



## The Role of Marketing in Social Media: How Online Consumer Reviews Evolve<sup>☆</sup>

Yubo Chen<sup>a</sup>, Scott Fay<sup>b</sup> & Qi Wang<sup>c,\*</sup>

<sup>a</sup> Eller College of Management, University of Arizona, Tucson, AZ 85721, USA

<sup>b</sup> Whitman School of Management, Syracuse University, Syracuse, NY 13224, USA

<sup>c</sup> School of Management, State University of New York at Binghamton, Binghamton, NY 13902, USA

Available online 10 March 2011

### Abstract

Social media provide an unparalleled platform for consumers to publicize their personal evaluations of purchased products and thus facilitate word-of-mouth communication. This paper examines relationships between consumer posting behavior and marketing variables—such as product price and quality—and explores how these relationships evolve as the Internet and consumer review websites attract more universal acceptance. Based on automobile-model data from several leading online consumer review sources that were collected in 2001 and 2008, this study demonstrates that the relationships between marketing variables and consumer online-posting behavior are different at the early and mature stages of Internet usage. For instance, in the early stage of consumer Internet usage, price is negatively correlated with the propensity to post a review. As consumer Internet usage becomes prevalent, however, the relationship between price and the number of online consumer reviews shifts to a U-shape. In contrast, in the early years, price has a U-shaped relationship with overall consumer rating, but this correlation between price and overall rating becomes less significant in the later period. Such differences at the two different stages of Internet usage can be driven by different groups of consumers with different motivations for online review posting.

© 2011 Direct Marketing Educational Foundation, Inc. Published by Elsevier Inc. All rights reserved.

**Keywords:** Word-of-mouth; Online community; Consumer reviews; Social media

### Introduction

With the advancement of the Internet, particularly Web 2.0 technologies, social media provide an unparalleled platform for consumers to publicize and share their product experiences and opinions—i.e., through word-of-mouth or consumer reviews. Various sources supply online consumer review websites and forums (Bickart and Schindler 2001): (a) retailers such as Amazon, (b) traditional consumer magazines (e.g., *Car and Driver's* [caranddriver.com](http://caranddriver.com) and *PC Magazine's* [pcmag.com](http://pcmag.com)), and (c) independent consumer community intermediaries (e.g.,

[epinions.com](http://epinions.com) and [consumerreview.com](http://consumerreview.com)). There is increasing evidence that online word-of-mouth has a significant influence on purchase behavior. For example, one recent *Wall Street Journal* survey reported that 71% of online U.S. adults use consumer reviews for their purchases and 42% of them trust such a source (Spors 2006).

Recently, an increasing number of marketing scholars have examined the implications of online consumer product reviews, such as their impact on product sales and firm marketing strategies (e.g., Chen, Wang, and Xie 2011; Chen and Xie 2005; Chen and Xie 2008; Chevalier and Mayzlin 2006; Godes and Mayzlin 2004; Liu 2006; Mayzlin 2006); the usefulness of online consumer product reviews for consumer decision-making (Sen and Lerman 2007; Smith, Menom, and Sivakumar 2005); and the value of online consumer reviews for sales forecasting (Dellarocas, Zhang, and Awad 2007; Dhar and Chang 2009). While practitioners and scholars have demonstrated the increasing importance of online consumer reviews, what motivates consumers to post their opinions on websites and, specifically, whether and how

<sup>☆</sup> The authors are listed alphabetically and contributed equally to the paper. They are deeply grateful to the Editor, Venkatesh Shankar, and to an anonymous reviewer for their valuable comments.

\* Corresponding author.

E-mail addresses: [yubochen@eller.arizona.edu](mailto:yubochen@eller.arizona.edu) (Y. Chen), [scfay@syr.edu](mailto:scfay@syr.edu) (S. Fay), [qiwang@binghamton.edu](mailto:qiwang@binghamton.edu) (Q. Wang).

marketers can strategically stimulate consumer postings, all remain under-explored. Several recent studies have taken an initial step in exploring consumers' motivations for posting online product reviews, placing special attention on consumer and product characteristics (Hennig-Thurau et al. 2004; Moldovan, Goldenberg, and Chattopadhyay 2006). Factors such as opinion leading, product-involvement level, and originality have been found to be significant drivers for consumer online reviews. However, few of these studies have examined the relationship between marketing variables and online consumer posting behavior. One exception is Feng and Papatla (2011). They studied how increased advertising can be associated with reduction in online WOM.

A long stream of research on marketing mix has found that variables such as product design, product quality, pricing, and various incentive programs profoundly impact consumer brand perception, and in turn the ultimate level of satisfaction (e.g., Anderson 1998). Extant literature has also suggested that the main motivations behind positive word-of-mouth versus negative word-of-mouth are to share expertise with others (i.e., Arndt 1967; Dichter 1966; Fehr and Falk 2002; Richins 1983) and/or to vent dissatisfaction (Jung 1959). Since the marketing mix affects consumer (dis)satisfaction, which in turn generates the desire to share and/or to disseminate (dis)satisfaction with others, it is reasonable to believe that the marketing mix must also affect consumer incentives to post experiences and comments about a product online.

In this article, we empirically study online consumer reviews using data on automobile models from *Consumer Reports*, J.D. Power and Associates, and several online consumer communities (e.g., epinions.com). We explore the relationships between different marketing variables and consumer posting behavior, and how such relationships have evolved over the last decade as the Internet and consumer review websites have attracted more universal acceptance. We find that instead of following a random selection process, firm marketing variables have a significant relationship with consumers' propensity to post. Furthermore, we investigate how such relationships have evolved. We conjecture that in the early Internet years, consumer review sites primarily attracted early adopters, but that over time these sites became more mainstream. Since early adopters have distinct motivations for posting reviews as compared with the general population, we form several hypotheses as to how posting behavior is likely to change as consumer review sites mature. We then test these hypotheses empirically. For instance, we find that in the early stage of consumer Internet usage, price is negatively correlated with the propensity to post a review. As consumer Internet usage becomes prevalent, however, the relationship between price and the number of online consumer reviews shifts to a U-shape. In contrast, in the early years, price has a U-shaped relationship with overall consumer rating, but this correlation between price and overall rating becomes less significant in the later period. In addition, we find that luxury-brand image has a significantly positive correlation with the number of online consumer reviews, but that this correlation becomes insignificant when usage of online consumer review sites is prevalent.

The remainder of the article is organized as follows. The next section reviews the relevant literature in order to construct hypotheses. Then, we describe the data used for this study, specify our empirical tests, and report the results. Concluding remarks, including managerial implications, are found in the last section.

## Hypotheses

Word-of-mouth communication is an important facilitator of learning and can have a large impact on consumer decisions (e.g., Feick and Price 1987; Leonard-Barton 1985). In some cases, this impact is so great that individuals optimally ignore private signals and instead rely entirely on information from the aggregate behavior of others (Banerjee 1993; Ellison and Fudenberg 1995; McFadden and Train 1996). Prior to the Internet, a spreader of word-of-mouth information would primarily impact her local group of friends and family, with dispersion to a wider audience occurring only gradually. However, electronic communication, via online consumer review sites, has enabled an immediate information flow to a much wider audience as a single message can affect all site visitors. Recent empirical studies have shown that the volume and valence of online consumer reviews significantly impact product sales (e.g., Chen, Wang, and Xie 2011; Chevalier and Mayzlin 2006; Liu 2006). Thus, it is imperative for firms to understand the driving forces of online consumer posting behavior and to learn how they can strategically affect that behavior to their advantage. In this paper, we focus on the relationship between marketing mix variables, such as a product's price and quality, and online consumer posting behavior, particularly the valence and volume of consumer reviews. We are especially interested in how these relationships have evolved over time.

### *Motivations for Posting Online Consumer Reviews*

In order to predict how many consumer reviews a given product will attract, it is necessary to explore the underlying motivation for posting reviews. Past research has found several distinct reasons for posting. First, one main psychological incentive for individuals to spread positive word-of-mouth is to gain social approval or self-approval by demonstrating their superb purchase decisions, and through altruistic behavior of sharing their expertise with others (e.g., Arndt 1967; Dichter 1966; Fehr and Falk 2002; Richins 1983). In line with this theory, Hennig-Thurau et al. (2004) show that online reviews can serve as a way for consumers to signal their expertise or social status. Second, word-of-mouth can be used to express satisfaction or dissatisfaction. For instance, previous research has found that consumers engage in negative word-of-mouth in order to vent hostility (Jung 1959) and to seek vengeance (Allport and Postman 1947; Richins 1984).

Different consumers may be driven by different motivations for posting. Our fundamental conjecture is that the early group of Internet users differs from the current group, particularly in terms of the two main posting incentives. Early consumers have high

levels of product expertise (Mahajan, Muller, and Srivastava 1990). They are also more likely to be status-seeking and engaging in conspicuous consumption (Cowan, Cowan, and Swann 2004). This suggests that demonstrating expertise and social status is especially important in the Internet's early years. Furthermore, the literature on innovation diffusion has shown that early adopters of innovation (i.e., the early Internet users) tend to have high incomes and to be price insensitive (Gatignon and Robertson 1985; Rogers 2003). Thus, expressing satisfaction or dissatisfaction, especially in relation to price paid, would be a relatively weak incentive to post reviews for these early adopters. However, as the Internet has evolved and matured over a decade, it has attracted a broader population of users. Internet usage and online consumer review sites have become mainstream. Late adopters tend to be more pragmatic and value driven than early adopters (Rogers 2003). Thus, as early adopters compose a smaller fraction of all Internet users, we expect the motivation based on expressing satisfaction or dissatisfaction to be a stronger factor in influencing posting behavior.

#### *Product Price and the Volume and Valence of Online Consumer Reviews*

In the early phase of consumer review sites, we expect that a majority of the Internet users were innovators and were primarily motivated by their desire to demonstrate expertise and provide information to other users. Holding product quality constant, a lower price indicates a better purchase decision. Hence, we expect that the number of postings will be negatively correlated with product price in the early online consumer-review stage. Furthermore, note that in the early stage of consumer Internet usage, consumers who posted online reviews were likely to be more affluent and less price-sensitive than mass consumers. Thus, expressing dissatisfaction over a high price was less likely to motivate consumer posting in the early Internet period. However, as these sites matured, expressing satisfaction or dissatisfaction is likely to become the predominant factor in posting behavior. Anderson (1998) finds that extremely satisfied and extremely dissatisfied customers are more likely to initiate information flows than consumers with more moderate experiences. For a given quality, a very low price creates a very high level of customer satisfaction. But when the price is very high, customer satisfaction will be very low. As a result, we expect to observe a U-shaped relationship between the number of postings and price. We summarize these conjectures in hypothesis 1:

- H1.** a) In the early stage of Internet usage, the number of online consumer reviews of a product decreases with the product price.  
b) With the prevalence of Internet usage, this relationship becomes U-shaped such that more postings will be observed for extremely low- or high-priced products than for moderately priced products.

Online product reviews usually report an overall rating. Such ratings can reflect customer expertise, satisfaction, and/or

perceived quality. An early adopter who is trying to demonstrate expertise or success would have a tendency to give higher ratings to low-priced and high-priced products than to moderately priced products. For low-priced products, an early adopter would be trying to tout the "good deal" which she received, while for high-priced products an early adopter could be demonstrating her high social status. Moreover, it is also well documented that price has a signaling function of product quality (e.g., Rao and Monroe 1989). A high price can signal high product quality, which will affect consumers' perception and in turn increase their product ratings. Together, we expect a U-shaped relationship between price and consumer ratings.

At the mature stage of Internet usage, postings are primarily made on the basis of customer satisfaction. Given the same objective quality of products, low price leads to high satisfaction and thus high consumer ratings. While high-priced products can signal high quality, which increases product ratings, high price also leads to higher dissatisfaction (especially for the later group of consumer review posters), which decreases ratings. These two opposite driving forces may even out and lead to an insignificant impact of price on consumer ratings for high-priced products. In summary, the U-shaped relationship between price and consumer ratings is more likely to be observed at the early Internet stage than at the maturity stage. These relationships between price and overall consumer rating are captured in the following hypothesis:

- H2.** Higher overall ratings will be observed more for extremely low- or extremely high-priced products than for products of moderate price. Such a U-shaped relationship is more likely to occur in the early stage of consumer review sites.

#### *Product Quality and the Volume and Valence of Online Consumer Reviews*

In addition to price, product quality should also impact posting behavior. For consumers motivated by the desire to persuade and inform others, we would expect a U-shaped relationship between the number of online postings and product quality. In particular, postings would be most informative and influential if the product being reviewed is of substantially lower quality or is of substantially higher quality than its competition. For consumers motivated by the desire to express extreme satisfaction or extreme dissatisfaction, we would also expect to see a U-shaped relationship between the number of online postings and product quality. This is because satisfaction is an increasing function of product objective quality (Anderson and Sullivan 1993); thus, for a given price, very low quality generates a high level of customer dissatisfaction and a very high quality generates a high level of customer satisfaction. Since both fundamental motivations for posting reviews suggest a U-shaped relationship between the number of online postings and quality, we have hypothesis 3:

- H3.** There exists a U-shaped relationship between the number of postings and the quality of a product, such that more postings will be observed for extremely low- or extremely high-quality products than for products of moderate quality.

Furthermore, both satisfaction (Anderson and Sullivan 1993) and perceived product quality should be positively correlated with objective product quality. For example, at a given price, the lower the quality of a product, the lower the customer satisfaction; the higher the quality of a product, the higher the customer satisfaction. Thus, we have the following hypothesis on the relationship between overall consumer rating and objective product quality:

**H4.** Overall consumer rating is positively related to objective quality.

#### *Product Category and the Volume and Valence of Online Consumer Reviews*

Finally, the product category itself could influence consumer postings. In particular, for consumers interested in displaying a high social status (which is a significant motivation for the early group of posters), reviewing a product with a luxury-brand image might be particularly desirable (Drèze, Han, and Nunes 2009). Therefore, we would expect that in the early stage of Internet consumer usage, luxury brands would have a higher volume of overall consumer ratings and associated higher ratings (to emphasize the reviewer's social status). However, with the prevalence of social media, such relationships will become weaker as more value-driven consumers adopt social media and post online product reviews. Hence, we have the following hypothesis on the evolving relationship between luxury-brand image and online consumer posting behavior:

- H5.** a) In the early stage of Internet usage, (1) the number of online consumer reviews of a product is positively correlated with luxury-brand image; and (2) the overall rating of a product is positively correlated with luxury-brand image.  
b) Such correlations may become insignificant with the prevalence of Internet usage.

### **Data and Empirical Specification**

#### *Description of the Data*

Our data include two samples that were collected in two different years. The first sample of new automobile models was collected in 2001, and the second sample of new automobile models was collected in 2008. One reason for selecting this particular market is that shopping for an automobile usually involves an intensive search because it requires a significant financial commitment for most households (e.g., Punj and Staelin 1983; Srinivasan and Ratchford 1991). Internet usage for a consumer automobile purchase process increased significantly between 2001 and 2008. Morton, Zettelmeyer, and Silva-Risso (2001) report that 54% of all new-vehicle buyers used the Internet in conjunction with buying a car. This percentage increased to 80% in 2008 according to a report by eMarketer.<sup>1</sup> The 2001 and 2008 data allow us to examine how the relationship of marketing

variables and online consumer-review behavior has evolved with the growing prevalence of Internet usage in this market.

We chose our sample websites using the same criteria for both of these periods in order to limit the likelihood that our results can be attributed to data source differences. Our selection is based on two important criteria: (1) our sample should include leading automobile review websites for the data-collection year that attract a considerable number of consumers to exchange product information (i.e., read and post product reviews), and (2) our sample websites should similarly cover the different segments of the market—i.e., both car enthusiasts and mass amateur consumers. Based on these two criteria, we collected consumer reviews on automobiles from three review websites in the first sample: Epinions, *Car and Driver*, and Autobytel—all leading websites for automobiles in 2001. Epinions is the leading online independent consumer product review forum, *Car and Driver* is the website of one of the most influential automobile consumer magazines, and Autobytel was the top automobile retailer website in 2001 (Morton, Zettelmeyer, and Silva-Risso 2001). Among these three websites, *Car and Driver* mainly attracts enthusiastic consumers who are experts on automobiles; whereas Autobytel and Epinions have attracted all consumers including mass amateur consumers.

We collected other variables such as sales, product quality, and price from a variety of data sources. Specifically, sales data were acquired from J.D. Power and Associates. The *number of sales* is the year-to-date (through October) data that were published in the J.D. Power and Associates in the October 2001 *Sales Report*. Quality data is collected from the 2001 *Consumer Reports New Car Buying Guide* (Consumers Union 2001) and measured by using the *overall performance* rating in *Consumer Reports*. This guide is published by Consumers Union, an independent, nonprofit testing and information organization. Ratings are based on tests conducted at their auto-test facility in East Haddam, CT. Consumers Union has published *Consumer Reports* since 1936. It is a respected source of reliable information and has historically been a widely read publication, with over four million current subscribers. Friedman (1987) found its report on used-car problems to be a good predictor of future problems. Furthermore, Friedman (1990) found *Consumer Reports'* ratings across a wide range of products to be highly correlated with *Which?*, a British-based consumer testing magazine. This suggests that *Consumer Reports* provides a valid indicator of a model's objective quality. *Price* was the manufacturer's recommended price for each automobile model.<sup>2</sup>

In 2008, we followed the same sample-selection criteria to collect consumer review data on new automobile models from four leading consumer review websites in this market: Epinions, *Car and Driver*, MSN, and Yahoo.<sup>3</sup> Similar to our sample in 2001, *Car and Driver* mainly attracts consumers who are experts on automobiles; whereas Epinions, MSN, and Yahoo

<sup>2</sup> We also used the average price paid by consumers as reported by Epinions in our 2001 data. The results were consistent when using both the average paid price and the manufacturer's suggested price.

<sup>3</sup> The Autobytel website no longer existed in 2008. For this latter period, we selected the MSN and Yahoo websites as the source for consumer reviews as these two sites are popular for consumer review information.

<sup>1</sup> [http://www.emarketer.com/Report.aspx?code=emarketer\\_2000443](http://www.emarketer.com/Report.aspx?code=emarketer_2000443).

are three other major automobile websites in the year 2008 that attract mass consumers for product information. Sales data were collected from Ward's, a popular and reliable source for the automobile industry, whose sales data have been widely used in many existing economics and marketing research studies (e.g., Arguea, Hsiao, and Taylor 1994; Sudhir 2001). Quality data were collected from the same data source as in our first sample—2008 *Consumer Reports New Car Buying Guide*. We report the descriptive statistics of variables in our two samples in Table 1 and the correlations in Appendices A and B.

### Model

To test our hypotheses concerning the number of online postings, we estimate the following equation:

$$\begin{aligned} \text{number of postings} = & \alpha_0 + \alpha_1(\text{quality}) + \alpha_2(\text{quality})^2 + \alpha_3(\text{price}) \\ & + \alpha_4(\text{price})^2 + \sum_i \alpha_{5i}(\text{vehicle class}) \\ & + \sum_i \alpha_{6i}(\text{websites}) + \alpha_7(\text{sales}) \\ & + \alpha_8(\text{sales})^2 + \varepsilon_1 \end{aligned} \quad (1)$$

Since the dependent variable, *number of postings*, is a counting variable, we employ a Negative Binomial estimation method that allows the distribution variance and mean to be different. Negative Binomial distribution includes Poisson distribution as a special case in which the distribution variance and mean are equal.  $H_1$  would suggest that *number of postings* has a negative relationship with price, and thus  $\alpha_3 < 0$  for the 2001 data, and a U-shaped relationship with price, and thus  $\alpha_3 < 0$  and  $\alpha_4 > 0$  for the 2008 data.  $H_3$  suggests that *number of postings* is a U-shaped function of quality. Thus, we expect  $\alpha_1 < 0$  and  $\alpha_2 > 0$ . *Vehicle class* is a series of dummy variables for the vehicle model type

(Luxury, Compact, SUV, Pickup, and Van), where Midsize Sedan is the omitted category.  $H_5$  suggests the coefficient of Luxury is positive, with this relationship being the most significant for the 2001 data. The inclusion of *sales* (and its square) allows the size of the pool of potential reviewers to influence the number of postings generated.

To test our hypotheses on overall rating, we have the following specification:

$$\begin{aligned} \text{overall rating} = & \beta_0 + \beta_1(\text{quality}) + \beta_2(\text{price}) + \beta_3(\text{price})^2 \\ & + \sum_i \beta_{4i}(\text{vehicle class}) + \sum_i \beta_{5i}(\text{websites}) \\ & + \beta_6(\text{number of postings}) + \beta_7(\text{number of postings})^2 + \varepsilon_2 \end{aligned} \quad (2)$$

We incorporate a series of dummy variables for vehicle class and websites to control heterogeneity across different classes and sites. We include *number of postings* and its square to control for any systematic biases arising from differing amounts of posts generated by a particular model. Since ratings came from different sources, which all have different scales, when we estimate regression (2), we compute the *z*-score for all models in each site as the dependent variable to control for differences in the mean and standard deviations across sites. This standardization allows us to pool the data across websites and years, and also makes the regression coefficients involving individual sites more comparable.

$H_2$  suggests that price will have a U-shaped relationship with *overall rating*. Thus, we expect the sign will be negative on *price* and positive on  $(\text{price})^2$  for both samples. From  $H_4$ , we expect the sign on *quality* to be positive if overall ratings are a valid indicator of product performance or customer satisfaction.  $H_5$  suggests that the coefficient of luxury is positive, with this relationship being most significant for the 2001 data.

### Results

We estimated Equations (1) and (2) simultaneously using the hierarchical Bayesian estimation techniques. We used the WinBUGs software (Bayesian Inference Using Gibbs Sampling) to run an MCMC sampler and obtain samples for posterior distributions for parameter estimation. The parameters  $\alpha$  and  $\beta$  were given slightly informative priors as  $N(0, 0.00001)$ , and all variance parameters of  $\sigma_\alpha^2$  and  $\sigma_\beta^2$  were given slightly informative priors as inverse-gamma distribution with a shape and scale of 0.01. Three independent chains were run with 7500 iterations for a built-in period and 2500 for posterior-distribution samples in each chain. Gelman and Rubin's (1992) statistics were used to diagnose whether the estimates have converged. To increase the interpretability of the estimates, continuous variables such as quality, price, and sales were also standardized.

In estimating these two equations, we pooled the data from each website and ran the estimation using the 2001 and 2008 data, respectively. In Tables 2 and 3, we report our empirical results regarding the number of postings and overall rating using these two different datasets.

Table 1  
Descriptive statistics.

Variable	2001 Data		2008 Data	
	Mean	Std.	Mean	Std.
No. of postings	12.848	17.228	21.959	32.904
Overall rating <sup>a</sup>	0.000	0.997	0.000	0.997
Quality	3.920 <sup>b</sup>	0.914	67.204 <sup>c</sup>	15.015
Price	24113.662	24794.520	35051.456	14845.069
Sales	86513.269	99584.877	57087.163	70188.488
Luxury	0.209	0.407	0.152	0.360
Compact	0.158	0.365	0.117	0.321
Sport	0.072	0.258	0.083	0.276
SUV	0.186	0.390	0.373	0.484
Pickup	0.066	0.248	0.071	0.257
Van	0.089	0.285	0.018	0.132
Car and Driver	0.352	0.478	0.255	0.436
Autobytel	0.315	0.465	—	—
MSN	—	—	0.281	0.450
Yahoo	—	—	0.294	0.456
Epinions	0.332	0.472	0.170	0.376
Sample size	349		565	

<sup>a</sup> Standardized overall rating is used in estimation.

<sup>b</sup> The quality rating ranges from 1 to 5 in the 2001 data.

<sup>c</sup> The quality rating ranges from 1 to 100 in the 2008 data.

Table 2  
Estimation results of the number of postings.

	2001 Data	2008 Data
Intercept	2.216*** (0.105)	0.730*** (0.081)
Quality	-0.465** (0.236)	-0.438*** (0.155)
(Quality) <sup>2</sup>	0.757** (0.241)	0.599*** (0.160)
Price	-0.173*** (0.057)	-0.549*** (0.146)
(Price) <sup>2</sup>	-0.074 (0.063)	0.304** (0.136)
Luxury	0.197* (0.154)	0.011 (0.101)
Compact	0.449*** (0.130)	0.104 (0.110)
Sport	0.468** (0.181)	0.433*** (0.107)
SUV	0.236** (0.133)	0.085 (0.072)
Pickup	-0.328* (0.216)	0.121 (0.113)
Van	-0.546*** (0.164)	-0.956*** (0.212)
Car and Driver	0.635*** (0.094)	0.770*** (0.090)
Autobytel	-1.020*** (0.106)	–
MSN		2.093*** (0.082)
Yahoo		2.956*** (0.084)
Sales	0.575*** (0.110)	0.861*** (0.074)
(Sales) <sup>2</sup>	-0.284*** (0.098)	-0.514*** (0.065)
Log-likelihood	-1600.54	-2675.76
N	349	565

Notes: The number in parenthesis is standard error. \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

a. Mean-centered variables for Quality, Price and Sales are used in estimation.

b. Midsize Sedan is the omitted category for car dummies.

c. Epinions is the omitted-site dummy.

### Posting Numbers

As shown in Table 2, the coefficient of *price* is significant and negative in the 2001 data, but the coefficient of (*price*)<sup>2</sup> is insignificant. Hence, the hypothesis H<sub>1a</sub> is supported. For the 2008 data, the coefficient of *price* is significantly negative ( $\alpha_3 = -0.549$ ,  $p < 0.01$ ), while the coefficient of (*price*)<sup>2</sup> is significantly positive ( $\alpha_4 = 0.304$ ,  $p < 0.05$ ). Based on these estimated

Table 3  
Estimation results of overall rating.

	2001 Data	2008 Data
Intercept	2.135*** (0.019)	2.130*** (0.016)
Quality	0.019*** (7.57E-03)	0.020*** (0.006)
Price	-0.009* (0.007)	-0.005 (0.023)
(Price) <sup>2</sup>	0.031*** (0.007)	0.012 (0.021)
Luxury	0.006 (0.022)	-0.008 (0.019)
Compact	-0.002 (0.021)	-0.007 (0.022)
Sport	0.026 (0.025)	-0.002 (0.021)
SUV	0.015 (0.020)	3.20E-03 (1.42E-02)
Pickup	0.022 (0.027)	2.76E-02 (2.15E-02)
Van	-0.051** (0.025)	-0.028 (0.040)
Car and Driver	0.003 (0.015)	0.074*** (0.016)
Autobytel	0.026** (0.016)	–
MSN		0.082*** (0.017)
Yahoo		0.050*** (0.022)
No. of postings	0.001 (9.24E-04)	-2.70E-04 (4.15E-04)
(No. of postings) <sup>2</sup>	-9.28E-06 (8.62E-06)	7.05E-07 (1.49E-06)
Log-likelihood	-1600.54	-2675.76
N	349	565

Notes: The number in parenthesis is standard error. \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

a. Mean-centered variables for Quality, Price and Sales are used in estimation.

b. Midsize Sedan is the omitted category for car dummies.

c. Epinions is the omitted-site dummy.

coefficients, we can rewrite the overall impact of price on the number of postings as  $\Gamma_{\text{price}} = 0.304\text{price}^2 - 0.549\text{price}$ . Thus, it can be derived that the minimum point on the U-shaped curve is when the price is at the level of 0.903. Therefore, when the price is between  $[-1.458, 0.903]$ , from the observed lowest price level (standardized) to the minimum point, the relationship and the number of postings is negative; and when it is between  $[0.903, 3.836]$ , from the minimum point to the observed highest price level (standardized), the relationship is positive. This suggests that posting numbers are higher for extremely high-priced and extremely low-priced products than for moderately priced products, which supports H<sub>1b</sub>. Together, these results imply that in the early Internet stage, controlling for *quality* and other factors, consumers who posted online reviews were less price sensitive. Almost a decade later, as the Internet attracts more universal usage and consumers are more accustomed to utilizing it as a media for word-of-mouth, more value-driven consumers post reviews online. As a result, when product prices are very high, consumers feel dissatisfied and have a strong incentive to post reviews to vent negative feelings.

The coefficients of *quality* and its square term are significantly negative and positive, respectively, in both the 2001 and 2008 data. In the 2001 data, since the coefficient of *quality* is  $-0.465$  ( $p < 0.05$ ) and the coefficient of (*quality*)<sup>2</sup> is  $0.757$ , the overall relationship between *quality* and the number of postings can be written as  $\Gamma_{\text{quality}} = 0.757\text{quality}^2 - 0.465\text{quality}$ . Thus, it can be derived that the minimum point on the U-shaped curve is when the *quality* is at the level of  $0.307$ . Therefore, when the product *quality* is between  $[-3.194, 0.307]$ , from the observed lowest *quality* level (standardized) to the minimum point, the relationship between *quality* and the number of postings is negative, and when the product *quality* is between  $[0.307, 1.182]$ , from the minimum point to the observed highest *quality* level (standardized), the relationship is then positive. Similarly, in the 2008 data, since the coefficient of *quality* is  $-0.438$  ( $p < 0.05$ ) and the coefficient of (*quality*)<sup>2</sup> is  $0.599$ , the relationship between *quality* and the number of postings is first negative when the *quality* level is between  $[-3.344, 0.366]$ , from the observed lowest *quality* level to the minimum point, and then it turns to positive when the *quality* level is between  $[0.366, 2.118]$ , from the minimum point to the observed highest *quality* level. These two results suggest a U-shaped relationship between product *quality* and online posting numbers, and they imply that, controlling for *price* and other factors, online posting numbers are higher for extremely low-quality or extremely high-quality products than for products of moderate *quality*. Therefore, hypothesis H<sub>3</sub> is empirically supported.

As for the relationship between luxury-brand image and consumer-posting behavior, consistent with H<sub>5a(1)</sub> we find that luxury cars generated more postings than midsize cars in the 2001 data but not in 2008. This suggests that in early Internet usage, status concern was one of the main drivers of consumer review-posting behavior.

The sign of (*sales*)<sup>2</sup> is negative and significant, indicating that there is non-linearity in this relationship such that sales levels drive postings at a decreasing rate as sales increase.

### Level of Overall Ratings

We report the results for Equation (2) in Table 3. For the price, the coefficient is significantly negative for *price* and positive for *(price)*<sup>2</sup> using the 2001 data. Specifically, the lowest rating occurs when the standardized price is 0.145, which lies in the observed standardized-price range of [−0.569, 10.025] in our data. This suggests that the correlation between price and overall rating is first negative and then positive. The coefficient, however, is insignificant for both price and its square term for the 2008 data. This is consistent with our H<sub>2</sub> and suggests that a U-shaped relationship between price and overall rating was more likely to have occurred in the early Internet stage. For the data across 2001 and 2008, product quality is positively correlated with overall rating, and this correlation is highly significant, providing strong evidence in support of H<sub>4</sub>. For the relationship between luxury-brand image and overall consumer rating, we find a positive coefficient in the 2001 data, which is consistent with H<sub>5a(2)</sub>. However, the coefficient is not significant. Together with positive and significant correlation between the luxury image and the posting number, our results suggest that premium-brand image can stimulate more consumers to post their reviews and, possibly, post more positive evaluations. In the 2008 data, we find an insignificant coefficient for *luxury*. This is consistent with our hypothesis H<sub>5b</sub>.

### Conclusion and Implications

#### Conclusion

This paper investigates the relationships between consumer review posting behavior and marketing variables in social media, and it examines how these relationships evolve as Internet and consumer review websites attract more universal acceptance. Our empirical analyses of automobile data from two years, 2001 and 2008, reveal several important patterns of consumer posting behavior as the Internet has evolved.

First, we find that marketing variables affect consumer online-posting behavior. For example, during the early stage of Internet usage, price has a negative relationship but premium-brand image has a positive relationship with the number of online consumer postings; differently, product quality has a U-shaped relationship with the number of online consumer postings. These different relationships are likely to be driven by early adopters of Internet usage, who are more affluent, less price-sensitive, and who tend to post consumer reviews to demonstrate their expertise and to tout good deals when they purchase a car with lower price/higher quality/premium brand.

Second, we find that each marketing variable has different relationships with the volume and valence of online postings. For example, different from the negative relationship that price has with the volume of online postings, price has a U-shaped relationship with the valence of online consumer postings (during the early stage of the Internet and on consumer review websites). In contrast, quality has a U-shaped relationship with the volume of consumer postings but a positive relationship with the valence of consumer postings. These different relationships with the volume and valence of consumer posting

behavior imply that while some marketing variables may lead to a large number of consumers engaging in online posting activities, they do not necessarily lead to high ratings.

Finally, these relationships concerning both the volume and valence of online consumer reviews vary across different stages of Internet evolution. For example, as the Internet penetrates to mass consumers who are more price sensitive and value driven, the negative relationship between price and the number of online postings shifts to a U-shaped pattern, indicating that mass consumers tend to post online reviews at both higher and lower purchase price levels, rather than primarily at lower price levels, which was the case during the early stage of Internet usage. Furthermore, the positive relationship of premium-brand image with the number of postings becomes insignificant for the mature stage of Internet usage. These shifts suggest that as the Internet has become accepted by mass consumers, expressing (dis)satisfaction has become a critical motivation for posting reviews (rather than having posting behavior predominantly be an avenue for demonstrating one's expertise or social status).

### Managerial Implications

#### Implications for the Marketers

Our result that product quality has a positive correlation with the number of positive online reviews provides important implications for markets. For example, online consumer reviews can benefit firms that produce high-quality products, as they can generate product awareness without large expenditures on advertising and promotion. In contrast, many negative word-of-mouth postings may make it difficult for a low-quality seller to overcome its adverse positioning.

Surprisingly, we found that it is unnecessary for firms to reduce product prices to satisfy customers. Consumers do not always have enough expertise and knowledge to evaluate a product even after purchase and usage, and the price–quality relationship may bring strong bias to their judgment. This is particularly true if most of the consumers are price-insensitive early adopters. In fact, a very high price increases the average ratings of overall consumer reviews, which may be good news for a firm's pricing decision.

We also found that status concerns are one main driver behind consumer-review behavior, particularly in the early Internet stage. As a result, a luxury-brand image had the advantage of evoking more consumer reviews in this stage.

With the increasing use of emerging technologies such as the mobile web, consumers have started to participate in other different social media (e.g., Twitter, Facebook). The evolving pattern between marketing variables and consumer online-posting behaviors observed in the last decade can shed important insights for social-media marketing.

#### Implications for Non-automobile Markets

Our empirical study focused on the automobile product category. Our conceptual framework, however, seems applicable to many other markets. We conjecture that our results are most applicable to markets in which quality is difficult or costly to



assess, heterogeneity in taste is an important factor in determining one's purchase, and consumers are engaged in extensive decision making. Under these conditions, which appear to be clearly met in the automobile market, consumers are likely to seek out others' opinions before making their own purchase decisions. Furthermore, the obscurity of quality presents an opportunity for innovators to express their expertise, while the high financial commitment leads to the possibility of extreme (dis)satisfaction and the chance to demonstrate social status. Examples of other markets that share these characteristics, and thus where we expect marketing variables may have a similar strong relationship with consumer-posting behavior, would include travel markets (such as vacation packages and cruises), electronic goods (such as computers and large-screen televisions), and household appliances (such as refrigerators and washers/dryers), among others.

### Theoretical Implications and Future Research

Our study has important theoretical implications. For example, in the current customer-satisfaction literature (e.g., Anderson, Fornell, and Lehmann 1994; Anderson and Sullivan 1993), customer-satisfaction data are mainly at the firm level. Since online consumer reviews are now an important information source for consumers, more research can be explored at the product level. Data from online communities could also be useful to researchers in the field of social-exchange theory. For example,

Brown and Reingen (1987) provide initial evidence that weak social ties frequently serve as bridges for information flow between distinct subgroups in the social system. Frenzen and Nakamoto (1993) suggest that consumers are reluctant to transfer information that bears a social stigma and therefore, impose "psychic costs" such as embarrassment or shame, but that they "may reveal psychically costly information to complete strangers." Internet forums provide anonymity and thus may facilitate information flows that might not occur otherwise. Online communities provide ample opportunity to test such theories.

This study raises some important and interesting questions for future research. First, it examines the relationships between marketing variables and consumer posting behavior and how these relationships evolve, using data from the automobile industry. Future research can study other product categories to see whether our findings generalize to other markets. Second, the study suggests that the relationships between marketing variables and consumer posting behavior evolve over time because of different groups of Internet users. Future studies can explicitly investigate how different segments of Internet users respond to products with various features (e.g., price level/branding level/product attributes) in social media using more detailed field data or controlled lab experiments. Finally, the extant studies of online word-of-mouth focus on user-generated content from forums (Godes and Mayzlin 2004; Liu 2006), e-commerce websites (e.g., Chen, Wang, and Xie 2011; Chevalier and Mayzlin 2006) or

### Appendix A. Correlation (2001 Data)

Variable	Overall rating <sup>a</sup>	No. of postings	Quality <sup>b</sup>	Price	Sales	Compact	SUV	Luxury	Sport	Pickup	Van	Car & Driver	Autobytel	Epinions
Overall rating	1													
No. of postings	.092 (.086) <sup>c</sup>	1												
Quality	.256 (.000)	.123 (.021)	1											
Price	.047 (.385)	-.089 (.097)	.244 (.000)	1										
Sales	-.053 (.321)	.213 (.000)	-.069 (.200)	-.195 (.000)	1									
Compact	-.132 (.013)	.131 (.014)	-.281 (.000)	-.190 (.000)	.053 (.327)	1								
SUV	.061 (.259)	-.063 (.244)	-.184 (.001)	.012 (.819)	-.117 (.029)	-.207 (.000)	1							
Luxury	.170 (.001)	-.038 (.479)	.308 (.000)	.361 (.000)	-.239 (.000)	-.222 (.000)	-.246 (.000)	1						
Sport	.115 (.031)	.050 (.356)	.146 (.006)	-.002 (.974)	-.178 (.001)	-.120 (.025)	-.133 (.013)	-.143 (.008)	1					
Pickup	-.011 (.844)	.014 (.798)	-.166 (.002)	-.107 (.046)	.500 (.000)	-.115 (.032)	-.127 (.018)	-.137 (.011)	-.074 (.169)	1				
Van	-.151 (.005)	-.107 (.045)	.160 (.003)	-.022 (.677)	-.010 (.848)	-.135 (.012)	-.149 (.005)	-.161 (.003)	-.087 (.106)	-.083 (.122)	1			
Car and Driver	.000 (1.000)	.395 (.000)	.019 (.726)	.002 (.977)	-.002 (.969)	.010 (.850)	-.014 (.794)	.019 (.727)	.004 (.935)	.022 (.687)	-.020 (.716)	1		
Autobytel	.000 (1.000)	-.346 (.000)	-.021 (.690)	-.009 (.871)	.030 (.571)	-.006 (.916)	.008 (.880)	-.030 (.571)	.003 (.957)	.019 (.728)	.005 (.926)	-.500 (.000)	1	
Epinions	.000 (1.000)	-.059 (.273)	.002 (.970)	.007 (.896)	-.028 (.603)	-.005 (.930)	.006 (.908)	.011 (.838)	-.007 (.892)	-.040 (.453)	.015 (.782)	-.521 (.000)	-.479 (.000)	1

Note: <sup>a</sup> The standardized overall rating is used in the estimation. <sup>b</sup> Quality ranges from 1 to 5 in the 2001 data set. <sup>c</sup> Numbers in parentheses are *p*-value.



## Appendix B. Correlation (2008 Data)

Variable	Overall rating <sup>a</sup>	No. of Postings	Quality <sup>b</sup>	Price	Sales	Compact	SUV	Luxury	Sport	Pickup	Van	Car & Driver	MSN	Yahoo	Epinions
Overall rating	1														
No. of postings	-.028 (.510)	1													
Quality	.141 (.001)	.044 (.295)	1												
Price	.114 (.007)	-.186 (.000)	.323 (.000)	1											
Sales	-.116 (.006)	.336 (.000)	-.003 (.949)	-.258 (.000)	1										
Compact	-.071 (.092)	.154 (.000)	-.170 (.000)	-.425 (.000)	.199 (.000)	1									
SUV	-.026 (.543)	-.122 (.004)	-.191 (.000)	.075 (.076)	-.182 (.000)	-.281 (.000)	1								
Luxury	.047 (.260)	-.084 (.046)	.300 (.000)	.380 (.000)	-.203 (.000)	-.154 (.000)	-.327 (.000)	1							
Sport	.042 (.321)	.027 (.521)	.163 (.000)	.149 (.000)	-.118 (.005)	-.110 (.009)	-.233 (.000)	-.128 (.002)	1						
Pickup	.028 (.503)	.032 (.450)	-.118 (.005)	.019 (.649)	.258 (.000)	-.100 (.017)	-.213 (.000)	-.117 (.005)	-.083 (.048)	1					
Van	-.022 (.594)	-.026 (.538)	.190 (.000)	.005 (.911)	.090 (.032)	-.049 (.247)	-.104 (.014)	-.057 (.177)	-.040 (.337)	-.037 (.379)	1				
Car and Driver	.000 (1.000)	-.289 (.000)	.017 (.678)	-.002 (.963)	.000 (.992)	.002 (.957)	-.023 (.580)	.012 (.772)	.030 (.481)	-.003 (.942)	-.017 (.689)	1			
MSN	.000 (1.000)	-.028 (.513)	-.004 (.916)	.029 (.498)	-.030 (.482)	-.019 (.647)	.013 (.754)	.009 (.836)	-.003 (.939)	.011 (.787)	.006 (.895)	-.366 (.000)	1		
Yahoo	.000 (1.000)	.516 (.000)	.009 (.827)	.066 (.117)	-.052 (.219)	-.017 (.690)	-.008 (.850)	.062 (.141)	.003 (.949)	-.027 (.529)	.002 (.965)	-.377 (.000)	-.404 (.000)	1	
Epinions	.000 (1.000)	-.257 (.000)	-.026 (.536)	-.112 (.008)	.099 (.019)	.041 (.332)	.021 (.620)	-.100 (.018)	-.034 (.421)	.022 (.600)	.011 (.799)	-.265 (.000)	-.283 (.000)	-.292 (.000)	1

Note: a: The standardized overall rating is used in the estimation. b: Quality ranges from 1 to 5 in the 2001 data set. c: Numbers in parentheses are *p*-value.

blogs (e.g., Dhar and Chang 2009). It would be interesting for future research to examine how marketing variables impact consumers' behavior in other emerging social media such as microblogs and social network sites (e.g., Twitter, Facebook), given their growing significance.

## References

- Allport, Gordon W. and Leo J. Postman (1947), *The Psychology of Rumor*. New York: Holt, Rinehart & Wilson.
- Anderson, Eugene W. and Mary W. Sullivan (1993), "The Antecedents and Consequences of Customer Satisfaction for Firms," *Marketing Science*, 12, 2, 125–43.
- , Claes Fornell, and Donald R. Lehmann (1994), "Customer Satisfaction, Market Share, and Profitability: Findings from Sweden," *Journal of Marketing*, 58, 3, 53–66.
- (1998), "Customer Satisfaction and Word of Mouth," *Journal of Service Research*, 1, 1, 5–17.
- Arguea, N.M., Cheng Hsiao, and G.A. Taylor (1994), "Estimating Consumer Preferences Using Market Data—An Application to US Automobile Demand," *Journal of Applied Econometrics*, 9, 1, 1–18.
- Arndt, Johan (1967), "The Role of Product-related Conversation in the Diffusion of a New Product," *Journal of Marketing Research*, 4, August, 291–5.
- Banerjee, V. Abhijit (1993), "The Economics of Rumors," *The Review of Economic Studies*, 60, 2, 309–27.
- Bickart, Barbara and Robert M. Schindler (2001), "Internet Forums as Influential Sources of Consumer Information," *Journal of Interactive Marketing*, 15, 3, 31–40.
- Brown, Jacqueline J. and Peter H. Reingen (1987), "Social Ties and Word-of-mouth Referral Behavior," *Journal of Consumer Research*, 14, December, 350–62.
- Chen, Yubo and Jinghong Xie (2005), "Third-party Product Review and Firm Marketing Strategy," *Marketing Science*, 23, 2, 218–40.
- and Jinghong Xie (2008), "Online Consumer Review: Word-of-mouth as a New Element of Marketing Communication Mix," *Management Science*, 54, 3, 477–91.
- Chen, Yubo, Qi Wang, and Jinhong Xie (2011), "Online Social Interactions: A Natural Experiment on Word of Mouth versus Observational Learning," *Journal of Marketing Research*, forthcoming.
- Chevalier, Judith and Dina Mayzlin (2006), "The Effect of Word of Mouth on Sales: Online Book Reviews," *Journal of Marketing Research*, August, 345–54.
- Consumers Union (2001), *New Car Buying Guide*. Vernon, NY: Consumer Reports Books.
- Cowan, Robin, William Cowan, and Peter Swann (2004), "Waves in Consumption with Interdependence Among Consumers," *Canadian Journal of Economics*, 37, 1, 149–77.
- Dellarocas, Chrysanthos, Xiaoquan Zhang, and Neveen F. Awad (2007), "Exploring the Value of Online Product Reviews in Forecasting Sales: The Case of Motion Pictures," *Journal of Interactive Marketing*, 21, 4, 23–45.
- Dhar, Vasant and Elaine A. Chang (2009), "Does Chatter Matter? The Impact of User-generated Content on Music Sales," *Journal of Interactive Marketing*, 23, 4, 300–7.
- Dichter, Ernest (1966), "How Word-of-mouth Advertising Works," *Harvard Business Review*, 16, November–December, 147–66.
- Drèze, Xavier, Young Jee Han, and Joseph Nunes (2009), "First Impressions: Status Signaling Using Brand Prominence," Marketing Science Institute Working Paper.
- Ellison, Glen and Drew Fudenberg (1995), "Word-of-mouth Communication and Social Learning," *Quarterly Journal of Economics*, 110, 1, 93–125.
- Fehr, Ernst and Armin Falk (2002), "Psychological Foundations of Incentives," *European Economic Review*, 46, 687–724.
- Feick, Lawrence F. and Linda L. Price (1987), "The Market Maven, a Diffuser of Marketplace Information," *Journal of Marketing*, 2, 83–97 (January).
- Feng, Jie and Purushottam Papatla (2011), "Advertising: Stimulant or Suppressant of Online Word of Mouth," *Quarterly Journal of Economics*, 25, 2, 67–76.

- Frenzen, Jonathan and Kent Nakamoto (1993), "Structure, Cooperation, and the Flow of Market Information," *Journal of Consumer Research*, 20, 360–75 (December).
- Friedman, Monroe (1987), "Survey Data on Owner-reported Car Problems: How Useful to Prospective Purchasers of Used Cars?" *Journal of Consumer Research*, 14, December, 434–9.
- (1990), "Agreement between Product Ratings Generated by Different Consumer Testing Organizations: A Statistical Comparison of Consumer Reports and Which? from 1957 to 1986," *The Journal of Consumer Affairs*, 24, 1, 44–68.
- Gatignon, Hubert and Thomas S. Robertson (1985), "A Propositional Inventory for New Diffusion Research," *Journal of Consumer Research*, 11, March, 849–67.
- Gelman, Andrew and Donald B. Rubin (1992), "Inference from Iterative Simulation Using Multiple Sequence," *Statistical Science*, 7, 4, 457–72.
- Godes, David and Dina Mayzlin (2004), "Using Online Conversations to Study Word of Mouth Communication," *Marketing Science*, 23, 4, 545–60.
- Hennig-Thurau, Thorsten, Kevin Gwinner, Gianfranco Walsh, and Dwayne Gremler (2004), "Electronic Word-of-mouth via Consumer-opinion Platforms: What Motivates Consumers to Articulate Themselves on the Internet?" *Journal of Interactive Marketing*, 18, 1, 38–52.
- J.D. Power and Associates (2001), *October Sales Report*, Agoura, CA: J.D. Power and Associates.
- Jung, C.G. (1959), "A Visionary Rumor," *Journal of Applied Psychology*, 4, 5–19.
- Leonard-Barton, Dorothy (1985), "Expert as Negative Opinion Leaders in the Diffusion of a Technological Innovation," *Journal of Consumer Research*, 11, 4, 914–26.
- Liu, Yong (2006), "Word of Mouth for Movies: Its Dynamics and Impact on Box Office Revenue," *Journal of Marketing*, 70, July, 74–89.
- Mahajan, Vijay, Eitan Muller, and Rajendra Srivastava (1990), "Determination of Adopter Categories by Using Innovation Diffusion Models," *Journal of Marketing Research*, February, 37–50.
- Mayzlin, Dina (2006), "Promotional Chat on the Internet," *Marketing Science*, 25, 2, 155–63.
- McFadden, Daniel L. and Kenneth E. Train (1996), "Consumers' Evaluation of New Products: Learning from Self and Others," *Journal of Political Economy*, 104, 4, 683–703.
- Moldovan, Sarit, Jacob Goldenberg, and Amitava Chattopadhyay (2006), "What Drives Word-of-mouth? The Roles of Product Originality and Usefulness," *MSI working paper series, issue two*, 06–002, 81–99.
- Morton, Fiona Scott, Florian Zettelmeyer, and Jorge Silva-Risso (2001), "Internet Car Retailing," *Journal of Industrial Economics*, 49, December, 501–19.
- Punj, Girish N. and Richard Staelin (1983), "A Model of Consumer Information: Search Behavior for New Automobiles," *Journal of Consumer Research*, 9, 4, 366–80.
- Rao, A.R. and Kent B. Monroe (1989), "The Effect of Price, Brand Name, and Store Name on Buyers' Perceptions of Product Quality: An Integrative Review," *Journal of Marketing Research*, 16, August, 351–7.
- Richins, Marsha L. (1983), "Negative Word-of-mouth by Dissatisfied Consumers: A Pilot Study," *Journal of Marketing*, 47, Winter, 68–78.
- (1984), "Word-of-Mouth Communication as Negative Information" in *Advances in Consumer Research*, T. Kinnear, ed. Provo, UT: Association of Consumer Research, 697–702.
- Rogers, E.M. (2003), *Diffusion of Innovations*. 5th ed. New York: Free Press.
- Sen, Shahana and Dawn Lerman (2007), "Why Are You Telling Me This? An Examination into Negative Consumer Reviews on the Web," *Journal of Interactive Marketing*, 21, 4, 76–94.
- Smith, Donnavieve, Satya Menon, and K. Sivakumar (2005), "Online Peer and Editorial Recommendations, Trust, and Choice in Virtual Markets," *Journal of Interactive Marketing*, 19, 3, 15–37.
- Spors, Kelly (2006), "How Are We Doing?" *Wall Street Journal*, 13, R9 (November).
- Srinivasan, Narasimhan and Brian T. Ratchford (1991), "The Empirical Test of a Model of External Search for Automobiles," *Journal of Consumer Research*, 18, September, 233–42.
- Sudhir, K. (2001), "Competitive Pricing Behavior in the Auto Market: A Structural Analysis," *Marketing Science*, 20, 1, 42–60.