The Effects of Social Popularity and Deal Scarcity at Different Stages of Online Shopping

Completed Research Paper

Cheng Yi  
School of Economics and Management  
Tsinghua University  
Beijing  
People’s Republic of China, 100084  
yich@sem.tsinghua.edu.cn

Zhenhui (Jack) Jiang  
Department of Information Systems, School of Computing  
National University of Singapore  
Singapore, 119077  
National University of Singapore (Suzhou) Research Institute  
377 Lin Quan Street, Suzhou Industrial Park  
Jiangsu Province  
People’s Republic of China, 215123  
jiang@comp.nus.edu.sg

Mi Zhou  
School of Economics and Management  
Tsinghua University  
Beijing  
People's Republic of China, 100084  
zhoum.12@sem.tsinghua.edu.cn

Abstract

The positive effects of social popularity (i.e., information based on other consumers’ behaviors) and deal scarcity (i.e., information provided by product vendors) on consumers’ consumption behaviors are well recognized. However, few studies have investigated their potential joint and interaction effects and how such effects may differ at different timing of a shopping process. This study examines the individual and interaction effects of social popularity and deal scarcity as well as how such effects change as consumers’ shopping goals become more concrete. The results of a laboratory experiment show that in the initial shopping stage when consumers do not have specific shopping goals, social popularity and deal scarcity information weaken each other’s effects; whereas in the later shopping stage when consumers have constructed concrete shopping goals, these two information cues reinforce each other’s effects. Implications on theory and practice are discussed.

Keywords: Social popularity, deal scarcity, shopping stage, purchase intentions
Introduction

When evaluating products and making purchase decisions, online consumers are often exposed to different kinds of product information. Past studies have long shown that besides intrinsic product attributes, consumers’ purchase decision is largely influenced by social and contextual information. For example, information based on other consumers’ behaviors such as the number of consumers who have purchased or “liked” the products often represents the social popularity of products. High social popularity usually serves as a form of “social validation” for product quality (Cialdini 2007; Granovetter and Soong 1986) and gives a “reason” for potential consumers to pursue the product (McFerran et al. 2010; Shafir et al. 1993). For instance, when choosing between two restaurants of similar type, people often pick the one with more “check-ins” or a larger number of reviews. Also, a New York Times bestseller can sell well enough to continue as a bestseller in spite of the mediocre reviews (Bikhchandani et al. 1998). Overall, high social popularity signals high quality and desirability of products, making people follow their fellow consumers’ actions even without regard to their own information. Such behavior is often called herd behavior (Banerjee 1992).

Online consumers’ purchase decisions are not only influenced by other fellow consumers, but also by information from product vendors such as the promotional information of products. In particular, promotions using scarcity appeals in the form of large sales with time constraint (e.g., offer expiring in one day) have been widely observed on e-commerce platforms such as group purchase sites (e.g., Coulter and Roggeveen 2012). Previous research has found that deal scarcity, as a tactic that highlights monetary savings but curtails consumers’ opportunities of obtaining deals, may increase consumers’ tendency to attain the deals before they expire because the fact that monetary savings will no longer be available may trigger consumers’ anticipated regret about the benefits they will lose (Brehm 1966; Cialdini 2007; Clee and Wicklund 1980). For example, on the Double Eleven Day in 2013 (China’s equivalent of America’s Cyber Monday), many online vendors on Taobao.com (the largest e-commerce marketplace in China) offered single-day product discounts, leading to a massive sales record of $5.7 billion within 24 hours, which was more than six months’ sales of Walmart in China.

Literature has distinguished between the desirability value of an action (i.e., the rewards of the action) and the feasibility of achieving the outcome (i.e., the cost or constraints associated with the action), and characterized them as two important types of values that decision makers need to consider (e.g., Bagozzi and Dholakia 1999; Liu 2008; Trope and Liberman 2003). In the current context, while social popularity information based on other consumers’ behaviors directly signals the desirability of products, deal scarcity information provided by product vendors may signal the desirability values of deals by highlighting the value for money and also the feasibility of actually obtaining the deals by highlighting the imposed constraints. Prior research has accumulated evidence about the positive effect of social popularity and deal scarcity on consumptions separately, however, no studies have examined how these two distinct types of information would jointly influence consumers and whether such effects would differ in different situations.

Indeed, literature has pointed out that consumers’ thoughts and their processing of different types of product information are not always the same as they proceed in the shopping process. According to the two-stage shopping framework proposed by Lee and Ariely (2006), people’s consumption goals tend to change from being abstract to more precise as they go through the shopping process, and the different levels of goal specificity in distinct shopping stages may determine consumers’ sensitivity to different types of information that either signal the general desirability of products or the feasibility of achieving the shopping goals. Accordingly, an important research question is how the relative influences of social popularity and deal scarcity differ based on when consumers are exposed to such information during their shopping process. Indeed, given the increasing abundance of product information and the limited real estate on webpages, online vendors have to consider the right timing of presenting particular information so that the most useful and influential information is presented to visitors. Hence, this study aims to investigate the individual and interaction effects of social popularity and deal scarcity information on consumers’ product evaluation at different timing along the shopping process. Our findings establish that social popularity and deal scarcity, as two distinct types of information, may strengthen or weaken each other’s effects as consumers’ shopping goals evolve.
The current research makes several important contributions to the literature. First, although popularity-related and scarcity-related marketing strategies have been widely studied, the interaction effect between these two different types of information has never been formally studied. We believe our research is one of the first that fills the gap by explicitly exploring their relative influence and potential interaction effects. Second, while the positive effect of scarcity on inducing consumptions has been widely supported, understanding on the mechanisms through which scarcity affects consumers’ decisions and how such mechanisms may differ according to when the concept of scarcity is activated remains limited (Roux and Goldsmith 2013). Our research reviews the competing cognitive accounts in prior research and suggests a novel perspective that the effects of scarcity on consumers’ information processing may differ depending on the concreteness of their shopping goals. Third, by investigating the individual and joint effects of social popularity and deal scarcity in different shopping stages, our research provides guidance to online vendors on how to feature their products and place their marketing information at appropriate times.

The rest of the paper is organized as follows. We first review the literature on popularity effects, scarcity effects, and construal level theory. Based on the literature review, a set of hypotheses are proposed. We then explain the research methodology and present our empirical results. Finally, we conclude the paper with future research directions.

**Literature Review**

*The Effects of Social Popularity*

High social popularity of a product, usually exhibited by a large number of people liking or purchasing the product, may induce users to perceive the product as of high quality and follow the purchase behavior. Such behavior-based social influence, often described as observational learning (Bikhchandani et al. 1998; Cai et al. 2009; Chen et al. 2011), can be explained by the economic theory of informational cascades (Bikhchandani et al. 1992), bandwagon effects (Corneo and Jeanne 1997; Leibenstein 1950) or herd behavior (Banerjee 1992). According to these theories, a decision maker often observes the actions of others and can extract information about the value of actions from others’ choices. When limited information is available, this observed information which reflects others’ beliefs may outweigh one’s own private information in shaping his/her belief. Eventually, an information cascade can occur, such that all decision makers hold the same belief as their predecessors and become engaged in a type of herd behavior, i.e., everyone is doing what everyone else is doing (Banerjee 1992). Bikhchandani, Hirshleifer, and Welch (1992) illustrate this idea using a model of consumer product adoption, in which a consumer adopts (rejects) a product if he/she believes that the quality of the product is high (low). For simplicity, in a model with only three consumers, it is shown that the third consumer will adopt (reject) the product if he/she observes that both previous consumers have adopted (rejected) the product, regardless of his/her private information. Many empirical studies have provided support to this idea and revealed that users’ decision making is markedly influenced by the decisions of others, such as in financial investment, technology adoption, firms’ strategic decisions, political voting, and dining and fashion trends (e.g., Bikhchandani et al. 1998; Duan et al. 2009).

We believe herd behavior could be particularly prominent on the Internet for two reasons. First, since products have become increasingly sophisticated and the number of competing products in each category has grown exponentially (Bakos 1991; Duan et al. 2009), online shoppers often find that they lack the knowledge and time to make the optimal purchase decision. In such cases, value assessment based on others’ choices or suggestions could be considered an efficient and rational way. Second, the Internet nowadays provides much more information about other users’ behaviors, therefore making herd behavior more prevalent. Many e-commerce websites such as Amazon.com and CNET Download.com explicitly indicate products’ popularity or rank items based on their previous sales. The prevalence of popularity information may drown out an online user’s private information and make him/her more prone to assess product quality based on earlier adopters’ decisions (Bikhchandani et al. 1998).

*The Effects of Deal Scarcity*

Scarcity is originally defined as limits on the supply or the number of suppliers (Brock 1968). Early studies have suggested several types of scarcity-related marketing tactics such as limited editions of products and restrictions on the time to obtain the products. With the prevalence of group buying sites...
nowadays and a growing number of online deal seekers, recent applications of scarcity focus on product
deals. A widely seen example is the restrictions on the time available to respond to a sale (Brannon and
Brock 2001; Coulter and Roggeveen 2012). For instance, group buying sites such as Groupon negotiate
large discounts with local businesses and then offer these deals on sites with a salient time counter that
ticks down to zero the “time-left-to-buy”. Such promotional tactics which highlight the scarcity of deals
are the focus of the current study.

Promotions with scarcity appeal have been shown to trigger users’ scarcity-sensitive brains, leading to
increased preference and demand of the discounted products (Parker and Lehmann 2011). Explanations
for such effects from past studies have not been consistent. On one hand, high deal scarcity may signal a
very attractive offer that needs to impose purchase restrictions. In fact, high scarcity often improves
consumers’ perceived value or favorableness of the deal as they uncritically apply a rule of thumb, namely,
“What is rare is good” (Cialdini 1993; Inman et al. 1997; Lynn 1992). On the other hand, deal scarcity limits
consumers’ freedom in obtaining the discounts due to low availability and thus creates a sense of
“urgency” in users’ mind. The sense of urgency or threat will result in a motivational state directed at
engaging in the behavior immediately to avoid the potential regret of losing the economic benefits (Brehm
1966; Clee and Wicklund 1980; Worchel et al. 1975).

Overall, both social popularity and deal scarcity may affect a potential consumer’s perceived value and
desirability of an offer since high social popularity conveys positive product beliefs of other consumers
and high deal scarcity highlights an offer that is rare and attractive. However, deal scarcity also highlights
cost savings and imposes feasibility constraints on actually obtaining the offer (Brehm 1966). As prior
studies point out, desirability and feasibility values are two core types of values associated with a decision
process (Bagozzi and Dholakia 1999; Liberman and Trope 1998). While desirability refers to the value of
an action’s end state, feasibility refers to the specific conditions for reaching the end state (Gollwitzer and
Moskowitz 1996; Miller et al. 1960; Kruglanski 1996). Literature has suggested the equal role of
desirability and feasibility in affecting the actual decision outcome, but recent studies have demonstrated
differences in users’ psychological representation of them (Liu 2008; Trope and Liberman 2003). Hence,
to further explore how social popularity and deal scarcity may influence consumers’ decision making, we
draw upon the theoretical framework of construal level theory (CLT) (Trope and Liberman 2003).

**Construal Level Theory and Two-Stage Shopping Framework**

Construal level theory posits that people may construe an object at an abstract, high level or at a concrete,
low level (Trope and Liberman 2003). High-level construals are superordinate and reflect a general
understanding of the object, whereas low-level construals are subordinate and reflect the details and
specifics of the object. For example, the same act of going on a summer vacation can be thought of as
having fun and relaxation (i.e., abstract features at a high-level construal) or it can be conceived as having
a tall cold drink at the hotel pool (i.e., concrete features at a lower construal level). Studies on CLT have
typically examined the context of decision making involving feasibility and desirability considerations.
Particularly, desirability values refer to the superordinate “why” aspect of an action and are often
identified as high-level, primary features of an object, whereas feasibility values reflect the subordinate
“how” aspect of an action and are considered low-level, secondary features (Carver and Scheier 1981;
Liberman and Trope 1998; Trope and Liberman 2003; Vallacher and Wegner 1987; Vallacher and
Kaufman 1996). For example, the desirability of attending a concert can be reflected by how much one
likes the band, whereas feasibility can be reflected by the ticket cost. Accordingly, in the current context,
social popularity which signals the quality and desirability of products via others’ purchase behaviors is
likely to be construed as high-level information, whereas deal scarcity may be construed at a high level
when interpreted as a sign of valuable deals, but may serve as low-level information when interpreted as a
feasibility constraint in actually obtaining the deals.

At the core of CLT is the proposition that mental construal of objects that are psychologically near tends
to be low-level and concrete, whereas construal of objects that are psychologically distant is more high-
level and abstract (Trope and Liberman 2003). For instance, temporal distance, as one kind of
psychological distance, could change people’s mental representation of future events. Events in the
distant future (e.g., next summer vacation) are more likely to be represented in terms of abstract and
central features at a higher level (anticipating fun and relaxation); events in the near future (e.g., the same
vacation coming very soon), however, are more likely to be represented in terms of concrete and
peripheral features at a lower level (e.g., having a drink at the hotel pool). A considerable amount of research has also emphasized the idea that an external stimulus becomes more influential when its level of representation is congruent with the natural construal level of decision makers (Higgins 2000; Higgins et al. 2003). For example, given the hierarchical construal of desirability and feasibility values, studies have found that when one is choosing a distant future assignment (i.e., a high-level construal mindset), he/she will rely more on the interest of assignments (i.e., desirability of outcomes) in making decisions (Liberman and Trope 1998; Sagristano et al. 2002). In contrast, when choosing a near future assignment (i.e., a low-level construal mindset), one will rely more on the level of difficulty of assignments (i.e., feasibility of achieving outcomes) in making decisions.

Lee and Ariely (2006) apply the idea of CLT to the shopping context and propose a two-stage shopping framework based on the increasing concreteness of shopping goal construal. According to this framework, consumers’ formation of goals and execution of volitional control in shopping activities involve two stages. In the initial shopping stage, consumers are generally uncertain about what they want to buy or how much they want to spend. They are in a deliberative mind-set and seek to define a desired outcome. At this stage, consumers tend to process information at a high construal level, concerning more about the abstract and central product information in order to narrow down their choices. Once consumers have constructed concrete goals, they move to the later stage, one that is characterized by goal determinism and action tenacity. At this stage, consumers switch to an implemental mind-set and they care about goal attainment. They thus tend to process information at a low construal level and focus more on the concrete features and specific conditions. Hence, it is expected that the relative effects of social popularity and deal scarcity information on consumers’ product evaluation would change over time as consumers proceed in the shopping process.

Hypotheses Development

This research investigates the effects of product social popularity and deal scarcity on consumers’ purchase intention, and how their effects differ at different shopping stages. The research model is shown in Figure 1.

According to CLT, users tend to define events in the distant future in abstract and superordinate terms and translate them into more concrete, subordinate terms as the events draw nearer (Trope and Liberman 2003). The two-stage shopping framework (Lee and Ariely 2006) follows this idea and proposes that consumers’ natural construal level will change according to the shopping stages they are in. Specifically, in the initial shopping stage, consumers have abstract goals and their natural construal level is high. Consumers in the later shopping stage, however, have established more concrete goals and their natural construal level is low. Since people always put more weight on the type of information that matches their.
natural construal level at a given time (Liberman and Trope 1998; Thomas et al. 2007), information which is typically construed at a higher level should exert a stronger influence on consumers’ product preference in the initial shopping stage than in the later shopping stage. Hence, the desirability values which indicate the high-level benefits of the products are expected to heavily influence consumers’ product evaluation in the initial shopping stage. Conversely, consumers in the later shopping stage should be more influenced by the low-level feasibility values such as the cost and constraints of obtaining the products (Castaño et al. 2008; Cheema and Patrick 2008; Liu 2008; Vallacher and Wegner 1987).

Accordingly, we expect that social popularity which indicates the high-level desirability of products is generally expected to exert more influence on consumers’ product evaluation in the initial shopping stage than in the later stage as it is more congruent with consumers’ high construal level in the initial stage. However, deal scarcity, which may signal valuable deals or the feasibility of obtaining the deals and hence can be interpreted as high-level or low-level information, is expected to affect consumers in both shopping stages. Specifically, in the initial stage, given consumers’ flexibility in deciding their shopping targets and their natural high construal level, high deal scarcity is likely to be interpreted as a signal of desirability and narrow consumers’ attention to the valuable deals (Cialdini 1993; Suri et al. 2007). In other words, consumers tend to be attracted by scarce deals in order to identify initial shopping goals. In the later shopping stage, however, consumers have already constructed specific shopping goals and high deal scarcity in this case may be processed as a low-level feasibility constraint of achieving their goals. As such, high scarcity may induce actions by playing upon consumers’ sense of urgency and fear of “losing out” (Cialdini 2007). Formally, we propose,

**H1:** Social popularity will positively influence consumers’ product evaluation. Such influence will be stronger in the initial shopping stage than in the later shopping stage.

**H2:** Deal scarcity will positively influence consumers’ product evaluation in both shopping stages.

Moreover, studies on scarcity have drawn upon CLT and proposed that exposure to scarcity cues may lead to changes in users’ information processing styles depending on how they interpret the scarcity cues. Specifically, in the initial shopping stage, high scarcity may be interpreted as a signal of desirability and narrow down consumers’ attention to the specific good deals since their targets are largely undefined. As a result, consumers will tend to devote more thorough evaluation of the detailed attributes of the scarce offers (Brannon and Brock 2001; Friedman and Förster 2010; Inman et al. 1997; Vallacher and Wegner 1987). Earlier studies have shown that when users engage in more rational and thorough thoughts, they tend to focus on more specific features to judge product quality and become less susceptible to relying on other abstract information (Eagly and Chaiken 1993). As such, the effect of abstract information such as social popularity on consumers’ product evaluation is likely to be weakened (Brannon and Brock 2001; Friedman and Förster 2010). Overall, while social popularity of a product is generally expected to exert positive influence on users’ choices in the initial shopping stage, the presence of high scarcity information of deals may dilute such influence. Formally, we propose,

**H3:** In the initial shopping stage, there will be a negative interaction effect between social popularity and deal scarcity, such that the positive effect of social popularity will be weakened when deal scarcity is high.

However, in the later shopping stage, consumers have already constructed specific shopping goals and they tend to pursue concrete information that facilitates goal attainment. In this case, high deal scarcity will pose a potential threat to their goal achievement via limiting their chances of getting the target deals. In particular, as the expiration time of a deal approaches, users may feel impending regret about the outcome that they will lose the benefits of getting the target product at a discount (Cialdini 2007; Inman and McAlister 1994). Such arousal is likely to interfere with users’ ability to process information in detail and lead to a suppressed cognitive process focusing on simpler decision rules and high-level information that directly defines the meaning and desirability of the purchase (Burroughs and Mick 2004; Marguc et al. 2011). In other words, the restrictions on attaining the target purchases with monetary savings would result in decisions on the basis of more automatic and abstract processing (Cialdini 1993; Roux and Goldsmith 2013; Suri et al. 2007). Hence, high-level information cues such as the number of people who have already bought the target product are more likely to be used in assessing the quality of the product and value of the deal. Overall, it is logical to expect that if a target deal that is highly popular is about to
expire, consumers’ tendency to avoid potential loss should be greater and their intention to obtain the offer will be magnified. Formally, we propose,

**H4:** In the later shopping stage, there will be a positive interaction effect between social popularity and deal scarcity, such that the positive effect of social popularity will be strengthened when deal scarcity is high.

**Research Methodology**

**Design**

A laboratory experiment was conducted to test the hypotheses. We constructed a shopping website for the experiment and backpacks were selected as the target product category. Since backpacks were common products for the majority of students, the task of inspecting and considering purchase of backpacks represented a realistic scenario for student subjects.

Two shopping stages characterized by different levels of shopping goal concreteness were manipulated based on Tam and Ho (2006). Specifically, subjects in the initial shopping stage were asked to visit an online shopping website and freely browse some products, which were currently on sale, for as long as they wanted. They were told that the listed products were randomly retrieved from the pool of products on sale and no purchase decision was needed to be made at the end of the visit. The purpose was to ensure that the subjects did not have specific shopping goals during the task process. In particular, ten backpacks which were similar in terms of the price level and users’ perceived attractiveness based on a pretest were featured on a product listing page. A hypothesized brand name was associated with the products to avoid the potential confounding effects of prior brand involvement. Information presented for each product on the listing page included a picture, product name, past sales of the product (i.e., social popularity), and a dynamically indicated time to deal expiration (i.e., deal scarcity). A target product was selected among the ten, of which the level of social popularity and deal scarcity were manipulated. The position of the target product on the product listing page was randomized.

For the later shopping stage, however, subjects were asked to visit a shopping website and search for “backpack” because they were considering making a purchase for the new semester. Among the ten products returned for the search, which were the same as those listed in the initial shopping stage, the subjects were primed with a preference for a predefined target backpack product¹ and were then directed to a detailed information page of the target product. Social popularity and deal scarcity information of the target product was not provided on the search result page, but was manipulated on its detailed information page. Subjects were asked to make purchase decision regarding the target product at the end of the visit. In other words, subjects in the later stage went through a similar product browsing web page as those in the initial stage, but they were exposed to the manipulated popularity and scarcity information only when they had formed a specific shopping target (i.e., when they were evaluating the details of the target product).

Social popularity was represented by the number of previous buyers of the product, with 2 buyers indicating low popularity and 223 buyers indicating high popularity. Deal scarcity was manipulated based on the remaining time that the promotional offer was available, with 12 days left representing low deal scarcity and 23 minutes left representing high deal scarcity. The way this information was presented on the experimental pages resembled their presence on real shopping environments such as group-buying websites and other e-commerce platforms.

Overall, the laboratory experiment employed a 2 (shopping stage: initial vs. later stage) × 2 (social popularity: high vs. low) × 2 (deal scarcity: high vs. low) between-subject design. The screen captures of the product listing page and information page along with the manipulations of social popularity and deal scarcity are provided in Appendix A.

¹ While the target product was generally similar to other products, we provided several positive attributes of this product on a separate page which made subjects perceive it to be a superior product. Hence, the subjects could establish a relatively clearer preference and goal as they proceeded.
Procedures

128 undergraduate and graduate students from a major public university in China participated in the experiment. The subjects were randomly assigned to one of the eight conditions (with each condition 14-19 subjects). They were instructed to perform a task, which was either to browse a list of products on sale without decision making (i.e., for the initial stage) or to search and evaluate the products in order to make a purchase decision (i.e., for the later stage). After browsing all the web pages, the subjects were asked to complete a questionnaire. In particular, for subjects in the initial shopping stage, after they browsed the product listing page, they were asked to indicate their purchase intention for several products, including the target product, on the product listing page. Purchase intention here served as a proxy measure for users’ interests in checking for more details of the respective products. Subjects’ intention to purchase the target product was used as the dependent variable. Subjects in the later shopping stage were asked to indicate their purchase intention for the target product after they browsed the information page of the product, and this was used as the dependent variable. Purchase intention was measured by three items in a 7-point Likert scale (likely to buy the backpack, look forward to buying the backpack, and purchase the backpack next time when needed; adapted from Coyle and Thorson 2001). Each session of the experiment lasted for around 20 minutes and a token of appreciation (CNY40, around US$6) was provided to each subject at the end of the session.

DATA ANALYSIS

The subjects were from 33 academic schools (46 departments), representing very diverse backgrounds. Among them, 54.7% were female (58 male versus 70 female). The age of the subjects ranged from 19 to 33 (average = 23).

Manipulation Check

To check the manipulation of shopping stages, we asked subjects to rate if they had specific goals during their interactions with the website in the experiment. Results showed that subjects in the later stage reported significantly higher level of goal specificity during their interaction with the website (Mean = 5.62, SD = 1.01) than those in the initial stage (Mean = 3.98, SD = 1.41; F(1,126) = 56.72, p < .001). Hence, the manipulation of shopping stages was successful.

To check the manipulation of product social popularity and deal scarcity, we asked subjects about their perceived popularity and deal scarcity of the target product. Results showed that the average score of subjects’ perceived popularity in the high popularity conditions (Mean = 5.70, SD = 1.34) was significantly higher than that in the low popularity conditions (Mean = 3.16, SD = 1.49; F(1,126) = 103.10, p < .001). The average score of subjects’ perceived deal scarcity in the high scarcity conditions (Mean = 5.21, SD = 1.39) was also significantly higher than that in the low scarcity conditions (Mean = 2.85, SD = 1.43; F(1,126) = 89.67, p < .001). Thus, our manipulations of social popularity and deal scarcity were successful.

Results

An ANOVA test with purchase intention as the dependent variable and the three manipulated factors as the independent variables was conducted to test our hypotheses. The descriptives were shown in Table 1. The results revealed a significant main effect of shopping stages (F(1, 120) = 13.9, p < .001, see Table 2), but there was no main effect of popularity or scarcity. There was no two-way interaction effect between popularity and shopping stage either. Hence, H1 and H2 were not supported. However, there was a significant three-way interaction among shopping stage, social popularity and deal scarcity on purchase intention (F(1, 120) = 4.22, p < .05, see Table 2). Tests of simple main effects showed that in the initial shopping stage, popularity had a stronger influence on purchase intention when deal scarcity was low (p = .05) as compared to when scarcity was high (p > .05, see Figure 2a). In the later shopping stage,

2 Questions used in the manipulation check of goal concreteness were: before browsing the shopping website, (1) I am certain about what I want to buy; (2) I have a specific shopping goal in mind; and (3) I know clearly what product I’m going to search on the website.
Social Popularity and Deal Scarcity

popularity had a stronger influence on purchase intention when deal scarcity was high (p < .05) as compared to when it was low (p > .05, see Figure 2b). Hence, H3 and H4 were supported.

<table>
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<tr>
<th>Stage</th>
<th>Popularity</th>
<th>Scarcity</th>
<th>Mean</th>
<th>SD</th>
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<td>Low</td>
<td>3.57</td>
<td>1.61</td>
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<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>4.63</td>
<td>1.13</td>
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<td></td>
<td>High</td>
<td>High</td>
<td>4.56</td>
<td>1.56</td>
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<tr>
<td></td>
<td>High</td>
<td>High</td>
<td>4.27</td>
<td>1.59</td>
</tr>
<tr>
<td>Later</td>
<td>Low</td>
<td>Low</td>
<td>5.04</td>
<td>1.27</td>
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<td></td>
<td>High</td>
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<td></td>
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<td></td>
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<td>High</td>
<td>5.75</td>
<td>1.01</td>
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Table 1. Descriptives of Purchase Intention in Different Conditions

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<th>df</th>
<th>F</th>
<th>Sig.</th>
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<td>.00</td>
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Table 2. Tests of Main and Interaction Effects
General Discussions

This research examines the effects of two types of product information, i.e., social popularity information based on consumers' behaviors and deal scarcity information generated by product marketers, on consumers' purchase intentions, and how such effects change as their shopping goals evolve.

While the positive individual effects of social popularity and deal scarcity are widely acknowledged in previous studies, our results do not reveal significant main effects of these two types of information cues. More importantly, our findings show that there is indeed an interaction effect between these two types of information, and such effect will change as consumers' shopping goals become more concrete. Specifically, in the initial shopping stage, there is a negative interaction effect between social popularity and deal scarcity, such that the positive effect of social popularity on inducing consumptions will disappear when deal scarcity is high. As we explained earlier, in this stage, consumers process information with a high-construal mindset seeking to define a desired goal. High deal scarcity highlighting the high value of a deal will tend to narrow their attention and motivate more concrete evaluation of the limited offers first. As consumers attend to the details of the product deals, the effect of the abstract and high-level information such as social popularity will be weakened. In the later shopping stage, however, the interaction effect becomes positive such that social popularity and deal scarcity will reinforce each other. In this stage, consumers are typically in a low-construal mindset with specific shopping goals in mind. High deal scarcity thus indicates a potential impediment of obtaining the target deals, which may stimulate consumers to accelerate the decision making based on more automatic and abstract processing (Cialdini 1993; Suri et al. 2007; Roux and Goldsmith 2013). Such a suppressed cognitive process thus leads to a stronger reliance on high-level information cues that directly signal the desirability of the products for decision making. Accordingly, consumers' tendency to avoid potential loss would be stronger when the target products are highly popular.

This research provides several theoretical and practical implications. Theoretically, extant studies have long shown that the social popularity of products serves as a good reference of quality and gives a reason for potential consumers to pursue the products (Banerjee 1992; Cialdini 2007; Granovetter and Soong 1986; McFerran et al. 2010; Shafir et al. 1993), and that high deal scarcity will increase consumers’ tendency to attain the limited offers via either increased value perception (Inman et al. 1990; Lynn 1992) or anticipated regret of losing great deals (Brehm 1966; Cialdini 2007; Clee and Wicklund 1980). However, given the frequent coexistence of such information on today’s e-commerce websites and the complicated information structure of websites, the joint and interaction effects of these two types of information as
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well as how their effects may differ in different situations deserve further investigation. To the best of our knowledge, our research is the first one to empirically examine the individual and joint effects of social popularity and deal scarcity at different timings along consumers’ shopping process. Our findings establish that these two distinct types of information may strengthen or weaken each other’s effects at different stages of online shopping. These findings can be explained by consumers’ different information construal levels as their shopping goals evolve from being abstract to concrete during the shopping process.

Moreover, while many studies have supported the positive scarcity effect, our research further suggests deal scarcity may play different roles in consumers’ decision making under different situations. When consumers do not have a specific shopping goal and thus tend to process product information in an abstract level, highlighting the high scarcity of valuable deals may narrow consumers’ attention to specific deals (Brannon and Brock 2001; Friedman and Förster, 2010; Inman et al. 1997; Vallacher and Wegner 1987). Accordingly, consumers tend to process the product details and become less susceptible to relying on abstract and high-level information pertaining to the deals to make choices (Eagly and Chaiken 1993). On the contrary, when consumers have formed more concrete shopping goals, they tend to consider more concrete information about how to attain the goals. In this case, the presence of high deal scarcity information may indicate a potential impediment to fulfilling their goals, which intensifies consumers’ feeling of impending regret of losing the benefits of the target deals. The feeling will interfere with consumers’ ability to process information in detail and lead to a suppressed cognitive process based on simpler decision rules and more automatic processing (Cialdini 1993; Suri et al. 2007; Roux and Goldsmith 2013). Overall, consumers’ mindset in different shopping stages determines how deal scarcity information is processed, which in turn changes how they process other product information.

The results of this study are also practically important because it is becoming common for businesses to publicize social popularity and deal scarcity information online (Shapiro and Varian 1998). However, when to serve popularity and scarcity information to effectively influence consumers is seldom investigated. Our findings thus provide valuable suggestions to businesses in terms of the time dimension of information provision. In particular, for consumers who are browsing multiple products without a concrete goal, highlighting the social popularity of a product will attract their attention to it and even induce impulsive purchases as long as the deal is not scarce. In other words, presenting high scarcity information at this stage may actually negate the positive effects associated with a high buyer number, as high deal scarcity may narrow down consumers’ attention to specific deal information and lead them to engage in more concrete thinking. For consumers who are considering particular products for purchase, however, businesses should highlight both the high popularity and high scarcity to effectively induce consumptions since they would reinforce each other.

Limitations and Future Research

This research also has a number of limitations that may be addressed in the future. First, our experiment only examines one type of product (backpack). It will be useful to study how social popularity and deal scarcity jointly affect choices on different types of product. For instance, Tucker and Zhang (2011) has pointed out that popularity information may actually be of greater benefit to narrow-appeal (niche) products than broad-appeal products. This is because narrow-appeal products are less likely to attract customers in general, hence social popularity information serves as a greater quality signal to potential customers. It is thus possible that the interaction effect of the two information cues might differ for these products.

Second, there might be different forms of social popularity and deal scarcity information besides the number of previous buyers and time-to-expiration. For example, social preferences expressed by “Likes” are immensely popular nowadays as more than 20% of the top 1 million web sites collect and display Facebook Likes, and more than 14% use Google’s equivalent “+1” (Web Technology Survey, 2012). In terms of scarcity, setting a quantity restriction is also often observed in online sales and has been found to increase consumers’ perceived value of the deals too (Cialdini 2007). Hence, future research is needed to provide a more complete picture of the effects of popularity and scarcity information.
Third, the outcome variable in our experiment is a self-reported measure. To fully quantify the economic consequences, it would be helpful to further investigate the effects of social popularity and scarcity on actual purchase decisions.

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Appendix A

Figure A.1. Products Displayed on the Product Listing Page in the Initial Stage
Figure A.2. Manipulated Information in the Initial Stage (Enlarged View of the Target Product on the Product Listing Page)

Figure A.3. Manipulated Information on the Product Information Page in the Later Stage
References


