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A Study of the Effectiveness of Online Scarce Promotion
—Based on the Comparison of Planned Buying and Unplanned Buying

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Abstract: Promotion can stimulate consumer’s unplanned buying which is regarded as the main source of sales growth, however, it may increase consumer’s planned buying shortfall as well. On one hand, online scarce promotion more significantly influences consumer’s unplanned buying and planned buying shortfall; On the other hand, frequent and continuing online promotion weakens its marginal performance. Under such circumstance, it becomes imperative for us to ascertain whether online scarce promotion can contribute to the growth of consumer’s purchases by comparing the effect of online scarce promotion on planned buying and unplanned buying. Our empirical analysis shows that online scarce promotion can decrease consumer’s planned buying shortfall, and also increase consumer’s unplanned buying, thus adding to consumer’s actual buying relative to their intended purchases.

Keywords: online scarce promotion, planned buying shortfall, unplanned buying

1. INTRODUCTION

According to the statistics from Alibaba Group⁵, in 2012, the total transaction amount reached 19.1billion for the Single Day⁶, four times that of last one (5.2billion). The huge success of the Single Day promotion can be mainly attributed to its big price discount. However, if the Single Day promotion is launched every day, its good performance may not be guaranteed. The following Double 12 Day⁷ promotion is a sound and good example. The big contrast between these two online promotions’ performance lies in the promotion scarcity, that is, the Single Day promotion is held once a year and lasts for only one day, while the Double 12 Day is only one month following the Single Day. Therefore, we are going to discuss the effectiveness of scarce promotion.

As for the effectiveness of promotion, prior literature points out that promotion can result in unplanned buying which is also regarded as the major source of sales growth. Many researches find that consumers tend to buy a lot of unplanned products. At the same time they fail to fulfill their intended purchases after each shopping, which, however, does not belong to unplanned buying but planned buying shortfall [¹]. As online shopping has become part of consumer’s daily life, the exposure to more and more intense promotion stimuli and the experience of a simpler shopping process both help generate more unplanned buying and more planned buying shortfall.

How will promotion, especially scarce promotion, influence consumer’s unplanned buying and planned buying shortfall? The probing into this question can not only theoretically help build a better understanding of scarce promotion, but also can practically guide sellers to launch more effective promotion, make better

¹ This paper is funded by the project titled “A Research and Application of the Entire B2B2C E-business Model Based on SAAS”, with the project ID: Guiyang Yunke No. 2011[11]
² Alibaba group which consists of taobao, tmall, alipay,etc is one of the world’s leading e-commerce companies
³ An online famous festival for promotion, celebrated on November 11th each year, also called double 11 day
⁴ Another online festival for promotion, celebrated on December 12th each year, just one month after the Single Day
decisions and achieve greater benefits.

2. LITERATURE REVIEW

2.1 Planned buying and unplanned buying

Early researches divide buying behavior into planned buying and unplanned buying according to the consistency of buying intention and actual purchases. That is, planned buying is buying behavior with both buying intention and actual purchases, whereas unplanned buying is buying behavior with no buying intention but actual purchases [2]. Later, planned buying is defined as buying behavior whose buying intention is made prior to entering the store, while unplanned buying is referred as instant buying generated in the store, and it includes impulse buying [3]. Many scholars agree with this viewpoint that impulse buying belongs to unplanned buying, but emphasize more of the suddenness, instantaneity, and without much thought during the shopping trip [8]. Further, domestic scholars classified unplanned buying into four types: (1) recalling buying, (2) related buying, (3) situational buying, and (4) impulse buying [8].

In sum, we adopt the definition of Cobb and Hoyer that planned buying is buying behavior whose buying intention is clear before entering the store, while unplanned buying is buying behavior of no clear buying intention but instant buying in the store.

Planned buying and unplanned buying comprise of consumer’s total buying. Therefore, sellers can increase consumer’s purchases by increasing their unplanned buying, or decreasing their planned buying shortfall.

A study about consumer’ buying behavior from POPAI\(^\text{1}\) in 1995 finds that a majority of consumer’s buying belong to unplanned buying. Moreover, that unplanned buying accounts for sales growth has received much recognition from many scholars and practitioners. As a result, unplanned buying becomes the focus of many researches and the goal of much marketing practice.

2.2 Non-promotional factors and unplanned buying

Based on the prior literature, we summarized the factors that affect unplanned buying as follows:

(1) Shopper traits: such as sex, income, education background, price sensitivity, brand preference, impulse buying tendency, overall shopping goal, etc. Researches find that consumer’s impulse buying tendency significantly and positively affect their unplanned buying [4]. Consumers with more abstract overall shopping goal, lower shop-level loyalty and larger transaction size can all lead to more unplanned buying [6][7].

(2) Environmental factors during the shopping trip. Further, it can be divided into in-store factors and out-of-store factors. The former mainly include in-store stimuli, time in store, in-store shopping path, inventory; while the latter primarily include shop-level advantage, shopping budget, the number and feature of shopping party, time pressure and the use of shopping list, etc. A survey from American Advertising Age indicates that consumers make 70% purchase decisions in store, namely, in-store stimuli is the main reason that explains unplanned buying [7].

(3) Product characteristics, such as product price, product’s purchase frequency, storage easiness, product hedonicity, shopping convenience, etc. Researches find that product price and purchase frequency are significantly and negatively related to unplanned buying, whereas shopping convenience positively affects unplanned buying [7]. Moreover, in the online environment, the greater convenience of online shopping process and the easiness of placing an order can to some extent generate more unplanned buying.

2.3 Promotional factors on unplanned buying and planned buying shortfall

Promotion is one of the major factors that influence consumer’s buying behavior in business practice. Therefore, sellers can accelerate consumer’s planned buying or stimulate their unplanned buying by initiating all kinds of promotion strategies. In addition, some smart sellers seek for sales growth by decreasing consumer’s

\(^1\) Point of Purchase Advertising Institute: http://www.popai.com/
planned buying shortfall. Prior literature focuses on the effect of time pressure during shopping and shop familiarity on planned buying shortfall in the traditional environment, and finds that higher time pressure and lower level of shop familiarity lead to more planned buying shortfall. Specifically, the reasons that explain planned buying shortfall in the traditional market include rush in time, forget to buy, can not locate, too expensive, out-of-stock and quality failure [1].

In contrast, online consumers are exposed to increasing information stimuli (i.e., a combination of rich pictures, text and videos), and they only need click the mouse during the whole online shopping process. As a consequence, consumers are inclined to do more unplanned buying, and are also more likely to neglect their intended purchases, namely planned buying shortfall [8]. Some scholars conclude that time pressure brought by promotion, budget restriction, brand preference, substitution effect and product price primarily account for planned buying shortfall in the online environment [9].

Hereby we want to emphasize the importance of scarcity. Originally, scarcity is an essential concept in neoclassical economics, and economist Walrus defines it as “something is useful but of limited quantity.” [10] Then, the role of scarcity is examined in psychology, for example, the scarcity can increase the assumed expensiveness of something [11]. Later, the concept is introduced into marketing to illustrate the value attribute of products, that is, products of scarcity or limited availability and receive more attention from consumers become more valuable [12].

Further, researches indicate that the scarcity created by marketing means can significantly add to the attractiveness of products. Here, we define scarce promotion as promotion with products of limited availability or restricted supply created by marketing means [11][12] and it consists of three dimensions: (1) continuing time scarcity, namely, consumers can get special offers only in a limited time (i.e., one day). Time pressure from scarce promotion can account for most change of planned buying, namely planned buying shortfall [13]; (2) quantity scarcity, that is, promotion products is limited in quantity [14]; (3) frequency scarcity, namely, certain kind of promotion is launched at a low frequency [15]. For instance, the Single Day promotion is launched by Taobao.com[15] once a year, which has been a most successful example. On the contrary, the following Double 12 Day, only one month after the Single Day, receives much less attention and performs worse although it also lasts for only one day and offer limited quantity. The sharp contrast lies in the lack of frequency scarcity of Double 12 Day. Promotion of high frequency can instead generate consumer’s fatigue toward itself, hence lowering its attractiveness.

3. RESEARCH HYPOTHESES AND RESEARCH MODEL
3.1 Continuing time scarcity

The study about the effect of time pressure on planned buying and unplanned buying has been the focus of many marketing researches. Here, there are two types of time pressure: one refers to the psychological pressure that time budget is not enough to fulfill one’s shopping task, the other is the psychological pressure that the continuing time of promotion is limited, namely continuing time scarcity, that consumers may not have enough time to make a fully decision, otherwise they may lose the scarce promotion. Researches about the effectiveness of promotion in the traditional market show that time pressure may hinders consumers from thoroughly getting exposed to and dealing with in-store promotion stimuli. As a result, consumers with higher time pressure tend to do less unplanned buying and meanwhile more planned buying shortfall [1][16].

One way to cope with the stress caused by time pressure is to make a tradeoff between speed and accuracy; seeking for rapidity and insufficient information results in inaccurate conclusions about the products [17][18].

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[15] Our research does not consider the situation of quantity limit per customer for a specific product
Further, when consumers have to make buying decisions in a limited time, they tend to rely on the easily obtained information, rather than invest more time in gathering additional or deep information \[19\]. This can be further illustrated by the theory of resource allocation which indicates that one’s total resources available for shopping are limited, and the depletion of time resource by time pressure reduces the remaining resource consumers can use, such as cognitive resource. As a consequence, consumers will judge and decide by the specific information rather than the existing knowledge structure \[1\] \[20\]. In online environment, the specific information mainly refers to various promotion stimuli created by transactional platforms and sellers. Accompanied by the time pressure, the promotion stimuli may make consumers feel more difficult to extract their original plans from their mind. As a result, consumers may deviate from their original plans, producing either unplanned buying or planned buying shortfall. Compared with consumers in the traditional environment, online consumers save the time wasted in the shopping trip (out-of-store and in-store), therefore the time pressure mainly refers to continuing time scarcity, and the dealing with abundant promotion stimuli in the case of continuing time scarcity makes consumers feel impulsive to do more unplanned buying, which is different from that in the traditional environment. Therefore, we put forward the following hypotheses.

\[H_{10}:\] in the online environment, continuing time scarcity can significantly and positively affect planned buying;

\[H_{15}:\] in the online environment, continuing time scarcity can significantly and positively affect unplanned buying;

\[H_{15}:\] in the online environment, the effect of the continuing time scarcity on planned buying can be stronger than that on unplanned buying.

### 3.3 Quantity scarcity

The impact of quantity scarcity on consumer’s purchase decisions can be illustrated from two aspects: First, according to the proverb “A thing becomes precious because of its rarity”, consumers usually assess the value of a product by its availability, that is, the harder to obtain a product, the higher the value of it \[11\] \[14\]. Moreover, consumers feel crazy and distinctive to pursue the products that cannot easily get \[21\]; Second, according to the reactance theory \[22\] \[23\], when consumers perceive the threat of their freedom to possess the product due to its scarce supply, which causes reactance, then they will feel more intense and impulsive to own it. In a word, the high value brought by quantity scarcity and the tension due to competing with others to buy something can greatly arouse consumer’s desire for owning it. Hence, in the case of quantity scarcity, consumers are very likely to do unplanned buying even if promotion products do not belong to consumer’s intended plan and at the same time, their intended purchases will also be accelerated. So, we hypothesize as follows:

\[H_{20}:\] in the online environment, quantity scarcity can significantly and positively impact planned buying;

\[H_{25}:\] in the online environment, quantity scarcity can significantly and positively impact unplanned buying;

\[H_{25}:\] in the online environment, the impact of quantity scarcity on unplanned buying can be more intense than that on planned buying.

### 3.2 Frequency scarcity

Prior literature indicates that promotion frequency is negatively related with consumer’s price expectation toward the promotional products, that is, a scarcer promotion frequency lead to a higher price expectation, and correspondingly a higher perceived value \[24\]. Recent study finds that a lower promotion frequency brings about a sense of surprise, when the specific promotion really comes, consumers may feel unexpected and surprised. Also, the frequency scarcity adds to the uncertainty of whether they can still enjoy the special offers in the future. All in all, the sense of surprise and uncertainty brought by frequency scarcity can both accelerate consumer’s buying decision making process \[25\]. Specifically, as for planned buying whose products are prepared for future use, consumers tend to buy in advance for storage in the case of frequency scarcity and big
price discount, thus reducing their planned buying shortfall; as for unplanned buying, the bearing of the opportunity cost due to missing the specific scarce promotion, and the relief of pressure and the enjoyment of happiness nationwide through the scarce promotion can all greatly contribute to consumer’s unplanned buying. From above analysis, we propose the following hypotheses:

H3a: in the online environment, frequency scarcity can significantly and positively influence planned buying;

H3b: in the online environment, frequency scarcity can significantly and positively influence unplanned buying;

H3c: in the online environment, the effect of frequency scarcity on unplanned buying can be stronger than that on planned buying.

From the above hypotheses, we can put forward our research model (see Figure 1). Here, we mainly want to investigate the impact of the three dimensions of scarce promotion on planned buying and unplanned buying, no consideration of the interaction of the three dimensions of scarce promotion.

![Research model: a study of the effectiveness of online scarce promotion](image)

**Figure 1.** Research model: a study of the effectiveness of online scarce promotion

4. **RESEARCH DESIGN**

4.1 **Research method**

In this paper, we combine experimental research and questionnaire study, and use the professional Internet survey platform called Wenjuanxing\(^\text{viii}\) to collect our data. First, we randomly select 20 subjects to do our pretest; next, based on the results of our pretest, we make some adjustment to the design of our experiment and questionnaire; then, we randomly select the subjects and conduct our formal experiment via the Internet; finally, by using the statistics tool SPSS 17.0, we conduct ANOVA analysis and draw our conclusions.

4.2 **The design of questionnaire**

As mentioned above, shopper traits are one type of factors that affect consumer’s unplanned buying; therefore, we must control these variables like sex, income, education background, impulse buying tendency, etc. Specifically, in our study, we choose sex, income, education background, impulse buying tendency, brand preference, and price sensitivity as our control variables. Since that consumer’s impulse buying tendency

\(^{viii}\) A professional internet survey platform, http://www.sojump.com/
positively impacts their unplanned buying \cite{1}, and impulse buying is part of unplanned buying, therefore, we adapt our scale of unplanned buying tendency by referring to the scales of impulse buying tendency raised by the researches (see \cite{1} \cite{20}). In addition, we adjust the content and sequence of scale items according to the analysis of our pretest. Finally, we conduct our formal experiment\textsuperscript{ix} on the sojump.com platform, and altogether collect 212 observations. Through the analysis of SPSS 17.0, the reliability of our scale meets the research standard with a Cronbach’s Alpha of 0.789.

4.3 The design of experiment

4.3.1 Experiment scheme

Our study designs four scenes which can be randomly selected by each subject via the professional Internet survey platform. Before the formal experiment, each subject need to fill in a short questionnaire, including the measurement of shopper traits and products they are going to buy on the Internet in the near future. Next, they enter into the experiment section. Suppose they log in a famous B2C shopping website, and browse the following promotional products, and then they have to decide whether to buy right after viewing each product.

4.3.3 The selection of promotional products

To choose the right promotional products for our experiment, we randomly select 24 subjects and interview them one by one about the products they most often buy on the Internet as our candidates. After careful weighing and consideration, we finally choose coffee, honey citron tea, mouse, books, Men’s watch, chocolate, Men’s wallet, nuts, hand cream, earphones, thermos bottle, lip oil, USB flash disk, toothpaste, shampoo, facial mask, and umbrella as our promotional products, altogether 18 products. Considering that the subjects’ brand preference may disrupt our results, we select products of top sales and well-known brand on Taobao.com. Just as our results prove it, the average planned buying rate of the 18 specific brands we choose reaches 52%, with a maximum rate of 86%, which indicates that the product and specific brand we choose can effectively support our experiment. Moreover, previous literature finds that only when accompanied by a big price discount, can quantity restriction and time restriction significantly influence consumer’s buying behavior \cite{12}. Hereby we want to mention that the products we choose are all special offers whose discount level varies from 3.1 to 8.9, with a mean of 6.6 (i.e., 34% off). Meanwhile, online consumer reviews have become an important source for consumers to judge the product quality \cite{27}, therefore based on the pretest and the one-to-one interview, we only select products with positive review rate over 95%, and we guarantee every product we choose is quality goods. Besides, whether shipping is free or not can influence consumer’s buying decisions, so the products we choose are all shipping free.

4.3.2 Variable measurement

**Dependent variables**

(1) Planned buying: before the experiment, subjects selected product category that they were planning to buy in these 18 categories of products in the near future. We let $X_i=1$ if product category $i$ is selected, and 0 if otherwise, and $\sum_{i=1}^{18} X_i$ is measured as planned buying. (2) Actual buying: in the experiment, they were required to selected products that they want to buy in the 18 specific products. The measuring procedure is similar as that of planned buying. We let $Y_i=1$ if product $i$ is selected, and 0 if otherwise, and $\sum_{i=1}^{18} Y_i$ is measured as actual buying. (3) Unplanned buying: the sum of products that are not selected before the experiment but selected in the experiment, namely the sum of $(X_i=0, Y_i=1)$. (4) Planned buying shortfall: the sum of products that are selected

before the experiment but not selected in the experiment, namely the sum of \((X=1, Y=0)\).

**Grouping variable**

The grouping variable is the level of promotion stimuli. Specifically, we tagged control group, continuing time scarcity group, quantity scarcity group and frequency scarcity group as 0, 1, 2, 3, and then we compare the latter three experiment groups with the former control group separately by one-way ANOVA analysis.

4.3.4 **Experiment product page layout**

To erase the possible effect of product page layout on our experimental results, we keep the arrangement of pictures and the format of information consistent among different products, conforming to the general layouts of those famous B2C websites. Specific information please refers to the websites of our experiments.

4.3.5 **Experiment procedures**

Our experiment comprises of one control group, and three experiment groups, namely continuing time scarcity group, quantity scarcity group and frequency scarcity group. Except that the levels of promotion stimuli are different, other parameters are identical among groups. On the basis of the pretest and the one-by-one interview, we determine the manipulations of promotion stimuli in time scarce group, quantity scarce group and frequency scarce group are respectively “the specific promotion last for only one day”, “the products of the specific promotion are limited in supply, and the remaining of each product is less than 100”, “the specific promotion is launched only once a year”. Definitely, in the product page of the continuing time scarcity group, we present “the specific promotion last for only one day, buy it as soon as possible!”, and in order to highlight time pressure, we use the dynamic counting down: “the remaining time: XXhours-XXmins-XXsecs”; We added “the specific product is only XX left, never more supply!” to the product page of quantity scarcity group; As the Single Day promotion is well known to our subjects, we put “the Single Day promotion is launched only once a year, hold the rare chance!” in the product page of frequency scarce group; As comparison, we do not add any promotion stimuli to control group.

5. **ANALYSIS AND RESULTS**

5.1 **Data collection**

We collected 242 raw data that are based on the research conducted on the Sojump.com platform from December 3, 2012 to January 8, 2013. We deleted invalid data from the same IP and got 212 useable data (return rate=87.5%).

5.2 **Regression analysis**

First, we use statistics software spss17.0 to do regression for price discount and actual buying. The result shows that price discount has no significant effect on actual buying (see Table 1), which indicates the possible disturbance of price discount to our experiment is excluded. Second, we do regression for unplanned buying tendency and unplanned buying, and find that unplanned buying tendency significantly and positively affect unplanned buying (see Table 2), which accords with the predecessors’ conclusions.

<table>
<thead>
<tr>
<th>Table 1. Price discount regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstandardized coefficients</td>
</tr>
<tr>
<td>Price discount</td>
</tr>
</tbody>
</table>

Note: Dependent variable: actual buying
5.2 One way ANOVA analysis

We use the control variables such as sex, income, education background, price sensitivity, brand preference, and unplanned buying tendency as the dependent lists and the grouping variable as the factor to do one way ANOVA analysis. Table 3 shows that these control variables displays no significant difference between groups, therefore we can exclude the interference of those control variables in our experiment.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Between groups</td>
<td>1.405</td>
<td>3</td>
<td>0.468</td>
<td>1.909</td>
</tr>
<tr>
<td>Income</td>
<td>Between groups</td>
<td>0.167</td>
<td>3</td>
<td>0.056</td>
<td>0.055</td>
</tr>
<tr>
<td>Education background</td>
<td>Between groups</td>
<td>3.197</td>
<td>3</td>
<td>1.066</td>
<td>2.520</td>
</tr>
<tr>
<td>Price sensitivity</td>
<td>Between groups</td>
<td>10.083</td>
<td>3</td>
<td>3.361</td>
<td>1.329</td>
</tr>
<tr>
<td>Brand preference</td>
<td>Between groups</td>
<td>10.505</td>
<td>3</td>
<td>3.502</td>
<td>0.937</td>
</tr>
<tr>
<td>Unplanned buying tendency</td>
<td>Between groups</td>
<td>3.753</td>
<td>3</td>
<td>1.251</td>
<td>0.675</td>
</tr>
</tbody>
</table>

Next, we make multiple comparisons for planned buying shortfall, unplanned buying and increasing amount of buying among groups, and the results are shown in table 4 below.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(G)group</th>
<th>(G)group</th>
<th>Mean difference</th>
<th>Std. error</th>
<th>Sig.</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned buying shortfall</td>
<td>Control group</td>
<td>Continuing</td>
<td>-0.628&quot;</td>
<td>0.303</td>
<td>0.040</td>
<td>H1a&lt;</td>
</tr>
<tr>
<td></td>
<td>Time scarcity</td>
<td>Quantity scarcity</td>
<td>-0.072</td>
<td>0.298</td>
<td>0.808</td>
<td>H2a&lt;</td>
</tr>
<tr>
<td></td>
<td>Frequency scarcity</td>
<td>-0.695&quot;</td>
<td>0.298</td>
<td>0.021</td>
<td>H3a&lt;</td>
<td></td>
</tr>
<tr>
<td>Unplanned buying</td>
<td>Control group</td>
<td>Continuing</td>
<td>1.009&quot;</td>
<td>0.419</td>
<td>0.017</td>
<td>H1b&lt;</td>
</tr>
<tr>
<td></td>
<td>Time scarcity</td>
<td>Quantity scarcity</td>
<td>1.227&quot;</td>
<td>0.412</td>
<td>0.003</td>
<td>H2b&lt;</td>
</tr>
<tr>
<td></td>
<td>Frequency scarcity</td>
<td>1.471&quot;</td>
<td>0.412</td>
<td>0.000</td>
<td>H3b&lt;</td>
<td></td>
</tr>
<tr>
<td>The growth of consumer’s buying</td>
<td>Control group</td>
<td>Continuing</td>
<td>-1.637&quot;</td>
<td>0.550</td>
<td>0.003</td>
<td>H1c&lt;</td>
</tr>
<tr>
<td></td>
<td>Time scarcity</td>
<td>Quantity scarcity</td>
<td>-1.299&quot;</td>
<td>0.540</td>
<td>0.017</td>
<td>H2c&lt;</td>
</tr>
<tr>
<td></td>
<td>Frequency scarcity</td>
<td>-2.166&quot;</td>
<td>0.540</td>
<td>0.000</td>
<td>H3c&lt;</td>
<td></td>
</tr>
</tbody>
</table>

Note: * means p<0.05

According to the results presented in the first three rows in Table 4, we can draw conclusions as follows:

Planned buying shortfall is significantly lower in continuing time scarcity group than in control group
(mean difference=-0.628, p=0.040), which indicates that continuing time scarcity can significantly and negatively affect planned buying shortfall, contrary to H1a, hence H1a is not supported. In our reckoning, on one hand, savings from scarce promotion’s price discount increase consumer’s actual income, which enables them to fulfill their planned purchases while increasing their unplanned buying [25]; On the other hand, customers may be not constrained by their budget, on the contrary, they may derive from their budget line and make more planned buying [28]. In this way, planned buying shortfall may also increase in the case of continuing time scarcity.

Planned buying shortfall is not significantly different between control group and quantity scarcity group (p=0.808, n.s.), therefore H2a is not supported. It may lie in that the 18 specific products in our experiment are mostly standardized products with not much symbolic meaning, which leads to the fact that subjects may not be significantly stimulated by the quantity scarcity situation [15]. Therefore, even if the subjects perceive the competition tension to buy the quantity-limited products, they may not produce actual buying.

Planned buying shortfall is significantly lower in frequency scarcity group than in control group (mean difference=-0.695, p=0.021), showing that frequency scarcity can significantly and negatively influence planned buying shortfall. So H3a is supported.

Unplanned buying is significantly higher in continuing time scarcity group than in control group (mean difference=1.009, p=0.017), which indicates that continuing time scarcity significantly and positively affect unplanned buying. Hence, the results support H1b.

Unplanned buying is significantly higher in quantity scarcity group than in control group (mean difference=1.227, p=0.003), demonstrating that quantity scarcity has positive effect on unplanned buying. H2b is supported.

Unplanned buying is significantly higher in frequency scarcity group than in control group, showing that frequency scarcity positively affect unplanned buying (mean difference=1.471, p=0.000). So, H3b is approved.

We try to find out whether scarce promotion can increase the total amount of consumer’s buying by comparing planned buying shortfall and unplanned buying. To be specific, we calculate the growth of consumer’s buying by subtracting planned buying shortfall from unplanned buying, and then we compare it between control group and the three experiment groups separately to investigate whether significant difference exists. At the same time, we compare the increasing amount of unplanned buying between control group and zero group (every item in this group is zero), finding out there is no significant difference (p=0.0579, n.s.). From the results in the last column in Table 4, we can conclude that the growth of consumer’s buying in the three experiment groups are all significantly larger than those in control group, namely larger than zero (p1=0.003, p2=0.017, p3=0.000; mean difference z=1.637, mean difference z=1.299, mean difference z=2.166), which illustrates that unplanned buying is significantly larger than planned buying shortfall in the three experiment groups. Therefore, H1c, H2c, H3c are all supported.

To sum up, continuing time scarcity and frequency scarcity can reduce planned buying shortfall and the three dimensions of scarce promotion can all increase unplanned buying. That is, scarce promotion increases consumer’s total purchases.

6. CONCLUSIONS AND IMPLICATIONS

First, frequency scarcity and continuing time scarcity can negatively influence consumer’s planned buying shortfall and positively affect consumer’s unplanned buying. Therefore, scarce promotion can not only reduce consumer’s planned buying shortfall but also increase their unplanned buying, hence contributing to the growth of consumer’s buying relative to their intended plans. Practically, online transactional platforms and sellers should invest more in creating scarce promotion rather than frequently or endlessly launching all kinds of
promotion.

Second, there is no significant relationship between quantity scarcity and planned buying shortfall, indicating that compared with competition tension caused by quantity scarcity, time pressure from continuing time scarcity and frequency scarcity can affect consumer’s planned buying shortfall more significantly. As for the magnitude, the effect of frequency scarcity on unplanned buying is the strongest, successively followed by quantity scarcity and continuing time scarcity, which illustrates that frequency scarcity can most generate consumer’s unplanned buying, since the time pressure brought by frequency scarcity is more intense than that of continuing time scarcity and the competition tension of quantity scarcity.

Thirdly, our results show that consumer’s impulse buying tendency can significantly and positively influence consumer’s unplanned buying. Therefore, if consumers belong to planned buyers, online transactional platforms and sellers should adopt more strategies toward creating continuing time scarcity and frequency scarcity so as to reduce consumer’s planned buying shortfall and increase their total purchases. On the other hand, if consumers tend to be unplanned buyers, platforms and sellers should exert themselves in creating frequency scarcity, so as to stimulate consumer’s unplanned buying and increase the total purchases.

REFERENCES


