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MEASURES OF ADVERTISING SUCCESS AND THE PROBABILITY OF PURCHASE: THE ORANGE-JUICE EXAMPLE

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Measures of Advertising Success and the Probability of Purchase: The Orange-Juice Example

Advertising is a form of communication. Bogart indicates that communication represents a process or an experience, which is not reducible to diagrammatic or schematic form and which cannot be expressed in numbers, because it involves symbolism, imagery and connotations; the stuff of fantasy and dreams. There is considerable discussion in the literature concerning the appropriate way to measure advertising effort; for example, the measurement of audiences, exposures, cost-per-thousand, percent of audience recalling message, and advertising expenditures. Advertising theory and research rarely question the convenient assumption that communication can be reduced to measurable, countable units.

Since the early days of advertising research, there has been an assumption that a successful advertisement plants a recallable message in the mind of its targeted audience. However, there are very few studies which offer proof that there is a causal relationship between advertising recall and subsequent purchase¹. Furthermore, it is unlikely that there exist simple cause-and-effect relationships such as are found in physics. Instead, one must think in terms of probabilities. An effective advertising campaign increases the probability of a given result, such as an increase in sales, and the level of probability is affected by many factors beyond the advertiser's control (Moran).

Advertising recalls have been used by most advertising agencies as measures for the success of advertising campaigns; however, the relationship between advertising recall and actual sales of the product advertised may differ from product to product. For example, the recent popular California raisin advertising campaign had very high recall, but the sales of raisins did not increase until two years after its debut².

In economic theory, the idea of "product", "good", or "service" is a basic concept. A recent development focuses on "product characteristics" and views a "product" as a collection of "characteristics, (e.g., Ladd, Lancaster, Theil, Waugh). Different products result from combining the same characteristics in different proportions or from combining different characteristics. In this study, the top-of-mind responses from interview respondents are considered as the perceived characteristics of orange juice.

Accurate measurement of the effectiveness of advertising messages has presented a challenge to researchers for decades. One of the goals of advertising-effectiveness research is to establish linkages

between specific advertising, consumer's product perceptions, and the probability of purchasing the product. Therefore, the problem becomes one of measuring the impact of advertising messages on product perception and thus the probability of product purchase.

In general, advertising tries to make an impression in the minds of its audience that will affect later behavior. To determine the presence and the strength of an impression, it is necessary to go beyond conscious recall and probe the subjective impressions that often cannot be directly expressed. Because these impressions often cannot be directly verbalized, one must use techniques that will be sensitive to non-verbal biases (Axelrod and Wybenga; Gibson).

In brand selection research, researchers often compare the images of competitive brands when there is no difference in quality among the brands. One feature of this approach is the identification of general user bias. The regular user of any brand will differ from the non-user by having a somewhat different subjective evaluation of the chosen brand from his evaluation of other brands (Johnson).

Another related phenomenon is a pattern in the mind (called a bond) that affects the relationships between ourselves and other people or objects. One can think of these bonds as forms of emotional ties, biases, and preferences that can be expressed in words or actions. The phenomenon of brand loyalty can be thought of as an example of bonding, and, when it is very strong, there is little brand switching. The bonding between a brand and its regular users affect evaluation of the brand and results in somewhat different perceptions of the brand by users as compared to non-users. Research on images of products and organizations reveals that the differences in images can be shown by techniques that tap subconscious feelings, such as top-of-mind response to certain questions (Zeitlin and Westwood).

Similar arguments can be used for studying product loyalty, such as the probability of consuming orange juice. The underlying hypothesis is that product loyalty can be thought of as a form of bonding which increases the probability that one product will be chosen more often than others; the stronger the bonding, the greater the probability of choosing the product. Thus, bonding is related to subjective mind-sets which discriminate among products, even when there are no obvious differences. To predict purchase of a product, one must measure the mind-set that discriminates between users and non-users of the

product. Advertising that changes these mind-sets will change the probability of purchase.

The overall objective of this study is to investigate the relationships among certain selected top-of-mind responses to 12 beverage-related perceptions phases (i.e., subjective mind-sets), advertising recalls, and the probability of purchasing orange juice. The specific objectives of this study are: (1) to determine whether advertising recalls have any impact on consumer perceptions of orange juice, and (2) to estimate the relationships between consumer perception of orange juice, recalls of advertising sponsors, and purchases of orange juice.

Orange-Juice Advertising

In general, there are two distinctive types of orange-juice advertising in the U.S.: (1) a cooperative (or generic) advertising program sponsored by the Florida Department of Citrus (FDOC) and supported by the Florida citrus industry through excise taxes; and (2) advertising programs funded by brand owners. Both the absolute and relative levels of cooperative and brand advertising have changed over time. Before 1984, more than 50 percent of advertising expenditures for orange juice were attributed to the cooperative advertising programs of the FDOC. Brand advertising expenditures for orange juice increased from \$16.2 million in 1982-83 to a high of \$44.9 million in 1987-88. During the same time period, FDOC generic advertising expenditures for processed orange products have decreased from \$17.9 million in 1982-83 to \$9.7 million in 1987-88.

Surveys sponsored by the FDOC measure the percent of consumers recalling various types of orange juice advertising, both on an unaided and aided basis. Recalls of orange-juice advertising increased from 62 percent in June 1983 to 76 percent in December 1984 and then decreased to 71 percent in December 1988. During the same period, specific orange-juice brand recalls (unaided) increased steadily from 61 percent in June 1983 to 84 percent in December 1988, while recalls of Florida orange-juice advertising (unaided and aided) increased from 46 percent in June 1983 to 56 percent in December 1984, and then decreased to 48 percent in December 1988.

Method and Data Sources

The probit approach by Goldberger (1964) was used in this study. In the probit model, one assumes that there is an underlying response variable y^* , (for example, the level of recall of an advertising slogan by consumer i) defined by the regression relationship

$$y^*_i = \beta'x_i + \mu_i \quad (1)$$

In practice, y^*_i is not observable. What one observes is a dummy variable y_i defined by

$$\begin{aligned} y_i &= 1 && \text{if } y^*_i > 0 \\ &= 0 && \text{otherwise.} \end{aligned} \quad (2)$$

From relations (1) and (2) one has

$$\begin{aligned} \text{Prob}(y_i = 1) &= \text{Prob}(\mu_i > -\beta'x_i) \\ &= 1 - F(-\beta'x_i) \end{aligned} \quad (3)$$

where F is the cumulative distribution function for μ . In this case, the observed values of y are realizations of a binomial process with probabilities given by (3) and varying from consumer to consumer (depending on x_i). Under the assumption that μ_i are normally distributed with zero mean and variance σ^2 , one has the probit model for relation (1).

In this study, two sets of probit models were estimated with the scoring method (Maddala, P.23)³. In the first set of models, consumer perceptions about orange juice (e.g., the perception about orange juice being good for breakfast) were used as dependent variables (y^*_i 's) and consumer's income level and recalls of the sponsors or orange-juice advertising were considered as independent variables (x_i 's). In the second set of probit models, the actions or purchasing orange juice at-home and away-from-home were used as dependent variables and consumer's perceptions about orange juice, recalls of advertising sponsors, and household income level were used as independent variables. The data collected during September 1987 by Market Facts, Inc., for the FDOC, covering 2,400 respondents, were used in the analysis. Selected sample statistics for the variables used in this study are presented in Tables 1 and 2, and regression results are presented in Tables 3 and 4.

In the September 1987 survey, thirteen product image-related questions for beverages were asked

(left hand column of Table 1) and twelve juice categories are considered⁴. The top of mind replies from the 2,400 respondents for the top four popular beverages: orange juice, milk, coffee, and soft drinks are detailed in Table 1. The response statistics indicate that orange juice ranked first among the twelve beverages as "good for breakfast", "the most natural", and "good for quick energy"; and ranked second as "good for your health", "a good value", and "invigorating"; milk ranked second for "good for breakfast", "good for any time of day", "lowest cost per serving", and "good for quick energy". Coffee was ranked first for "good for any time of day", "lowest cost per serving", "good wherever you are", "good for weight watching", "refreshing", "thirst quenching", and "you like the best"; and ranked second for "the most natural" and "invigorating".

Results

Results for the first set of probit models are presented in Table 3. In general, most parameter estimates are statistically not different from zero, i.e., an indication that there is no relationship between advertising sponsor recalls and consumer's perceptions about orange juice. Results indicate that if the respondent recalled the sponsor or orange-juice advertising, his/her probability of considering orange juice as the beverage he/she "likes the best" and considered "invigorating" would increase by 0.08 and 0.03, respectively. However, if the consumer recalled the sponsors of the orange-juice advertising, his/her probability of considering orange juice as a beverage which is refreshing would decrease by .10. Results in Table 3 also indicate that consumer perceptions about orange juice are related to household income level. Parameter estimates for the income variable indicate that as household income increases, the respondent's probability of considering orange juice as the beverage he/she likes the best, considers a good value, or refreshing would decrease; however, his/her probability of considering orange juice as a beverage which is good for quick energy would increase.

The second set of probit models presented in Table 4 shows the estimated relationships between product characteristics (in terms of respondent's subjective perceptions about orange juice), advertising recalls and the actual purchase of orange juice. In general, if the respondent recalled advertising messages

or has positive perceptions about orange juice, his/her probabilities of purchasing orange juice would increase. In addition, the respondent's probability of purchasing orange juice is positively related to his/her household income level. Parameter estimates presented in Table 4 indicate that if the respondent considered orange juice as the beverage which he/she "liked the best", "is good for breakfast", "is the most natural", "is good for quick energy", and is "refreshing", then his/her probability of at-home orange-juice consumption would increase. In addition, the magnitudes of the parameter estimates indicate that the respondent's perception about orange juice as a beverage which is "good for breakfast" is the most important factor among the five perceptions mentioned above associated with at-home consumption. Similar results can be found for the probabilities for away-from-home orange-juice consumption, except that the perception "good for breakfast" played a less important role than the perception "you like the best".

Results in Table 4 also indicate that the respondent's probabilities of consuming orange juice at home and away-from-home are positively related to whether he/she recalled the sponsor of orange-juice advertising messages. In addition, results indicate that the respondent's probability of consuming orange juice both at-home and away-from-home are positively related to his/her household income level.

Concluding Remarks

The results of this study demonstrate that advertising recalls and consumer's subjective mind-sets or perceptions about orange juice affect the probability of purchasing orange juice. The set of product perceptions which affects the probability of purchasing orange juice coincide with the ranking of orange juice by product perceptions. The implication of this result is that if advertising is able to positively change consumers' perception of the product advertised, then it is likely to increase the consumption of the advertised product. However, the results for the relationship between orange-juice advertising recalls and consumers' perceptions for orange juice indicate that the impact of advertising recalls on consumer perceptions for orange juice is limited. The lack of impact of advertising recalls on consumers' perceptions for orange juice may be due to the fact that advertising is a long-term investment, a one-time measure or recall may not be the best approach for studying this relationship. However, due to the nature of the data

(cross-sectional) used in this study, the lagged impacts of advertising recalls on consumers' perceptions of orange juice were not explored.

Footnotes

¹A review of articles published in *J. Advertising Research* and *J. Marketing Research* for the past five years showed no studies for the relationship between advertising recalls and purchase behavior.

²Comments made by Clyde Nef, manager of the Raisin Administrative Committee, at the NEC-63 Regional Research Committee on Commodity Promotion Programs, in Oakland, California, October 28, 1988.

³In general, the covariance of error terms between the perception equations and purchase equation is not zero and a multinomial probit model should be used. Due to the large number of perception equations included in this study, this approach is not feasible (see Maddala, p. 62), therefore the simple bivariate probit model is used instead.

⁴The twelve beverage considered are: coffee, milk, tea, orange juice, grapefruit juice, apple juice, other juice, fruit drinks, alcoholic beverages, soft drinks, soft drinks with juice, diet soft drinks, all other.

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Table 1. Consumer rankings of four selected beverages.

Criterion	Percent of Consumers Said ^a			
	Orange Juice	Milk	Coffee	Soft Drink
What Drink Would You Say Is (Top of Mind):				
Good for Breakfast	56.8(1)	21.3(2)	14.0(3)	0.2(7)
Good for Any Time of Day	13.5(3)	16.2(2)	29.4(1)	10.2(5)
Lowest Cost per Serving	7.8(5)	25.1(2)	26.3(1)	4.5(6)
Good for Your Health	28.6(2)	35.0(1)	15.0(3)	0.8(9)
The Most Natural	34.1(1)	17.9(3)	19.2(2)	1.4(8)
Good Wherever You Are	11.7(4)	13.6(3)	32.5(1)	18.5(2)
Good for Quick Energy	27.8(1)	22.1(2)	13.3(3)	13.2(4)
A Good Value	20.4(2)	36.7(1)	11.5(3)	5.1(7)
Good for Weight Watching	7.1(5)	17.3(3)	26.1(1)	1.2(10)
Refreshing	11.4(5)	6.7(6)	19.8(1)	16.9(2)
Thirst Quenching	4.6(6)	5.5(5)	40.3(1)	11.0(3)
Invigorating	11.8(4)	30.0(1)	16.7(2)	14.6(3)
You Like the Best	15.7(2)	11.8(4)	23.7(1)	13.5(3)

^a Based on the National Consumer Survey of 2,400 customers in September 1987. The numbers in parentheses are the rankings by these consumers among 12 beverage categories.

Table 2. Sample means and standard deviations for selected variables.

Variable	Mean	Standard Deviation
----- % -----		
Orange Juice is the Drink Which (Top of Mind)^a		
You Like the Best	15.71	36.40
Is Good for Breakfast	56.79	49.55
Is Good for Any Time of Day	13.54	34.22
Is Lowest Cost per Serving	7.79	26.81
Is Good for Your Health	28.58	45.19
Is the Most Natural	34.08	47.41
Is Good Wherever You Are	11.67	32.11
Is Good for Quick Energy	27.79	44.81
Is a Good Value	20.38	40.29
Is Good for Weight Watching	7.08	25.66
Is Refreshing	11.42	31.81
Is Thirst Quenching	4.58	20.92
Is Invigorating	11.75	32.21
Unaided OJ Advertising Recall^a	41.67	49.31
----- \$1,000 -----		
Income	22.53	10.64

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In terms of percent of positive responses.

Table 3. Estimated relationship between advertising recalls and orange-juice images.

Orange Juice is the drink which is:	Independent Variable		
	Intercept	Unaided OJ Adv. Recall	Income
You Like the Best	-.8582** (.0736)*	.0835* (.0630)	-.0083** (.0029)
Good for Breakfast	.1970** (.0625)	.0530 (.0525)	-.0021 (.0024)
Good for Any Time of Day	-1.1576** (.0784)	.0398 (.0653)	.0017 (.0030)
Lowest Cost per Serving	-1.3566** (.0905)	.0437 (.0763)	-.0036 (.0036)
Good for Your Health	-.5438** (.0657)	.0294 (.0553)	-.0015 (.0026)
The Most Natural	-.4243** (.0642)	.0432 (.0537)	-.0002 (.0025)
Good Wherever You Are	-1.1717** (.0802)	.0421 (.0681)	-.0017 (.0031)
Good for Quick Energy	-.6953** (.0668)	.0693 (.0555)	.0034* (.0026)
A Good Value	-.7182** (.0698)	-.0247 (.0594)	-.0045* (.0028)
Good for Weight Watching	-1.4600** (.0943)	.0293 (.0786)	-.0010 (.0037)
Refreshing	-1.0415** (.0799)	-.0968* (.0694)	-.0056** (.0032)
Thirst Quenching	.0540** (.0104)	.0029 (.0087)	-.0004 (.0004)
Invigorating	.1107** (.0160)	.0341** (.0134)	-.0003 (.0006)

*Numbers in parentheses are standard errors of estimates.

*Estimate is statistically different from zero at $\alpha = .10$ level.

**Estimate is statistically different from zero at $\alpha = .05$ level.

Table 4. Estimated relationships between orange-juice purchase and consumer's opinion about orange-juice images.

Independent Variable	Orange-Juice Purchase		
	At Home	Away From Home	
		Last Week	Last 24 Hrs.
Intercept	.0512** (.0800)*	-.9203** (.0780)	-1.6179** (.1019)
Orange Juice is the Drink Which (Top of Mind)			
You Like the Best	.2069** (.0959)	.2535** (.0785)	.2679** (.0949)
Is Good for Breakfast	.3668** (.0608)	.1079** (.0565)	-.0235 (.0713)
Is Good for Any Time of Day	.0850 (.0991)	.0420 (.0833)	.0586 (.1022)
Is Lowest Cost per Serving	.1384 (.1244)	-.0206 (.1041)	-.0026 (.1306)
Is Good for Your Health	.0352 (.0740)	.0062 (.0652)	-.0724 (.0828)
Is the Most Natural	.1309** (.0676)	.0766 (.0602)	.1737** (.0754)
Is Good Wherever You Are	-.1013 (.1028)	-.0231 (.0895)	-.0256 (.1108)
Is Good for Quick Energy	.1511** (.0752)	.1141** (.0649)	.1610** (.0807)
Is a Good Value	.0921 (.0831)	.0762 (.0714)	-.0599 (.0919)
Is Good for Weight Watching	-.1010 (.1249)	-.0513 (.1100)	-.1160 (.1421)
Is Refreshing	.1448* (.1101)	-.0022 (.0922)	.1654* (.1115)
Is Thirst Quenching	.0015 (.1563)	.1018 (.1321)	.1819 (.1574)
Is Invigorating	.1353 (.1077)	-.0454 (.0895)	-.1949** (.1178)
Unaided OJ Advertising Recall	.2708** (.0613)	.1733** (.0550)	.1717** (.0695)
Income	.0123** (.0028)	.0069** (.0026)	.0088** (.0033)

*Numbers in parentheses are standard errors of estimates.

*Estimate is statistically different from zero at $\alpha = .10$ level.

**Estimate is statistically different from zero at $\alpha = .05$ level.