Information Systems Research

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

A Note on the Impact of Daily Deals on Local Retailers' Online Reputation: Mediation Effects of the Consumer Experience

Xue Bai, James R. Marsden, William T. Ross, Jr., Gang Wang

To cite this article:
Xue Bai, James R. Marsden, William T. Ross, Jr., Gang Wang (2020) A Note on the Impact of Daily Deals on Local Retailers' Online Reputation: Mediation Effects of the Consumer Experience. Information Systems Research

Published online in Articles in Advance 20 Oct 2020

. https://doi.org/10.1287/isre.2020.0935

http://pubsonline.informs.org/journal/isre

INFORMATION SYSTEMS RESEARCH
Articles in Advance, pp. 1–12
ISSN 1047-7047 (print), ISSN 1526-5536 (online)

A Note on the Impact of Daily Deals on Local Retailers' Online Reputation: Mediation Effects of the Consumer Experience

Xue Bai,[a] James R. Marsden,[b,*] William T. Ross, Jr.,[c] Gang Wang[d]

[a] Department of Marketing and Supply Chain Management, Department of Management Information Systems, Fox School of Business, Temple University, Philadelphia, Pennsylvania 19122; [b] Operations and Information Management, School of Business, University of Connecticut, Storrs, Connecticut 06269; [c] Marketing Department, School of Business, University of Connecticut, Storrs, Connecticut 06269; [d] Accounting and Management Information Systems, Alfred Lerner College of Business and Economics, University of Delaware, Newark, Delaware 19716

*Corresponding author

Contact: xue@temple.edu, https://orcid.org/0000-0001-9261-4998 (XB); james.marsden@business.uconn.edu, https://orcid.org/0000-0001-6695-9896 (JRM); bill.ross@business.uconn.edu (WTR); gangw@udel.edu, https://orcid.org/0000-0002-4086-4343 (GW)

Received: May 10, 2018
Revised: March 9, 2019; February 9, 2020
Accepted: March 26, 2020
Published Online in Articles in Advance: October 20, 2020

https://doi.org/10.1287/isre.2020.0935

Abstract. This study investigates the impact of daily deals on local retailers' (restaurants') online ratings. We collected and utilized a comprehensive panel data set that combines information on restaurants' deal offerings (Groupon or LivingSocial) with their Yelp review details. Although demonstrating a negative main effect of daily deals on a restaurant's monthly average ratings, we worked to uncover the underlying mechanisms by focusing on the mediating role of consumers' postconsumption perception. Our mediation analyses show that daily deals are associated with the reduction of both consumers' perceived food quality and perceived service quality as revealed in review texts, which leads to subsequent declines in a restaurant's online ratings. We further noted and studied two types of reviews that existed during the deal-redemption period: (1) reviews that mentioned daily deals (*DD Reviews*) and (2) reviews that did not mention daily deals (*NDD Reviews*). *NDD Reviews* are usually from regular customers, whereas *DD Reviews* are likely from a different base of customers, deal users. Our separate analyses demonstrate differential mediation processes between *DD Reviews* and *NDD Reviews*. For *DD Reviews*, both perceived food and service quality had mediation roles, suggesting a mismatch effect. That is, daily deals attract discount-focused consumers, including new customers, who are less likely to appreciate the food or service and, therefore, leave a negative review. In contrast, for *NDD Reviews*, only perceived service quality had a mediation role, suggesting a negative externality effect. That is, the large volume of deal redemptions by deal users may induce a longer waiting time (to be seated and/or served) and, thus, reduced perceived service quality for regular customers. These results deepen our understanding of the impact of daily deals on business online reputation and provide important practical guidance to both local retailers and daily deal platforms.

History: Anand Gopal, Senior Editor; Jesse Bockstedt, Associate Editor.
Supplemental Material: The online appendix is available at https://doi.org/10.1287/isre.2020.0935.

Keywords: daily deal • electronic word of mouth • mediation • negative externality • mismatch • service • Groupon • text mining

1. Introduction

Recent advances in information technology have enhanced the effectiveness of price promotions, among other tactics, by employing online influencers, such as electronic word of mouth (e-WOM) (Lu et al. 2013, Li and Wu 2018). Daily deals provided by various e-commerce sites, such as Groupon and Amazon, integrate price promotions with both e-WOM and social media and can reach a large number of consumers (Li 2018, Mejía et al. 2020a). Not surprisingly, daily deals have become a popular marketing tool by local retailers (Dholakia 2011). Prior studies on retailer's promotion strategies and the sustainability of daily deal offerings have mainly focused on the acquisition and retention of new customers (Kumar and Rajan 2012, Edelman et al. 2016). However, there is a dearth of research on how daily deal offerings affect retailers' online reputation represented by consumer ratings, an important longer-term effect of daily deals on business performance (Li 2016). This research gap is noteworthy given the strong linkage between retailers' online reputation and their continued viability as a business (Anderson and Magruder 2012, Mayzlin et al. 2014).

Two extant studies provided initial analyses of the effect of daily deal promotions on online ratings at the local retailer level. Byers et al. (2012a) compared local retailers' Yelp ratings before and after offering

Groupon deals and showed a declining trend of online ratings (reputation) after offering Groupon deals. Li (2016) also showed a negative average effect of daily deals on restaurants' monthly Yelp ratings. However, research to date has provided little understanding of what factors actually drive the impact of daily deals on online reputation. Only one study, by Byers et al. (2012b), sought to identify the "root causes" of the negative linkage between daily deals and online ratings. Utilizing a data set from Groupon and Yelp, Byers et al. (2012b) provided a mixture of explanatory factors, such as poor business behavior, Groupon user experimentation, and inflated baseline ratings due to the artificial reviews in Yelp. The challenge remains to organize and quantify key factors related to consumer and merchant behavior in a theoretically coherent framework.

To deepen our understanding of the daily deal effect on online ratings from a local retailer's perspective, we constructed a unique data set that combined information on a restaurant's daily deal (Groupon or LivingSocial) with Yelp review details for that restaurant. Our panel model analysis first confirmed that, on average, daily deals had a negative effect on a restaurant's average monthly ratings. We then expanded our analysis to include investigating potential underlying mechanisms—the mediating roles, if any, of consumers' revealed postconsumption perceptions on the relationship between daily deals and online reputation. We adopted a mediation effect framework because the potential mediating paths have been shown separately in prior studies. First, prior literature on e-WOM has shown that consumers' postconsumption perceptions are thought to be the main drivers of whether consumers post an online review and, if they do so, of the content they post (Hu et al. 2009, Moe and Schweidel 2012). Second, many studies have examined the effect of price promotions on consumers' perceptions of quality and brand image (Raghubir and Corfman 1995, Yoo et al. 2000), not the retailer's performance. Therefore, we focused on whether postconsumption consumer perceptions mediate the relationship between daily deals and online ratings for a local retailer.

In the restaurant industry, two components of consumers' perceptions, perceived food quality and perceived service quality, have been shown to be critical for consumers' postconsumption satisfaction (Susskind and Chan 2000, Ryu and Han 2010). We operationalized the two components using what consumers reveal in online reviews. Performing a feature-sentiment text-mining analysis, we extracted features, including perceived food quality and perceived service quality, from Yelp reviews and identified the feature-level sentiment for each review. Our mediation analyses then used the average values of sentiments for the two features as the potential mediators, finding evidence that both perceived food quality and perceived service quality mediated the negative daily deals effect on online ratings.

Prior literature has mainly focused on the effect of price promotions on deal users' perception and evaluation (Raghubir and Corfman 1995, Mela et al. 1997, Jedidi et al. 1999). In the daily deal setting, there may also exist an externality effect, which is rarely discussed in prior studies. That is, daily deals may also affect regular customers' experience and perception because of the deal redemption by deal users (Kong 2016). To further investigate the potential externality effect, we conducted separate mediation analyses on two types of reviews: (1) those from deal users that explicitly mentioned daily deals (hereafter *DD Reviews*) and (2) those not mentioning daily deals (hereafter *NDD Reviews*) and more likely to be from regular customers. Our results show different mediation processes for the two types of reviews. For *DD Reviews*, both perceived food and service quality had mediation roles, suggesting a negative promotion effect. In contrast, for *NDD Reviews*, only perceived service quality had a mediation role, suggesting a negative externality effect. We proffer that an increased number of customers brought in by promotions may make the restaurant slip below its quality service capacity, leading to increasing waiting time and reducing perceived service quality for regular customers.

Our study provides several important contributions to the literature. Although prior studies have examined various drivers of e-WOM, only a few investigated the impact of price promotions on the valence (positive or negative) of e-WOM. We empirically demonstrated that daily deals, a form of price promotion, had a negative average effect on local retailers' online ratings. In contrast to extant studies on the relationship between daily deals and local retailers' online ratings (Byers et al. 2012a, Li 2016), we took a more nuanced approach by articulating the mediation roles of consumers' perceptions revealed in reviews. Our results highlighted the important mediating roles of consumers' perceived food quality and perceived service quality in interpreting the negative effect of daily deals on online ratings. Moreover, we decompose the daily deal effect on online ratings into two differing paths. The first is the mismatch effect, which refers to deals attracting discount-focused consumers, including new customers, who are less likely to appreciate the food or service. Second, daily deals may have a negative externality effect. That is, the large volume of deal redemption by deal users may result in longer waiting time and thus reduce perceived service quality for regular customers. Our results provide important managerial implications

for local retailers (restaurants) on whether to offer a daily deal and how to avoid the potential damage of daily deals to their online reputation given the decision to offer them.

2. Related Literature and Hypotheses Development

2.1. Drivers of e-WOM

Previous studies have explored various drivers of e-WOM and emphasized perception (specifically perceived satisfaction and dissatisfaction) as driving e-WOM. Hu et al. (2009) argued that consumers tend to write reviews only when they are either extremely satisfied or extremely dissatisfied about the products or services. Dellarocas and Wood (2008) found that consumers are more likely to post online reviews when satisfied than when dissatisfied. A variety of factors can also influence consumers' perception and, hence, influence the posting of online reviews. For example, several authors investigated previously posted opinions as key triggers of e-WOM (Moe and Schweidel 2012). Wu and Huberman (2008) showed that exposing potential reviewers to previously posted reviews leads to increasingly extreme reviews. Other factors, such as peer influence from online friends (Lee et al. 2015, Wang et al. 2018) and financial rewards (Burtch et al. 2017), that can influence subsequent reviews have also been documented in the literature. Focusing on markets where the product price changes frequently (such as electronics), Li and Hitt (2010) argued that price can affect consumers' perception and product evaluation and thus influence e-WOM postings.

More relevant to our study in the daily deal promotion context, earlier authors (Berger and Schwartz 2011, de Matos et al. 2016) have shown that price promotions can increase the volume of e-WOM. Regarding how daily deal promotions influence the valence (positive or negative) of e-WOM, although it is likely that daily deals may stimulate some deal users to post positive reviews (Cassia et al. 2016), the existing studies have suggested a negative effect of daily deals on online ratings from the retailers' perspective. Byers et al. (2012a) first showed a declining trend in local retailers' Yelp ratings after those retailers offered Groupon deals. Conducting a causal analysis using propensity score matching (PSM) and difference-in-differences (DID) analyses, Li (2016) concluded a negative average effect of daily deals on restaurants' online ratings and also showed that daily deals had a positive effect for a substantial minority (about 24%) of restaurants (those that had relatively low prior ratings and few prior reviews). Our study adds to the literature by carefully analyzing the impact of daily deals on local retailers' (restaurants) online reputation. Moreover, our results highlight the important mediating roles of consumers' postconsumption perceptions (revealed in reviews) in interpreting the negative impact of daily deals on online ratings.

2.2. Local Retailers' Daily Deal Promotion Strategies

Daily deals have become a widely accepted marketing tool, which attracts consumers via the online channel to local retailers offline (Li et al. 2018). Several studies to date have examined the impacts of various online deal features. Having a minimum requirement that must be met before a deal becomes valid can improve deal sales (Wu et al. 2014, Bai et al. 2015), whereas a discount rate beyond a certain threshold may have a boomerang effect and hurt deal sales (Cao et al. 2018). Daily deals are often linked with social media sites (such as Facebook) and called "social couponing." We found three studies that investigated how different types of social influence (such as Facebook "likes") affect deal sales (Kuan et al. 2014, Bai et al. 2015, Li and Wu 2018).

Although daily deals have been referred to as an online-to-offline process (Li et al. 2018), studies above have centered on the first phase of the process: how to design deal features to increase online deal sales. Only a few studies considered consumers' offline behavior. Luo et al. (2014) extended the prior studies by incorporating consumers' offline deal-redemption behavior in their analyses. Using a data set including both deal purchasing and deal-redemption details, they showed that when the level of deal popularity (the cumulative number of deals sold) is higher, deal users redeem the deals earlier. Song et al. (2016) showed that new deal users tended to redeem the deals earlier, which they argue is likely to cause small retailers to become overwhelmed.

Our study is related to a broader literature on the local retailers' promotion decisions and the longer-term impact of daily deals. Although many retailers decide to offer daily deals to attract new customers and expand their market size (Kimes and Dholakia 2011, Edelman et al. 2016), through an analytical model, Kumar and Rajan (2012) suggested that daily deals might not ensure the long-term profits for local retailers. We add to the literature by connecting the relationship between daily deals and local retailers' online ratings via postconsumption perceptions during the deal-redemption period.

2.3. Hypotheses Development

As discussed in Section 2.1, although it is possible that daily deals increase the online ratings for a small subset of local retailers, we follow the stylized negative trend (Byers et al. 2012a, Li 2016) and posit that daily deals have a negative main effect on restaurants'

online ratings on average. In this subsection, we develop hypotheses regarding (1) the mediational roles of consumption perception components and (2) the differential mediation mechanisms for *DD Reviews* versus *NDD Reviews*.

2.3.1. Mediation Roles of Consumer Perception Components on the Effect of Daily Deals and Local Retailers' Online Ratings. Daily deals may influence online ratings by directly influencing consumers' consumption experience. Daily deals provide consumers with a highly discounted price (typically 50% of normal—see Bai et al. 2015), which may boost consumers' moods and improve the consumption experience. However, many daily deal users redeem these deals at a time distant from when they purchased the daily deal (Luo et al. 2014). Lee and Tsai (2014) argued that the time delay prior to deal redemption would likely reduce the positive influence of the deal on users' consumption experience. Therefore, if a deal user delays the deal usage and the consumption experience, a longer delay may even overturn the positive effect of daily deals on his/her moods and the subsequent rating (Wu et al. 2016). Moreover, the price promotion literature has long documented the negative impact of price promotions on brand image and perception. For example, Zeithaml (1988) made the case that, for products and/or services that have high variation in quality (such as restaurant meals), consumers frequently form lower perceptions of quality from lower prices. Yoo et al. (2000) showed that consumers who used coupons tend to infer lower quality during their postpurchase consumption. Together, this body of work suggests that consumers getting lower prices by using daily deal coupons may derive a less positive consumption perception, which links to lower online ratings.

For service products, consumers evaluate their experience from multiple dimensions of consumption (Myung et al. 2007). In the restaurant industry, the context of this study, prior studies have discussed some consumption perception components that are important for consumers' overall perception and satisfaction with their experience. For example, Ryu and Han (2010) and Susskind and Chan (2000) examined three factors: perceived food quality, perceived service quality, and perceived quality of the physical environment (such as décor and background music). The authors showed that all three were significant determinants of consumer satisfaction. Prior literature also suggested other perception components, such as price perception (Han and Ryu 2009). In this study, we focus on two major consumption experience components, perceived food quality and perceived service quality for two reasons. First, as we detail in the online appendix section on consumers' consumption perceptions, the importance of these factors is more theoretically fundamental in consumers' overall consumption perceptions. Second, these two components were also the most frequently mentioned in Yelp reviews (Table OA15 in the online appendix). We argue that daily deal users are likely to form lower perceptions of both food and service quality because of the deep discounts connected with the daily deals they use. We anticipate that these perceptions, in turn, likely result in more negative reviews.

Some may argue that there may exist positive effects of daily deals on perceived food quality. For example, consumers may buy restaurant deals to food that they already like and then post positive reviews. However, prior studies (Kimes and Dholakia 2011, Byers et al. 2012b) showed that deal users might utilize daily deals as a tool to experiment with new products and services and to expand their experience. Many deal users are likely to be novice consumers for restaurants offering a deal. It may be difficult for such novice consumers to know in advance whether or not the type of cuisine they try using deals matches their taste or preference (Chen and Xie 2008). It is likely that deal users, after their trials, find the new type of cuisine and/or service not a good fit with their taste. Therefore, we posit that the negative effect of daily deals on consumers' perceived food quality will dominate the positive effect.

In addition, daily deals may also alter the restaurant experience, which is likely to impact consumers' consumption experience for both deal users and nondeal users. For example, daily deals may bring a larger volume of consumers into a restaurant over a shorter period of time (Kumar and Rajan 2012). This increased patronage may make consumers' waiting time longer and/or reduce the quality of the restaurant's service (Kong 2016), which may lower consumers' perceptions of service quality and induce an unfavorable online review.

In summary, we hypothesize the following mediation effects of perceived food quality and perceived service quality on the effect of daily deals on online ratings:

Hypothesis 1a. *Daily deals have a negative influence on consumers' perceived food quality, which, in turn, leads to a decrease in online ratings.*

Hypothesis 1b. *Daily deals have a negative influence on consumers' perceived service quality, which, in turn, leads to a decrease in online ratings.*

2.3.2. Differential Mediation Effects—*DD Reviews* vs. *NDD Reviews*. Daily deals have been used as an effective marketing tool to attract new customers, an advantage that daily deal sites emphasize in their

marketing to retailers (Dholakia 2011). During the period when daily deals can be redeemed (redemption duration), restaurants face two groups of consumers: deal users (many new customers attracted by the deals) and nondeal users (regular customers) (Kong 2016). Some review postings from deal users will explicitly mention daily deals (such as Groupon), whereas other reviews from regular customers will likely not mention daily deals. Most prior studies have assumed that reviews during the redemption period did not need to be differentiated into *DD Reviews* and *NDD Reviews* categories. We found that only two studies (Byers et al. 2012b, Cassia et al. 2016) recognized these two types of reviews and noted that *DD Reviews* had lower average ratings than *NDD Reviews*.

We seek to deepen our knowledge of daily deals' impact on online ratings by examining the potential different mediational mechanisms between the two types of reviews. First, for *DD Reviews*, both perceived food quality and perceived service quality should have mediation effects on the relationship between daily deals and restaurants' online ratings for four reasons (similar logic to developing H1a and Hypothesis 1b):

i. Although deal users are likely to derive positive moods from the deep discounts, many of them redeem the deals at a time distant from when they purchase the deal (Luo et al. 2014). Such a time delay may reduce or even overturn the positive consumption perception of using deals (Wu et al. 2016).

ii. Deal users are also likely to infer lower perceived quality in their consumption experience based on the discounted price they paid (Zeithaml 1988, Yoo et al. 2000).

iii. Deal users attracted by the price discount may like the product or service less because they have different tastes than nondeal users, who, if they are loyal patrons, are more likely to appreciate the product or service (Myung et al. 2007, Li and Hitt 2008).

iv. A large volume of deal users may visit a restaurant over a shorter period of time (Kumar and Rajan 2012). The increased number of customers may increase the waiting time for both deal users and nondeal users, which lowers consumers' perceived service quality.

Regarding *NDD Reviews*, perceived service quality still is expected to have a mediation role in the impact of daily deals on online ratings, because the increased customers during the redemption period can bring down the service level, which negatively affects regular customers' perception of service quality. However, for *NDD Reviews*, we argue that perceived food quality may not have a mediation effect for two reasons:

i. Some *NDD Reviews* are from regular customers not using the deal. These regular customers are the patrons of the restaurants and more likely to appreciate the food or the specific type of cuisine than deal users.

ii. *NDD Reviews* are also likely from new customers who did not use a deal. These customers may decide to visit a restaurant because they already like a similar type of food and, therefore, have a higher perceived food quality than deal users.

In summary, for *DD* reviews, both perceived food quality and perceived service quality should lead to a mediation effect. However, for *NDD Reviews*, perceived service quality is expected to have a mediation effect, but perceived food quality may not have a mediation effect. Therefore, we hypothesize the following:

Hypothesis 2. *The mediation effect of consumer perception varies for DD Reviews versus NDD Reviews.*

3. Data Collection and Variables

To test our hypotheses, we collected and constructed a comprehensive data set, which includes daily deal information offered by restaurants and Yelp online review details of restaurants. Table 1 details the key variables, their definitions, and data sources we employed.

3.1. Restaurant Daily Deal Data Collection

We first collected daily deals offered by restaurants in the Chicago area from two major daily deal sites (Groupon and LivingSocial)[1] from March 1, 2011 to January 17, 2013. As detailed in the online appendix section on data collection, a complete data set drawing from multiple complementary data sources covers daily deals from December 7, 2008 to January 17, 2013. From the complete deal data, we were able to observe whether a specific restaurant provided multiple deals, even if the multiple deals were offered by two different daily deal sites. To avoid confounding our results with the effect of multiple promotions, we excluded restaurants that ran more than one daily deals. We, therefore, obtained 655 restaurants (hereafter, *Daily Deal Restaurants*) that had run *one and only one* daily deal between March 1, 2011 and January 17, 2013. For each deal, we obtained detailed information, including the start date when a daily deal buyer could first redeem the deal and the length of redemption duration.

3.2. Online Rating-Related Variables

We next matched the 655 *Daily Deal Restaurants* with those from Yelp using Yelp links provided by daily deal sites, or using business information, such as names, physical addresses, and phone numbers. Yelp provides both online ratings and restaurant-related information such as, *Number of Yelp Dollar Signs*.

Table 1. Key Variables, Definitions, and Data Sources

Variables	Definitions/operationalization	Data sources
Average Monthly Yelp Rating	The average of Yelp numeric ratings of reviews posted within a particular month t for a restaurant	Constructed using Yelp data
Average Monthly Sentiment of Perceived Food Quality	The average of sentiment value associated with consumers' perceived food quality across reviews posted within a particular month t for a restaurant	Text mining on Yelp review texts
Average Monthly Sentiment of Perceived Service Quality	The average of sentiment value associated with consumers' perceived service quality across reviews posted within a particular month t for a restaurant	Text mining on Yelp review texts
Redemption	A dummy variable indicating whether a particular month t is before offering a daily deal (equal to 0) or after offering the deal, that is, during the redemption period (equal to 1)	Constructed using daily deal data

In addition, Yelp provides individual consumer reviews for each restaurant. We collected all of each text in each restaurant's individual reviews, each review's corresponding numeric rating (1–5 points), and review dates. Therefore, we were able to construct online rating related variables, such as *Average Monthly Yelp Rating* for a restaurant at any period before and after offering a daily deal.

We constructed the consumer-revealed perception variables necessary for the mediation analysis. Specifically, we examined consumers' perceived food quality and perceived service quality revealed in Yelp review texts. Because neither is directly observable from Yelp data, we applied text-mining methods to obtain the mediator variable values (Mejía et al. 2020b). Our specific feature-sentiment analysis involved two major steps: feature extraction and feature-level sentiment analysis. Although our online appendix provides the detailed procedures of the two steps, we illustrate the general idea as follows:

Step A. Feature Extraction at the Sentence Level. We first split the text of each review into sentences. For each sentence, we extracted mention of the two predefined features of consumer experience, perceived food quality and perceived service quality. Using some 4,000 sentences with manually labeled features as ground-truth, we adopted a supervised learning method (support vector machine, or SVM). We trained the SVM model for perceived food quality and perceived service quality separately. We then used each well-trained SVM model to tag whether a specific feature was mentioned for each sentence in a review. It is possible that a sentence was identified as including both features. For example, a sentence such as "the food is tasty, but the service is too slow" mentioned both perceived food quality and perceived service quality.

Step B. Sentiment Identification. For each sentence tagged with one or both of the features, we then identified its sentiment orientation (1 for positive sentiment, 0 for neutral, or −1 for negative sentiment). In this step, we adopted a semisupervised learning method based on the Bidirectional Encoder Representations from Transformers (BERT) model (a cutting-edge and powerful model). Using sentences with manually labeled sentiments, we fine-tuned the BERT model for perceived food quality and perceived service quality separately. We then determined the sentiment score for each feature in each sentence in each review. For example, for the sentence "the food is tasty, but the service is too slow," the sentiment of perceived food quality would be classified as positive (indicated by 1), whereas the sentiment of perceived service quality would be classified as negative (indicated by −1).

Having tagged feature(s) and feature-specific sentiment(s) for each sentence in a review, we then determined the review-level sentiment score for each of the two features. The sentiment orientation for a feature is calculated by averaging the sentiment scores of sentences mentioning that feature. The review-level sentiment score for a feature is 1 (positive) if the average sentiment value is greater than 0, 0 (neutral) if the average sentiment value is 0, and −1 (negative) otherwise.

4. Empirical Analysis

4.1. Main Effect—A Panel Data Approach

We first analyze the effect of daily deals on a restaurant's online ratings by utilizing a panel model with a time-based fixed effect. Our specific econometric model is as follows:

$$AvgRating_{i,t} = \alpha + \beta\, Redemption_{i,t} + \eta_i + v_t + \varepsilon_{i,t},$$

where i indexes a *Daily Deal Restaurant* and t indexes a particular month (a 30-day period starting from January 2011, $t = 1, 2, 3, \ldots$). For a specific restaurant, the maximum value of t is the month of its deal's expiration date (i.e., the end of the redemption du ration).

$AvgRating_{i,t}$ is the *Average Monthly Yelp Rating* at month t for restaurant i. $Redemption_{i,t}$, the focal independent variable, is a dummy variable indicating whether it is within the redemption period or not at month t for restaurant i. We also control for the possible time invariant restaurant-level fixed effect (η_i) and the possible time-based fixed effect (v_t).

The main effect of daily deals on *Average Monthly Yelp Rating*, hence, is captured by the parameter β. We use all 655 *Daily Deal Restaurants* to estimate the main effect and summarize the results in Table 2. The estimated coefficient of $Redemption_{i,t}$ is −0.153 and statistically significant. Consistent with prior studies (Byers et al. 2012a, Li 2016), our results show a negative main effect of daily deal promotions on a restaurant's online ratings across the 655 *Daily Deal Restaurants*.

4.2. Mediation Effects

4.2.1. Mediation Effects of Consumer Perception Components. We now investigate the potential roles of perceived food quality and perceived service quality using the mediation analysis (illustrated in Figure 1). Under the mediation framework by Baron and Kenny (1986), an independent variable (here, offering a daily deal by a restaurant) affects a dependent variable (*Average Monthly Yelp Ratings*) via mediators (consumption perceptions mined from reviews). The mediating variables are the average monthly values of sentiments of perceived food quality and perceived service quality demonstrated in a restaurant's reviews.

We utilized and adjusted a regression-based procedure of the parallel multimediator model from (Hayes 2017) under the panel data structure (Zhou and Duan 2016). Specifically, our estimation procedure includes two steps, the first with two equations and the second with one equation to be estimated as follows:

Step 1:

$$Senti\_Food_{i,t} = \beta_{10} + \beta_{11}\, Redemption_{i,t} + \beta_{12} Senti\_Food_{i,t-1} + \eta_i^1 + v_t^1 + \varepsilon_{i,t}^1, \quad (1)$$

$$Senti\_Service_{i,t} = \beta_{20} + \beta_{21}\, Redemption_{i,t} + \beta_{22} Senti\_Service_{i,t-1} + \eta_i^2 + v_t^2 + \varepsilon_{i,t}^2, \quad (2)$$

Step 2:

$$AvgRating_{i,t} = \beta_{30} + \beta_{31}\, Redemption_{i,t} + \beta_{32} Senti\_Food_{i,t} + \beta_{33} Senti\_Service_{i,t} + \eta_i^3 + v_t^3 + \varepsilon_{i,t}^3, \quad (3)$$

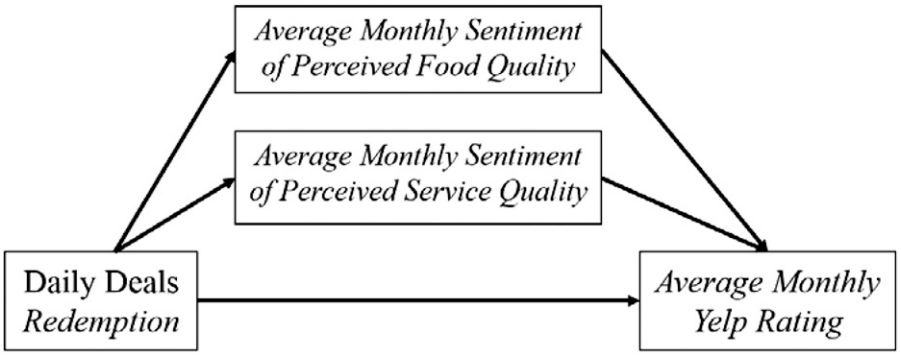
where $Senti\_Food_{i,t}$ and $Senti\_Service_{i,t}$, respectively, indicate the *Average Monthly Sentiment of Perceived Food Quality* and *Average Monthly Sentiment of Perceived Service Quality* at month t for restaurant i. Using the specification, Equations (1), (2), and (3) above, two estimates are used to estimate a mediation path for perceived food quality. The estimated coefficient $\widehat{\beta_{11}}$ is the estimate of the effect of daily deals on perceived food quality, and $\widehat{\beta_{32}}$ is the estimate of the effect of perceived food quality on online ratings. The mediation effect of perceived food quality is estimated by

Table 2. Effects of Daily Deals on Restaurants' Online Ratings

	Main effect		Mediation effects		
	All *Daily Deal Restaurants*	Subset of *Daily Deal Restaurants*	Equation (1)	Equation (2)	Equation (3)
$Redemption_{i,t}$	−0.141***	−0.119**	−0.097***	−0.091***	−0.005
	(0.045)	(0.050)	(0.035)	(0.034)	(0.033)
$Senti\_Food_{i,t}$	—	—	—	—	0.610***
					(0.019)
$Senti\_Service_{i,t}$	—	—	—	—	0.682***
					(0.019)
$Senti\_Food_{i,t-1}$	—	—	−0.098***	—	—
			(0.016)		
$Senti\_Service_{i,t-1}$	—	—	—	−0.112***	—
				(0.016)	
Restaurant fixed effect	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes
Number of restaurants	655	591	591	591	591
Observations	5,548	3,853	3,853	3,853	3,853
Adjusted R^2	0.229	0.277	0.169	0.185	0.689

Note. Standard errors clustered by restaurants are reported in parentheses.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Figure 1. Conceptual Model of the Mediation Effects of Consumption Perceptions



the product of the two estimators, $\widehat{\beta_{11}} \times \widehat{\beta_{32}}$. Similarly, the mediation effect of perceived service quality is estimated by the product of the two estimators, $\widehat{\beta_{21}} \times \widehat{\beta_{33}}$. In addition, we conducted a bootstrap analysis to obtain the standard errors and confidence intervals for the two estimated mediation effects: $\widehat{\beta_{11}} \times \widehat{\beta_{32}}$ and $\widehat{\beta_{21}} \times \widehat{\beta_{33}}$ (Hayes 2017).

To empirically test our hypothesized mediation effects for perceived food quality and perceived service quality, we identified a subset of *Daily Deal Restaurants* (591 out of 655), where each had one or more reviews mentioning both perceived food quality and perceived service quality for periods of both before and after offering a daily deal. We conducted the formal mediation analysis and summarized the estimation results in Table 2.

From Table 2, we see that the estimated coefficient of $Redemption_{i,t}$ in Equation (1) $\widehat{\beta_{11}}$, is −0.097 and statistically significant, indicating a negative effect of daily deals on consumers' perceived food quality. The estimated coefficient of *Senti_Food* in Equation (3), $\widehat{\beta_{32}}$, is 0.610 and statistically significant, indicating a positive effect of consumer perceived food quality on *Average Monthly Yelp Ratings*. The mediation effect of perceived food quality, $\widehat{\beta_{11}} \times \widehat{\beta_{32}}$, is equal to −0.059. We conducted a bootstrap analysis (10,000 samples) and found that result to be statistically significant ($p < 0.01$). Hence, Hypothesis 1a is supported. Similarly, the mediation effect of perceived service quality, $\widehat{\beta_{21}} \times \widehat{\beta_{33}}$, is equal to −0.062 and statistically significant (10,000 bootstrap samples, $p < 0.01$). Hence, Hypothesis 1b is supported. Hence, both perceived food quality and perceived service quality are mediators of the effect of daily deals on online ratings (*Average Monthly Yelp Ratings*). Although perceived service quality tends to have a larger mediation effect than perceived food quality, our bootstrap analysis (10,000 samples) showed that the two mediation effects do not statistically significantly differ. These results help us understand better what factors contributed to the decline of a restaurant's online reputation in the context of daily deals. The results also provide practical significance, because reduced overall quality (especially service quality) has been shown to be positively associated with restaurants' closure (Mejía et al. 2020b).

4.2.2. Differential Mediation Effects—*DD Reviews* vs. *NDD Reviews*. As discussed earlier, within the deal-redemption period, there were two types of reviews posted for *Daily Deal Restaurants*: *DD Reviews* (reviews that mentioned daily deals) and *NDD Reviews* (reviews that did not mention any daily deals). We further investigated the potential differential mediation processes of consumers' perception components for *DD Reviews* versus *NDD Reviews*.

To ensure that we were able to calculate the sentiments of the two perception components for both *DD Reviews* and *NDD Reviews*, we further identified 443 *Daily Deal Restaurants*. We conducted separate analyses to test the potential differing mediation processes of *DD Reviews* and of *NDD Reviews*. Table 3 contains estimation results of mediation analyses for *DD Reviews* (Panel A) and for *NDD Reviews* (Panel B). In Equation (1) and Equation (2), we examined the effects of daily deals on two potential mediators. In Equation (3), we examined the effects of two potential mediators on *Average Monthly Yelp Ratings*.

In Table 4, we summarized the mediation effects derived from Table 3, the difference between the two mediation effects, and bootstrap estimation results (10,000 samples) for *DD Reviews* (column I) and for *NDD Reviews* (column II). For *DD Reviews*, the estimated mediation effect of perceived food quality is −0.148 and statistically significant, whereas the estimated mediation effect of perceived service quality is −0.182 and statistically significant. The difference between the two mediation effects is 0.034 and not statistically significant. Deal users, often new customers attracted by discounts, were more likely to reveal negative postconsumption perceptions of both perceived food quality and perceived service quality in their reviews and to post negative ratings. Prior studies (Kimes and Dholakia 2011, Byers et al. 2012b)

Table 3. Estimation Results of Mediation Effects—*DD Reviews* vs. *NDD Reviews*

	DD reviews			*NDD reviews*		
	Panel A			Panel B		
	Equation (1)	Equation (2)	Equation (3)	Equation (1)	Equation (2)	Equation (3)
$Redemption_{i,t}$	−0.226*** (0.066)	−0.295*** (0.065)	−0.100 (0.064)	−0.063 (0.041)	−0.123*** (0.040)	0.003 (0.049)
$Senti\_Food_{i,t}$	—	—	0.655*** (0.032)	—	—	0.579*** (0.023)
$Senti\_Service_{i,t}$	—	—	0.617*** (0.037)	—	—	0.720*** (0.023)
$Senti\_Food_{i,t-1}$	−0.112*** (0.029)	—	—	−0.107 (0.019)	—	—
$Senti\_Service_{i,t-1}$	—	−0.172*** (0.028)	—	—	−0.126*** (0.019)	—
Restaurant fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of restaurants	443	443	443	443	443	443
Observations	1,642	1,642	1,642	2,757	2,757	2,757
Adjusted R^2	0.137	0.134	0.650	0.145	0.179	0.673

Note. Standard errors clustered by restaurants are reported in parentheses.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

argued that deal users might utilize daily deals as a tool to try out new products and services. If this is indeed correct, then our results suggest that the new cuisines tried by deal users were not typically good matches with their taste buds, suggesting a mismatch effect of daily deals.

In contrast, for *NDD Reviews*, although the estimated mediation effect of perceived service quality is −0.089 and statistically significant, perceived food quality does not have a statistically significant mediation effect. Further, the difference between the two mediation effects is 0.053 and statistically significant. *NDD Reviews* are more likely from those customers who are regulars because they appreciate the restaurants food. Therefore, these consumers' perceived food quality did not mediate the negative daily deal effect on online ratings. However, an indirect effect can occur from larger volumes of customers because of deal users. Such increased volume tends to induce a negative effect on regular customers' perceived service quality, suggesting a negative externality effect of daily deals (Kong 2016).

In sum, the two types of reviews have differing mediation processes, supporting Hypothesis 2. For *DD Reviews*, both perceived food quality and perceived service quality mediated the negative daily deal effect on online ratings, whereas for *NDD Reviews*, only perceived service quality had a mediation role.

4.3. Robustness Tests

To show the robustness of our results, we conducted several additional analyses. First, the mediators are generated based on the sentiment values of perceived quality predicted from the text-mining analysis. The imperfect text analysis may lead to measurement errors and estimation biases in the mediation analyses. Adopting the approach by Yang et al. (2018),

Table 4. Mediation Effects Derived from Table 3—*DD Reviews* vs. *NDD Reviews*

	DD reviews	*NDD reviews*
	(Column I)	(Column II)
Mediation effect of perceived food quality on *Average Monthly Yelp Ratings*	−0.148***	−0.036
Mediation effect of perceived service quality on *Average Monthly Yelp Ratings*	−0.182***	−0.089***
Difference of the two mediation effects (perceived food quality − perceived service quality)	0.034	0.053***

Note. Standard errors clustered by restaurants are reported in parentheses.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

we directly addressed the potential issue with measurement errors from the text-mining analyses (see the "Measurement Error Correction" section in our online appendix). More specifically, we conducted an error-diagnostics procedure and gauged the direction and magnitude of the measurement errors, which allowed us to conduct an error-corrected mediation analysis using the Simulation-Extrapolation (SIMEX) procedure. The results demonstrate that our main conclusions hold.

Another concern lies in the identification strategy of the main analysis, which may suffer from an endogeneity issue at a restaurant level. That is, a restaurant's decision to offer a daily deal is likely to be affected by restaurant-time specifics, which may also affect its online ratings. To address the endogeneity issue, we conducted an analysis using a DID method combined with a PSM process (Jung et al. 2019) (for details, please see the "A Panel Model based on Difference-in-Differences with Propensity Score Matching" section in our online appendix). The new analysis shows that our hypotheses were still supported.

The daily deal data set in the main analysis was from 2011–2013. As a further step, we collected daily deals offered by restaurants in the Chicago area (from August 25, 2019) together with their Yelp reviews (up until December 31, 2019). Utilizing the up-to-date data set, we show that our main conclusions largely hold (see the "Updated Data set of Daily Deal Promotions" section in our online appendix).

5. Summary and Discussion

Local retailers have used online daily deals as an effective marketing tool to attract new customers online to physical stores (Li et al. 2018). However, the longer-term effect of daily deals on business performance has not received proportional attention (Li 2016). The goal of the work presented here was to investigate the impacts of daily deals on local retailers' online ratings and uncover the underlying mechanisms through an in-depth mediation analysis. Focusing on restaurants as one type of local retailers, we constructed variables using deal data compiled from two daily deal sites (Groupon and LivingSocial) and review data from Yelp. We first showed a negative main effect of daily deals on restaurants' average monthly Yelp ratings. Going beyond the main effect, and in contrast to recent studies on the relationship between daily deals and online ratings (Byers et al. 2012a, b; Li 2016), we took a more nuanced approach by articulating the mediation roles of consumers' revealed postconsumption perceptions. We used text-mining techniques to identify potential mediators—sentiments associated with two components of consumer perceptions, perceived food quality and perceived service quality. Mediation analyses show that daily deals are associated with the reduction of the average perceived quality (perceived food quality and perceived service quality), linking to a decline in a restaurant's monthly average ratings.

Moreover, separate analyses on *DD Reviews* and *NDD Reviews* demonstrate two differing mediation processes. For *DD Reviews*, we showed a mismatch effect of daily deals. That is, deal users attracted by discounts are often new customers and less likely to appreciate the food or service. In contrast, for *NDD Reviews*, we showed a negative externality effect of daily deals. That is, daily deals tended to bring in larger numbers of consumers (deal users) in a short period of time, leading to longer waiting times and reducing perceived service quality for regular customers. These results together deepen our understanding of the underlying processes of how daily deals affect local retailers' online reputation.

Understanding what factors drive the negative impact of daily deals on online reputation is a question of significant consequence to restaurants who might consider using daily deals to enhance their business. The mismatch effect results indicate that new customers attracted by daily deals may not be the ones who will like the food or service and return to the restaurant in the future. Moreover, the mismatched deal users could jeopardize a restaurant's Yelp ratings, which could directly hurt a restaurant's future demand (Anderson and Magruder 2012). Therefore, our results can help restaurants that consider daily deals for the acquisition and retention of new customers be aware of the mismatch risk and avoid losses. The negative externality effect results suggest that restaurants that decide to offer a daily deal should pay special attention to the service quality they provide during the promotion period to reduce the damage to online ratings. For example, restaurants may opt to require deal users to make a reservation to ease the pressure of too many customers in one period of time and thus reduce consumers' waiting time. Restaurants may also increase training for wait staff before engaging in daily deals or to up the staffing level to help provide better/quicker service during the deal-redemption period.

Our findings also provide important implications for the sustainability of daily deal sites. Prior studies on daily deals focused on strategies to increase consumers' deal purchases, suggesting that deal sales determine the effectiveness of the daily deal business (Kuan et al. 2014, Wu et al. 2014). However, our results reveal that consumers' perceptions in the deal-redemption stage should not be neglected. Deal users may include individuals who like the product less when they redeem the deals, leading to negative reviews that can harm the local retailers' online

reputation and future business. The daily deal platforms, once estimated as a multibillion industry, have been struggling recently. Daily deals sites should attempt to develop more effective techniques to help match local retailers with consumers' tastes, such that negative impacts of daily deals on local retailers' online ratings can be avoided.

Like all studies, our analysis has some limitations. The primary concern regarding our conclusions is that there may exist endogeneity at both the restaurant level and the consumer level. The endogeneity issue at the restaurant level mainly stems from self-selection in a restaurant's decision to offer a daily deal. It is possible that struggling restaurants are more likely to offer a daily deal and also suffer from declining online ratings. To directly address this issue, we adopted a DID analysis together with a propensity score matching method and reached consistent conclusions. Although the matching process of *Daily Deal Restaurants* with *Non–Daily Deal Restaurants* is based on important observable characteristics, they may fail to capture all of the elements encompassing similarity. It is possible that unobservable factors may influence the matching process, which in turn may affect our results.

The endogeneity issue at the consumer level may lie in self-selection among consumers and omitted variables. Because of data limitations, some aspects of consumers' decisions in the context of daily deals are not observable. For example, deal users with negative perceptions may be more likely to post a review and mention the usage of daily deals in the review texts. To completely address the self-selection issues, we would need an all-inclusive, and rather unrealistic, data set including information about consumers' deal purchasing, deal-redemption behavior, and the individual consumers Yelp reviews. Although acknowledging the data limitation, we did dig deeper into the review texts and extract information. For example, we extended text-mining analysis including perceived service quality related to waiting time, which provided additional suggestive evidence on the negative externality effect.

In addition, when the mediator variables are generated from the text-mining methods, misclassifications and biases are introduced in the mediation analyses. In the online appendix, we directly gauged the magnitude of measurement errors in the text-mining analysis using 30% of randomly selected restaurant samples following the state-of-the-art study by Yang et al. (2018). By applying the SIMEX method, we conducted mediation analyses using error-adjusted measures and obtained largely consistent conclusions. However, we are aware of possible estimation biases in the mediation analyses because of the choice of a particular text analysis method. Future research will explore additional mediators utilizing other advanced text-mining techniques, such as representation learning algorithms.

Another caveat in suggesting implications for local retailers is that our analyses and results are based on restaurants. Future research needs to be directed at investigating whether our findings can be generalized to other local retailers (e.g., hair salons), especially those providing experience goods. In these contexts, consumers derive their utility directly from the consumption of the experience goods. At the same time, service quality (e.g., the waiting time) also affects consumers' overall consumption experience. Future research will investigate whether our conclusions also hold in contexts where (1) the consumption of experience goods and service delivery happen together and (2) the quality of both are important for consumers' overall evaluation and, therefore, their online ratings.

Endnote

[1] During our data collection period, the two sites together accounted for about 75% of the daily deal market share. See https://tommytoy.typepad.com/tommy-toy-pbt-consultin/2012/11/throwing-more-cold-water-on-what-was-once-a-white-hot-daily-deal-space-livingsocial-is-reportedly-ready-to-cut-about-10-of.html (retrieved January 8, 2020).

References

Anderson M, Magruder J (2012) Learning from the crowd: Regression discontinuity estimates of the effects of an online review database. *Econom. J. (London)* 122(563):957–989.

Bai X, Marsden JR, Ross WT Jr, Wang G (2015) Relationships among minimum requirements, Facebook likes, and Groupon deal outcomes. *ACM Trans. Management Inform. Systems* 6(3):1–28.

Baron RM, Kenny DA (1986) The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Personal Social Psych.* 51(6): 1173–1182.

Berger J, Schwartz EM (2011) What drives immediate and ongoing word of mouth? *J. Marketing Res.* 48(5):869–880.

Burtch G, Hong Y, Bapna R, Griskevicius V (2017) Stimulating online reviews by combining financial incentives and social norms. *Management Sci.* 64(5):2065–2082.

Byers JW, Mitzenmacher M, Zervas G (2012a) Daily deals: Prediction, social diffusion, and reputational ramifications. *Proc. 5th ACM Internat. Conf. Web Search Data Mining* (ACM, New York), 543–552.

Byers JW, Mitzenmacher M, Zervas G (2012b) The Groupon effect on yelp ratings: a root cause analysis. *Proc. 13th ACM Conf. Electronic Commerce* (ACM, New York), 248–265.

Cao Z, Hui KL, Xu H (2018) When discounts hurt sales: The case of daily-deal markets. *Inform. Systems Res.* 29(3):567–591.

Cassia F, Magno F, Ugolini M (2016) Does social couponing stimulate positive eWOM and online referrals? Sinergie *Italian J. Management* 34(100):113–124.

Chen Y, Xie J (2008) Online consumer review: Word-of-mouth as a new element of marketing communication mix. *Management Sci.* 54(3):477–491.

Dellarocas C, Wood CA (2008) The sound of silence in online feedback: Estimating trading risks in the presence of reporting bias. *Management Sci.* 54(3):460–476.

Dholakia UM (2011) What makes Groupon promotions profitable for businesses. Preprint, submitted March 20, https://dx.doi.org/10.2139/ssrn.1790414.

Edelman B, Jaffe S, Kominers SD (2016) To Groupon or not to Groupon: The profitability of deep discounts. *Marketing Lett.* 27(1):39–53.

Han H, Ryu K (2009) The roles of the physical environment, price perception, and customer satisfaction in determining customer loyalty in the restaurant industry. *J. Hospital Tourism Res.* 33(4):487–510.

Hayes AF (2017) *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach* (Guilford Publications, New York).

Hu N, Zhang J, Pavlou PA (2009) Overcoming the J-shaped distribution of product reviews. *Comm. ACM* 52(10):144–147.

Jedidi K, Mela CF, Gupta S (1999) Managing advertising and promotion for long-run profitability. *Marketing Sci.* 18(1):1–22.

Jung J, Bapna R, Ramaprasad J, Umyarov A (2019) Love unshackled: Identifying the effect of mobile app adoption in online dating. *MIS Quart.* 43:47–72.

Kimes SE, Dholakia UM (2011) Restaurant daily deals: Customers' responses to social couponing. *Cornell Hospital Rep.* 11(20):1–22.

Kong G (2016) Promotion strategy for a service firm with delay sensitive customers. Preprint, Submitted December 13, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2815290.

Kuan KKY, Zhong Y, Chau PYK (2014) Informational and normative social influence in group-buying: Evidence from self-reported and EEG data. *J. Management Inform. Systems* 30(4):151–178.

Kumar V, Rajan B (2012) Social coupons as a marketing strategy: A multifaceted perspective. *J. Acad. Marketing Sci.* 40(1):120–136.

Lee L, Tsai CI (2014) How price promotions influence postpurchase consumption experience over time. *J. Consumer Res.* 40(5):943–959.

Lee YJ, Hosanagar K, Tan Y (2015) Do I follow my friends or the crowd? Information cascades in online movie ratings. *Management Sci.* 61(9):2241–2258.

Li H, Shen Q, Bart Y (2018) Local market characteristics and online-to-offline commerce: An empirical analysis of Groupon. *Management Sci.* 64(4):1860–1878.

Li X (2016) Could deal promotion improve merchants' online reputations? The moderating role of prior reviews. *J. Management Inform. Systems* 33(1):171–201.

Li X (2018) Impact of average rating on social media endorsement: The moderating role of rating dispersion and discount threshold. *Inform. Systems Res.* 29(3):739–754.

Li X, Hitt LM (2008) Self-selection and information role of online product reviews. *Inform. Systems Res.* 19(4):456–474.

Li X, Hitt LM (2010) Price effects in online product reviews: An analytical model and empirical analysis. *MIS Quart.* 34(4):809–831.

Li X, Wu L (2018) Herding and social media word-of-mouth: Evidence from Groupon. *MIS Quart.* 42(4):1331–1351.

Lu X, Ba S, Huang L, Feng Y (2013) Promotional marketing or word-of-mouth? Evidence from online restaurant reviews. *Inform. Systems Res.* 24(3):596–612.

Luo X, Andrews M, Song Y, Aspara J (2014) Group-buying deal popularity. *J. Marketing* 78(2):20–33.

de Matos M, Ferreira P, Belo R (2016) Price discounts and peer effects in information goods: Results from a randomized experiment. Preprint, submitted May 13, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2551800.

Mayzlin D, Dover Y, Chevalier J (2014) Promotional reviews: An empirical investigation of online review manipulation. *Amer. Econom. Rev.* 104(8):2421–2455.

Mejía J, Gopal A, Trusov M (2020a) Deal or no deal? Competition, online daily deals and consumer quality perceptions. *Inform. Systems Res.* Forthcoming.

Mejía J, Mankad S, Gopal A (2020b) Service quality using text mining: Measurement and consequences. *Manufacturing Service Oper. Management*. Forthcoming.

Mela CF, Gupta S, Lehmann DR (1997) The long-term impact of promotion and advertising on consumer brand choice. *J. Marketing Res.* 34(2):248–261.

Moe WW, Schweidel DA (2012) Online product opinions: Incidence, evaluation, and evolution. *Marketing Sci.* 31(3):372–386.

Myung E, Barrash D, Feinstein A (2007) The effects of coupon promotion on repeat visits in restaurants. *J. Foodservice Bus. Res.* 9(1):55–75.

Raghubir P, Corfman KP (1995) When do price promotions signal quality? The effect of dealing on perceived service quality. *Adv. Consumer Res.* 22(1):58–61.

Ryu K, Han H (2010) Influence of the quality of food, service, and physical environment on customer satisfaction and behavioral intention in quick-casual restaurants: Moderating role of perceived price. *J. Hospital Tour Res.* 34(3):310–329.

Song M, Park E, Yoo B, Jeon S (2016) Is the daily deal social shopping? An empirical analysis of customer panel data. *J. Interactive Marketing* 33:57–76.

Susskind AM, Chan EK (2000) How restaurant features affect check averages: A study of the Toronto restaurant market. *Cornell Hotel Restaurant Adm. Quart.* 41(6):56–63.

Wang A, Zhang M, Hann IH (2018) Socially nudged: A quasi-experimental study of friends' social influence in online product ratings. *Inform. Systems Res.* 29(3):641–655.

Wu F, Huberman B (2008) How public opinion forms. Papadimitriou C, Zhang S, eds. *4th Internat. Workshop Internet Network Econom.*, Lecture Notes in Computer Science, vol. 5385 (Springer, Berlin, Heidelberg), 334–341.

Wu J, Shi M, Hu M (2014) Threshold effects in online group buying. *Management Sci.* 61(9):2025–2040.

Wu J, Zhao JL, Fan S (2016) Impact of promotion on online review ratings: The moderating role of temporal distance and deal proneness. *Proc. Pacific Asia Conf. Inform. Systems* (Association for Information Systems, Atlanta), Article 310.

Yang M, Adomavicius G, Burtch G, Ren Y (2018) Mind the gap: Accounting for measurement error and misclassification in variables generated via data mining. *Inform. Systems Res.* 29(1):4–24.

Yoo B, Donthu N, Lee S (2000) An examination of selected marketing mix elements and brand equity. *J. Acad. Marketing Sci.* 28(2):195–211.

Zeithaml VA (1988) Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *J. Marketing* 52(3):2–22.

Zhou W, Duan W (2016) Do professional reviews affect online user choices through user reviews? An empirical study. *J. Management Inform. Systems* 33(1):202–228.