ADMINISTERING AND CAPITALIZING ON PRODUCT SAMPLING IN AN ONLINE CONTEXT

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 ADMINISTERING AND CAPITALIZING ON PRODUCT SAMPLING IN AN ONLINE CONTEXT

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Abstract

Product sampling, a promotional tactic long employed by brands looking to enter a new market, release a new product, or increase existing sales, has recently been applied in the online context. This seems a viable strategy given the Internet’s capability to reach a wide audience and track consumer responses. Furthermore, firms may acquire product consumption experience information from the consumers who are given product samples, and use it as word-of-mouth (WOM) to further stimulate sales. However, our understanding of the effectiveness of employing this strategy in the online context is limited. By analyzing product sampling campaign data from a leading e-commerce store in China, we show that administering product sampling online can lead to increased sales, but only for experience products and not search products. Additionally, publishing product consumption experience information from product sampling (i.e., product sampling reviews), alongside usual consumer reviews, can stimulate sales of experience products directly and indirectly through enhancing subsequent consumer reviews. However, it is interesting to note that when product sampling reviews were overwhelmingly positive, they instead lowered subsequent consumer reviews. This implies that firms hoping to influence consumer reviews through positive product sampling reviews need to be wary of their negative repercussion.

Keywords: Product sampling, electronic commerce, consumer reviews, word-of-mouth (WOM).
1 INTRODUCTION

Product sampling, which offers a free amount or a trial of a product for consumers, is an old but effective way to enter a new market, promote a new product, or increase existing sales (Jain et al. 1995; Marks and Kamins 1988). By distributing samples to target customers to try out for free, this promotional tactic allows firms to demonstrate their product quality while taking the risk off the consumers. Consequently, product sampling may help create brand awareness, enhance brand perception, induce purchases, and potentially lead to brand loyalty (Bawa and Showmaker 2004; Gedenk and Neslin 1999; Heiman et al. 2001; Lammers 1991). Furthermore, it may be used as a means to poach customers from competitors (Jain et al. 1995).

Despite their benefits, product sampling is also an expensive approach given that samples are offered free (Jain et al. 1995). Also its reach and influence could be limited because typically only a small portion of consumers get to sample a product, and they may be exposed to the sampling experience only once, thus lacking the reinforcing effects of multiple advertising exposures (Jain et al. 1995; Marks and Kamins 1988). Additionally, consumer responses to product sampling are often difficult to track. With regard to product sampling conducted offline, Reid (2013) notes, “… as product freely transfers from the brand ambassador’s hand to the consumer’s, there is no way for the brand to know who that consumer is, what they actually think of the product or if they’ll become a buyer. In this regard, many current sampling programs can be considered one dimensional and lead to large amounts of wasted product.”

Recently, this promotional tactic has been extended to the online context. For instance, Walmart.com has a section that offers free product samples provided by various brands to customers\(^1\). In China, major e-commerce portals such as taobao.com and yihaodian.com also allow brands to offer free samples through their platform. The online context allows firms to reach a wide audience (Rowley 1996), which makes it easier to identify target consumer segments for administering product sampling. In addition, compared to offline product sampling campaigns where consumer responses are difficult to track, in the online context firms are able to measure the outcomes of this strategy in an accurate manner. For instance, firms administering product sampling campaigns through an e-commerce portal may record the details of consumers who are given product samples, follow up with them after the sampling to assess their brand attitude, and track whether and to what extent they make subsequent purchases.

Firms may also acquire product consumption experience information from the consumers who are given product samples, and use it as word-of-mouth (WOM) to further stimulate sales. Indeed it has been noted that a key to product sampling success is the sharing of word-of-mouth information by consumers who sampled the product, which extends its reach and influence beyond these consumers to others (Heiman et al. 2001; Jain et al. 1995). The online context enables firms to obtain such information from the consumers (e.g., by asking them to write a product sampling review) and disseminate the information to a wide audience to influence sales. These advantages of administering product sampling online has led to a prediction that it will be the “next big thing” (Costa 2010). Yet, although offline product sampling has received some attention in the literature (Bawa and Showmaker 2004; Gedenk and Neslin 1999; Heiman et al. 2001; Lammers 1991), surprisingly there has been very scant research on product sampling in the online context\(^2\).

\(^1\) http://instoresnow.walmart.com/In-Stores-Now-Free-Samples-And-Savings.aspx

\(^2\) There is a stream of recent research on online trial of digital products, e.g., software (Cheng and Liu 2012), music (e.g., Hu et al. 2010), and information goods in general (e.g., Wang and Zhang 2009). Our focal product sampling differs in that it involves physical products (e.g., grocery and household products) distributed to consumers for their offline consumption. Also while piracy is a pertinent issue confronting the trial of digital products owing to their ease of duplication and distribution (Wang and Zhang 2009), this is less so for sampling of physical products. The relative difficulty of accessing physical products (without purchasing) compared to digital products also implies that consumption experience information could be particularly valuable in increasing their sales as it helps non-users understand such products to make purchase decisions.
Given the lack of research and empirical evidence, firms would be interested to know whether and to what extent it can lead to increased sales to justify their investment in the online channel. To more fully capitalize on administering product sampling online, firms would also be keen to make use of the product consumption experience information generated to further stimulate sales. However, it is not clear whether and how this can be achieved. To investigate these issues, we collaborate with a leading e-commerce store that administers product sampling online for data collection. In the following, we discuss the research hypotheses of this study.

2 HYPOTHESES DEVELOPMENT

We expect product sampling applied in the online context will lead to increased sales. Previous research on product sampling has highlighted three theoretical perspectives that may explain the positive effect of this promotional measure on consumer purchase, namely learning theory, self-perception theory, and attribution theory (Lammers 1991). First, sampling may lead to an effect akin to “shaping” in learning theory (Nord and Peter 1980). Consumers who sampled a product may be shaped to think of themselves as users of the product, thus increasing their probability of purchasing the product in future (Lammers 1991). Second, by sampling a product, consumers may go through a process of forming self-perceptions about their behavior (Bem 1972; Lammers 1991), e.g., as someone who is willing to try and use the products sampled. This leads them to be more willing to purchase the product when opportunity arises. Third, through the perspective of attribution theory (Sawyer and Dickson 1984), a product sample may heighten or accentuate the cues associated with the consumption of the product, and increase the consumers’ tendency to purchase.

Beyond the consumers who are given a product sample, product sampling when applied in an online context may also non-trivially influence other consumers at a broader level. The online channel increases the visibility of a product sampling campaign by expanding the audience base it can reach (e.g., visitors of an e-commerce store). Previous research notes that the offering of product samples may signal a brand’s confidence in their product quality (Wright and Lynch 1995). This effect may be amplified in the online context - consumers who visit an e-commerce store, even if they do not obtain a product sample, may infer from the product sampling campaign that the product quality is good and thus become more likely to purchase.

However, when examined at a deeper level, we expect the positive effect is more salient for experience products than for search products, particularly in the online context. Search products are goods or services for which the most essential attributes can easily be evaluated prior to purchase (Franke et al. 2004; Huang et al. 2009). In contrast, experience products are goods and services for which the evaluation of their essential attributes incurs high cost in terms of time, money, cognitive effort, or other resources (Franke et al. 2004; Huang et al. 2009).

Product samples serve as a direct source of experiential information that reduces the risk of product uncertainty and consumers’ cost of trial (Wright and Lynch 1995). This is especially useful for consumer consideration to purchase experience products, whose information about their essential attributes are difficult to obtain. Conversely, the benefits product sampling affords to search products may be less given that information about their essential attributes can be easily obtained online. Indeed a recognized major advantage afforded by the Internet is the widespread availability and accessibility of information (Lawrence and Giles 1999). Leading from this, the signaling effect that product sampling may offer, as described, should also be less salient for search products. Thus, we hypothesize:

H1. Administering product sampling online will promote sales for experience products more so than for search products.

To maximize the impact of product sampling, it is hoped that consumers who sampled the product will share WOM information with others (Heiman et al. 2001; Jain et al. 1995), e.g., their friends and family members. In the online context, firms may more systematically leverage on this measure to amplify its effect. For instance, firms may require consumers to register to receive product samples, follow up with them afterward to assess their evaluation (e.g., via email), and incentivize them to
submit product sampling review online. The product sampling reviews may then be published on the product webpage, along with usual consumer reviews (e.g., on top of the latter reviews), to stimulate greater sales. This fits what Godes et al. (2005) describe as “firm as mediator”, whereby a firm takes strategic control of the information to publish and disseminates it itself.

As previous research indicates, e-WOMs, in particular those of positive nature, are an effective driver of sales (Chen and Xie 2008; Chevalier and Mayzlin 2006; Clemons et al. 2006; Dellarocas et al. 2007; Zhu and Zhang 2010). Intuitively, product sampling reviews tend to be more positive in nature because consumers who received a product sample are likely to perceive favorably about the brand out of goodwill (Heiman et al. 2001). For the same reason, these consumers may also be willing to expend effort in providing greater details about the product in writing its review, which can help reduce uncertainty for other consumers\(^3\). Hence, we expect the incorporation of product sampling reviews into the pool of usual consumer reviews would serve to bring about greater sales. However, for the similar rationales provided for H1 above, we expect the positive effect is more salient for experience products that for search products. Specifically, the marginal increment of useful information due to the incorporation of sampling reviews of search products is likely to be minimal, given that information about their essential attributes can be obtained online, and might already be available in existing consumer reviews. In contrast, experience products are likely to benefit non-trivially from the greater details that consumers willingly put into describing their experience with such products. Such details might not have been available under usual circumstances (i.e., consumers write reviews after purchasing and trying an experience product). Hence, we hypothesize:

**H2.** Publishing product sampling reviews alongside usual consumer reviews (within the same section) will promote sales for experience products more so than for search products.

Product sampling reviews may also influence subsequent product reviews contributed by consumers. When a consumer voluntarily puts in time and effort to write a review (without receiving any tangible benefit such as a product sample), it is reasonable to assume that he or she has read and remembered some existing reviews for the product, either before purchase or after trying the product and considering to write a review. To the extent that products of decent quality in which firms are confident are usually selected for administering expensive product sampling campaigns, positive product sampling reviews are likely to lead to the generation of more positive reviews due to reasons similar to how product sampling influences consumer purchase. First, seeing the positive product sampling reviews, consumers may be influenced to also favorably review the product due to a learning effect (Lammers 1991; Nord and Peter 1980). Second, per the attribution theory (Lammers 1991; Sawyer and Dickson 1984), positive product sampling reviews may heighten or accentuate the positive cues associated with the consumption of the product, which leads consumers to provide positive reviews about the product.

To this end, firms may be tempted to purposely select highly positive product sampling reviews and include them into the mix of usual consumer reviews, with the hope to influence the latter in a positive direction and ultimately obtain greater sales. However, we posit that when the product sampling reviews included are overly positive, they may instead undermine subsequent consumer reviews. There have been skepticisms raised about the credibility of online product reviews due to firms’ manipulation effort through paid reviewers (Dellarocas 2006; Mullins 2012), and one criterion proposed to spot a manipulated review is whether it is overly positive (Mullins 2012). When a product sampling review is too positive such that it raises skepticism in the consumers, their motivation to favorably review the product may be dampened. Instead they may be more cautious in reviewing in the interest of other consumers. Therefore, we hypothesize the following:

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\(^3\) We consider these product sampling reviews to be different from those written by paid bloggers (Dellarocas 2006), who are obligated to write positive reviews about a brand. In our context of product sampling, consumers are encouraged to write review of the sampled product to increase their chance of getting product samples (from the same brand or different brands) in future, but it is up to them to do so.
H3: There is an inverted U-shaped relationship between the positive extents of product sampling reviews and subsequent consumer reviews.

3 DATA DESCRIPTION

We collaborated with a leading e-commerce store in China to obtain data of product sampling campaigns and their effects. The e-commerce store sells a variety of products, ranging from grocery and household products, clothing, electrical appliances, toys, to cosmetic and healthcare products. A product sampling platform was set up in 2012, which allows brands to offer product samples to the store customers. Customers may apply for free product samples on the platform, from which recipients of the samples are randomly selected. A product sampling campaign is typically run for one week, during which customers were invited to apply for sampling the product offered (see Figure 1 for an example). The selected customers would be requested to write a product sampling report detailing their experience of using the product sample (see the review at the top of the page in Figure 2 for an example).

![Figure 1. An example product sampling campaign page](image)

In September 6, 2013, the product sampling platform decided to incorporate the product sampling reviews gathered for a product into the usual consumer reviews of the product to assess if this could promote sales (see Figure 2). The selected product sampling reviews are placed on top of usual consumer reviews to increase their visibility (with indication that they are reviews generated from product sampling).

Through the platform, we collected two panel datasets, Dataset I (DAS-I) and Dataset II (DAS-II). DAS-I was employed to assess the comparative effect of administering product sampling campaigns on sales of experience products vs. search products (H1). The dataset contained 147 products that ran sampling campaigns during June and July, 2013 on the platform and their sales data. In this dataset, we also included the sales data of 86 products that did not run sampling campaign as a control. This product subset was purposely selected such that they consisted of similar products as those that ran sampling campaigns for comparison purpose. The whole period of this dataset was from May 1 to August 31, 2013 (to capture the sales data before and after the campaigns). The reason for this separate dataset was to have a clean assessment of the effects of administering product sampling, without the potential influences from incorporating product sampling reviews into the usual reviews on the platform in September 6, 2013.
DAS-II was employed to examine the effects of incorporating product sampling reviews into usual consumer reviews (H2 and H3). It included the sales data of 504 products which conducted product sampling campaigns during the period from October 2012 to July, 2013. We captured their sales data from August 6 to October 6, 2013, to examine the change in sales before and after the incorporation of product sampling reviews on September 6, 2013. To assess the extent to which a product sampling review was written in a positive manner, we performed a content analysis by counting the positive points mentioned in each of the review. For example, for a product sampling review “The design of this product is very adorable, I like it right after I opened the package… The brush left me with a clean feeling that you can't get from a manual toothbrush…. the battery life is good, and the battery door is very easy to open!... the only thing I didn’t like about this toothbrush is that it is a little bit bulky, and not good for travelling…. ” We counted this review as having three positive points (adorable design, brush leaving a clean feeling, good battery package) and one negative point (not good for travelling as it is bulky). Also to unveil richer insights we counted the negative points mentioned in these reviews. Additionally, we collected the ratings given by consumers for these products to indicate how consumers review them under normal circumstances (i.e., review after purchasing and trying). The descriptive statistics of the focal variables in DAS-I and DAS-II are reported in Table 1 below. Both datasets are organized as product per day.

<table>
<thead>
<tr>
<th>Source</th>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAS-I</td>
<td>sale_num</td>
<td>9122</td>
<td>41.05</td>
<td>117.75</td>
<td>1</td>
<td>2964</td>
</tr>
<tr>
<td></td>
<td>product_price</td>
<td>21760</td>
<td>150.15</td>
<td>281.37</td>
<td>0.3</td>
<td>2680</td>
</tr>
<tr>
<td></td>
<td>avg_rating</td>
<td>3626</td>
<td>4.69</td>
<td>0.58</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>product_price</td>
<td>17433</td>
<td>311.59</td>
<td>518.56</td>
<td>11.65</td>
<td>5980</td>
</tr>
<tr>
<td></td>
<td>cmmnt_num</td>
<td>20184</td>
<td>1.38</td>
<td>8.17</td>
<td>0</td>
<td>247</td>
</tr>
<tr>
<td></td>
<td>unique_view</td>
<td>20184</td>
<td>5.82</td>
<td>247.20</td>
<td>1</td>
<td>6719</td>
</tr>
<tr>
<td></td>
<td>positive_points</td>
<td>20184</td>
<td>1.11</td>
<td>3.41</td>
<td>0</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>negative_points</td>
<td>20184</td>
<td>0.02</td>
<td>0.21</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 1. Descriptive statistics of the datasets
4 MODELS

4.1 Study I: Effects of Administering Product Sampling on Sales

As mentioned, we chose the products that conducted sampling campaign as treatment group, and similar products that did not conduct such a campaign as the control group to investigate the effects of administering product sampling online on sales.

For this study, our focal dependent variable was sales (quantity of products sold); and we controlled for other factors such as price, product type and date. Using a difference in deference (DiD) model, we specify the regression model as follows:

\[ (1) \ \text{lsale\_num}_i = \gamma_0 + \gamma_1 \text{lsale\_num}_{i,t-1} + \gamma_2 \text{treatment}_i + \gamma_3 \text{before\_after}_i + \gamma_4 \text{treatment}_i \text{Xafter}_i + \gamma_5 \text{lnon\_member\_price}_i + \gamma_6 \text{business\_unit}_i + \gamma_7 \text{holiday}_i + \gamma_8 \text{weekend}_i + \varepsilon_i \]

Variable \text{lsale\_num}_i and \text{lnon\_member\_price}_i are the logarithm of sales number and normal price of product \(i\), and \(t-1\) indicates its first-order lag term. Two dummy variables \text{treatment}_i and \text{before\_after}_i stands for the state of product \(i\) and date \(t\) respectively. When \text{treatment}_i is 1, it means product \(i\) belongs to the treatment group. And when \text{before\_after}_i equals to 1, it means the product sampling campaign has started before the \(t^{th}\) day. VariablereatmentiXbefore\_after are their interaction term. Variables \text{holiday}_i and \text{weekend}_i, are dummies to mark the holiday and the weekend. Considering that e-commerce retailers may conduct promotions shortly before, during, and shortly after holidays, when \(t^{th}\) day is a holiday, we mark dates in \([t-3, t+3]\) as holidays to more fully capture the potential effects of these holiday promotional activities. Variable \text{business\_unit}_i is a dummy variable to indicate whether product \(i\) was sold by the e-commerce store or on behalf of a third party. In the analysis we examined the effects of administering product sampling online for search products and experience products respectively.

Figure 3 visually compares the weekly average sales of products in the treatment group and the control group. The unit of X-axis is week and Y-axis indicates sales. From Figure 3, we can see that the weekly average sales of products in the treatment group increased noticeably more than those in the control group. However, it should be noted that products in the sampling group in general have a lower sales to begin with compared to the control group, probably because most of these products are relatively new in the market. Therefore, we need to conduct more comprehensive statistical test to affirm this effect (as will be reported in Section 5)

![Figure 3. Comparison of weekly avg. sales of products between the treatment and the control groups (note: red arrow indicates the start of online product sampling campaigns)](image)

4.2 Study II: Effects of Incorporating Product Sampling Reviews

In this study, our focal dependent variables were product sales number and the average ratings of a product (reflecting usual consumer reviews). We first conducted a paired t-test (see Table 2) to explore the treatment effect on products sales and average ratings. Treat=0 indicates that the date is before September 6, thus product sampling reviews have not been incorporated into usual consumer
reviews. We found that there were no product sampling reviews for some products in DAS-II because their sampling campaign was still ongoing. For these products, consumers could not read sampling reviews even when Treat=1. Therefore, we use true_treat to indicate the true state of the incorporation of product sampling reviews (true_treat=1 means product sampling reviews were available when Treat=1).

From Table 2 in column (a), we can see that the effect of true_treat is significant. That is, when the product sampling reviews were incorporated (and were available), it led to higher sales. In column (b), the increase of sales after September 6 was marginally significant at p<0.10, which is intuitive and implies minor temporal effects.

<table>
<thead>
<tr>
<th></th>
<th>(a) Treat</th>
<th>(b) True_treat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 Mean</td>
<td>1 Mean</td>
</tr>
<tr>
<td>sale_num</td>
<td>12.381 (0.998)</td>
<td>15.063 (1.163)</td>
</tr>
<tr>
<td>avg_rating</td>
<td>4.672 (0.014)</td>
<td>4.698 (0.013)</td>
</tr>
</tbody>
</table>

Note: *: p<0.10, **: p<0.05, ***: p<0.01; standard error in parentheses

Table 2. Paired t-test for sale_num and avg_rating

Considering the potential endogeneity between ratings and sales, it may be inappropriate to examine the effects of incorporating product sampling reviews on sales and ratings separately. Thus, we decided to employ a simultaneous equations model as follows.

(2) \[ \text{sale}_{it} = \alpha_i + \alpha_{UV_i} + \alpha_{avg\_rating_{it}} + \alpha_{lprice} + \alpha_{weekend} + \alpha_{holiday} + \alpha_{true\_treat_{it}} + u_i \]

(3) \[ \text{avg\_rating}_{it} = \beta_0 + \beta_{cmmt\_num_{it}} + \beta_{lprice} + \beta_{weekend} + \beta_{holiday} + \beta_{true\_treat_{it}} + \eta_i \]

sale_{it} and avg_rating_{it} stands for the logarithm of sales and average rating of product \( i \) on \( t \)th day respectively. UV_{it} stands for the unique view of product \( i \) on \( t \)th day, and cmmt_num_{it} is number of comments garnered by the product. Variable \( lprice_{it} \) is the logarithm of price of \( i \)th product. A set of dummy variables indicates the type of a day, including weekend and holiday. When promote_{it} is equal to 1, it means that product \( i \) conducts a promotional activity on \( t \)th day. Lastly, true_treat_{it} means whether the product sampling reviews \( i \) were incorporated and available on \( t \)th day.

5 RESULTS

5.1 Study I: Effects of Administering Product Sampling on Sales

We employ a difference-in-difference (DiD) model to examine the effects of administering product sampling online on sales. The DiD approach is a research design for estimating causal effects. It is popular in empirical economics, e.g., to estimate the effects of certain policy interventions and policy changes that do not affect everybody at the same time and in the same way. It is used in other social sciences as well and in many applications, where “time” is an important variable that may hamper the assessment of the true effect of a treatment.

The DiD models, which measure the difference in outcome over time for the treatment group compared to the difference in outcome over time for the control group, are effective methods to distinguish true effects of treatment from potential time trends. In this study, we set the products which conducted sampling campaign as treatment group and those (similar products) that did not conduct such a campaign during the same time period as control group. Thus, we could compare the differences of means of sales between the two groups to examine effects of administering product sampling online. As mentioned, we separated the analyses by search products (e.g., mobile phones, electrical appliances) and experience products (e.g., food items, cosmetic products) following previous literature (Nelson 1974, Franke et al. 2004). The results are reported in Table 3.
From Table 3, given the coefficient of treatmentXafter is positive and significant for experience products but not for search products, we can conclude that the administration of product sampling online can increase the sales of experience products more so than for search products (i.e., H1 was supported).

### 5.2 Study II: Effects of Incorporating Product Sampling Reviews

To estimate the parameters of simultaneous equations, we need check whether the equations could be identified. We can find that both equation (2) and equation (3) satisfy order condition and rank condition, and three-stage least squares method (3SLS) may be used to estimate this model. Considering there may be specific differences among products, we use fixed effect to reflect potential product characteristics that may affect sales and ratings. We included a set of dummy variables for each product to realize fixed effect, but their estimated coefficients were omitted in the reported tables.

#### 5.2.1 Effects on sales in general

The estimated results of simultaneous equations are reported in Table 4. Column (a) reports the results for products with sampling reviews; whereas column (b) reports the results for products without product sampling reviews.

In column (a), the coefficient of treat is significant and positive, which implies that the incorporation of product sampling reviews increased sales. In column (b), we can observe that there was no difference in sales before and after the intervention (of incorporating product sampling reviews on the platform) for products with no sampling reviews.

### Table 3. Estimated Results of DiD Models

<table>
<thead>
<tr>
<th>Variable</th>
<th>Search products</th>
<th>Experience products</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1_lsale_num</td>
<td>0.482*** (0.079)</td>
<td>0.609*** (0.039)</td>
</tr>
<tr>
<td>Treatment</td>
<td>-0.574*** (0.049)</td>
<td>-0.588 (0.051)</td>
</tr>
<tr>
<td>before_after</td>
<td>0.082 (0.059)</td>
<td>0.263*** (0.067)</td>
</tr>
<tr>
<td>treatmentXcafter</td>
<td>0.059 (0.097)</td>
<td>0.334*** (0.098)</td>
</tr>
<tr>
<td>lnon_member_price</td>
<td>0.138*** (0.024)</td>
<td>-0.050*** (0.005)</td>
</tr>
<tr>
<td>bussiness_unit</td>
<td>0.082 (0.055)</td>
<td>0.850*** (0.118)</td>
</tr>
<tr>
<td>Holiday</td>
<td>-0.125** (0.061)</td>
<td>-0.157*** (0.038)</td>
</tr>
<tr>
<td>Weekends</td>
<td>-0.109*** (0.024)</td>
<td>-0.100*** (0.025)</td>
</tr>
<tr>
<td>Obs.</td>
<td>1458</td>
<td>5841</td>
</tr>
</tbody>
</table>

(a) With sampling review  
(b) Without sampling review

<table>
<thead>
<tr>
<th>Variables</th>
<th>lsale_num (avg rating)</th>
<th>lsale_num (avg rating)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV</td>
<td>0.001*** (0.0001)</td>
<td>0.000 (0.0002)</td>
</tr>
<tr>
<td>avg_rating</td>
<td>3.292 (2.174)</td>
<td>9.539** (4.614)</td>
</tr>
<tr>
<td>lproduct_price</td>
<td>-3.307 (2.439)</td>
<td>-8.229** (4.112)</td>
</tr>
<tr>
<td>cmmnt_num</td>
<td>0.002* (0.001)</td>
<td>0.001 (0.001)</td>
</tr>
</tbody>
</table>
This effect can also indicate an inverted U-shaped relationship between the two variables. This suggests that positive product sampling reviews may lead to more positive consumer ratings subsequently, but overwhelming praises for the product in the sample reviews may hurt (i.e., \textit{H3 was supported}). We can calculate the inflection point is about 22.7 positive points. It is also worth noting that \textit{negative points} (indicating the extent of mentions of negative things in a product sampling review) have a significant negative effect on sales at p<0.05 level.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Weekend & -0.213* & 0.010 & 0.313 & -0.052 \\
       & (0.110) & (0.028) & (0.357) & (0.036) \\
Promote & 1.225*** & 0.072*** & 1.092*** & 0.028 \\
       & (0.219) & (0.036) & (0.320) & (0.033) \\
Holiday & -0.099 & -0.014 & -0.267 & 0.016 \\
       & (0.107) & (0.026) & (0.246) & (0.033) \\
Treat & 0.378*** & 0.015 & 0.071 & 0.001 \\
       & (0.103) & (0.025) & (0.250) & (0.034) \\
\hline
\hline
Obs. & 2241 & 2241 & 1253 & 1253 \\
\hline
\end{tabular}
\caption{Estimated Results of Simultaneous Equations}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
Variables & Search products & Experience products & Search products & Experience products \\
\hline
UV & 0.0005*** & 0.0004*** & (0.0002) & (0.0001) \\
avg_rating & 8.535 & 3.968 & (8.021) & (1.943) \\
l\text{product_price} & -6.009 & -3.271* & (5.507) & (1.720) \\
       & 0.683*** & 0.884*** & (0.061) & (0.016) \\
cmmtnt_num & 0.005 & 0.001 & (0.005) & (0.001) \\
Weekend & -0.150 & -0.108 & (0.492) & (0.101) \\
       & -0.011 & -0.024 & (0.056) & (0.024) \\
Promote & 0.869 & 1.267*** & (0.673) & (0.173) \\
       & -0.021 & 0.028 & (0.076) & (0.028) \\
Holiday & -0.142 & -0.136 & (0.507) & (0.091) \\
       & 0.037 & -0.022 & (0.051) & (0.022) \\
Treu & 0.494 & 0.335*** & (0.666) & (0.109) \\
       & -0.057 & 0.025 & (0.061) & (0.024) \\
\hline
\hline
Obs. & 698 & 2796 & 698 & 2796 \\
\hline
\end{tabular}
\caption{Comparison of Estimated Results for Search and Experience Products}
\end{table}

\subsection{Effects on Sales across Search and Experience Products}

From Table 5, we can see that this intervention has different effects on sales across search products and experience products. For experience products, the incorporation of product sampling reviews positively affected sales at p<0.01 level. However, this effect is not significant in the case of search products. This implies that the incorporation of product sampling reviews could increase the sales of experience products more so than for search products (i.e., \textit{H2 was supported}).
<table>
<thead>
<tr>
<th>Variables</th>
<th>lsale_num</th>
<th>avg_rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>UV</td>
<td>0.0013***</td>
<td>0.853***</td>
</tr>
<tr>
<td></td>
<td>(0.0002)</td>
<td>(0.112)</td>
</tr>
<tr>
<td>avg_rating</td>
<td>3.877</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(3.314)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>lproduct_price</td>
<td>-0.559*</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.289)</td>
<td>(0.039)</td>
</tr>
<tr>
<td>cmmnt_num</td>
<td>0.003</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>Weekend</td>
<td>-0.079</td>
<td>-0.655</td>
</tr>
<tr>
<td></td>
<td>(0.167)</td>
<td>(0.628)</td>
</tr>
<tr>
<td>Promote</td>
<td>1.021**</td>
<td>0.106*</td>
</tr>
<tr>
<td></td>
<td>(0.448)</td>
<td>(0.057)</td>
</tr>
<tr>
<td>Holiday</td>
<td>-0.312**</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>(0.144)</td>
<td>(0.033)</td>
</tr>
<tr>
<td>positive_points</td>
<td>-1.235</td>
<td>0.120**</td>
</tr>
<tr>
<td></td>
<td>(1.484)</td>
<td>(0.048)</td>
</tr>
<tr>
<td>positive_points²</td>
<td>0.021</td>
<td>-0.003***</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>negative_points</td>
<td>-8.969**</td>
<td>-0.655</td>
</tr>
<tr>
<td></td>
<td>(4.128)</td>
<td>(0.628)</td>
</tr>
<tr>
<td>negative_points²</td>
<td>1.422</td>
<td>0.332*</td>
</tr>
<tr>
<td></td>
<td>(1.000)</td>
<td>(0.200)</td>
</tr>
<tr>
<td>Obs.</td>
<td>1218</td>
<td>1218</td>
</tr>
</tbody>
</table>

Note: *, p <0.10, **, p <0.05, ***, p <0.01; standard error in parentheses.

Table 6. Estimated results of simultaneous equations with content analysis of product sampling reviews

6 DISCUSSION AND CONCLUSION

In this study, we attempt to provide a better understanding of applying product sampling in the online context, which seems a viable strategy given the Internet’s capabilities to reach a wide audience, track consumer responses, and acquire and exploit information generated from product sampling. Indeed our empirical findings suggest that administering product sampling online can promote sales. However, this effect is more salient for experience products than for search products. Additionally, the incorporation of product sampling reviews into the usual consumer reviews can stimulate sales, but again more so for experience products than for search products. Together these consistent findings suggest that while the Internet’s capabilities make this strategy particularly viable, the widespread accessibility of information online also render its benefits to be applicable mainly to experience products rather than search products whose essential attribute information can be easily obtained online. This insight has important implications for managers contemplating to administer product sampling online- it would be more worthwhile to adopt this promotional tactic when their products are of experience type. Also our findings extend the extant research on product sampling in the offline context that does not emphasize product differences in terms of search vs. experience (e.g., Bawa and Showmaker 2004; Gedenk and Neslin 1999; Heiman et al. 2001; Lammers 1991).

Furthermore, we show that the more positive the product sampling reviews incorporated into usual review mix, the higher the subsequent consumer review ratings, but only up to a point, after which the effect became detrimental. Thus, firms hoping to influence consumer reviews through positive product sampling reviews need to be wary of the negative repercussion of doing so. Specifically, we caution the conventional wisdom that “the more positive, the better”, and suggest firms should select those sampling reviews that are not overwhelmingly positive to achieve optimal results. Our findings coincide with recent industrial viewpoint that overly positive review information can provoke skepticisms (Mullins 2012).
Additionally, our research extends the stream of literature on online product information (e.g., Chen and Xie 2008; Chevalier and Mayzlin 2006; Dellarocas et al. 2007; Godes and Mazylin 2004) by highlighting product sampling reviews as another form of influential information to consumers’ purchase decisions in today’s Web 2.0 context, in addition to seller-created information (e.g., advertising) and consumer-created information (e.g., reviews) (Chen and Xie 2008). Specifically, we show that when firms decide to strategically select such information to influence consumers (Godes et al. 2005), they need to be wary of selecting those that are overly positive as this could hurt subsequent regular consumer reviews.

As with other studies, this research has some limitations that also provide opportunities for future research. First, our data was obtained from an online retailer in China; future research may replicate our study in other contexts to extend the generalizability of our findings. Second, the observation period of our data is relatively short; future research may expand the time-length and perform longitudinal study to investigate the potential dynamics in the effects of administering product sampling online. Nevertheless, our study provides timely and valuable insights for this promising online promotional tactic, for which knowledge about its administration and exploitation is currently lacking.

References


