



**The Effects of Advertised and Observed Quality on Expectations about New Product Quality**

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PRAVEEN K. KOPALLE and DONALD R. LEHMANN\*

The authors describe a model of the effects of advertised and observed quality on consumer expectations about new product quality. They test the model using data from two computer-controlled shopping experiments. In both studies, quadratic and gamma specifications for the effect of advertising claim discrepancy on expectation change fit better than a linear model. Furthermore, the adaptive expectations framework describes the updating of consumer expectations when the consumer observes the quality of the new product. In this setting, the observed quality is more influential than the advertised quality in changing expectations, and "good news" is discounted, whereas "bad news" is more readily accepted.

## The Effects of Advertised and Observed Quality on Expectations About New Product Quality

In 1992, 16,000 new products were introduced into grocery and drug stores (Kotler 1994). Marketing managers make a number of decisions about these products, including decisions about product quality and advertising. In product categories, in which quality is not observable until use, initial demand will depend on consumer expectations about the quality of the product (Goering 1985), that is, consumers' prepurchase beliefs about product quality (Olson and Dover 1979).

Our article makes three contributions. First, we provide another test of the effect of various levels of the difference between advertised quality and initial expectations about product quality (i.e., advertising claim discrepancy) on consumers' updated expectations about product quality. Our test includes instances of negative discrepancies, that is, when advertised quality is less than the consumers' initial expectations. Second and most important, we specify and estimate a particular model of the effect of advertising and observed quality and test the specification of the proposed model relative to alternative formulations. Third, we estimate the impact of advertised and observed quality on expectations. We

do this by measuring the subjects' expectations about product quality, over time, in two computer-controlled experiments.

We present a brief review of prior research, followed by a discussion of our model and hypotheses. We then discuss our methodology and results. Finally, we present our conclusions and directions for further research.

### BACKGROUND

#### *The Role of Expectations*

In his analysis of consumer information processing literature, Bettman (1979) argues that experience with a phenomenon plays a key role in the formation of future expectations about the phenomenon under consideration. Consumers place new information (e.g., about the level of a product attribute) within a context that is based on the past and form future expectations about the attribute level (Oliver and Winer 1987; van Raaij 1991).

Expectations, (dis)confirmation, and perceived product performance play a significant role in the satisfaction formation process (Anderson 1973; Anderson and Sullivan 1993; Boulding et al. 1993; Cadotte, Woodruff, and Jenkins 1987; Churchill and Suprenant 1982; Iacobucci, Grayson, and Ostrom 1994; Oliver 1980, 1981; Oliver and DeSarbo 1988; Parasuraman, Zeithaml, and Berry 1985; Tse and Wilton 1988; Yi 1990; Zeithaml, Berry, and Parasuraman 1988). According to the "disconfirmation," or the "gap," model, satisfaction is a function of the difference between experience and expectations. Expectations about the quality of a new product are formed and change over time on the basis of various factors, such as advertised product quality,

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published quality ratings, and experience with the product (Boulding et al. 1993; Goering 1985; van Raaij 1991). We extend the previous work by studying the effects of advertised and observed, or "experienced," product quality on expectations about product quality.

*The Effect of Advertised Quality Discrepancy*

Communication effectiveness depends, among other things, on communication discrepancy, that is, the gap between what is being communicated and the prior attitude of the recipient (Aronson, Turner, and Carlsmith 1963; Bochner and Insko 1966; Fishbein and Ajzen 1975; Hovland, Harvey, and Sherif 1957). Anderson (1973) found that consumers rated a product less favorably when the discrepancy was too high. Lutz (1985) and MacKenzie and Lutz (1989) propose a conceptual model of attitude toward the advertisement, in which advertising claim discrepancy affects the extent of believability of the advertising claim. Burke and colleagues' (1988) results suggest a positive relationship between advertising claim discrepancy and consumers' brand attribute beliefs. For a relatively new product, Goldberg and Hartwick (1990) found a non-linear relationship between advertising claim discrepancy and change in product evaluation. On the basis of this research, we develop and test models of the impact of advertised quality on expectations.

*The Relative Impact of Advertising and Experience*

Smith and Swinyard (1983) find that attribute based confidence and belief strength scores are higher for subjects exposed to product trial than for subjects exposed to advertising. According to Hoch and Deighton's (1989) model, when consumers have low familiarity with a product category, exhibit a low motivation level, and experience a low level of ambiguity in the information environment, product experience will have a stronger effect on consumer learning. When consumers have access to unambiguous evidence, judgments of product quality depend only on the evidence (Hoch and Ha 1986). Marks and Kamins (1988) show that attitude change is significantly greater for subjects receiving an advertisement sample sequence than for those who received the reverse sequence, which suggests that the beliefs created by indirect product experience are more susceptible to change than those created by direct product experience. Wright and Lutz (1993) show that advertising shifts attention toward experience attributes and increases their perceived importance during trial when compared to trial exposure alone. Here, we estimate the impact of advertised and observed product quality on expectations.

**MODEL AND HYPOTHESES**

*The Effect of Advertised Quality on Expectations*

Consider a product whose quality is not observable until the product is purchased and used, that is, an experienced good (Nelson 1970). Let  $E_0$  denote the consumers' initial expectations about the quality of a new product and  $L$  denote the advertised quality. Let  $f(L - E_0)$  be the effect of the advertising claim discrepancy on the change in expectations. Our discussion in the previous section on the effect of advertised quality suggests that, first, when a firm advertises the quality of its product at the level of the consumers' ex-

pectations, the advertised quality will not induce any change in the consumers' expectations. Therefore, when the advertising claim discrepancy is zero,  $f$  will also be equal to zero. Second, as the advertising claim discrepancy becomes more positive,  $f$  increases up to a point. But eventually, as the advertising claim discrepancy gets large,  $f$  stops increasing. In the extreme, analogous to the "boomerang effect" (Hovland, Harvey, and Sherif 1957) of communication on attitude change,  $f$  may decrease or even become negative.

Companies may advertise quality below expectations because the quality of their product is less than the expected quality, especially if they believe in the disconfirmation paradigm in the consumer satisfaction literature and are concerned about long run customer relations (Boulding et al. 1993). We consider negative, as well as positive, discrepancies here. The theories of negativity bias (Anderson 1981; Kanouse and Hanson 1972) and loss-aversion (Kahneman and Tversky 1979) suggest an asymmetric effect of advertising claim discrepancy on change in expectations. Attribution theory (Folkes 1988) also suggests that advertising claims below expectations may be considered more believable and, hence, may be discounted less. We test part of an untested proposition by Oliver and Winer (1987, p. 495), "In addition, observed attribute values above the expectation will not necessarily be valued the same as those below; that is, the loss function may be asymmetric (Kahneman and Tversky 1979)." One form that reflects the previous discussion, is given by,

$$(1) \quad f(L - E_0) = E_1 - E_0 = \beta_1(L - E_0) + \beta_2(L - E_0)^2,$$

where

$E_0$  = initial expectations,

$E_1$  = updated expectations after observing the advertised quality,

$L$  = advertised quality,

$L - E_0$  = advertising claim discrepancy,

$\beta_1 > 0$ , and

$\beta_2 < 0$ .

Under this model, at some level of  $L$ ,  $f$  decreases and can even be negative. We formulate two other model specifications to compare with the previous quadratic formulation. A linear specification reflects the adaptive expectations framework applied to the effect of advertising claim discrepancy on expectation change (Nerlove 1958; Winer 1985); that is,

$$(2a) \quad E_1 = \beta_3 L + (1 - \beta_3)E_0; \quad 0 < \beta_3 < 1,$$

or equivalently,

$$(2b) \quad E_1 - E_0 = \beta_3(L - E_0).$$

The other model is a form of the gamma (Kopalle 1992):

$$(3) \quad E_1 - E_0 = \beta_4(L - E_0)\exp[\beta_5(L - E_0)],$$

where,  $\beta_4 > 0$  and  $\beta_5 < 0$ . This model suggests that consumers may ignore advertising claims that are much higher than their initial expectations, but will not decrease expectations regardless of the extremity of the claim.

### *The Effect of Observed Quality on Expectations*

The adaptive expectations framework (Nerlove 1958) is perhaps the most widely applied model that relates past experience to future expectations. Assuming that observed quality,  $M$ , is revealed after the quality is advertised, let  $E_2$  be the resulting consumer expectations. Thus,

$$(4a) \quad E_2 = \alpha M + (1 - \alpha)E_1; 0 < \alpha < 1,$$

or equivalently,

$$(4b) \quad E_2 - E_1 = \alpha(M - E_1).$$

### *Hypotheses*

On the basis of the previous discussion, we present the subsequent hypotheses:

- $H_{1a}$ : When advertising claim discrepancy is zero, the change in expectations about new product quality is zero.
- $H_{1b}$ : When advertising claim discrepancy is positive, the change in expectations is a non-linear function of discrepancy.
- $H_{1c}$ : An advertising claim with a negative discrepancy will have more impact on expectations about new product quality than a claim with an equal positive discrepancy.
- $H_2$ : The change in expectations about new product quality after observing the quality of the product is proportional to the difference between the observed quality and the prior expectations.

We also compare the impact of advertised and observed quality on expectations. The relative impact will vary depending, for example, on the believability and memorability of advertising, the observability of quality, and the involvement of the individual. In our study, we used an experiment in which quality was described unambiguously to the subjects. Although this quality manipulation may not have as much impact as an actual experience, we believe its unambiguous nature will enable it to have more impact than a single advertising exposure.

- $H_3$ : Observed quality will have a greater impact on expectations about new product quality than advertised quality.

In the subsequent section, we describe two studies that enable us to test the hypotheses and the particular model forms developed.

### *STUDY 1*

Similar to Oliver and DeSarbo's (1988) study, we used a computer-controlled shopping experiment to test the model specifications and hypotheses. We obtained subjects' initial expectations,  $E_0$ , and manipulated the advertised quality at seven levels on the basis of the initial expectations. We then measured  $E_1$  and manipulated the observed quality at three levels on the basis of  $E_1$ . Finally, we obtained measures of their updated expectations,  $E_2$ , and several covariates.

#### *Selection of Product Category, Product Attribute, and Brand*

We focused on experience goods for which subjects had no information regarding the quality of the new brand. We considered reasonably high involvement product categories in which there was one important, objective product attribute that was representative of product quality, but in

which the level of the attribute was not observable until use. We chose car tires for the study.

According to *Consumers' Research* (1983) and Bystrak (1991), six attributes are relevant when purchasing car tires: Tire type, tread design, traction, heat resistance, tire warranties, and mileage or treadlife. A pretest with a small convenience sample of Master of Business Administration (MBA) and doctoral students indicated that safety and mileage are the two most important considerations when purchasing car tires, and neither are observable until the product is purchased and used. However, mileage is a more continuous attribute and is easier to manipulate in an experimental setting. Hence, we chose the mileage of car tires as the attribute for analysis. Finally, to reflect a new product introduction scenario and remove any impact of a known brand name, we chose an unfamiliar brand name, CAMAC, which is a European brand of car tires.

#### *Design*

Similar to Goldberg and Hartwick's (1990) study, we chose a between subjects design in which different groups of subjects were exposed to different levels of advertising claim discrepancy and observed quality. To test  $H_{1a}$ ,  $H_{1b}$ , and  $H_{1c}$ , we used seven levels for the manipulation of advertising claim discrepancy: One negative, one zero, and five positive. We focused primarily on positive discrepancy because (1) we generally would expect advertisers to overstate quality and (2) previous research has concentrated on positive discrepancy. To test the effects proposed in  $H_2$  and  $H_3$ , we used three levels to manipulate the difference between observed quality ( $M$ ) and prior expectations ( $E_1$ ). Thus, the study uses a  $7 \times 3$  (advertised by observed quality) between subject full-factorial design.

#### *Subjects and Procedures*

The subjects in our study consisted of 165 MBA students at a major Northeastern university. After consultation with consumers who have been driving cars for more than fifteen years, reasonable limits for the mileage initially expected from CAMAC tires were set at (10,000 to 75,000) miles. Responses from nine subjects whose initial expectations fell beyond limits were discarded. Also, data from one subject were discarded because of evidence of a lack of understanding of the task. Thus, the resulting sample size was 155. We also analyzed the data using observations only from those 121 subjects who had bought car tires in the past. Because the results are similar, we focus on the complete sample.

Appendix 1 provides an overview of the various stages in the experiment. The subjects' initial expectations of the target brand's quality were measured first, and then subjects were exposed to a particular level of advertised quality on the basis of their initial expectations. Because different subjects may have different initial expectations for the same brand, advertising claim discrepancy was manipulated as a particular percentage of each subject's initial expectation: -20%, 0%, 20%, 40%, 80%, 200%, and 500%. After subjects observed advertised quality for the brand, their updated expectations were measured.

Once subjects reported their expectations after observing the advertised quality for the brand, their experience with the product in terms of how long the tires lasted (i.e., ob-

**Table 1**  
EFFECT OF ADVERTISED QUALITY: STUDY 1

Percentage Claim Discrepancy, $(L - E_0)/E_0$	Average Percentage Change in Expectations, $(E_1 - E_0)/E_0$
-.2	-.214 (26) <sup>a</sup>
0.0	-.040 (27)
.2	.114 (26)
.4	.152 (28)
.8	.439 (20)
2.0	.803 (20)
5.0	.606 (8)

<sup>a</sup>cell sizes in parentheses.

served quality) is described. Observed quality is manipulated at three levels in relation to subjects' updated expectations measured after observing advertised quality (-20%, 0%, 20%). The range of manipulation is more limited for observed quality than for advertised quality. This is primarily because the linear formulation used to explain the effect of observed quality does not require as broad a manipulation as the proposed non-linear effect of advertised quality. After subjects observed the target brand's quality, their subsequent expectations were measured.

We implemented this procedure using a computer-controlled experiment. Except for the manipulations of advertised quality and observed quality, all subjects essentially see the same information on the computer screen.

**Basic Results**

People, on average, drive 13,977 miles each year. Among the six attributes rated, mileage received the highest average importance rating (5.79 of a possible 7.0). The subjects also indicated that they had never heard of CAMAC prior to the experiment and that the scenario was fairly realistic.

There is a significant difference ( $p < .05$ ) among the mean expected life of a typical brand, a top of the line brand, and a private label brand of car tires with respective means of 38,065, 47,458, and 35,532 miles. The subjects' mean initial level of expectations ( $E_0$ ) for CAMAC was 36,355 miles. The difference between  $E_0$  and the expected life of a private label brand is not significant ( $p > .25$ ); however, there is a significant difference between  $E_0$  and the subjects' estimate of the life of a top of the line brand ( $p < .05$ ) and that of a typical brand ( $p < .05$ ). Hence, when subjects do not have information about the quality of a brand, that is, when they have neither seen the advertised quality of the brand nor have used the brand nor have had other extrinsic cues, such as company or retailer reputation, their initial expectations of that brand's performance is similar to that of a private label brand (this may be the result of encountering an unfamiliar dealer who carried no brand name tire in the required size).

**The Effect of Advertised Quality**

There is a significant main effect ( $p < .001$ ) of percentage advertising claim discrepancy,  $(L - E_0)/E_0$ , on percentage change in expectations,  $(E_1 - E_0)/E_0$ . Table 1 presents the results.

When the advertising claim discrepancy is zero, the mean percentage change in expectations is -.04, which explains

21% of the variation about the hypothesized zero mean and is slightly, but significantly, different from zero ( $p < .05$ ). Thus, there may be some downward drift, perhaps because of people assuming that advertising overstates quality.

When advertising claim discrepancy is -20%, the mean percentage change in expectations is -21.4% (and explains only 3% of the variation around -20%). The absolute amount of change in expectations in the negative cell is significantly higher ( $p < .01$ ) than when advertising claim discrepancy is 20% positive (11.4%), thus, supporting  $H_{1c}$ .

**Model estimation and specification testing.** The proposed model is based on the actual change in expectations and the actual level of advertising claim discrepancy, rather than on the percentage changes. Thus, we estimate the parameters using the actual levels of advertising claim discrepancy and expectation change. Assuming that the error is distributed normal, with mean 0 and variance  $\sigma$ , and using maximum likelihood estimation (MLE), we find that:

$$(5) \quad E_1 - E_0 = .507(L - E_0) - .025(L - E_0)^2; R^2 = .549$$

Both the parameters,  $\beta_1$  and  $\beta_2$ , are significant ( $p < .05$ ) in the expected direction.

We next compare the proposed quadratic with linear and gamma specifications. Table 2 shows that the Akaike Information Criterion (AIC) and  $R^2$  measures for the quadratic and the gamma are quite close to each other but significantly better than those of the linear model. We also estimated the three model forms by eliminating data from the 500% manipulation because this level of manipulation is extreme. Again, we found that the AIC and  $R^2$  measures for the quadratic (AIC = 346.8,  $R^2 = .62$ ) and the gamma (AIC = 342.8,  $R^2 = .63$ ) are very close to each other, but significantly better than those of the linear model (AIC = 392.5,  $R^2 = .56$ ). This suggests that for reasonable levels of advertising claim discrepancy, the quadratic and gamma specifications provide an equally good fit. Furthermore, introducing intercept terms to the equations did not improve their fit, perhaps because of the small effect of a zero discrepancy. The significantly better fit for the non-linear specifications provides support for  $H_{1b}$ . Whether the effect of positive discrepancy asymptotes or actually decreases at some point is

**Table 2**  
EFFECT OF ADVERTISED QUALITY—MODEL ESTIMATION:  
STUDY 1 (TIRES)

Dependent Variable : $(E_1 - E_0)$ Complete Sample (155 observations)				
		LL	AIC <sup>a</sup>	R <sup>2</sup>
Linear	.165(L - E <sub>0</sub> ) (7.4) <sup>a</sup>	-260.1	522.2	.261
Gamma	.866(L - E <sub>0</sub> )exp[-.146(L - E <sub>0</sub> )] (10) (-9.9)	-214.8	433.6	.588
Quadratic	.507(L - E <sub>0</sub> ) - .025(L - E <sub>0</sub> ) <sup>2</sup> (13.2) (-9.9)	-221.9	447.8	.549

<sup>a</sup>AIC = -2(Log Likelihood) + 2(Number of Parameters) (Akaike 1974).  
<sup>b</sup>t-values in parentheses.

L = Advertised quality  
E<sub>0</sub> = Initial expectations  
E<sub>1</sub> = Updated expectations after observing the advertised quality  
L - E<sub>0</sub> = Advertising claim discrepancy

Table 3  
EFFECT OF OBSERVED QUALITY: STUDY 1

Percentage Observed Quality, $(M - E_1)/E_1$	Average Percentage Change in Expectations, $(E_2 - E_1)/E_1$
-.2	-.196 (53) <sup>a</sup>
0.0	-.003 (48)
.2	.147 (54)

<sup>a</sup>cell sizes in parentheses.

not clear. However, at reasonable levels of discrepancy, there is no evidence of any decline in expectations.

It appears that the effect of positive and negative discrepancies are different. We, therefore, estimated a model that allowed for different linear effects of a negative discrepancy. We also allowed for different linear and quadratic terms and the model did not perform better. Hence, we report the simpler specification (t-values in parentheses):

$$(6) \quad E_1 - E_0 = .731(L - E_0) - .024(L - E_0)^2 - .24I_1(L - E_0); R^2 = .56,$$

(5.95)                      (-9.56)                      (-1.9)

where

$$I_1 = -1 \text{ if } L < E_0 \text{ and} \\ = 1 \text{ if } L \geq E_0.$$

This result shows that the shape of the function is indeed different for positive and negative discrepancies ( $p < .06$ ); that is, the slope is steeper in the negative domain.

#### The Effect of Observed Quality

There is a significant ( $p < .001$ ) main effect of percentage difference in observed quality and prior expectations,  $(M - E_1)/E_1$ , on percentage change in expectations,  $(E_2 - E_1)/E_1$ . (See Table 3 for results.)

When observed quality is 20% less than subjects' prior expectations, expectations decrease by almost the same amount (19.6%). Furthermore, subjects' expectations do not change significantly (.3%) when observed quality is equal to their priors. On the other hand, some discounting is noted when observed quality is greater than subjects' expectations. The mean change in expectations is 14.7% when observed quality is 20% higher than subjects' prior expectations.

*Model estimation.* Estimation of Equation 4b using Ordinary Least Squares (OLS) shows that (t-values in parentheses):

$$(7) \quad E_2 - E_1 = .86(M - E_1); R^2 = .81. \\ (21)$$

Consistent with  $H_2$ , the smoothing constant,  $\alpha$ , is significantly ( $p < .001$ ) positive. We allowed for a non-linear (quadratic) term, but it was not significant ( $p > .25$ ). In contrast, using the same +20%, 0, and -20% manipulations for advertised quality and estimating a quadratic model of the effect of advertised quality, we found that the quadratic term was significant ( $p < .05$ ).

We also estimated a model that allows for different effects of positive and negative discrepancies of quality (t-values in parentheses):

$$(8) \quad E_2 - E_1 = .872(M - E_1) - .1I_2(M - E_1); R^2 = .82. \\ (21.9) \qquad \qquad \qquad (-2.8)$$

where

$$I_2 = -1 \text{ if } M < E_1 \text{ and} \\ = 1 \text{ if } M \geq E_1$$

Thus, whereas the effect of observed quality for a negative discrepancy is significantly greater than that for a positive discrepancy, the difference in the effect is smaller and not as high as that for advertised quality.

#### The Relative Effect of Advertised and Observed Quality

Previous work on the relative effect of experience versus advertising has primarily concentrated on consumers' attitudes (for example, Hoch and Ha 1986; Marks and Kamins 1988; Smith and Swinyard 1983). Here, we examine expectations about new product quality. Specifically, using data from the three manipulations (-20%, 0%, and 20%) used for both advertised and observed quality, we estimate the subsequent equation, which summarizes the relative effect of advertised versus observed quality on expectations about new product quality (t-values in parentheses):

$$(9) \quad E_2 - E_0 = .57(L - E_0) + 1.21(M - E_1); R^2 = .37. \\ (4.05) \qquad \qquad \qquad (8.4)$$

There is a significant difference ( $p < .05$ ) between the effect of advertised quality and observed quality on expectations, which supports  $H_3$ .

We also compared the relative effects of advertised and observed quality for positive and negative discrepancies. Comparing the cases in which the discrepancy is -20% versus 20%, we see that in the case of a negative discrepancy, both advertised and observed quality have similar effects (-21.4% and -19.6%), but when the discrepancy is positive, advertised quality is somewhat less persuasive than actual quality (11.4% versus 14.7%). We, therefore, estimated a model that allows for a potential interaction between the effects of advertised and observed quality and the sign of the discrepancy (t-values in parentheses):

$$(10) \quad E_2 - E_0 = .67(L - E_0) - .24I_1(L - E_0) + .79(M - E_1) - .1I_2(M - E_1); R^2 = .72, \\ (10.7) \qquad \qquad \qquad (-2.69) \qquad \qquad \qquad (10) \qquad \qquad \qquad (-.88)$$

where

$$I_1 = -1 \text{ if } L < E_0 \text{ and} \\ = 1 \text{ if } L \geq E_0, \\ I_2 = -1 \text{ if } M < E_1 \text{ and} \\ = 1 \text{ if } M \geq E_1$$

There is no significant difference ( $p > .25$ ) between the effects of advertised quality and observed quality on expectations for negative discrepancies (.91 versus .89). But, a significant difference ( $p < .05$ ) exists for positive discrepancies (.43 versus .69). Thus, observed quality is given greater

weight than advertising when the discrepancy is positive; when the discrepancy is negative, observed quality and advertised quality are given equal weight. Again, we see that the effect of advertised quality on expectations is significantly higher ( $p < .05$ ) for negative discrepancies than for positive discrepancies. Note that, for observed quality, though the effect for a negative discrepancy seems to be higher, we do not see the significant effect we observed in Equation 8. We make two observations in this regard. First, the effect size, though significant in Equation 8, is small. Second, in Equation 10, the dependent variable is  $E_2 - E_0$ , whereas Equation 8 uses changes in expectations between periods 1 and 0. We further examine this issue in Study 2.

### Summary of Study 1

We tested the effects of advertised and observed quality on subjects' expectations about new product quality. We estimated the effects using particular model forms, which we then subjected to a specification test. The coefficients are all significant and in the expected direction. The non-linear model specifications for the effect of advertised quality performed significantly better than the linear model.

When subjects had no prior information about the quality of CAMAC, an unknown European brand, their initial expectations of its quality, on average, were equal to that of a private label brand. Meyer and Sathi (1985) assume that the initial expectation regarding the quality of a new product is some product class baseline, but do not propose any hypothesis regarding the nature of such a baseline. Our result suggests that the product class baseline consumers use to anchor their initial expectations about the quality of a new brand may be the quality of a private label brand.

An advertising claim discrepancy equal to zero produced a very small but significant downward change in expectations. This may indicate that consumers are skeptical, though very slightly, of advertisements that confirm their expectations. When an advertising claim discrepancy was positive and increasing, the change in expectations increased, but at a decreasing rate, suggesting that consumers began to discount advertising claims that are much higher than their prior expectations. When an advertising claim discrepancy was negative, the change in expectations was also negative. Advertised quality that was below initial expectations was considered more believable than advertised quality that was higher than initial expectations. In other words, "good news" appears to be discounted, whereas "bad news" is more readily accepted, supporting Oliver and Winer's (1987) proposition.

Finally, the effect of observed quality on expectations was significantly greater than that of advertised quality when the discrepancy was positive; there was no significant difference when the discrepancy was negative.

### STUDY 2

Our objectives of Study 2 were (1) to extend the findings of Study 1 to another durable product and (2) to modify some aspects of the design of Study 1. We chose car batteries for this study because they represent a relatively high involvement durable good, and we used battery life to represent the quality of the product. According to *Consumer Reports* (1991), the important attributes that need to be consid-

ered when buying a car battery are the cold-cranking amps, reserve capacity, and life of the battery. A pretest with 95 undergraduate students showed that the life of a car battery is the most important attribute. Again, we used a hypothetical brand of automobile batteries, ORION.

Although the cover story and the various stages of the computer-controlled experiment in Study 2 are essentially the same as in Study 1, there are five major differences between the two studies. First, to more thoroughly compare negative and positive levels of advertising claim discrepancy, we included two levels of negative advertising claim discrepancy in Study 2. Second, the subsequent measures have been taken to minimize demand effects:

1. A 10 minute distractor-task was introduced after subjects purchased the target battery and before they observed the quality of the product; the distractor-task consisted of completing a survey on the demographic, shopping, and expenditure patterns of the subjects
2. When presenting the advertising information about ORION batteries, two other attributes (cold cranking amps and reserve safety minutes) have been included to increase realism. The levels of these attributes were held constant for all subjects.

Third, the reverse order of presentation, that is, an experience-advertisement sequence, was included in Study 2 to assess the order effect on the relative impact of advertised quality and observed quality on expectations. Fourth, we measured subjects' confidence levels when recording their expectations about the quality of ORION batteries. Fifth and finally, subjects' estimates of the life of a typical brand, top of the line brand, and a private label brand of car battery are measured toward the end of the experiment, as opposed to the beginning of the experiment, to reduce the effect of explicit anchors on their initial expectations about the target brand. The overview of the advertisement-experience order of this study is shown in Appendix 2. For the experience-advertisement sequence, Stage III essentially becomes Stage VI, and Stages IV, V, and VI form Stages III, IV, and V, respectively.

### Design and Subjects

In this study six levels of manipulations were used for advertising claim discrepancy, two negative (-50%, -25%), one at 0%, and three positive (25%, 50%, 75%). Observed quality was manipulated at three levels (-25%, 0%, 25%). Thus, this study uses a  $6 \times 3$  (advertised by observed quality) between subjects full-factorial design in the advertisement-experience sequence. The experience-advertisement sequence was presented for two levels of manipulations (-25% and 25%) for both advertised quality and observed quality. Hence, this study uses another  $2 \times 2$  between subjects full-factorial design in the reverse order, namely, an experience-advertisement sequence.

Subjects consisted of 242 undergraduate business students at a major Southwestern university. They were students of the introductory marketing management course and received course credit for participating in the experiment. One hundred ninety-nine subjects participated in the  $6 \times 3$  design in which the advertisement-experience sequence was used. Forty-three subjects participated in the  $2 \times 2$  design in which the experience-advertisement sequence was used.

Table 4  
EFFECT OF ADVERTISED QUALITY: STUDY 2

Percentage Claim Discrepancy, $(L - E_0)/E_0$	Average Percentage Change in Expectations, $(E_1 - E_0)/E_0$
-.50	-.443 (29) <sup>a</sup>
-.25	-.285 (28)
0.0	-.098 (30)
.25	.015 (34)
.50	.232 (35)
.75	.295 (32)

<sup>a</sup>cell sizes in parentheses.

The study was conducted in a computer laboratory. Data from 11 subjects who reported having heard of ORION batteries before participating in the study were eliminated from the sample. The final sample consists of 188 subjects in the advertisement-experience sequence and 43 subjects in the experience-advertisement sequence.

#### Basic Results

The subjects, on average, drive 11,372 miles each year and gave life of a battery the highest importance rating (6.23 of a possible 7). Subjects' mean initial level of expectation,  $E_0$ , for ORION is 31 months with an average confidence level of 4.2 of a possible 7. The difference between  $E_0$  and the expected life of a private label brand (30.5 months) is not significant ( $p > .25$ ). There is a significant ( $p < .05$ ) difference between  $E_0$  and the estimates for a top of the line brand (46.5 months) and for a typical brand (34.6 months). This reinforces the result from Study 1 that when subjects do not have any information about the quality of a brand, their initial expectations about its quality may be equal to that of a private label brand.

#### The Effect of Advertised Quality

To test the effect of advertised quality, we used data from the advertisement-experience sequence. There is a significant ( $p < .05$ ) main effect of percentage advertising claim discrepancy on percentage change in expectations (see Table 4).

When the advertising claim discrepancy equals zero, the mean percentage change in expectations is -9.8%, which is significantly different from zero ( $p < .05$ ), thus rejecting  $H_{1a}$ . When the advertising claim discrepancy is -50% and -25%, respectively, the mean percentage changes in expectations are -44.3% and -28.5%. The absolute amount of these changes are significantly ( $p < .01$ ) greater than when advertising claim discrepancy is positive (1.5% and 23.2% for the 25% and 50% manipulations, respectively). The results support  $H_{1c}$ .

**Model estimation and specification testing.** The scatter plot of expectation change versus advertising claim discrepancy suggests a non-linear relationship. Table 5 provides the MLEs, AIC, and  $R^2$  measures for the linear, gamma, and quadratic specifications for the effect of advertised quality. The results for only those subjects who had bought a car battery in the past were essentially the same and are not reported here. As seen in Study 1, both the quadratic and the gamma specifications have lower AICs and higher  $R^2$ s than the linear model. The gamma specification has marginally

lower AIC and higher  $R^2$ . Analyzing only subjects who have bought a car battery in the past shows that the AIC and  $R^2$  measures for the quadratic and the gamma specifications are not noticeably different from each other, but are significantly better than those of the linear specification. Introducing intercepts terms did not improve the fit of the respective model forms. The above results are consistent with those of Study 1 and provide additional support for  $H_{1b}$ . We also allowed for different effects of positive and negative discrepancy (t-values in parentheses):

$$(11) \quad E_1 - E_0 = .67(L - E_0) - .025(L - E_0)^2$$

(18)                      (-7.4).

$$- .39I_1(L - E_0); R^2 = .69$$

(-5.6)

where

$$I_1 = -1 \text{ if } L < E_0 \text{ and} \\ = 1 \text{ if } L \geq E_0.$$

Again, we see that the slope is steeper for negative discrepancies than for positive discrepancies. We allowed for different linear and quadratic terms in the negative quadrant and the model fit did not improve, and, therefore, we report the simpler specification.

#### The Effect of Observed Quality

Data from the advertisement-experience order is used to estimate the effect of observed quality. A one-way ANOVA reveals a significant ( $p < .001$ ) main effect of observed quality on expectations (see Table 6).

When observed quality is 25% below expectations, expectations decreased by 22.1%. Subjects' expectations did not change significantly ( $p > .05$ ) when the percentage discrepancy was zero. When observed quality is 25% higher than their expectations, the change in expectations is 22.4%.

**Model estimation:** The OLS results for Equation 4b are (t-values in parentheses):

$$(12) \quad E_2 - E_1 = .80(M - E_1); R^2 = .73$$

(22.5)

Table 5  
EFFECT OF ADVERTISED QUALITY—MODEL ESTIMATION:  
STUDY 2 (BATTERIES)

	Dependent Variable: $(E_1 - E_0)$ Complete Sample (188 observations)			
		LL	AIC	$R^2$
Linear	.479(L - $E_0$ ) (14) <sup>a</sup>	-220.4	442.8	.513
Gamma	.64(L - $E_0$ )exp[-.188(L - $E_0$ )] (18.3)                      (-8.7)	-190.0	384.0	.649
Quadratic	.69(L - $E_0$ ) - .097(L - $E_0$ ) <sup>2</sup> (17.3)                      (-7.9)	-193.6	391.2	.635

<sup>a</sup>t-values in parentheses.

L = Advertised quality

$E_0$  = Initial expectations

$E_1$  = Updated expectations after observing the advertised quality

$L - E_0$  = Advertising claim discrepancy



**Table 6**  
EFFECT OF OBSERVED QUALITY: STUDY 2

Percentage Observed Quality, $(M - E_1)/E_1$	Average Percentage Change in Expectations, $(E_2 - E_1)/E_1$
-.25	-.221 (61) <sup>a</sup>
0.0	.051 (62)
.25	.224 (65)

<sup>a</sup>cell sizes in parentheses.

We allowed for a non-linear (quadratic) term and it was not significant ( $p > .4$ ). In contrast, for the same manipulations (+25%, 0%, -25%), the quadratic term relating to the impact of advertised quality was highly significant ( $p < .01$ ). Taken together with the results of Study 1, this provides some support for a linear model of the response to observed quality, which supports  $H_2$ . We also estimate a model that allows for different effects of positive and negative discrepancies (t-values in parentheses):

$$(13) \quad E_2 - E_1 = .796(M - E_1) - .024I_2(M - E_1); R^2 = .75$$

(21.3)                      (-.88)

where

$$I_2 = -1 \text{ if } M < E_1 \text{ and} \\ = 1 \text{ if } M \geq E_1.$$

Unlike the case of advertised quality, the effect of observed quality on expectations is not significantly different for positive and negative discrepancies.

*The Relative Effect of Advertised and Observed Quality*

Using data from the  $2 \times 2 \times 2$  (order of presentation by advertised and observed quality by -25% and 25% manipulations) between subjects full-factorial design, we examine the order effect using (t-values in parentheses):

$$(14) \quad E_2 - E_0 = .4(L - E_0) + .65(M - E_1) + .05I(L - E_0) \\ + .02I(M - E_1); R^2 = .35$$

(4.1)                      (7.3)                      (.23)                      (.55)

where,

$$I = 1, \text{ if the order of presentation is advertisement-experience; and} \\ I = -1, \text{ if it is experience-advertisement.}$$

The coefficients for advertised and observed quality are significant and in the expected direction. We reject ( $p < .05$ ) the null hypothesis that the effects of advertised and observed quality on expectations are equal. This result generalizes the result of Study 1 on the relative impact of advertising and experience on expectations about new product quality and provides further support for  $H_3$ . The order of presentation does not have a significant interaction effect with advertised or observed quality on change in expectations about new product quality.

Again, we test for different effects of positive and negative discrepancies on advertised quality (t-values in parentheses):

$$(15) \quad E_2 - E_0 = .52(L - E_0) - .58I_1(L - E_0) \\ + .75(M - E_1) - .15I_2(M - E_1); R^2 = .37$$

(4)                      (-3.97)                      (7.2)                      (-1.33)

where,

$$I_1 = -1, \text{ if } L < E_0 \text{ and} \\ = 1, \text{ if } L \geq E_0, \\ I_2 = -1, \text{ if } M < E_1 \text{ and} \\ = 1, \text{ if } M \geq E_1.$$

As in Study 1, the effect of advertised quality on expectations is significantly higher ( $p < .05$ ) for negative discrepancies than for positive discrepancies (1.1 versus -.06). On the other hand, the effect is not significant ( $p > .25$ ) for observed quality (.9 versus .6). Furthermore, there is no significant difference ( $p > .25$ ) between the effects of advertised quality and those of observed quality on expectations for negative discrepancies (1.1 versus .9). But, a significant difference ( $p < .05$ ) exists for positive discrepancies (-.06 versus .6). Thus, consumers give observed quality greater weight than advertising when the discrepancy is positive.

**DISCUSSION AND FURTHER RESEARCH**

For a new product, advertising discrepancy has a non-linear impact on expectations about product quality. Both a quadratic and a gamma model provide a significantly better fit than a linear model. On the other hand, the effect of observed quality on updated expectations seems adequately described by a linear model, at least for small discrepancies. Table 7 summarizes our results.

**Table 7**  
SUMMARY OF RESULTS

Hypothesis	Study 1	Study 2
H <sub>1a</sub> When the advertising claim discrepancy is zero, the change in expectations about new product quality is zero.	Not Supported	Not Supported
H <sub>1b</sub> When the advertising claim discrepancy is positive, the change in expectations is a non-linear function of discrepancy.	Supported	Supported
H <sub>1c</sub> An advertising claim with a negative discrepancy will have more impact on expectations than an equally discrepant claim with positive discrepancy.	Supported	Supported
H <sub>2</sub> The change in expectations about new product quality after observing the quality of the product is proportional to the difference between observed quality and prior expectations.	Supported	Supported
H <sub>3</sub> Observed quality will have a greater impact on expectations about new product quality than advertised quality.	Supported	Supported

Apparently, consumers slightly discount advertising claims that match their expectations about new product quality. When the advertising claim discrepancy is positive, the change in expectations exhibits a non-linear relationship. Subjects exhibited asymmetric behavior depending on whether the advertising claims are below or above their initial expectations. Finally, we found that observed quality has a significantly greater impact than advertised quality on expectations about the quality of a new product.

The significant differences found for the impact of advertised and observed quality on expectations about new product quality must be considered within the limitations of the study. As in Oliver and DeSarbo's (1988) study, the purchase situation was simulated and the subjects did not actually experience the product. The relative impact of the two sources of information will depend on their salience, credibility, and ambiguity. A prominent, highly credible, and unambiguous advertisement may have greater impact than observed quality when the observer is unsure of his or her evaluation or knows there is a large variability in quality for the product. In a normative sense, information should be weighted inversely proportional to ambiguity/variance. Clearly, this is an area for further research.

A related limitation is that the study was performed in a laboratory setting and each subject was exposed to a single advertisement. Still, if, as Marks and Kamins (1988) argue, the purpose of repetitive advertising is to gain consumers' attention, attention may be achieved with one exposure in a laboratory setting because of minimal distractions.

This research can be extended in a number of directions. We were unable to distinguish between the quadratic and gamma specifications on empirical grounds. Because of the range of manipulations used, this suggests that the choice of specification does not make an important practical difference. Further research could examine the effect of more extreme manipulations of advertising claim discrepancy on change in expectations to check whether the function asymptotes to zero or becomes negative. Furthermore, examination of the gamma specification (Equation 3) shows that the parameter  $\beta_5$  (which is negative) can be interpreted as a source credibility parameter so that higher values of  $\beta_5$  are associated with larger values of discrepancy that will produce maximal change in expectations about product quality; in Fishbein and Ajzen's (1975) framework, the point of maximal change occurs at a lower discrepancy level for the low-credibility communicator than for the high-credibility communicator. Additional research could test the proposition that the higher the level of source credibility, the higher the advertising claim discrepancy at which change in expectations starts to decrease. Similarly, we have not extensively investigated the possibility of a non-linear relationship between observed quality and expectations. Further research could use more extreme manipulations of actual quality to see if the apparent linear relationship still holds.

One extension of this study, which has implications from a regulatory perspective, would be to analytically derive the optimal levels of advertised quality and actual quality from a firm's point of view and characterize market conditions that would hinder or facilitate the overstatement of product quality. For example, the current study describes situations in which product quality is observable. However, when

quality is not fully observable, firms may have an incentive to overstate quality in their advertisements, as suggested by a *Wall Street Journal* (1992) report on the overstatement of skiable terrain by different ski resorts. Thus, further research could examine the impact of the observability of product quality on the extent of overstatement of quality.

#### APPENDIX 1

##### *Overview of Computer-Controlled Experiment: Study 1 (tires)*

*Stage I.* Subjects respond to a series of questions about how long (in miles) a typical brand, a top of the line brand, and a private label brand of car tires are likely to last.

*Stage II.* Imagine you have purchased a car (a mid-size one) that you intend to keep for a long time. A few months later, you decide to take a long trip in your car and you are now on a highway on your trip.

Inadvertently, you drive over a road hazard that slashes two of your standard original equipment tires. You realize that the tires need to be replaced and so you get the attention of a highway patrolman who calls for a tow truck. The tow truck takes you to the nearest gas station, which also happens to be the only gas station in the area. You notice that the dealer is an American Automobile Association (AAA) recommended dealer.

In the gas station you notice a prominently displayed brand of "all-season steel belted radial" tires – CAMAC, a European brand. The display indicates that CAMAC has been in the tire business for over 50 years in Europe.

##### *Measure initial expectations, $E_0$*

*Stage III.* The dealer notices that you are inspecting CAMAC tires and gives you a brochure about CAMAC. In the brochure you notice the advertised average useful life of "all-season steel belted radial" CAMAC tires to be "L" miles.

##### *Measure updated expectations, $E_1$*

*Stage IV.* As you are considering which brand to buy, the dealer inquires about the tire size you need. You find out that the only brand of tires available in the correct size is CAMAC, and so you buy them. You get the tires changed and continue on your trip. You return home after a refreshing vacation.

*Stage V.* Some time later, you notice that the CAMAC tires need replacement and observe that the tires lasted "M" miles.

##### *Measure final expectations, $E_2$ , and other covariates*

#### APPENDIX 2

##### *Overview of Computer-Controlled Experiment: Study 2 (batteries)*

*Stage I.* Subjects respond to some background questions regarding automobile ownership.

*Stage II.* Imagine you own a mid-size car that you intend to keep for a long time. One day you decide to take a long trip in your car. After driving for some time, you stop to buy lunch and do some shopping. Upon returning to your car, you find that it will not start. You go to the nearest gas sta-

tion and have the mechanic check your car. The mechanic tells you that the battery seems to be damaged and needs to be replaced. Because there is no other store close by, it appears that you have to buy the battery from the gas station.

The gas station carries a brand of car batteries - ORION, made by Orion Battery & Ignition Corporation, a manufacturer of automobile parts and accessories. You wonder about buying the battery and in particular, are concerned about its performance.

*Measure initial expectations,  $E_0$  and confidence*

*Stage III.* You ask the mechanic if he has some literature on ORION batteries. The mechanic gives you a ORION Company brochure that describes ORION batteries. In the brochure you notice the following claims:

ORION BATTERY

COLD CRANKING AMPS: 500

RESERVE SAFETY MINUTES: 60

BATTERY LIFE (IN MONTHS): L

You look through the brochure and are now faced with the decision of whether or not to purchase a ORION battery.

*Measure confidence levels for the attributes, measure updated expectations,  $E_1$  and confidence*

*Stage IV.* Being stranded at the gas station, you really have no option and, therefore, decide to buy the ORION battery. You get the battery changed and continue on your journey. You return home after a refreshing trip.

*Stage V.* Ten minute distractor-task: Subjects fill in a questionnaire

*Stage VI.* It is now M months since the trip and you have been driving the same car; you find that it is time to replace the ORION battery.

*Measure final expectations,  $E_2$ , confidence and satisfaction*

*Measure other covariates including subjects' estimate of the life of typical brand, top of the line brand and a store brand of car battery*

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