Assessing the Use of Regression Analysis in Examining Service Recovery in the Insurance Industry: Relating Service Quality, Customer Satisfaction, and Customer Trust

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Abstract: This study explores customer service quality, satisfaction, and trust judgments within the context of service recovery and relationship marketing practices in an insurance setting. Service recovery most generally deals with complaint management. The study offers three contributions to the body of knowledge specific to the insurance industry. First, the results identify potential interactive and curvilinear influences that possess the ability to bias traditional regression results. Second, the results suggest that models of customer behaviors may vary across target markets and/or respondent pools, and even across organizations and their own agents. Finally, a research framework is presented and discussed that will assist insurance marketers in helping to overcome potential bias in regression coefficients used in competitive insurance settings. The research and managerial implications of the reported study are also presented and discussed. [Keywords: regression, interactions, curvilinear, service quality, satisfaction, trust.]

INTRODUCTION

Current thinking within service sectors such as the insurance industry suggests that the provision of service quality and the ultimate attainment of customer satisfaction and trust are fundamentally important and

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useful marketing objectives (Berry, 1999, 2000; Berry and Parasuraman, 1991; Heskett, Sasser, and Hart, 1990; Heskett, Sasser, and Schlesinger, 1997; Rust and Oliver, 1994; Zeithaml, Parasuraman, and Berry, 1990). The basis for this thinking is the recognition that post-purchase relationship considerations (as opposed to pre-purchase sales considerations) can lead to significant positive business outcomes through repeat patronage, customer loyalty, and positive word-of-mouth behaviors.

These important behavioral outcomes operate within the domain of relationship marketing. Relationship marketing most generally refers to managing customers toward long-term relationships in an effort to maximize lifetime customer value (Kumar, 1999; Parvatiyar and Sheth, 2000; Rust, Zahorik, and Keiningham, 1996).[1] Pride and Ferrell (2000) state that relationship-marketing practices serve to deepen a buyer's reliance on an organization, and as the customer's confidence in the organization grows, the firm's understanding of the customer's needs deepens. Thus, marketing efficacy improves with long-term relationships. In fact, the traditional sales perspective (transaction marketing that creates short-term customer judgments) can be considered a part of the longer-term lifetime value orientation of relationship marketing (Kotler and Armstrong, 2001). Readers interested in a comprehensive and more general treatment of relationship marketing and its implications for marketing theory and practice will find Sheth and Parvatiyar (2000) an excellent resource and review of the literature.

This study further explores service recovery efforts within the context of relationship marketing practices. Service recovery most generally relates to organizational efforts to manage customer complaints.[2] Service recovery has recently emerged as an important area of inquiry within the services literature in part because it is believed to have a significant impact on relationship marketing efforts by service marketers (Tax, Brown, and Chandrashekaran, 1998).

Despite their desire to be good relationship marketers, however, service companies across industries within the United States seem to be experiencing difficulty implementing the relationship marketing perspective (Brady, 2000). In fact, the University of Michigan's ongoing American Customer Satisfaction Index has demonstrated that average customer satisfaction ratings since 1994 for insurance concerns have dropped 6.2% for life insurance companies and 3.7% for personal property insurance companies (Fornell et al., 2000). Stafford and Wells (1996) conducted a large insurance study concerning service quality judgments of claims and found that, on average, customers' expectations greatly exceeded their perceptions of performance. Even some insurance executives appear skeptical as to how well insurance companies in general are performing in terms of

customer satisfaction and service quality goals (Katz, 1999). This trend signals trouble for insurance companies and their relationships with their customers as the competitive nature of the insurance industry continues to evolve over the coming years and the importance of relationship marketing practices and customer retention continues to grow.

This study seeks to provide an exploratory investigation into relationship marketing and service recovery efforts within an insurance setting. The study is divided into four sections. First, the theoretical underpinnings of the study are identified and discussed. Second, the research design is presented. Third, the empirical results are presented and discussed. Finally, the summary and conclusions of the research are explored.

THE THEORY UNDERLYING THE STUDY AND RESEARCH HYPOTHESES

Several constructs are currently believed to contribute significantly to relationship marketing and service recovery models. The first two important post-sales influencers of long-term marketing relationships involve service quality versus customer satisfaction judgments.[3] Oliver (1997) notes that until recently there has been some confusion in the literature concerning the conceptual domains and relative boundaries of the service quality versus customer satisfaction constructs. The confusion can be traced to the subtle interplay between performance dimensions that are used in both quality and satisfaction judgments, and the recognition that both constructs appear to exhibit short- and long-term manifestations. However, the literature in recent years has evolved toward commensurability and a much better understanding of these constructs as unique entities. This study follows Oliver's (1997) conclusions. Oliver (1997, p. 28) defines quality as "A judgment of performance excellence; thus, a judgment against a standard of excellence." Satisfaction, on the other hand, is "… the customer's fulfillment response, the degree to which the level of fulfillment is pleasant or unpleasant" (Oliver, 1997, p. 28). Thus, while closely related, these constructs represent unique theoretical entities that should be uniquely measured in marketing research inquiries.

Customer trust also is believed to play an influential role in the formation of customer perceptions of their relationships with service firms (Bredberg, 2000; Harrington, 1997; Hart and Johnson, 1999). Berry (2000) argues that the evidence suggests that relationship marketing is built on a foundation of trust. This assertion appears true for services, given their intangible nature and the prevalence of mistrust within the United States

among customers. Trust is defined herein as a willingness to rely on an exchange partner in whom one has confidence.[4]

Service recovery efforts involve post-purchase activities and can therefore also contribute to our understanding of relationship marketing practices. One gap in the literature is an understanding of how service quality and satisfaction judgments operate within the specific context of service recovery efforts and a relationship marketing orientation. A second significant gap in the existing literature concerns how customer trust contributes to such models. The current study attempts to help insurance marketers better understand the relationships between these important marketing considerations by (1) investigating how service quality and customer satisfaction operate in service recovery experiences, and (2) exploring the relative contribution of customer trust to such explanatory models.

A final theoretical concern relates to the empirical analyses used to study the relationships identified above. A review of the literature specific to the insurance industry suggests that to date, much of the effort related to post-purchase considerations and maintenance of marketing relationships has been directed toward quality scorecards (indexes) or direct predictors of customer satisfaction (Crosby and Stephens, 1987, is a notable exception). Thus, many organizations appear to be collecting measures of service quality and customer satisfaction for purposes of managerial decision-making. The data often appear to be treated as summed indices yielding overall quality and satisfaction judgment scores that are tracked across time. However, a great deal of insight is also available by investigating how these important relationship variables operate in terms of what they mean to an organization's overall relationship-marketing performance. In other words, knowledge of service quality, customer satisfaction, and trust judgments is most useful if it can lead to a better understanding of relative contributions to desired relationship outcomes.

A common way for marketers to achieve such understanding is by using (linear) statistical methods like regression analysis to relate direct measures of these judgments as independent variables to customer intentions/behaviors (such as word-of-mouth behaviors and repurchase) as dependent variables. The purposes of such analyses would include (1) measuring how well current relationship-based managerial efforts are influencing eventual customer intentions/behaviors, and (2) identifying whether attainment of customer satisfaction ***or*** a positive service quality judgment ***or*** a strong perception of trust is relatively more important from an operational perspective for a unique (competitive, demographic, or geographic) target audience. Such tradeoffs may be common, given resource constraints in today's competitive insurance settings.

The use of traditional regression analyses for such purposes is a viable methodological alternative *only as long as the independent variables are not moderating in nature*. Non-moderating variables are those variables related to criterion and/or predictor variables that exhibit no interaction with the predictor variable. A moderating variable, on the other hand, "systematically modifies the form and/or strength of the relationship between a predictor and criterion variable" (Sharma, Durand, and Gur-Arie, 1981). Traditional regression analyses in service marketing practice often appear to assume the absence of moderating relationships, instead assuming that the independent variables are simply additive in terms of their contribution to the explained variance of criterion variables.

Unfortunately, as Taylor (1997) demonstrates, service quality and customer satisfaction judgments can exhibit forms whereby customer satisfaction moderates (not mediates) the service quality → purchase intention relationship, and can even be curvilinear in nature.[5] These findings call into question the use of simple traditional regression techniques in service environments, as they may yield misleading conclusions when marketers attempt to treat such regression coefficients as importance weights.

Evidence from the emerging literature appears to generally support Taylor's (1997) results. Anderson (1998) reports results supporting a nonlinear relationship between customer satisfaction and word-of-mouth behaviors in service settings. Smith, Bolton, and Wagner (1999) found interaction (moderating) effects in an empirical analysis of a model of customer satisfaction with service encounters involving failure and recovery. Anderson and Mittal (2000) demonstrate a nonlinear relationship between customer satisfaction and customer retention. Mittal and Kamakura (2001) also report results supporting nonlinear relationships between customer satisfaction and both repurchase intentions and repurchase behaviors.

The preceding literature review has also identified the likely importance of trust in predictive models of customer-based behavioral outcomes in insurance settings. It is unclear from the literature at this time how trust specifically operates in the formation of desirable customer outcomes. What is clear is that it likely *does* operate in such models, particularly given the intangible nature of the insurance product. Some insight may be apparent in Anderson and Mittal's (2000) conceptualization of loyalty, relative to satisfaction, as involving three thresholds—defection, consideration, and trust. This conceptualization may help to theoretically account for some of the results identified above. Trust, as an indicant of higher levels of customer retention, appears part of a complex array of nonlinear relationships. It is therefore not improbable that traditional (linear) regression analyses may also be ill-suited to adequately capture relationships related

to customer trust, much as it appears so when relating service quality and customer satisfaction to relationship-based criterion variables. Thus, given the exploratory nature of the current research, it appears appropriate to suspect that trust could interact with satisfaction in a more complex manner, much as does service quality.

In summary, the current research attempts to fill the gaps in the literature identified above by conducting an exploratory investigation as to whether the more complex theoretical and empirical models hypothesized and/or validated in other settings generalize to the insurance industry. This leads to four research hypotheses:

H1: Service quality, customer satisfaction, and customer trust judgments interact in the formation of customer word-of-mouth behaviors.

H2: Service quality, customer satisfaction, and customer trust judgments interact in the formation of customer repurchase intentions.

H3: Service quality, customer satisfaction, and customer trust judgments are best captured by curvilinear regression methods in the formation of customer word-of-mouth behaviors.

H4: Service quality, customer satisfaction, and customer trust judgments are best captured by curvilinear regression methods in the formation of customer repurchase intentions.

THE RESEARCH DESIGN

In this section the statistical methods employed in the research are first presented and discussed. Second, the measures used in the current research are articulated. Finally, the sampling strategy and obtained sample are identified and considered.

The Statistical Techniques Used in This Study

The preceding literature review identifies the possibility of moderating and curvilinear relationships among the variables studied herein. The subject is important because the presence of such phenomena leads to biased regression weights (see Aiken and West, 1991 for a detailed discussion of the arguments in this section).

$$\hat{Y} = b_1X + b_2Z + b_3W + b_0 \quad (1)$$

Equation (1) presents the traditional regression model for relating three independent variables to a criterion variable. Here, the regression of Y (e.g., repurchase intention) on X (e.g., quality) is independent of and additive to Z (e.g., satisfaction) and W (e.g., trust). Thus, the derived regression weights often are treated as importance weights suggesting which independent variable contributes most to the explained variance of the criterion variable. In our case, such a methodological strategy would involve insurance marketers using this simple form of regression to identify which of the independent variables (i.e., quality, satisfaction, or trust) is "most important" to word-of-mouth behaviors or repurchase intentions.

However, the presence of an XZ interaction means that the predictor Z is conditional (now depends) on the value of X. In other words, there is a different regression of Y on Z at each value of X. So the presence of interaction terms, for centered variables, produces regression coefficients that represent the conditional effect of one independent variable at the mean of the second independent variable.

This problem is further complicated by the presence of any higher-order relationships, such as hypothesized in the current research. Aiken and West (1991) argue that in order to assess the possibility that curvilinear relationships exist, specific higher-order terms must be deliberately built into regression equations. If the higher-order terms are omitted, nonlinearity will not be detected even when it exists. This affects the interpretation of regression coefficients in the following manner (Aiken and West, 1991, p. 65):

> When X bears a linear relationship to Y (i.e., no higher-order term containing X appears in the equation), a one-unit change in X is associated with a one-unit change in Y. In contrast, when X bears a curvilinear relationship to Y (i.e., there is a higher-order term containing a power of X in the equations such as X^2), then a change in Y for a one-unit change in X depends on the value of X.

Thus, the failure to account for potential interactive and/or curvilinear relationships makes *the interpretability of regression weights that do not account for true interactions and/or curvilinear influences potentially biased*, and not valid as importance-weight measures in explaining relationship outcomes. Aiken and West argue that, in a regression context, hypotheses about nonlinear and interactive effects may be tested through a general model comparison procedure that forms the basis for Taylor's (1997) framework.

Step 1: Taylor (1997) first suggests a consideration of the properties of raw data typically collected in service settings. Consistent with Aiken and West (1991), he argues for mean-centering the independent variables prior to analysis to reduce potential skew and multicollinear influences and to

ensure that all tests of the gain in prediction by the regression equations subsequently used are scale invariant. This suggestion is consistent with Peterson and Wilson's (1987) finding that self-report measures of customer satisfaction invariably possess distributions that are negatively skewed and possess a positivity bias. The *dependent* variables are not mean-centered in the current research. Thus, the first methodological task in the proposed framework is to mean-center the independent variables to ensure appropriate distributional properties for purposes of the proposed regression analyses.

Step 2: The second step in the proposed framework involves testing for interactions between the independent variables. The appropriate regression equation for three potentially interacting independent variables requires that all first- and second-order terms be included in the equation (see equation 2 below).

$$\hat{Y} = b_1X + b_2Z + b_3W + b_4XZ + b_5XW + b_6ZW + b_7XZW + b_0 \qquad (2)$$

Here, the test of the b7 coefficient indicates whether the three-way interaction between service quality (X), customer satisfaction (Z), and trust (W) is significant. Any two-way interactions (e.g., XZ) represent conditional interaction effects, which are evaluated when the third variable (W) equals 0. Thus, with centered variables, the two-way interactions are interpreted as conditional interaction effects at the mean of the variable not involved in the interaction (e.g., the conditional XZ interaction at the mean of W).

Aiken and West (1991) suggest investigating for the presence of interaction effects using a step-down approach prior to deciding which overall interaction model to assess. They argue that the step-down approach handles issues related to scale invariance and also helps ensure that lower-order effects will be interpreted as conditional or average effects once higher-order effects have been shown to exist. They further argue that this method is consistent with the position that first-order terms should not be independently tested if there is a significant interaction. This is the method that is implemented herein.

$$\hat{Y} = b_1X + b_2X^2 + b_3X^3 + b_0 \qquad (3)$$

Step 3: Taylor next suggests investigating for evidence of any theory-based curvilinear properties of the independent variables. That is, he suggests addressing the question of whether the independent variables should be considered first-order (i.e., no exponent) or higher-order (i.e., curvilinear). The weight of the literature to date suggests that the relation-

ships between (1) both service-quality (S-shaped zones of tolerance) and customer-satisfaction (S-shaped curves) judgments and (2) customer behavioral outcomes are likely best characterized by cubed functions (Taylor, 1997; Oliver, 1997).[6] Thus, equation (3) above represents the appropriate model to assess in Step 3.

Aiken and West (1991) suggest a method for conducting such analyses whereby one simplifies higher-order regression models on a term-by-term basis. The procedure begins by first considering the highest-order term in the regression equation and then stepping down through the hierarchy following an algorithm for scale-independent terms. The procedure concludes when all nonsignificant higher-order terms have been eliminated from the equation. Jaccard, Turrisi, and Wan (1990) suggest that one way to begin such an analysis is by forming two regression equations, one based on the linear model of a single independent variable and the other based on a higher-order model. The outcome of comparing these models is the identification of which order curvilinear variable is best suited for forming the initial regression equation necessary to implement Aiken and West's (1991) proposed step-down method of model identification.

Step 4: The final step in the proposed framework involves constructing regression models that adequately capture any identified interaction and/or curvilinear influences in the data set. Aiken and West (1991) provide a detailed discussion of how to determine which regression model best captures true main effects by accounting for true higher-order and interaction effects.

Researchers are cautioned to consider the potential impact of multicollinearity between the independent variables, given the multiplicative nature of many of the derived variables used in the proposed regression analyses. Two commonly used indices are used in the research to assess potential multicollinearity in the regression models: the tolerance and variance inflation factor (Hair, Anderson, Tatham, and Black, 1995). Hair et al. suggest that the commonly accepted standards for these indices include tolerance values $\leq .10$ and variance inflation factors (VIF) scores of ≥ 10 to denote high collinearity.

A final consideration involves which form of regression coefficient to interpret. The literature generally agrees that only the unstandardized regression coefficients should be used in such analyses, particularly if the purpose is to interpret regression results as importance weights (Aiken and West, 1991; Mendenhall and Sincich, 1993).[7]

The Measures Used in the Current Research

Direct measures of the relevant constructs are used in the current research (see Appendix A). The measures are captured relative to custom-

ers' judgments of both the company and the agent's performance as independent models. That is, each hypothesis is tested relative to customer perceptions of the company itself (CX), and then to the company's agents (AX). The first six measures are independent variables and include judgments as to service quality (CQ and AQ), overall customer satisfaction with the service recovery process (CS and AS), and overall trust of the respondent of the insurance firm or its agent (CT and AT).

Dependent variables for purposes of analysis derive from the literature and include behavioral intentions related to word-of-mouth behaviors (two alternative measures of recommendation denoted by RC1, RC2, RA1, and RA2) and a measure of overall intention to repurchase (RPI) the auto insurance product. It is important to recognize that the recommendation-related dependent variables differ in that the first (RC1 and RA1) are typical direct predictors of intended customer behaviors, whereas the second (RC2 and RA2) are more of a behavioral intention measure based on advocacy of the company or agent to others. Thus, both measures capture intended behavioral intentions, but in different ways.[8, 9]

The Sampling Frame and Obtained Sample

The data are from a large Midwest insurance company's annual study of customer satisfaction with the service recovery process associated with their auto insurance product. The participating firm employs agents who are employees, and does not offer policies via independent agents. The data were collected by an independent professional marketing research firm using telephone-based surveys of the firm's existing customer base. Some 1,808 policyholders completed the overall survey, with 45.8% stating that they perceived some problem with their relationship with the participating company or its agent in the last year (see Table 1). Some of the complaints that were noted included perceptions that the premiums were too high (17.9%), having to play "phone tag" with their agent (9.5%), having to pay service charges (14.1%), and a variety of information-based issues. In addition, 24.2% of the respondent pool stated that they had submitted an auto insurance claim within the last year. Readers will note from Table 1 that most of the respondents (67.7%) have enjoyed a relationship with the participating insurance firm for ten years or more.[10]

In the end, 165 usable surveys were obtained for analyses. The reduced number is an outcome of the skip pattern used to collect the data. Only people who first experienced a problem and then responded to all of the research variables were included in the study. Table 2 presents the characteristics of the (raw) obtained variables used for purposes of analyses.

Table 1. Sample/Demographic Characteristics (*N* = 165)

Variable	Characteristics
Sample Behavioral Characteristics	
Number of policies owned with XYZ Company	One: 18.9%
	Two: 33.4%
	Three: 24.3%
	Four or more: 23.4%
Length of relationship with XYZ Company	Less than two years: 6.4%
	Two to ten years: 25.9%
	Ten years or more: 67.7%
Experienced a problem over the last 12 months?	Yes: 45.8%
	No: 54.2%
Submitted auto insurance claim in the last year?	Yes: 24.2%
	No: 75.8%
Complained about most serious problem in the last 12 months?	Yes: 25.4%
	No: 74.6%
Of those who did complain, what was the number of contact times it took to resolve any problems?	One: 32.2%
	Two: 23.1%
	Three: 22.4%
	Four or more: 22.3%
Of those who did complain, how long did it take XYZ Company to resolve the issue?	Immediately: 23.4%
	Less than 1 day: 7.3%
	Less than 2 days: 10.9%
	Between 3 and 7 days: 17.5%
	More than 7 days: 40.9%
Sample Demographics Characteristics	
Gender	Males: 43%
	Females: 57%
Education level	High school graduate or less: 38.1%
	Some college: 25.6%
	College graduate: 25.7%
	Graduate education: 10.6%
Marital status	Married: 80.6%
	Other: 19.4%
Age	Less than 34 years old: 17.4%
	35–44 years old: 26.3%
	45–54 years old: 27.5%
	55–64 years old: 16.8%
	65 or older: 12.1%
Household income	Under $35,000: 21.6%
	$35,000 to under $50,000: 25.1%
	$50,000 to under $75,000: 29.1%
	$75,000 to under $100,000: 16.2%
	$100,000 or greater: 8.1%

Table 2. Obtained Variable Characteristics

Variable[1]	Mean	Standard Error	Standard Deviation	Skew	Kurtosis
CS	2.61	.110	1.41	.556	–.976
CQ	2.32	.082	1.05	.180	–1.182
CT	2.00	.077	.99	.981	.483
AS	2.07	.100	1.30	1.115	.137
AQ	2.16	.086	1.10	.448	–1.142
AT	1.98	.090	1.16	1.240	.777
RC1	2.18	.092	1.18	.926	.051
RC2	2.17	.060	.77	.509	.173
RA1	2.21	.100	1.30	.892	–.290
RA2	2.19	.065	.84	.306	–.457
RPI	1.68	.068	.88	1.172	.541

[1]See Appendix A for a description of these variables. $N = 165$ for all analyses. Please note that lower numbers reflect "better" judgments (1 = best, 4/5 = worst).

RESULTS

This section presents the results of hypothesis testing using the identified research framework. Table 3 presents the results associated with the empirical assessment of Hypotheses 1 and 2, which address the potential for interaction effects in the relationships between service quality, customer satisfaction, and customer trust. Two steps are necessary to test the initial two research hypotheses. First, a simple traditional linear regression analysis must be conducted in order to establish a baseline explained variance via Equation (1) above. Second, we use Equation (2) to test whether two- or three-way interactions exist.

In Table 3, each criterion variable has two associated regression equations (see the column titled "Predictor Equation"). The first equation represents a simple traditional regression analysis whereby service quality, customer satisfaction, and customer trust independent variables are regressed upon the criterion variable (see equation [1]). The second regression equation represents the statistically significant variables when we begin regression analysis by first looking at potential interaction effects, and then evaluating the main effects using Equation (2). Readers should be aware that potential multicollinear influences were not found in any of the regression equations reported in Table 3.

Table 3. GlobalTest for Presence of Three-Way Interaction Between Service Quality, Consumer Satisfaction, and ConsumerTrust Independent Variables in the Formation of Relationship-Related Intentional Outcomes

Criterion[2]	Predictor Equation[1]	R^2	ΔR^2	Standard Error
Company-Related Consumer Perceptions (Equation 1 vs Equation 2)				
RC1	2.176 + .298[c](CQ) + .543[c](CT)	.428	.557	.90
	2.202 + .308[c](CQ) + .539[c](CT)	.436		.91
RC2	2.169 + .161[b](CQ) + .371[c](CT)	.372	.9615	.62
	2.215 + .165[b](CQ) + .403[c](CT)	.387		.62
RPI	1.679 + .143[c](CS) + .373[c](CT)	.395	1.694	.69
	1.683 + .150[b](CS) + .342[c](CT) + .114[a](CS*CT)	.420		.68
Agent-Related Consumer Perceptions (Equation 1 vs Equation 2)				
RA1	2.206 + .497[c](AQ) + .461[c](AT)	.596	3.496	.83
	2.189 + .649[c](AQ) + .364[c](AT) – .128[a](AQ*AS) + .172[b](AQ*AT)	.629		.81
RA2	2.194 + .293[c](AQ) + .350[c](AT)	.618	2.283	.52
	2.292 + .302[c](AQ) + .306[c](AT) – .102[b](AQ*AS)	.639		.52
RPI	1.679 + .190[c](AS) + .260[c](AT)	.412	3.886	.68
	1.684 + .156[a](AS) + .196[a](AQ) – .111[a](AQ*AS) + .160[c](AS*AT)	.465		.66

[1] = Please note that non-significant regression weights are omitted from this table to aid in readability.
[2] = Please turn to Appendix A for a presentation of the criterion variables.
[a] $p = .05$
[b] $p = .01$
[c] $p = .001$

The test for determining if any identified statistically significant interaction effects in Table 3 are of consequence involves assessing an F-test of the increment in proportion of variance accounted for by the interaction equation (Aiken and West, 1991; Lomax, 1992). The test statistic for this purpose can be found via Equation 4:

$$F = \frac{[(R^2_{Full} - R^2_{Reduced})/(m_2 - m_1)]}{[(1 - R^2_{Full})/(n - m_2 - 1)]} \quad (4)$$

Where: R^2_{Full} = The explained variance for the second equation in Table 3

$R^2_{Reduced}$ = The explained variance for the first equation in Table 3

m_2 = The number of predictors in the full model (seven in the case of Step 2 in the current research)

m_1 = The number of predictors in the reduced model (three in the case of Step 2 in the current research)

N = Sample size which is 165 in all cases for Table 3.

Equation (4) results can be found in the column titled "ΔR^2" in Table 3. This study adopts the more conservative standard of $p \leq .01$ to assess the results associated with Equation (3). Thus, the standard that we will use to assess the numbers associated with ΔR^2 is $F_{.01}$ is 3.32.[11]

Returning to Table 3, we see that interaction effects are apparent for predicting RA1 and RPI, but not for any of the other criterion variables. The conclusion that can be drawn is that the appropriate regression model for such investigations may very well be setting, sample, and/or model dependent. In other words, it is likely that different models may be appropriate for different samples and research variables. This result is intriguing, although not entirely surprising. Danaher (1998) demonstrates that customer heterogeneity exists in service environments, and that differing customer segments can emphasize different service attributes.

We now have a better reflection of the true unique contributions of the first-order terms (e.g., CQ, CS, and CT) having accounted for the conditional effects necessarily involved in theoretically nonlinear and interactive relationships. When theoretically appropriate interaction effects are accounted for, the unstandardized regression weights change, sometimes remarkably. For example, the traditional regression equation predicting RA1 for agents based on Equation [1] suggests that quality and trust judgments are essentially equally important, and satisfaction judgments do not add to the explained variance of the criterion variable. However, the appropriate equation that does account for interaction effects (based on Equation [3]) suggests not only the primacy of service quality judgments over customer trust when customers evaluate their agent representatives, but that interaction effects are also important and can remarkably change the interpretation of the derived regression equation.

The equation predicting RPI for agent-related customer perceptions is equally altered. In the biased first equation, customer trust is identified as somewhat more important than customer satisfaction in predicting future repurchase intentions. The second, unbiased equation identifies the rela-

tive primacy of service quality judgments and the interactive nature of customer satisfaction judgments.[12]

Table 4 presents the results associated with the global tests for hypothesized curvilinear effects (see Equation [3]). Here again, the appropriate test for assessing whether the model identified as Equation (3) above *meaningfully* adds to our understanding of the models explaining the criterion variables is an F-test of ΔR^2. Second-order effects were found *relative to the satisfaction* in five of the six criterion variables assessed in the current research across the research settings. These findings are consistent with the previously discussed emerging belief that higher-order effects may be prevalent in models relating relationship influences to behavioral intentions, particularly as they relate to the satisfaction construct. Thus, evidence is presented supporting Hypotheses 3 and 4 for one of the three independent variables.

$$\hat{Y} = b_1X + b_2Z + b_3W + b_4Z^2 + b_5XZ^2 + b_6WZ^2 + b_0 \quad (5)$$

$$\hat{Y} = b_1X + b_2Z + b_3W + b_4Z^2 + b_5XZ^2 + b_6WZ^2 + b_7XZ + b_8XW + b_{9ZW} + b_0 \quad (6)$$

To this point, evidence has been presented supporting the presence of interaction and curvilinear effects between the predictor and criterion variables in the research models. The final step (Step 4) is to combine the identified effects into full regression models that more appropriately capture the identified influences. Our investigation of interaction effects in Table 3 suggests the presence of interaction effects in equations related to customers' perceptions of agents, but not relative to perceptions of the company itself. Thus, Equation (5) appears as the appropriate regression equation to assess combined curvilinear and interaction effects for company-related customer perceptions, and equation (6) appears as the appropriate regression equation to assess combined curvilinear and interaction effects for agent-related customer perceptions.

Table 5 presents the results of the analyses depicted in Equations (5) and (6) above. Here again, the more conservative standard of $p \leq .01$ is used to assess the results. Thus, the standard that we will use to assess the numerical standard for $F_{.01}$ associated with Δ^2 for company-related customer perceptions is 3.78, and is 2.80 for the models depicting agent-related customer perceptions. The results in Table 5 suggest that while every full equation added to the explained variance of the prediction equation, only relative to customers' stated future repurchase intentions with the company-related models was the contribution to the explanatory model suffi-

Table 4. Tests for Presence of Curvilinear Effects Between Independent Variables and Relationship-Related Intentional Outcomes

Criterion Variable[2]	Predictor Equation[1]	R^2	F-Test of ΔR^2	Standard Error
Company-Related Consumer Perceptions (Equation 1 vs Equation 3)				
RC1	2.175 + .581[c](CQ)	.267		1.02
	2.131 + .573[c](CQ)	.268	.624	1.02
	2.177 + .275[c](CS)	.107		1.08
	2.551 + .420[c](CS) – .189[c](CS)^2	.178	.000	10.8
	2.176 + .722[c](CT)	.368		.94
	2.176 + .723[c](CT)	.368	.992	.94
RC2	2.169 + .330[c](CQ)	.203		.69
	2.187 + .333[c](CQ)	.204	.766	.69
	2.170 + .132[b](CS)	.059		.75
	2.434 + .234[c](CS) – .134[c](CS)^2	.142	.000	.72
	2.170 + .451[c](CT)	.338		.63
	2.173 + .454[c](CT)	.338	.935	.63
RPI	1.678 + .368[c](CQ)	.196		.79
	1.565 + .349[c](CQ)	.209	.100	.79
	1.680 + .271[c](CS)	.189		.79
	1.857 + .340[c](CS) – .0898[a](CS)^2	.219	.015	.79
	1.679 + .500[c](CT)	.321		.72
	1.666 + .488[c](CT)	.322	.786	.73
Agent-Related Consumer Perceptions (Equation 1 vs Equation 3)				
RA1	2.203 + .833[c](AQ)	.498		.92
	.2093 + .788[c](AQ)	.502	.216	.92
	2.205 + .550[c](AS)	.305		1.09
	2.525 + .824[c](AS) – .190[c](AS)^2	.359	.000	1.05
	2.209 + .786[c](AT)	.490		.93
	2.233 + .810[c](AT)	.491	.726	.93
RA2	2.192 + .533[c](AQ)	.486		.60
	2.211 + .541[c](AQ)	.487	.734	.61
	2.193 + .350[c](AS)	.295		.71
	2.482 + .597[c](AS) – .171[c](AS)^2	.400	.000	.65
	2.196 + .531[c](AT)	.536		.57
	2.274 + .613[c](AT)	.546	.055	.57
RPI	1.677 + .416[c](AQ)	.273		.75
	1.495 + .341[c](AQ) + .152[a](AQ)^2	.302	.011	.74
	1.678 + .376[c](AS)	.313		.73
	1.739 + .428[c](AS)	.319	.315	.73
	1.681 + .440[c](AT)	.338		.72
	1.695 + .445[c](AT)	.338	.775	.72

[1] = Please note that non-significant regression coefficients are omitted from this table to aid in readability.
[2] = Please turn to Appendix A for a presentation of the criterion variables.
[a] $p = .05$
[b] $p = .01$
[c] $p = .001$

Table 5. Test for Presence of Both Curvilinear and Interaction Effects Between Service Quality, Consumer Satisfaction, and Consumer Trust Independent Variables in the Formation of Relationship-Related Intentional Outcomes

Criterion[2]	Predictor Equation[1]	R^2	ΔR^2	Standard Error	Durbin-Watson
Company-Related Consumer Perceptions (Equation 1 vs Equation 5)					
RC1	$2.176 + .298^{c}(CQ) + .543^{c}(CT)$	.428	1.322	.90	2.049
	$2.340 + .285^{a}(CS) + .472^{c}(CT)$	.442		.90	
RC2	$2.169 + .161^{b}(CQ) + .371^{c}(CT)$	.372	1.911	.62	1.853
	$2.316 + .352^{c}(CT) - .074^{a}(CS)^2$	.394		.61	
RPI	$1.679 + .143^{c}(CS) + .373^{c}(CT)$	.395	4.745	.69	2.040
	$1.741 + .230^{a}(CQ) + .174^{c}(CS) - .059^{a}(CQ*CS^2) + .104^{c}(CT*CS^2)$	.445		.67	

[1] = Please note that non-significant regression weights are omitted from this table to aid in readability.
[2] = Please turn to Appendix A for a presentation of the criterion variables.
[a] $p = .05$
[b] $p = .01$
[c] $p = .001$

ciently significant to merit further consideration. Unfortunately, collinearity indices precluded the interpretation of the agent-related models relative to Equation (6).

SUMMARY AND CONCLUSIONS

Evidence has been presented for the presence of interaction effects in models predicting customer outcomes based on agent-related customer perceptions. Theoretically suspected curvilinear effects were also identified relative to customer satisfaction with both their insurance company and its agents. What do the presence of the identified interactive and curvilinear influences found in this study mean in terms of managerial decision-making practices in insurance settings? The ultimate purpose of marketing research is to aid in the process of managerial decision-making. Good decision-making can only be built on a foundation of true insights from marketing research data. The identified relationships suggest that not testing for these influences can lead to situations where regression results

can be misleading. Thus, the results suggest a more rigorous approach in using regression analysis to model marketing relationships in insurance settings. One practical outcome of this study has been the demonstration of a framework that will provide insurance marketers with a tool for minimizing potential bias when using regression analyses relative to their own competitive settings.

The need for implementing the proposed framework is further supported by the varied findings across regression models, dependent variables, and research settings. The results suggest that a single explanatory model of customer behaviors related to the organization itself versus its agents may vary across target markets and/or respondent pools. Again, these results are not totally unexpected given the presence of customer heterogeneity in service settings. Thus, it may be that such explanatory models differ when explaining perceptions of the organization versus its own agents even when the same variables are used based on the same general underlying theories. Therefore, there is an increased need to carefully assess models of customer behaviors in insurance settings specific to unique target groups, competitive settings, and dependent variables.

This study is exploratory in nature, but lays the foundation for the development of future research related to relationship marketing practices and service recovery specific to insurance concerns. First, the explained variances associated with the identified criterion variables in the current research suggest that service quality, satisfaction, and trust judgments help account for some of the explained variance in relationship-based behavioral intentions. Future research should consider which additional variables could further increase such explained variance. For example, loyalty, value, and perceived risk all may add explanatory power to these models.

Second, there are numerous statistical methodologies for assessing "importance" in models. There is a need for full, unbiased methodologies for assessing the "importance" of relevant relationship-based customer variables in research models for the insurance industry. Taylor (1995) provides a useful discussion of how "importance weights" might best be derived in research models such as investigated herein. Danaher (1998) also identifies alternative methods. Future research should consider assessing competing methodologies for developing importance weights for the insurance industry.

Third, all of the relevant constructs measured in the current research were assessed at the global level of analysis. In reality, each of these constructs likely possesses very complex, multidimensional characteristics. For example, it is well established that customer satisfaction possesses both cognitive and affective dimensions (Oliver, 1997). Service quality and customer trust judgments are generally accepted to be multidimensional

in nature (Johnson and Grayson, 2000; Oliver, 1997). Investigations in insurance settings should consider the development and use of insurance-specific measures of these constructs that more fully capture their associated domains.

Fourth, a useful extension of the current research would be to move toward assessments of how customers strengthen their relationships within the insurance industry (Christopher, Payne, and Ballantyne, 1991; Narayandas, 1998; White and Schneider, 2000). Readers are reminded that there were two measures of word-of-mouth behaviors in the current research. The first measure (RC1 and RA1) represented a typical Likert-style recommendation measure. However, the second measure (RC2 and RA2) represented an advocacy form of word-of-mouth behavior. Such investigations would be a useful inquiry for insurance marketers to help ascertain how to turn customers into true advocates.

Fifth, the area of service recovery is only beginning to be understood in the general services literature. For example, Boschoff (1999) reports an initial scale for measuring satisfaction with transaction-specific service recovery called RECOVSAT that could be assessed and modified to assist relationship marketers in the insurance industry. In fact, an opportunity exists for insurance marketers to develop and investigate models related to service recovery as a contribution to the general services literature as well as insurance-specific settings.

Finally, it is noteworthy that the current sample suggests that respondents in the insurance industry may not express complaining behaviors even though they have long-term relationships with their insurance carrier. This is very troubling as it precludes the ability of insurance concerns to proactively identify and rectify threats to their relationships with their most valued customers. Future research should verify this finding and seek ways to encourage customers to work with their insurance providers to increase the management of long-term customer relationships.

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NOTES

[1] The term *relationship marketing* can be formally defined as "the ongoing process of engaging in cooperative and collaborative activities and programs with immediate and end-user cus-

tomers to create or enhance mutual economic value at reduced cost" (Parvatiyar and Sheth, 2000).

[2] Tax and Brown (2000, p. 272) formally define *service recovery* as "a process that defines service failures, effectively resolves customer problems, classifies their root(s), and yields data that can be integrated with other measures of performance to assess and improve the service system." They further state the recognition that much of the services literature to date has essentially equated service recovery with complaint management.

[3] Readers interested in a comprehensive treatment of service quality versus customer satisfaction and its implications for marketing theory and practice will find Oliver (1997) an excellent resource and summary of the extant literature.

[4] Berry (2000) relies on the following definition of *trust* in his considerations: *Trust* is a willingness to rely on an exchange partner in whom one has confidence (Moorman, Deshpande, and Zaltman, 1993). Narayandas (1998) similarly argues that customers are more comfortable building relationships with trustworthy vendors (Mooreman, Zaltman, and Deshpande, 1992). However, readers should be aware that the conceptual domain of customer trust continues to evolve in the service literature. Recent evidence suggests a multidimensional nature of the construct and the likelihood that at least four types of trust may operate within service contexts: generalized, system, process-based, and personality-based (see Johnson and Grayson, 2000). Further, these authors argue that the four types of trust can be difficult to distinguish and may operate differentially, given the strength of marketing relationships. Future empirical research will shed light on the nuances of the conceptual domain of trust and eventually produce a reliable and valid multidimensional operationalization of customer trust. However, for purposes of the current research, which relies on direct predictors of trust, we will adopt the generally accepted global definitional positions of Berry (2000) and Narayandas (1998).

[5] This position is not inconsistent with Oliver's (1997) Encounter Quality—Influences—Satisfaction Model.

[6] Cubed functions exhibit two "kinks" in the curve leading to an S-shaped characterization.

[7] One reason is because the standardized (beta) coefficients are affected by additive transformations such as mean-centering, whereas the unstandardized regression coefficients are not. A second concern involves the potential bias inherent in standardized regression coefficients as a function of issues related to standard errors when not accounting for the discussed influences. A final consideration involves Bring's (1994) argument that standardized multiple regression coefficients are generally incorrectly calculated and assertion that the correct method for standardizing regression coefficients is to use partial standard deviations instead of ordinary standard deviations.

[8] The direct measures used in this study are typical of those used in academic and managerial practice in service settings, employing Likert-type items for service quality, customer satisfaction, word-of-mouth behaviors, and repurchase intention. The items used to measure trust and the second recommendation variable (RC2 and RA2) derive from Narayandas (1998)

[9] Readers may note that some of the scales involve four points, while others involve five points. The practice of using measures scaled with a differing number of points is not problematic for purposes of regression analysis in the current research, even though the reported results do not rely on standardized regression coefficients. This exploratory study attempts only to ascertain the presence or absence of statistically significant curvilinear and/or interaction effects, and not to derive *specific* predictive equations as to *how much* the relevant variables differentially contribute to future predicted outcomes. Thus, the final derived regression equations are not to be interpreted as suggesting that a unit increase in satisfaction, quality, or trust will yield a unit increase in repurchase intention. Rather, the final regression results are to be interpreted as simply identifying which variable are relatively more important in terms of the explained variance of the criterion variable when the independent variables are appropriately considered jointly after capturing theoretically-based curvilinear and interaction effects.

[10] As an interesting aside, only 25.4% of respondents answered affirmatively when queried as to whether they had complained to either the company or the insurance agent about their per-

ceived problem. Stephens (2000, pp. 288–289) states that: "An unfortunate finding of virtually every study of customer complaining is that many dissatisfied buyers do not say anything to the company, store, or the service provider. Unhappy customers may very well speak up, but only privately, to warn friends and family. At the same time, they frequently resolve not to buy the brand again. A lack of customer candor is a problem for businesses because they never learn the problem, get a chance to fix it, or preserve customer loyalty. More importantly, they do not have the opportunity to diagnose the problem to see if it indicates a greater issue that could be solved through better marketing strategy." Thus, the evaluation of the obtained sample for the current research suggests that customers within the insurance industry may well exhibit some of the undesirable relationship-based customer patterns of behaviors found in other service industries that have been studied.

[11] There are 12 separate regression equations associated with Table 3. Kleinbaum et al. (1998) suggest that when evaluating several statistical tests from the same data set, the probability of making a Type I error will be larger than α. The authors suggest considering a Bonferroni correction, α/k (where k is the number of tests to assessed). However, the authors further state that this correction can lead to such a small rejection region for each individual test that the power of each test may be too low to detect important deviations from the null hypothesis being tested. For purposes of the current research, this predicament is further complicated by the inherent difficulty detecting true interactions in field studies (McLelland and Judd, 1993). Marketing research results of this nature are typically interpreted using a standard of $\alpha \leq .05$.

[12] Readers may be puzzled by the presence of negative regression coefficients associated with some of the interaction terms. These are not to be interpreted as being "negatively related" to the criterion variable. Rather, these signs refer to the nature of the interactions between the independent variables.

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APPENDIX A:
THE MEASURES USED IN THE CURRENT RESEARCH

Independent Variables

Satisfaction – Company (CS): Which ONE of the following statements best describes your feelings about the action taken by XYZ Company to resolve the problem you consider most serious?

1 = I was completely satisfied
2 = I was not completely satisfied, but the action taken was acceptable
3 = I was not completely satisfied, but some action was taken
4 = I was not at all satisfied with the action taken
5 = I was not at all satisfied because no action was taken

Quality – Company (CQ): Based on your overall experience, which ONE of the following statements best describes your feelings about the quality of service provided by XYZ Company when handling your most serious problem?

1 = I would rate the quality of service associated with the handling of my problem as excellent.
2 = I would rate the quality of service associated with the handling of my problem as good.
3 = I would rate the quality of service associated with the handling of my problem as acceptable.
4 = I would rate the quality of service associated with the handling of my problem as unacceptable.

Trust – Company (CT): Which ONE of the following statements best describes your trust in XYZ Company' ability to resolve any problems you may encounter with your auto insurance?

1 = I completely trust XYZ Company to resolve any problems I may encounter with my auto insurance.
2 = I somewhat trust XYZ Company to resolve any problems I may encounter with my auto insurance.
3 = I neither trust nor distrust XYZ Company to resolve any problems I may encounter with my auto insurance.
4 = I somewhat distrust XYZ Company to resolve any problems I may encounter with my auto insurance.

5 = I completely distrust XYZ Company to resolve any problems I may encounter with my auto insurance.

Satisfaction – Agent (AS): Which ONE of the following statements best describes your feelings about the action taken by your XYZ Company agent to resolve the problem you consider most serious?

1 = I was completely satisfied
2 = I was not completely satisfied, but the action taken was acceptable
3 = I was not completely satisfied, but some action was taken
4 = I was not at all satisfied with the action taken
5 = I was not at all satisfied because no action was taken

Quality – Agent (AQ): Based on your overall experience with your XYZ Company agent, which ONE of the following statements best describes your feelings about the quality of service provided by your XYZ Company agent when handling your most serious problem?

1 = I would rate the quality of service associated with the handling of my problem as excellent.
2 = I would rate the quality of service associated with the handling of my problem as good.
3 = I would rate the quality of service associated with the handling of my problem as acceptable.
4 = I would rate the quality of service associated with the handling of my problem as unacceptable.

Trust – Agent (AT): Which ONE of the following statements best describes your trust in your agent's ability to resolve any problems you may encounter with your auto insurance?

1 = I completely trust my agent to resolve any problems I may encounter with my auto insurance.
2 = I somewhat trust my agent to resolve any problems I may encounter with my auto insurance.
3 = I neither trust nor distrust my agent to resolve any problems I may encounter with my auto insurance.
4 = I somewhat distrust my agent to resolve any problems I may encounter with my auto insurance.
5 = I completely distrust my agent to resolve any problems I may encounter with my auto insurance.

Dependent Variables

Recommend – Company 1 (RC1): Based on your overall experience, how likely is it that you would recommend XYZ Company auto insurance to a friend or colleague, if they asked you to recommend an auto insurance company?

1 = Definitely would recommend
2 = Probably would recommend
3 = Might or might not recommend
4 = Probably would not recommend
5 = Definitely would not recommend

Recommend – Company 2 (RC2): Just to clarify your answer, in talking to friends and associates about automobile insurance, what is your viewpoint regarding XYZ Company? (Negatively worded and reverse coded for purposes of analyses.)

1 = I actively discourage others from buying insurance from XYZ Company.
2 = I'm lukewarm to somewhat negative in advocating insurance from XYZ Company.
3 = I generally recommend insurance from XYZ Company.
4 = I'm an enthusiastic advocate of insurance from XYZ Company.

Recommend – Agent 1 (RA1): Now, based on your experience with your agent, how likely is it that you would recommend your XYZ Company agent to a friend or colleague, if they asked you to recommend an agent?

1 = Definitely would recommend
2 = Probably would recommend
3 = Might or might not recommend
4 = Probably would not recommend
5 = Definitely would not recommend

Recommend – Agent 2 (RA2): Just to clarify your answer, in talking to friends and associates about automobile insurance, what is your viewpoint regarding your XYZ Company agent? (Negatively worded and reverse coded for purposes of analyses.)

1 = I actively discourage others from buying insurance from my XYZ Company agent.

2 = I'm lukewarm to somewhat negative in advocating insurance from my XYZ Company agent.

3 = I generally recommend insurance from my XYZ Company agent.

4 = I'm an enthusiastic advocate of insurance from my XYZ Company agent.

Overall Repurchase Intention (RPI): When it comes time to renew your auto insurance, how likely are you to buy again from XYZ Company?

1 = Very likely
2 = Somewhat likely
3 = Somewhat unlikely
4 = Very unlikely