AN EXAMINATION OF MEASUREMENT CONTEXT AND REPRESENTATIONAL EFFECTS OF CONSUMER EXPECTATIONS

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ABSTRACT

The authors report the results of an experiment in which the disconfirmed expectations theory of consumer satisfaction is tested under conditions that facilitate the separation of empirical effects involving the consumer satisfaction model (i.e., theoretically meaningful effects) from empirical effects resulting from the measurement context. The experiment was designed to examine predictors and consequences of consumer satisfaction and to examine the degree to which expectations produce effects independent of measurement context effects. The findings extend previous research, providing further strong support for the strategic implications of the disconfirmed expectations theory, particularly with respect to the complex processes that link consumer expectations with product choice behavior.

INTRODUCTION

The disconfirmed expectations theory of consumer satisfaction (hereafter referred to as the disconfirmed expectations theory) is a frequently studied theory with commonly accepted managerial implications (for a review see Teas and Palan, 2003). For example, some managers may choose to decrease consumers' expectations in order to increase their satisfaction, assuming that doing so will result in increased purchases. Until recently, however, very little research has examined whether or not the effects of consumers' expectations on the disconfirmation process was the result of representational effects, wherein the consumers' actual opinions about objects are affected by the comparison of expectations to performance, or the result of the measurement context response language effects, wherein the process of measurement inflates the associative variation among the measures of concepts specified in a model. More specifically, response language effects involve "...how context-invariant representations are mapped onto response scales provided by researchers..." (Lynch, Chakravarti and Mitra, 1991, p. 285). To the degree to which associative variation among variables specified in a theoretical model is produced by response language effects, misleading empirical support for the theory is produced. This is an important question because the managerial implications derived from the theory are based on the assumption of representational effects—that is, the consumers' actual opinions resulting from the comparison process correspond to parallel changes in their purchase behavior (Lynch et. al., 1991). In contrast, if the comparative process is the result of response language effects resulting from the process of measuring expectations, then consumers' ratings of disconfirmation and satisfaction would not be expected to carry over to purchase behaviors, in effect nullifying the value of the theory.

In a test of the disconfirmed expectations theory, Teas and Palan (2003) designed an experiment making it possible to separate results that provided empirical support for the theory from results that were artifacts of the measurement processes. Specifically, the controlled experiment focused on the effects of expectation level and measurement manipulations on choice variables less susceptible to response language effects (product part-worth, product choice probability, and price part-worth) than the purchase intention variable used in most research. The result provided evidence of representational effects of expectancy level on satisfaction, product choice, and product utility. An important limitation of the study, however, is that it represented only a partial test of the disconfirmed expectations theory because the extensive examination of

measurement context effect issues precluded a comprehensive test of the disconfirmed expectations model of satisfaction. That is, linkages in the disconfirmed expectations model involving performance and disconfirmed expectations were not examined in the study.

This paper builds on Teas and Palan's (2003) research findings by addressing additional issues. First, this study examines not only the effects of expectation level manipulations, but also the presence or absence of differential effects related to the timing of the measurement of expectations. Whereas Teas and Palan (2003) administered the expectations measurement manipulation (i.e., measured/not measured) in all experimental cells *after* exposure to the expectations treatment and a taste test, this study includes four different measurement of expectations timing treatments. By examining the measurement timing of expectations, information is provided concerning the degree to which the magnitude of response language measurement varies across different measurement procedures. This information is useful in the identification of methods that potentially reduce the impact of response language effects in tests of theoretical models. Second, this study examines measurement context effects issues in conjunction with a comprehensive test of the disconfirmed expectations model of satisfaction by testing hypotheses focusing on linkages among all of the variables specified in the model—performance, expectations, disconfirmed expectations, satisfaction, and product choice—in contrast to the previous study which focused strictly on expectations variables.

JUDGMENTAL CONTRAST AND ASSIMILATION EFFECTS IN THE DISCONFIRMED EXPECTATIONS THEORY OF CONSUMER SATISFACTION/DISSATISFACTION

In the disconfirmed expectations theory, consumer expectations provide a point of reference for judgments of performance, disconfirmation, and sat- isfaction. Salient to this study is that most prior research has assumed that the comparison of expectations to performance affects consumers' actual opinions and subsequent behaviors—a representational effect. As such, it is helpful to briefly review the empirical relationships between the theory variables on which this assumption is based.

The Expectations–Perceived Disconfirmation Relationship

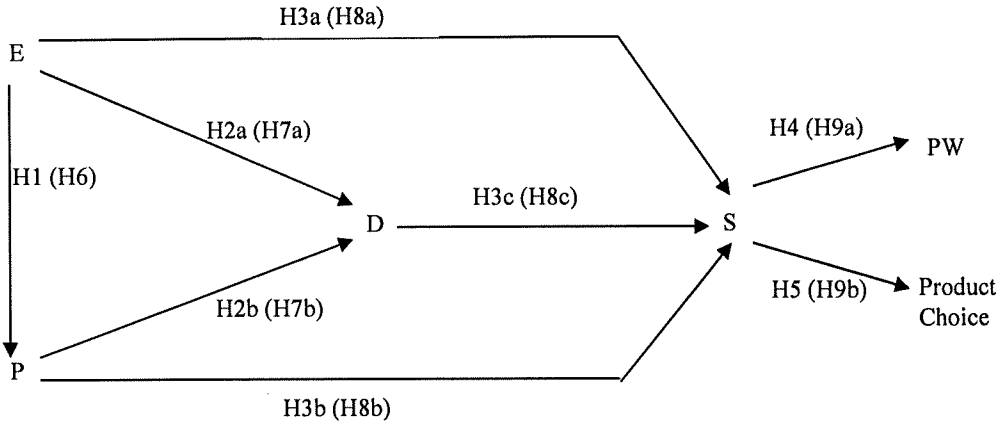
In the disconfirmed expectations model, consumers' satisfaction is predicted to be a function of the perceived difference between a perceived performance outcome and forecasted or expected performance (Oliver, 1980a; Woodruff, Cadotte, and Jenkins, 1983). In general, expectations are predicted to be negatively related to disconfirmed expectations. Since the disconfirmed expectations theory specifies disconfirmed expectations as an antecedent of satisfaction (Oliver, 1993; 1994; 1977; 1979; 1980b; Oliver, Balakrishnan, and Barry, 1994), this negative expectations–disconfirmation linkage suggests that perceived satisfaction might be positively affected by reducing consumer expectations (Parasuraman, Zeithaml, and Berry, 1985; 1988).

The Expectations–Perceived Performance Relationship

Some empirical evidence suggests expectations may be directly related to perceived performance, which could reflect

either contrast or assimilation processes (Oliver, 1997). If the process is that of assimilation, then consumers' judgments of performance are likely to assimilate toward their expectations in situations where consumers a) are reluctant to acknowledge that expectations and performance are different (Hart, 1995), b) have difficulty judging performance because the performance dimensions are ambiguous (Herr, 1989; Herr, Sherman and Fazio, 1982; Schwarz and Bless, 1992), or c) are not highly involved with the performance dimensions (Oliver, 1997; Feldman and Lynch, 1988). The result would be a positive correlation between expectations and performance, which is supported by empirical evidence (Boulding, Kalra, Staelin, and Zeithaml, 1993; Oliver et al. 1994; Churchill and Suprenant, 1982). Specifically, as indicated in Figure 1, expectations may positively affect satis- faction indirectly through a performance-satisfaction linkage (H1, H3b), a positive performance-disconfirmation-satisfaction linkage (H1, H2b, H3c), and a positive disconfirmation-satisfaction linkage (H2a, H3b).

Figure 1
Comprehensive Test Model



If, however, the relationship between expectations and performance is reflective of a contrast effect, then the consumer focuses on discrepancies between expectations and performance, which results in an exaggeration of a perceived difference. Thus, when performance is perceived to be below (above) the expected level, consumers will perceive performance to be below (above) the objective performance level (Oliver, 1997). This contrast effect scenario suggests that increasing expectations may negatively affect perceived performance which, in turn, will negatively affect satisfaction indirectly through the linkages noted above.

The Expectations–Satisfaction Relationship

Satisfaction ratings usually are found to be positively related to respondents' prior expectations (see, for example, Bone, Shimp, and Sharma, 1990; Szajna and Scamell, 1993; Tse and Wilton, 1988; Oliver and DeSarbo, 1988) implying that increasing consumer expectations may result in a direct positive impact on consumer satisfaction.

CONTEXT EFFECTS INTERPRETATIONS OF EXPECTATIONS EFFECTS

When empirically testing models, such as the disconfirmed expectations model of consumer satisfaction, researchers generally assume they are examining representational effects, which are defined by Lynch et al. (1991, p. 285) to involve "...the underlying mental representations of judged objects." This is an important assumption because it involves a necessary condition underlying empirical tests of models that are based upon subjects' responses to psychological measures. For example, when empirically testing a model, if statistically significant relationships among variables specified in a model are caused by something other than true "mental representations" of the measured concepts, false support (or non-support) for the model may be generated. Considerable research evidence suggests empirical measurement processes used in tests of consumer behavior models can produce non-representational effects that result from response language measurement context effects (Feldman and Lynch, 1988; Lynch et al., 1991; Simmons, Bickart, and Lynch, 1993). Based upon this evidence, Lynch et al. (1991) argue that empirical research in consumer satisfaction needs to be re-examined because researchers "...cannot rule out the possibility that expectations change how subjects label satisfaction or quality-scale categories without changing true perceptions of satisfaction or quality...other measures are needed to document that empirically examined changes in ratings of satisfaction or quality truly reflect changes in the satisfaction or quality experience."

TESTING FOR REPRESENTATIONAL AND RESPONSE LANGUAGE EFFECTS

Because the use of measurement scales can result in response language effects, clearly discerning whether empirically estimated relationships in the disconfirmed expectations model are the result of representational or response language effects rests on observations collected without measurement scales or with maximally different measurement methods. Three such methods are used in this study: decompositional utility measurement, a product choice task, and a measurement manipulation.

Decompositional Utility Measurement

Response language effects can be distinguished from representational effects in studies that require respondents to judge multidimensional stimuli (rather than unidimensional stimuli) "...in which contextual stimulus sets differ in their ranges on only one dimension" (Lynch et al., 1991, pp. 286-287). Thus, having a respondent judge the desirability or preference for a set of offers comprised of various pairs of product and price combinations (i.e., "cookie" versus "candy bar" and "low price" versus "high price") would enable a researcher to evaluate the utility of different stimulus sets. For example, a conjoint measurement procedure could be used in which a set of four stimulus offers would be created based upon a 2 x 2 factorial design resulting in a set of four product/price offerings (*i.e.*, conjoint stimuli) described on two dimensions (price and product) with each dimension consisting of two levels.

Representational effects. In a situation where the cookie chocolate chip content expectations are manipulated experimentally via a product description and these

manipulations produce represent- ational effects, only the cookie product expectations should be affected—the candy product and price expectations should be unaffected since they are not related to the experimental treatment. If the conjoint stimuli are evaluated under these expectations treatment conditions, a contrast effect situation would affect the utility associated with the cookie product. Under the high (low) expectations conditions (i.e., eight versus four chips in a cookie) the chocolate chip cookie utility part-worth would be lower (higher). The cookie part-worth estimates are different across the treatment conditions because of the differences across experimental groups induced by the expectations context; the price-part worth utilities, however, are not affected. This conjoint measurement scenario suggests a method of detecting response language and/or representational context effects by linking the product and price part-worth functions. An index can then be calculated that links the focal (i.e., cookie) product part-worth with the price part-worths as described in the following:

$$(1) \qquad R = \frac{PW_x}{PW_{LP} - PW_{HP}}$$

where:

R	=	Product part-worth/Price part-worth range ratio
PW_x	=	Part-worth of the cookie product
PW_{LP}	=	Part-worth of the low price
PW_{HP}	=	Part-worth of the high price

Under the representational effects situation, the part-worth functions associated with the products and prices are not expected to change proportionally. Therefore, the R value under the high and low expectations conditions is not the same. Let us illustrate. Assume the part-worth for the cookie product is 6 and the part-worth range corresponding to the high and low prices is 8 [*i.e.*, $PW_{LP} - PW_{HP} = 4 - (-4) = 8$]. Therefore, using Equation (1):

(2) $R = 6/8 = .75$

However, under the high expectations conditions, the part-worth for the cookie is reduced to 3 because of the representational effects of the expectations manipulation. The part-worth range corresponding to the high and low prices is the same as the range under low expectations conditions [*i.e.*, $PW_{LP} - PW_{HP} = 4 - (-4) = 8$] because the utility associated with prices are not linked to the expectations manipulation. Therefore, under high expectations:

(3) $R = 3/8 = .375$

The implication is that under representational effects the expectations context effects influence the R index.
Moreover, in this situation, the R is lower under high expectations than under low expectations.

Response language effects. In the response language effects situation, the experimental subjects' responses to the expectations measurement scales are higher (lower) because of the high (low) chocolate chip content treatments. The experimental subjects' perceived chocolate chip content of the actual cookie product is not affected by the high versus low expectations experimental treatments. Therefore, the perceived chip content is identical across the two experimental groups. However, the overt

cookie ratings are different across the experimental groups because of response language contrast effects. The high (low) expectations conditions and the process of measuring those expectations create high (low) scale anchors that cause the chocolate chip content ratings, disconfirmation ratings, and satisfaction ratings to be different across the two experimental groups because of response language contrast effects. Additionally, under the response language effect situation the expectations treatment causes differences across the two experimental groups in terms of the way they anchor their ratings of the four conjoint stimuli—the total set of four conjoint stimuli are contrasted or displaced for those high (low) expectations ratings. The entire set of conjoint stimuli receives more (less) favorable ratings under the low (high) chocolate chip content expectations conditions. This results in the part-worth utilities associated with both the product and price conjoint treatments to be different across the groups by a common multiplier (Lynch et al., 1991, p. 287).

Under this response language effects situation, the part-worth functions associated with the product and prices can be expected to change proportionately. Therefore, the R value under the high and low expectations conditions is the same. Again let us illustrate. Under low expectations, the R is .75 as calculated in (2). Under the high expectations condition, response language effects cause the utility of the products and prices to be reduced by a common multiplier: the part-worth for the cookie product is reduced to 3 and the part-worth range corresponding to the high and low prices is 4 [e.g., 2 – (-2)]. Therefore, using Equation (1):

(4) $R = \frac{3}{4} = .75$

The implication is that, under response language effects, the R index is unaffected by the expectations context effect treatment.

Product Choice

Similar to the expected effects on the cookie relative part-worths, response language effects are less likely to affect respondents' product choice behavior than their rating of the product on a scale because a rating scale is not used to indicate product choice. So, in a product choice situation where expectations have been manipulated, if the cookie choice percentage is unaffected even though the expectations manipulation affected the expectations ratings, then there would be evidence of a response language effect. In contrast, when the cookie choice percentage among respondents is affected, representational effects are more likely present, consistent with the prediction that the relative part-worth of the cookie is affected by the chocolate chip content manipulation. That is, the expectation manipulation affected the respondents' perceptions of the cookie and, subsequently, their ultimate behavior.

Associative Variation Among Constructs

Response language effects resulting from the measurement of expectations can inflate the association among variables specified in a causal model. Feldman and Lynch (1988) refer to this measurement context effect as "self-generated validity" and argue that self-generated validity is produced by a process in which the act of measurement alters the phenomena being investigated, which, in turn, results in thought processes predicted by the causal theory. This type of measurement context effect can produce distorted empirical results. Teas and Palan (2003) did not find evidence of self-generated validity in a previous limited test of the disconfirmed model. One of the purposes of this study is to examine this issue more comprehensively by estimating a more completely specified model.

Experimental Measurement Manipulation

The process of measuring expectations can produce response language effects on other variables. Consequently, a third method for examining the response language versus representational effects question is to experimentally manipulate the expectations measurement process. An example of an approach is to experimentally manipulate the expectations level (e.g., high versus low) and to experimentally manipulate expectations measurement (e.g., before versus after the performance, disconfirmation, satisfaction, conjoint measurement task, and product choice task measurements). Manipulation of the measurement sequence is an accepted method used in measurement context effects research (for examples, see Simmons et al., 1993 and Bickart, 1993). Findings that indicate statistically significant expectations measurement treatment main effects or interaction effects on components of the disconfirmed expectations model, conjoint results, or respondent choice would be evidence that response language effects resulting from the measurement process distort the results of empirical tests of the disconfirmed expectations model. On the other hand, a representational effects interpretation would be indicated if the findings show no statistically significant main effects or interaction effects involving the measurement treatment while, at the same time, indicating linkages between (a) expectations and (b) cookie part-worths and choices that are mediated by variables comprising the disconfirmed expectations model.

Thus, with respect to experimental measurement manipulations, the following simultaneous conditions would produce strong evidence of representational effects which, in turn, would produce empirical support for the theoretical model:

1. The findings indicate statistically significant direct or indirect paths linking expectations with satisfaction.
2. Satisfaction is a statistically significant predictor of the respondents' product part-worth and product choice behavior.
3. The findings indicate statistically insignificant main and interaction effects of the expectation measurement manipulation in equations predicting performance, disconfirmation, satisfaction, product part-worths, and product choice.

Hypotheses Focusing on Response Language versus Representational Effects

Because one purpose of this study included examining whether or not experimental manipulations of expectations level and measurement timing affect part-worth utilities and choice probabilities associated with the test product, i.e., chocolate chip cookies, research hypotheses are posited related to this issue. In addition, we specify hypotheses suggested by the theoretical and empirical literature for linkages between expectations, performance, disconfirmed expectations, and satisfaction.

H1: Perceived performance is related to expectations.

H2: Perceived disconfirmation is:

a. negatively related to expectations.
b. positively related to perceived performance.

H3: Satisfaction is:

a. positively related to expectations.
b. positively related to perceived performance.
c. positively related to perceived disconfirmation.

H4 and H5 concern the degree to which consumer satisfaction is a mediator variable linking the antecedents (particularly the expectations level manipulation) of satisfaction with the potential consequences of satisfaction (i.e., cookie part-worths and choice). Support for the hypotheses would indicate that at least a portion of the antecedents' direct and indirect linkages with satisfaction involve representational effects.

H4: The test cookie conjoint measurement part-worth is positively related to satisfaction.

H5: The propensity to choose the test cookie from a product choice set is positively related to satisfaction.

Hypotheses 6 through 8 are based upon the Feldman and Lynch (1988) self-generated validity concept, which predicts measurement-induced alterations of the associative variation among variables specified in a psychological model. The specific issue examined concerns the degree to which the measurement order manipulation moderates the strengths of the linkages among variables in the disconfirmed expectations model. Support for the hypotheses would suggest that at least a portion of the empirical association among the variables is the result of the measurement process, which would be indicative of possible response language effects:

H6: When compared to the M_0 control situation, the measurement of expectations prior to the measurement of perceived performance (M_1, M_2, and M_3 conditions) positively moderates the linkage between expectations and perceived performance, as predicted in H1.

H7: When compared to the M_0 control situation, the measurement of expectations prior to the measurement of perceived performance (M_1, M_2, and M_3 conditions):

a. negatively moderates the linkage between expectations and perceived disconfirmation as predicted in H2a.

b. positively moderates the linkage between perceived disconfirmation and performance as predicted in H2b.

H8: When compared to the M_0 control situation, the measurement of expectations prior to the measurement of perceived performance (M_1, M_2, and M_3 conditions) positively moderates the linkage between satisfaction and:

a. expectations as predicted in H3a.

b. perceived performance as predicted in H3b.

c. perceived disconfirmation as predicted in H3c.

Finally, H9 and H10 examine the question of measurement processes affecting the respondents' cookie part-worth scores and behavior. If these hypotheses are supported, evidence would be produced that the process associated with the measurement of expectations affected the decompositional cookie part-worths and consumer choice, a finding that would be indicative of response language effects.

H9: When compared to the M_0 control situation, the measurement of expectations prior to the measurement of perceived performance (M_1, M_2, and M_3 conditions) positively moderates the

linkage between the cookie conjoint measurement part-worth and satisfaction hypothesized in H4.

H10: When compared to the M_0 control situation, the measurement of expectations prior to the measurement of perceived performance (M_1, M_2, and M_3 conditions) positively moderates the linkage between the respondent's propensity to choose the test cookie from the product choice set and satisfaction hypothesized in H5.

A comprehensive model showing the relationships being tested is provided in Figure 1 (depicted earlier). Hypotheses H1-H5 are hypothesized direct linkages specified based upon the disconfirmed expectations model. Hypotheses H6-H9b, which are in parentheses, are the hypothesized moderator variable effects of the experimental expectations measurement manipulation. For example, hypothesis H6 specifies the expected moderator variable effect on the predicted (H1) linkage between expectations (E) and performance (P).

AN EXPERIMENTAL TEST OF EXPECTATIONS EFFECTS

Subjects, Design, and Procedure

One hundred eighty-two undergrad business students participating for course credit were exposed to the cells of a 2 (expectations: high versus low) x 4 (expectations measurement: time 1 through time 4) between-subjects experimental design. In addition to the measurement of expectations, measurements were also obtained for perceived performance (P), perceived disconfirmation (D), satisfaction (S), and a set of (Y) measures (intentions, conjoint measures, and product choice).

The experiment, which is summarized in Exhibit 1, was conducted over two sessions, separated by one week. Over the two sessions, subjects completed a set of tasks in the following sequence--exposure to an ad for a fictitious brand of chocolate chip cookie, a taste test of a chocolate chip cookie, and measurement of the P, D, S, and Y variables. In addition, expectations were measured at four different times—in Session 1, immediately following ad exposure (cells 2 and 6); at the beginning of Session 2, prior to the taste test (cells 3 and 7); in Session 2, immediately following the taste test (cells 4 and 8); or at the end of Session 2, after P, D, S, and Y had been measured (cells 1 and 5).

Ad Stimuli

The stimuli for the expectations treatments were ads for two fictitious brands of chocolate chip cookies. The high expectations ad highlighted Windsor Chips R' Us brand cookie, a cookie with lots of chocolate chips ("50% of cookie covered with chips, GUARANTEED!" and "big chocolate taste"); a picture of a cookie covered with chocolate chips was shown in this ad. The low expectations ad featured the Windsor Chocolight brand cookie, a cookie light on chocolate ("40% less chocolate than our classic Windsor Chips R' Us Cookie" and "light chocolate taste"), and was portrayed by a picture of a cookie with very few chocolate chips.

EXHIBIT 1

The Experimental Design

	Session 1		Session 2						
	Expectations								
Cell	Treatment[a]	Measurements	Taste Tests & Measurements[b]						
1	(E_0) Low			T		P	D	S	Y (M_0)
2	(E_0) Low	(M_1)		T		P	D	S	Y
3	(E_0) Low		(M_2)	T		P	D	S	Y
4	(E_0) Low			T	(M_3)	P	D	S	Y
5	(E_1) High			T		P	D	S	Y (M_0)
6	(E_1) High	(M_1)		T		P	D	S	Y
7	(E_1) High		(M_2)	T		P	D	S	Y
8	(E_1) High			T	(M_3)	P	D	S	Y

[a] Expectations Treatments
(E_0) – Low expectations
(E_1) – High expectations
Expectations Measurement Treatments
(M_0) – Expectations measured last
(M_1) – Expectations measured in session 1 following exposure to the expectations treatment
(M_2) – Expectations measured at the beginning of session 2
(M_3) – Expectations measured in session 2 after the taste-test

[b] Session 2 occurred one week after session 1. The taste-test (T) and expectations measurement treatments (M_0), (M_2), and (M_3) were administered during session 2. Additionally, the following measurements were obtained in sequence: Perceived Performance (P), Perceived Disconfirmation (D), Satisfaction (S), and a set of (Y) measures – Intentions, Conjoint Measures, and Product Choice.

The two ads contained identical claims for taste ("mom's homemade taste") and texture ("extra large cookie for a bigger crunch"). The ad layout also was similar for both ads—the cookies portrayed in both ads were the same size (four inches in diameter) and differed only in the number of chips. Subjects in Cells 1, 2, 3, and 4 were exposed to the low expectations ad, while subjects in Cells 5, 6, 7, and 8 were exposed to the high expectations ad.

Product Performance

In order to hold performance constant, the chocolate chip cookies used in the taste test were uniformly made with respect to size (four inches in diameter), texture (soft), taste (buttery), and number of chocolate chips (seven). A pretest of chocolate chip cookies was conducted to determine the appropriate number of chocolate chips. The cookies, which varied

only in the number of chocolate chips, having 4, 7, or 12 chocolate chips, were randomly distributed to 52 undergraduate marketing students who rated the cookies with respect to P, D, S, intentions, and product choice. Based on these results, cookies with seven chocolate chips were used in the experiment.

Measures

Expectations, performance, and disconfirmed expectations were measured via summated scales. One seven-point bipolar scale (small number of chocolate chips–large number of chocolate chips) was used in each of the expectations, performance, and disconfirmed expectations measures. To protect against methods variance, two steps were taken. First, the remaining scale items used for the three measures were not the same across scales to reduce the likelihood of methods variance. Second, since the expectation manipulation involved only one attribute—chocolate chip—we created additional global and attribute specific measurement items to include with the chocolate chip content measures. We designed items that we expected would be influenced by chocolate chip perceptions but that were not directly measuring chocolate chip quantity.

Expectations. Expectations were measured with three items specified by Teas and Palan (2003). One item consisted of a difference score calculated as the absolute value of the difference between the expected chocolate chip content and the ideal chocolate content. The theoretical rationale is discussed by Teas and Palan (2003) and by Teas (1993). Both measures consisted of a 7-point bipolar scale, where 1 = "small number of chocolate chips" and 7 = "large number of chocolate chips." The other two items consisted of bipolar 7-point scales anchored with 1 = "low (high) level of richness" and 7 = "poor (good) taste." Prior to creating the summated scale, the items were normalized by subtracting the item mean and dividing by the item standard deviation; coefficient alpha for the scale was .81.

Performance. Performance was measured with three items designed specifically for the cookie product in this study. One item consisted of a difference score calculated as the absolute value of the difference between the perceived chocolate chip content and the ideal chocolate chip content (the procedure was the same as that used for the ideal point expectancy scale). The other two measures were: "This is a high quality cookie" and "This cookie is similar to my ideal chocolate chip cookie" (11 point agree/disagree scale; Strongly Disagree = 0; Strongly Agree = 11). The items were normalized by subtracting the item mean and dividing by the item standard deviation prior to creating the summated scale; coefficient alpha for the scale was .74.

Disconfirmation. A three-item summated scale, designed and successfully implemented by Teas and Palan (2003), was used to measure disconfirmed expectations. The items were: A) "The number of chocolate chips in this cookie is..." where 0 = "smaller than I anticipated"; 5 = "exactly what I anticipated"; 10 = "larger than I anticipated"; B) "The richness of the cookie is..."where 0="less rich than I anticipated"; 5 = "exactly what I anticipated"; 10 = "richer than I anticipated"; and C) "The taste of the cookie is..." where 0 = "not as good as I anticipated; 5 = "exactly what I anticipated"; 10 = "better than I anticipated." Coefficient alpha for the scale was .74.

Satisfaction. Satisfaction was measured with a three-item summated bipolar scale designed by Crosby and Stephens (1987) anchored with the following pairs:

"dissatisfied" (coded 1) and "satisfied" (coded 7); "displeased" (coded 1) and "pleased" (coded 7); "unfavorable" (coded 1) and "favorable" (coded 7). Coefficient alpha for the scale was .94.

Conjoint measurement. The conjoint measurement exercise was based upon stimuli created by a 3 x 3 full factorial design (see Appendix A). Subjects indicated their preferences for nine product-price stimuli created with three different products (12-ounce can of Classic Coke, 2-ounce Snicker candy bar, or two Windsor test cookies) at three different prices (40¢, 50¢, or 60¢).

Product choice. Product choice was measured by asking subjects to indicate which of two products they wished to receive when the study was completed. Subjects chose between a 2-ounce Snicker candy bar or two Windsor test cookies. One month after the study ended, the subjects were given the product they had chosen.

ANALYSES AND FINDINGS

The hypotheses were tested via hierarchical regression procedures by estimating equations corresponding to five dependent variables: perceived performance (P), disconfirmed expectations (D), satisfaction (S), product part-worth/price part-worth range variable (R), and product choice (PC). A detailed discussion of the specification of the regression equations based upon the hypotheses is presented in Appendix B.

Disconfirmed Expectations Model Relationships

Perceived performance. The following regression equation was estimated to test hypotheses H1 and H6 (as indicated in parentheses above the appropriate term) involving perceived performance as a dependent variable:

(5)

$$P = \beta_1^{(1)} E + \beta_2^{(6)} M_1 E + \beta_3^{(6)} M_2 E + \beta_4^{(6)} M_3 E + \varepsilon$$

where:

P = perceived performance
E = expectations
M_i = a dummy variable indicating the experimental expectation measurement treatment M_i

and where:

M_1 = 1 if the respondent was exposed to the M_1 treatment; 0 otherwise.
M_2 = 1 if the respondent was exposed to the M_2 treatment; 0 otherwise.
M_3 = 1 if the respondent was exposed to the M_3 treatment; 0 otherwise; and
ε = error term.

The expected signs for $\beta_1 - \beta_4$ are positive.

Hierarchical multiple regression was used to test expression (5) by entering variable sets in the following order: 1) expectations, 2) the three measurement treatment dummy variables, and 3) the cross-product variables comprised of the expectations cross-multiplied by the dummy variable set. As indicated in Table 1, none of the variable sets was statistically significant; consequently, hypotheses 1 and 6 were not supported by the results. Neither the expectations treatment nor the expectations-by-measurement treatment cross-product variables were statistically significantly related to perceived performance.

TABLE 1

Regression Estimate of Equation (5)
Dependent Variable = Performance
(n = 181)

Hierarchical Regression Results

Explanatory Variable Set[a]	R^2 Change	F	Degrees of Freedom	Significance of F
Set 1: E	.004	.68	1	.41
Set 2: M1 M2 M3	.009	.52	3	.67
Set 3: EM1 EM2 EM3	.033	2.05	3	.11

[a] Variable sets 1 and 3 correspond to *a priori* hypotheses (H1 and H6). Variable set 2 is included in the analysis so that the M_i main effects are controlled when estimating the set 3 interaction effects.

Disconfirmed expectations. The equation specified to test the hypotheses involving disconfirmed expectations as a dependent variable (H2 and H7) is:

(6)

$$D = \beta_1 \overset{(2.a)}{E} + \beta_2 \overset{(2.b)}{P} + \beta_3 \overset{(7.a)}{M_1E} + \beta_4 \overset{(7.a)}{M_2E} + \beta_5 \overset{(7.a)}{M_3E} + \beta_6 \overset{(7.b)}{M_1P} + \beta_7 \overset{(7.b)}{M_2P} + \beta_8 \overset{(7.b)}{M_3P} + \varepsilon$$

where D = disconfirmed expectations and where the remaining terms are defined in equation (5). The expected signs for β_1, β_3, β_4, and β_5 are negative and the expected signs for β_2, β_6, β_7, and β_8 are positive.

Similar to the estimate of Equation (5), Equation (6) was estimated by sequentially entering four variable sets into the equation. The results, in Table 2a, show that the only statistically significant variable set was set 1, which included the expectations and performance variables. The follow-up estimate reported in Table 2b, which includes the expectations and performance variables as predictors of disconfirmed expectations, indicates that both expectations and performance were statistically significant ($p <$ .01). Thus, expectations were negatively related to disconfirmed expectations, and performance was positively related to disconfirmed expectations as hypothesized in H2. The R^2 for the estimate is .24. These findings support the disconfirmed expectations model; further, there was no indication of response language effects.

TABLE 2
Regression Estimate of Equation (6)
Dependent Variable = Disconfirmation
(n = 181)

2a. Hierarchical Regression Results

Explanatory Variable Set[a]	R^2 Change	F	Degrees of Freedom	Significance of F
Set 1: E P	.247	29.60	2/180	.00
Set 2: M1 M2 M3	.011	.79	3/5	.49
Set 3: EM1 EM2 EM3	.019	1.51	3/8	.21
Set 4: PM1 PM2 PM3	.002	.14	3/11	.94

2b. Estimate of Equation (6) Using the Significant Variable Sets Reported in Panel a.

Explanatory Variable	Expected Sign for B	Unstandardized B	Standardized B	T
E	–	-.20	-.36	-5.50[b]
P	+	.19	.33	5.03[b]
Constant		-.01		-.11
R^2 = .25[c]				

[a] The set 1, 3, and 4 variables are related to *a priori* hypotheses (H2 and H7).Variable set 2 is included in the equation to control for the measurement treatment main effects.
[b] $p < .01$ for a one-tailed t-test.
[c] $p < .01$ for an F-test.

Satisfaction. The equation corresponding to the H3 and H8, which involve satisfaction as a dependent variable, is:

(7)

$$S = \beta_1 \overset{(3.a)}{E} + \beta_2 \overset{(3.b)}{P} + \beta_3 \overset{(3.c)}{D} + \beta_4 \overset{(8.a)}{M_1 E} + \beta_5 \overset{(8.a)}{M_2 E} + \beta_6 \overset{(8.a)}{M_3 E} + \beta_7 \overset{(8.b)}{M_1 P} + \beta_8 \overset{(8.b)}{M_2 P} + \beta_9 \overset{(8.b)}{M_3 P} + \beta_{10} \overset{(8.c)}{M_1 D} + \beta_{11} \overset{(8.c)}{M_2 D} + \beta_{12} \overset{(8.c)}{M_3 D} + \varepsilon$$

where S = satisfaction and where the remaining terms are defined in equations (5) and (6), above. The expected signs for β_1–β_{12} are positive.

As indicated in Table 3.a, the only statistically significant variable set was set 1. The results of the follow-up estimate, including the set 1 variables, are reported in Table 3.b. Expectations, performance, and disconfirmed expectations are each statistically significantly positively related to satisfaction ($p < .05$, $p < .01$, $p < .01$, respectively) as hypothesized in $H_{3.a}$, $H_{3.b}$, and $H_{3.c}$. The findings, therefore, support the disconfirmed expectations theory; there was no indication of response language effects.

TABLE 3

Regression Estimate of Equation (7)
Dependent Variable = Satisfaction
(*n* = 181)

3a. Hierarchical Regression Results

Explanatory Variable Set[a]	R^2 Change	F	Degrees of Freedom	Significance of *F*
Set 1: E P D	.505	60.98	3/180	.00
Set 2: M1 M2 M3	.019	2.22	3/6	.09
Set 3: EM1 EM2 EM3	.002	.19	3/9	.90
Set 4: PM1 PM2 PM3	.003	.38	3/12	.77

TABLE 3 (Continued)

3b. Estimate of Equation (7) Using the Significant Variable Sets Reported in Panel a.

Explanatory Variable	Expected Sign for B	Unstandardized B	Standardized B	*t*
E	+	.07	.11	1.91[c]
P	+	.13	.19	3.36[b]
D	+	.77	.65	10.79[b]
Constant		.02		.24
$R^2 = .49$[d]				

[a] Variable sets 1, 3, and 4 are related to *a priori* hypotheses (H3 and H8). Variable set 2 is included in the equation to control for the measurement treatment main effects.
[b] $p < .01$ for a one-tailed *t*-test.
[c] $p < .05$ for a one-tailed *t*-test.
[d] $p < .01$.

Prediction of Part-Worth Estimates and Choice

Conjoint ratio variable. H4 and H9 examine the representational vs. response language effects issue with the cookie part-worth/price part-worth range ratio variable (R) as the dependent variable. The corresponding equation is:

(8)

$$R = \beta_1 \overset{(4)}{S} + \beta_2 \overset{(9)}{M_1 S} + \beta_3 \overset{(9)}{M_2 S} + \beta_4 \overset{(9)}{M_3 S}$$

where R = the cookie part-worth/price part-worth ratio and the remaining terms are defined in equation (5). The expected signs for β_1–β_4 are positive.

Table 4a, which summarizes the results, shows the only variable that was statistically significant was satisfaction. Each of the other four sets of variables was statistically insignificant when entered into the equation. The follow-up estimate, which is reported in Table 4b, indicates satisfaction explains approximately 18% of the variance of the conjoint ratio dependent variable; consumer satisfaction is positively related to the ratio variable ($p < .01$). H4 is supported.

TABLE 4

Regression Estimate of Equation (8)
Dependent Variable = Cookie Part-worth/Price Part-worth Ratio
(*n* = 181)

4a. Hierarchical Regression Results

Explanatory Variable Set[a]	R^2 Change	F	Degrees of Freedom	Significance of *F*
Set 1: S	.182	40.25	1/180	.00
Set 2: E P D	.013	.95	3/4	.42
Set 3: M1 M2 M3	.010	.75	3/7	.52
Set 4: EM1 EM2 EM3	.007	.50	3/10	.69
Set 5: PM1 PM2 PM3	.030	2.01	3/13	.12

4b. Estimate of Equation (8) Using the Significant Variable Sets Reported in Panel a.

Explanatory Variable	Expected Sign for B	Unstandardized B	Standardized B	*t*
S	+	.14	.42	6.35[b]
Constant		.80		24.03[c]
$R^2 = .18$[d]				

[a] Variable sets 1, 2, 4, and 5 are related to *a priori* hypotheses (H4 and H9). Variable set 3 is included in the equation to control for the measurement treatment main effects.
[b] $p < .01$ for a one-tailed *t*-test.
[c] $p < .01$ for a two-tailed *t*-test.
[d] $p < .05$.

Product choice. The following equation was estimated to test hypotheses 5 and 10 involving product choice:

(9)

$$PC = \frac{1}{1 + EXP(\beta_0 + \beta_1 S + \beta_2 M_1 S + \beta_3 M_2 S + \beta_4 M_3 S) + \varepsilon}$$

where PC = the probability of choosing the test cookie and where the remaining terms are defined in equations (5)–(7). The hierarchical LOGIT model estimation results, which are presented in Table 5, indicate that only variable set 1 is statistically significant, which includes consumer satisfaction as a single predictor variable. As indicated in Table 5, the follow-up estimate indicates that the satisfaction variable is statistically significantly positive in the estimate as hypothesized in H5. Moreover, there is no indication of response language effects.

TABLE 5

LOGIT Estimates: Hierarchical Estimation of Equation (9)
Dependent Variable = Product Choice
(*n* = 181)

5a. Hierarchical LOGIT Results

Predictor Variables Added[a]	-2 Log Likelihood	Improvement χ^2	Degrees of Freedom	Significance Level
Set 1: S	160.20	28.63	1	.00
Set 2: E, P, D	158.23	1.98	3	.58
Set 3: M1, M2, M3	157.44	.79	3	.85
Set 4: EM1, EM2, EM3	156.83	.61	3	.89
Set 5: PM1, PM2, PM3	151.12	1.71	3	.12

5b. Estimate of Equation (9) Using the Significant Variable Sets Reported in Panel 9a

Variable	Expected sign for β	β	Wald	Degrees of Freedom	Significance Level
S	+	.71	22.43	1	.00
Constant		-.84	17.76	1	.00

DISCUSSION

The primary purpose of this study was to extend and test the disconfirmed expectations theory of consumer satisfaction under conditions that would enable the separation of theoretically meaningful effects from measurement context effects; this study partially re-examined some of the same issues reported by Teas and Palan (2003), but also extended the previous work by utilizing a more complex experimental design. The results produced several significant findings. First, while the empirical results generally support the theoretical linkages specified in the disconfirmed expectations theory of consumer satisfaction, the findings also provide further evidence of statistically significant relationships between a) consumer satisfaction and b) product utility and choice behavior. Specifically, both the focal product's part-worth values and choice probabilities were significantly related to the respondents' satisfaction ratings, as hypothesized. Further, there was no evidence of a direct expectations effect on part-worth values or choice behaviors. Rather, the expectations effect was fully mediated by consumer satisfaction.

Second, the findings provide strong evidence that the linkages among the variables are the result of theoretically meaningful effects and not measurement context effects. That is, the results suggest that disconfirmed expectations have the effect on consumers' product choice behaviors. Indeed, the criteria identified as evidence of representational effects were met:

1. The expectations level treatment was negatively related to disconfirmation and positively related to consumer satisfaction. Interestingly, the expectations treatment did not affect perceived performance.

2. Consumer satisfaction was a statistically significant predictor of the respondents' cookie product part-worth estimates and choice probabilities. These results suggest the expectations treatment not only affected the classic variables of the disconfirmed expectations model of consumer satisfaction, but also carried over to decompositional product part-worth values and to product choice.

3. The expectations measurement manipulations were statistically insignificant in equations predicting performance, disconfirmation, satisfaction, focal product part-worths, and choice. If the measurement process had created response language effects, the location of the expectations measurement in the measurement sequence would be expected to create significant moderating effects, but no evidence of moderating effects was detected.

Limitations and Future Research.

This study does have limitations which should be noted. The ability to generalize results is limited by the student sample. However, the use of a sample of homogeneous respondents, such as students, is ideal for theory falsification procedures (Calder, Phillips, and Tybout, 1981), which was the focus of this study. Another impediment to generalization of results is the employment of a nondurable consumer product (cookie) as the product stimulus. Churchill and Surprenant (1982) have noted different variable relationships in the disconfirmed expectations theory when durable products are involved than when nondurable products are involved. Therefore, future research should examine the relationships in this study under conditions in which durable products are the focal stimuli. An unanticipated finding in this study offers another area for future research. The performance of the chocolate chip cookie was held constant—that is, even though the cookies were individually baked, they were

baked to identified specifications. However, although objective performance was held constant, perceived performance varied across informants. That is, perceived performance was found to have a statistically significant linkage with disconfirmation and with consumer satisfaction, but this impact of performance was not the result of the expectations treatment. These findings suggest that, although the objective product performance of the product was held constant, perceived performance varied across the subjects and was found to be linked to choice behavior via linkages with disconfirmation and satis- faction as predicted by the disconfirmed ex- pectations theory of consumer satisfaction.

Contributions of the Study

This study makes three major contributions to the satisfaction literature:

1) it extends the empirical literature on the disconfirmed expectations theory of consumer satisfaction by including decompositional utility and choice behavior variables;

2) it offers strong support for the strategic implications of the disconfirmed expectations theory; and

3) it further clarifies the roles of expectations, performance, disconfirmation, and satisfaction.

Extension of the disconfirmed expectations theory of consumer satisfaction.

An important contribution of this research is that it provides a thorough empirical test of the linkages between consumer satisfaction and choice behavior. Only a limited number of previous studies have included choice variables in tests of the disconfirmed expectations theory of consumer satisfaction, despite the fact that to fully understand the expectancy-disconfirmation paradigm, the transactional circumstances associated with the satisfaction formation process needs to be examined (Tse, Nicosia, and Wilton, 1990).

Moreover, this study also allows us to examine whether consumers' mental representations change when comparing performance to expectations or whether contextual comparative factors are responsible for changing how consumers map their mental representations onto rating scales, in support of previous research by Teas and Palan (2003). If the disconfirmed expectations theory is to have practical value, then it is critically important to demonstrate that statistically significant linkages among the variables are the result of representational effects and not response language effects. If the empirical support for the theory were merely the result of response language, the support would be the result of measurement artifact; and the managerial implications associated with the theory would be meaningless. The use of conjoint measurement procedures and a product choice exercise in this study enabled a detailed examination of this response language versus representational effects issue.

Strong support for the strategic implications of the disconfirmed expectations theory.

Because this study included three methods for detecting response language effects, one of which had not been previously used, and because the results support a representational effects interpretation of significant linkages among the disconfirmed expectations theory variables and not a response language effects interpretation, a second major contribution of this study is that the strategic implications of the disconfirmed expectations theory are even more strongly supported than previously. That is, the findings suggest that marketing strategies

focused on influencing consumer expectations and disconfirmation can be expected to produce effects that go beyond the core variables of the consumer satisfaction model. Therefore, marketing managers who use strategies to influence consumers' expectations can expect that these strategies also will impact choice behavior—indeed, expectations may well produce a positive effect on choice behavior through a direct linkage with satisfaction and a negative effect on choice behavior through an indirect linkage with satisfaction that is mediated by disconfirmed expectations.

Further clarification of the roles of expectations, performance, disconfirmation, and satisfaction.

Testing the disconfirmed expectations theory under conditions that enabled the separation of representational effects from response language effects (i.e., by including conjoint measurement and choice variables and by manipulating expectation level and measurement timing) also helps to further explicate the roles of expectations, performance, disconfirmation, and satisfaction. Previous research has shown that expectations are significantly linked to perceived disconfirmation (Churchill and Surprenant, 1982), performance (Churchill and Surprenant, 1982; Oliver et al., 1994), and to satisfaction (see, e.g., Churchill and Surprenant, 1982 and Oliver, 1977; 1979; and 1980a). The empirical findings of this study confirm the significant linkages of expectations to perceived disconfirmation and to satisfaction. However, a significant linkage between expectations and performance was not found even though performance was found to have a statistically significant linkage with disconfirmation and with consumer satisfaction, suggesting that perceived performance varied across respondents.

Thus, consumer expectations play a crucial role not only in determining satisfaction, but also in determining choice behavior. Strong support was found that disconfirmation and satisfaction mediate the linkage between consumer expectations and choice behavior. Consumer satisfaction, in fact, was identified as a key determinant of choice behavior— the consumer expectations effect on choice was completely mediated by consumer satisfaction. These findings confirm that there is an intricate web of relationships that determine consumers' choice behavior.

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APPENDIX A

Directions. The following are nine product choice options. Each consists of a product and a price to be paid for the product. Please scan all of the options so that you are familiar with the entire set of nine product/price options. After briefly scanning the set, use the scale at the bottom of each box containing each option to indicate your preference for each option. Use larger numbers for stronger preferences and smaller numbers for smaller preferences.

One 12-ounce can of Classic Coke
Price = $.60
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Two Windsor Test Cookies
Price = $.40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

One 2-ounce Snicker
Price = $.60
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

One 12-ounce can of Classic Coke
Price = $.40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Two Windsor Test Cookies
Price = $.50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

One 2-ounce Snicker
Price = $.40
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

One 12-ounce can of Classic Coke
Price = $.50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Two Windsor Test Cookies
Price = $.60
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

One 2-ounce Snicker
Price = $.50
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

APPENDIX B
Specification of the Multiple Regression Equations

Hypotheses H1–H3, suggest the following multiple regression equations (hypotheses are noted in parentheses above the appropriate regression term):

(B1) $$P = \overset{(1)}{\beta_1} E + \varepsilon$$

(B2) $$D = \overset{(2.a)}{\beta_1} E + \overset{(2.b)}{\beta_2} P + \varepsilon$$

(B3) $$S = \overset{(3.a)}{\beta_1} E + \overset{(3.b)}{\beta_2} P + \overset{(3.c)}{\beta_3} D + \varepsilon$$

where:

E	=	Expectations
P	=	Perceived performance
D	=	Disconfirmed expectations
S	=	Satisfaction
εs	=	Error terms
βs	=	Standardized partial regression coefficients

The expected sign for β_1 in (B1) is positive. The expected signs for β_1 and β_2 in (B2) are negative and positive respectively. The expected signs for β_1, β_2, and β_3 in (B3) are positive.

Hypothesis H4, which predicts a positive relationship between satisfaction with the test cookie and the cookie conjoint part-worth estimate, suggests the following multiple regression equation:

(B4) $$CPW = \overset{(4)}{\beta_1} S + \varepsilon$$

where CPW= Dollar Metric Cookie Part-Worth dependent variable and where the remaining terms are defined in expressions (B1), (B2), and (B3). The expected sign for β_1 is positive.

Hypothesis H5, which predicts a positive relationship between satisfaction with the test cookie and cookie choice propensity, suggests the following LOGIT model:

(B5) $$PC = \frac{1}{1 + \exp(\beta_1 S + \varepsilon)}$$

where PC = the cookie choice probability and the remaining terms are defined in (B5).
The expected sign for β_1 is positive.

Hypothesis H6, which predicts that the measurement treatment conditions will moderate the perceived performance–expectations linkage, suggests the following expansion of equation (B1):

(B6) $$P = \overset{(1)}{\beta_1} E + \overset{(6)}{\beta_2} M_1 E + \overset{(6)}{\beta_3} M_2 E + \overset{(6)}{\beta_4} M_3 E + \varepsilon$$

where P and E are defined in equation (B3) and where:

APPENDIX B (Continued)

M = a Dummy variable for the experimental expectation measurement treatment M_i, where:
- M_1 = 1 if the respondent was exposed to the M_1 treatment condition; 0 otherwise.
- M_2 = 1 if the respondent was exposed to the M_2 treatment condition; 0 otherwise.
- M_3 = 1 if the respondent was exposed to the M_3 treatment condition; 0 otherwise.

Hypotheses H7a-c, which predict that the measurement treatment will moderate the disconfirmation–expectations linkage and the disconfirmation–performance linkage, suggest the following expansion of equation (B2):

(B7)

$$D = \beta_1 \overset{(2.a)}{E} + \beta_2 \overset{(2.b)}{P} + \beta_3 \overset{(7.c)}{M_1 E} + \beta_4 \overset{(7.a)}{M_2 E} + \beta_5 \overset{(7.a)}{M_3 E} + \beta_6 \overset{(7.b)}{M_1 P} + \beta_7 \overset{(7.b)}{M_2 P} + \beta_8 \overset{(7.b)}{M_3 P} + \varepsilon$$

where all the terms are defined as in equations (B1)–(B6). The expected signs for β_4–β_6 and for β_7–β_9 are negative and positive, respectively.

Hypotheses H8a-c, which predicts the measurement treatment will moderate the linkages between (a) satisfaction and (b) expectations, performance, and disconfirmation, suggest the following expansion of equation (B3):

(B8)

$$S = \beta_1 \overset{(3.a)}{E} + \beta_2 \overset{(3.b)}{P} + \beta_3 \overset{(3.c)}{D} + \beta_4 \overset{(8.a)}{M_1 E} + \beta_5 \overset{(8.a)}{M_2 E} + \beta_6 \overset{(8.a)}{M_3 E} + \beta_7 \overset{(8.b)}{M_1 P} + \beta_8 \overset{(8.b)}{M_2 P} + \beta_9 \overset{(8.b)}{M_3 P} + \beta_{10} \overset{(8.c)}{M_1 D} + \beta_{11} \overset{(8.c)}{M_2 D} + \beta_{12} \overset{(8.c)}{M_3 D} + \varepsilon$$

where all the terms are defined as in equations (B1)–(B6). The expected signs for β_5–β_{12} are positive.

Hypothesis H9, which predicts the measurement treatment will moderate the linkage between satisfaction and the cookie conjoint measurement part-worth estimate, suggests the following expansion of equation (B4):

(B9)

$$R = \beta_1 \overset{(4)}{S} + \beta_2 \overset{(9)}{M_1 S} + \beta_3 \overset{(9)}{M_2 S} + \beta_4 \overset{(9)}{M_3 S} + \varepsilon$$

where all of the terms are defined as in equations (B1)–(B6). The expected signs for β_2–β_4 are positive.

Hypothesis H10, which predicts the measurement treatment will moderate the linkage between the respondents' satisfaction with the test cookie and their propensity to choose the cookie in the product choice exercise, suggests the following expansion of equation (B5):

(B10)

$$PC = \frac{1}{\exp\left(\beta_1 S + \beta_2 M_1 S + \beta_3 M_2 S + \beta_4 M_3 S + \varepsilon\right)}$$

where all of the terms are defined as in Equations (B1)–(B6). The expected signs for β_2–β_4 are positive.