent with the concept of a hierarchical structure of effects of advertising.

3. The major changes in the values of the variables occur between waves 2 and 3, when the major introductory campaign was in operation. Thus the introductory campaign is at least concurrent with, if not responsible for, the major changes in the attitudinal variables that occurred for this particular durable.

4. The differences are more pronounced between waves 2 and 3 than they are between waves 3 and 5. This suggests that in some way, the attitudinal variables may head toward some "equilibrium" level which is not greatly influenced by exposure to advertising during the introductory campaign.

5. There is substantial instability in the results that suggests that a combination of omitted variables and pure noise are very important determinants of the variables.

Thus, based on averages, advertising exposure does appear to affect favorably the values of the measured variables. Unfortunately, the results may reflect the influence of other variables. For example, it is possible that those people who are more heavily exposed to media differ in terms of education, and it is education, and not advertising exposure, that influences the attitudinal variables. In order to take into account some of the most obvious omitted variables, a series of regression analyses were used.

### **Regression Analysis**

As a means of simultaneously estimating the effect of both media and



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### Table 4 Regression Estimates of the Effects of Demographics and Media Exposure on Attitudinal Variables: Wave 3

Independent				
Variable	Knowledge	Attitude	Intention	Confidence
Sex			- ,27	1.24
	(2.37)	(-2.76)	(-1.83)	(-5.21)
Age	16	- ,14		06
-	(-3.78)	(-3.31)	(-1.79)	(-1.30)
Income	02	.12		05
	(26)	(-2.09)	(-34)	(.66)
Education	.09	07		01
	(1.95)	(~1.52)	(-1.57)	(.28)
Group 2	.05	38	. 12	58
	(.19)	(1.38)	(.58)	(1.79)
Group 3	09	19	.55	27
	(33)	(66)	(2.64)	(.80)
Group 4	.27	.03	.25	1.02
	(.99)	i. 13)	(1.27)	(3.22)
Medium Magazine		.02		.22
	(87)	(-05)	(- <u>1.82</u> )	(
High Magazine	.49	07	13	.36
	(1.10)	(15)	(.39)	(71)
Medium TV	32	~1.04	39	.36
	( 79)	(-2.56)	(-1.30)	(
High TV	.54	.02	- 15	71
-	(1.26)	(.04)	(48)	(1.41)
Medium Magazine-	.82	.79	.84	.85
Medium TV	(1.41)	(i.36)	(1.96)	(1.25)
Medium Magazine-	.11	. 20	.26	23
High TV	(.19)	( 32)	0.58	(-33)
High Magazine–	.54	1.45	. 34	, m <b>i</b>
Medium TV	(.93)	(2.47)	(. 79)	- 601
High Magazine-	.54	71	.15	.26
High TV	(.87)	(1.15)	(.33)	1.36)
Constant	3.19	7.97	3.02	4,97
$R^2$	.09	07	.(14	. [1]

### \*Coefficient (ratio).

demographic variables on the attitudinal variables, multiple regression analysis was employed. Available demographics (age, education, etc.) were utilized. The different exposure levels were input as dummy variables representing medium and high exposure to each medium and as interaction terms. Thus the procedure used is, in essence, an analysis of covariance.

The results of the regressions, such as those for wave 3, which appear as Table 4, clearly indicate a high level of individual variability since the  $R^2$ s are .10 or less. The dummy variables representing the various media exposure patterns are 24 not generally statistically significant, although it does appear that some, such as the interaction of medium magazine and medium TV, are significant. In fact, the demographic variables are most significantly related to the attitudinal variables. The specific demographic results were as follows:

1. As expected, females have significantly less favorable attitudes toward the product.

2. Younger people are more favorably disposed toward the product.

3. More highly educated people have more knowledge about the product, but are less likely to buy it. If this result is not due to tendencies of people with higher education to answer the knowledge and intention questions differently, it suggests the rather disquieting explanation that careful examination of the product leads to decreased rather than increased sales.

Realizing that there was substantial noise in the data, it nonetheless seemed desirable to obtain the best estimates of the effects of media exposure on the attitudinal variables. In order to do this, the coefficients of the relevant dummy variables were added for each possible combination of advertising exposure. The coefficients used for the estimates appear in Table 5. The resulting estimates for wave 3 appear as Table 6

Examination of Table 6 leads to two basic conclusions:

 Advertising exposure is positively related to the key variables.

2. Knowledge and confidence appear to be more sensitive to advertising than attitude or intention.

The results of the regressions thus are supportive of the analyses of the means in suggesting that advertising does appear to affect knowledge of, confidence in, and attitude toward the new product.

### Limitations

Several caveats are important in interpreting these results. First, they may not be generalizable to other types of products or even to other situations involving similar products. Second, the data are subject to such problems as nonresponse bias and experimenter effect Third, expected advertising exposure rather than actual advertising exposure was measured. Finally, and most important, the results are not causal. It is possible that people who are favorably disposed toward the new product also happen to be heavily exposed to media. In fact, wave 2 results suggest that this may be the case. It is also possible that the four key variables would have increased without magazine or television advertising as fast as they did with ii. The most likely result, however

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Table 5

Advertising Exposure		Estimated Effect (Average Difference from Low–Low Exposure)		
Magazine TV				
Low	Low			
Low	Med.	Medium TV		
Low	High	High TV		
Med.	Low	Medium Magazine		
Med.	Med.	Medium Magazine + Medium TV + Medium Magazine Medium TV		
Med.	High	Medium Magazine + High TV + Medium Magazine– High TV		
High	Low	High Magazine		
High	Med.	High Magazine + Medium TV + High Magazine- Medium TV		
High	High	High Magazine + High TV + High Magazine-High TV		

## Table 6 Estimated Effect of Advertising Exposure on Four Key Variables: Wave 3

	Magazine Exposure	TV Exposure		
		Low	Medium	High
Knowledge	Low	.00*	32	.54
	Medium	37	.13	.28
	High	.49	.71	1.57
Attitude		.00	-1.04	.02
		.02	23	16
		07	.34	.66
Intention		.00	39	15
		57	12	46
		.13	.08	.13
Confidence		.00	.36	.71
		22	.99	.72
		.36	1.13	1.33

\*The effects of magazine and TV exposure on the dependent variables were estimated by means of dummy variables.

seems to be that the values of the four variables would have increased some amount without advertising, and those who are heavily exposed to media would have, in general, held a more favorable view of the product. The effect of advertising, therefore, may be to speed the rate of increase in the values of the four variables proportionally to the amount of advertising to which an individual is exposed.

### Conclusion

Advertising exposure appears to be positively related to the perceived

knowledge of, confidence in ability to judge, and attitude toward a new consumer durable. In general, advertising seems most effective in changing knowledge and confidence, somewhat effective in changing attitude, and not at all effective in changing intention. These results are perfectly consistent with both hierarchical models of choice and the practice of focusing on awareness and attitudinal measures in assessing the effect of an introductory campaign.

An even more interesting result is the tendency of individuals with high media exposure to be more favorably disposed to the new car even before advertising began. While this may be explainable by a variety of reasons concerning the type of people who are exposed to media, it is possibly the "conditioning" effect of long-term media exposure. This possibility seems worthy of further study.

The issue of which media has greater efficacy was unresolved. This is partly due to the obvious high level of randomness in individual behavior which is unexplained by media exposure. Still, the fact that exposure to both media was related to the key variables suggests that both television and magazines were useful vehicles for advertising this car and, by implication, for many durable products.

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