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Out-of-Stock versus Sold-Out: Consumers' Cognitive Processes Triggered by Unavailability Marks in Online Shopping Malls

Cheul Rhee[a,*], Wooseok Park[b]

[a] *Associate Professor, E-Business Department, Ajou University, Korea*
[b] *Manager, Big Data & AI Department, EFIL, Korea*

ABSTRACT

In online shopping, "out-of-stock" and "sold-out" are used to indicate product unavailability, and this unavailability and its effects on consumers' behaviors have been studied with great interest for practical purposes. However, few studies have specifically discussed out-of-stock and sold-out products in the same paper. We hypothesized that consumers might cognitively interpret items marked out-of-stock and sold-out differently, and in this paper, we studied these potential differences from the perspectives of consumers' emotions, behaviors, and loyalty based on the stimulus-organism-response framework. In order to explore the differences, we used a multi-method approach that consisted of experiments, surveys, and interviews. Specifically, we built an experimental website on which the same products were categorized as either out-of-stock or sold-out, and we measured the participants' emotions, attitudes, and intentions after the experiment. After two weeks, we conducted interviews to confirm our results and to learn more about consumers' everyday behavior. In the results, males and females demonstrated differences in emotion, behaviors, and loyalty with the interaction effects of an item's being marked out-of-stock versus sold-out. We found that the consumers demonstrated different levels of loyalty based on whether the item was marked out-of-stock or sold-out. We discuss the strategic implications of our findings.

Keywords: Sold-out, Out-of-stock, Online Retailers, Consumer Emotion, Attribution Theory

Ⅰ. Introduction

In online shopping malls, we often see *out-of-stock* or *sold-out* when a product is unavailable. Presumably, retailers mark products as sold-out or out-of-stock without considering the causes of unavailability. From the consumer's point of view, however, can we say that out-of-stock and sold-out affect consumers' attitudes and consequent behaviors in identical ways? What if consumers unconsciously perceive the

*Corresponding Author. E-mail: crhee@ajou.ac.kr

two terms completely differently? According to Ge et al. (2009), products are marked out-of-stock because of poor inventory management, whereas they are marked sold-out because they are highly popular. We posit that consumers' perceptions may be different when confronted with the two slightly different terms if the unavailability originates from different perceived causes.

In the academic literature about unavailability in online shopping, we found first that most studies regarding product unavailability refer to products as out-of-stock more often than sold-out. Second, many studies seem to overlook attribution effect; most studies regarding product unavailability limit their results to whether a product can be bought or sold and the resulting customer emotions and behaviors, but consumers may feel differently about the exact same event if they perceive the event differently. That is, emotions and behaviors may vary depending on what the consumer believes is the reason for the unavailability. Third, there are few studies address gender differences in consumers' reactions to product unavailability. Vast numbers of studies maintain that male and female consumers show different shopping patterns, but these studies do not seem to consider the gender difference.

In many cases, reactions can be explained by emotions. For our purposes, we employed the stimulus-organism-response (S-O-R) framework to explain the relationships between emotions and behaviors. We confirmed that consumers showed differing emotional reactions depending "on whether a product was marked out-of-stock or sold-out and that their reactions affected their product loyalty. Further, we tested whether male and female consumers would show differences in emotions and product loyalty depending on whether the product was marked out-of-stock or sold-out. We specifically used a multi-method approach with experiments, surveys, and interviews to ensure the reliability of our findings. In the following section, we discuss the relevant literature, followed by our research methods and results. Then, we discuss managerial implication.

Ⅱ. Conceptual Background

2.1. The Perceived Cognitive Difference between Out-of-stock and Sold-out

Both out-of-stock and sold-out are marked widely online when products are not available; presumably, retailers think the terms are interchangeable because each merely indicates that the product is currently not available and thus cannot be sold. The literature has also not distinguished between these seemingly similar terms; although *out-of-stock* appears more frequently in the literature, few studies clarify that the term can mean different things to different people.

However, consumers may perceive the two terms differently because they tend to think of causes when confronted with events. According to attribution theory (Weiner, 1980), consumers who identify problems with products attempt to identify the causes of the problems; in particular, they attempt to determine if the problem is caused by the product itself or by any situational factors (Kelley, 1967). Further, Speights et al. (2019) explain the relationship between emotion and external stimuli such as conflicts using attribution theory. When consumers are not satisfied with products or services, they may seek reasons for why the products or services are not satisfactory. Attribution theory categorizes reasons for dissatisfaction into three dimensions of causality: locus of causality, stability, and controllability. Locus

of causality refers to whether the service failure is attributable to the actor or the situation, stability refers to whether the reasons are temporary or permanent, and controllability refers to whether the reasons are intentional or unintentional.

Previous studies on attribution theory have investigated consumers' reactions to service failure through the dimensions of causality (Weiner, 1980; Weiner et al., 1979). According to Ge et al. (2009), products are out-of-stock because retailers have failed at inventory management, whereas products are sold-out because they are popular. Thus, consumers may attribute out-of-stock product circumstances to retailer or wholesaler failure but attribute sold-out products to their popularity, which could differently affect consumer loyalty. If a clerk at McDonald's says, "it's sold out," we may think the product is so popular that we're running out of materials. However, if a clerk says, "It's out of stock," we may ask the clerk back, "is there a problem?"

2.2. The S-O-R Framework and the Current Study

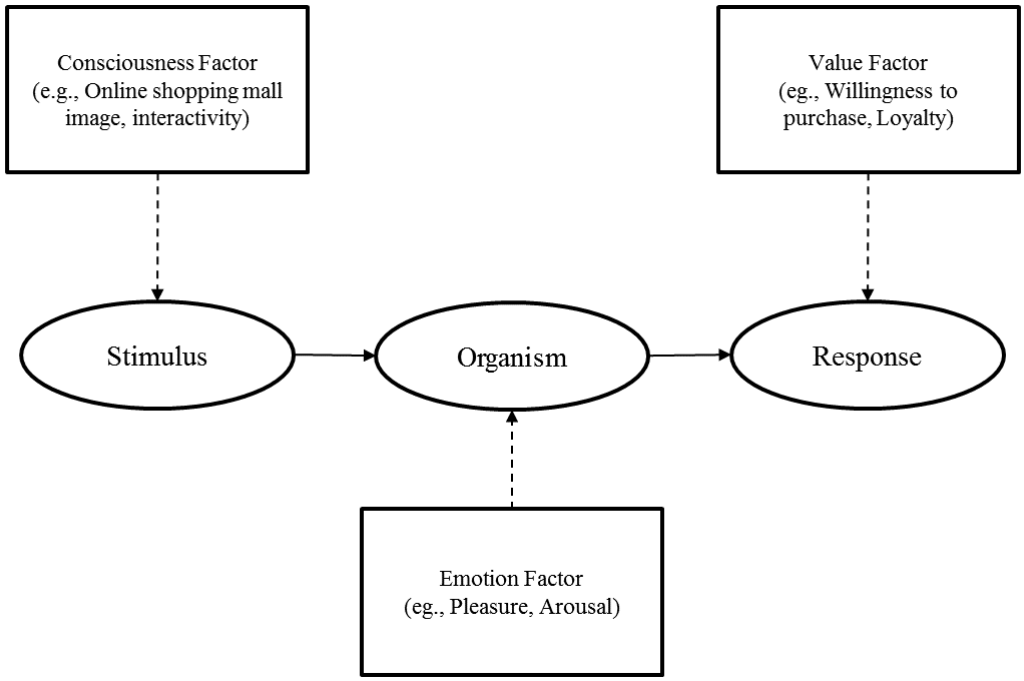
Woodworth and Schlosberg introduced the stimulus-organism-response model in 1954 to show how environments affect individual organisms, including triggering measurable reactions. According to Mehrabian and Russell (1974), the S-O-R model can explain human behaviors from a cognitive and holistic perspective.

The focus of the model is individuals' internal information processing of stimuli. In marketing, stimuli are divided broadly into direct or indirect, with the former referring to a stimulus's immediate connections with subjects or events. For instance, price, product information, and advertising are direct stimuli that affect these subjects or events (Bagozzi, 1986). Indirect stimuli result from environments and do not have direct influences on subjects or events but instead are related to social and psychosocial factors. For example, one study found that consumers were affected by the music and other atmospheric characteristics of shopping malls (Arora, 1982).

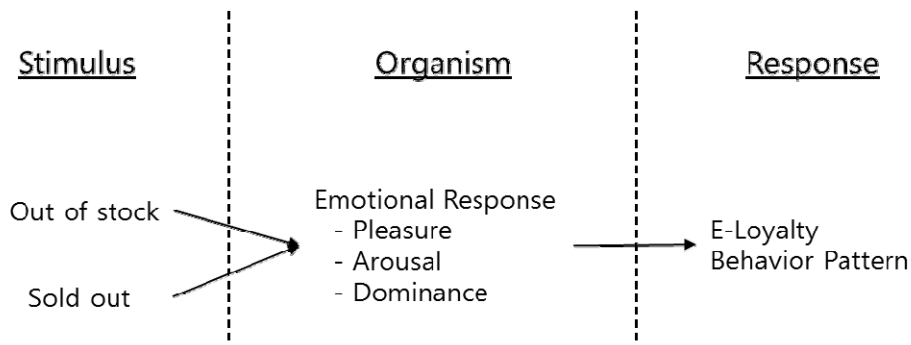
In the S-O-R model, the organism refers to the individual and his or her internal processes and how these derive from stimuli and trigger responses (Bagozzi, 1986). The organism has the perceptions, physiological reactions, thoughts, and emotions, which are all closely related (Bagozzi, 1986), and in many cases, the S-O-R model can explain why an individual shows a specific reaction (response) to a specific stimulus. The response in the model refers to these individual reactions to external stimuli, including individuals' internal cognitive processes such as changes in attitude (Bagozzi, 1986).

Many authors have attempted to adopt the S-O-R framework in studying consumers' online shopping behaviors (Chang and Chen, 2008; Donovan et al., 1994; Fiore and Kim, 2007; Gao and Li, 2019; Kawaf and Tagg, 2012; Kim and Lennon, 2010; Kim and Lennon, 2013; Kühn and Petzer, 2018; Manganari et al., 2011; Wang et al., 2011). In these studies, conscious and/or unconscious factors correspond to stimuli, and authors attempt to determine how these stimuli affect consumers' responses; these studies use the S-O-R framework to explain how stimuli affect consumers' (organisms') responses. <Figure 1> delineates the framework and applicable factors based on a study by Fiore et al. (2005).

For this study, we propose the product status of either *out-of-stock* or *sold-out* as the stimulus in the S-O-R framework to discover whether the organisms —that is, the consumers— will respond differently depending on the product status. <Figure 2> depicts the conceptual model we developed based on the



<Figure 1> S-O-R Framework and Corresponding Factors (Adapted from Fiore et al., 2005)



<Figure 2> Conceptual S-O-R Model for Comparing Out-of-Stock with Sold-Out Products

framework; with regard to response, we focused on e-loyalty and behavioral patterns as discussed in by Corsten and Gruen (2003). Whereas previous studies focus on stimuli and the influences of constructs, we simply compare consumer reactions to whether a product is out-of-stock or sold-out.

Ⅲ. Research Hypothesis

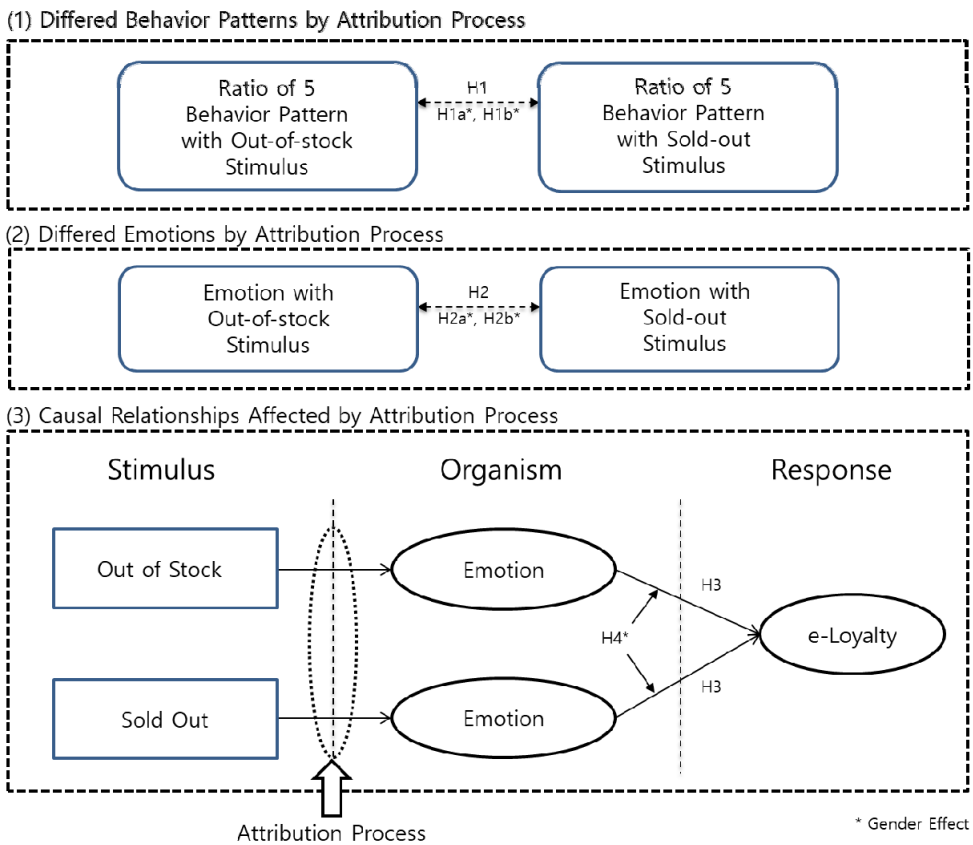
Attribution theory combined with the S-O-R fra mework posits that the different reasons for a prod-uct's unavailability may trigger different emotions and behaviors. According to Ge et al. (2009), products are out-of-stock because retailers have failed at in-

ventory management but they are sold-out because they are highly popular. Thus, although both terms convey the identical meaning that a product is unavailable, consumers may make negative attributions to retailers when a product is out-of-stock but make positive attributions if it is sold-out because it is so popular. <Figure 3> presents our research framework and hypotheses for this study.

Corsten and Gruen (2003) suggest that consumers show specific behavioral patterns when products are unavailable in offline stores; they may purchase an alternative brand, purchase from another, or postpone or even give up making the purchase. The authors found that the behavior patterns varied by product type but that the pattern ratios were very similar regardless of where the products were purchased.

According to Levin and Gaeth (1988), consumers' emotions and responses can be susceptible even to changes. For example, consumers react more favorably to a package of beef labeled "75% lean" than to one labeled "25% fat," and they will likely react differently to a product that is described as being "on sale for three days" than to one that is described as "on sale for three days only."

Meanwhile, differences in shopping behavior by gender have been studied enormously for decades. The rationale behind the different behaviors by gen-



<Figure 3> Out-of-stock Versus Sold-out Research Framework

der come from different motives; women more tend to shop for hedonic motives (Hu and Jasper, 2004). However, it is not known or studied how men and women would distinctively behave when they face out of stock situation and sold out situation.

Based on the preceding review of the literature, we formulated the following hypotheses.

H1: The ratios of five behavior patterns for out-of-stock versus sold-out products (the stimulus) will be different for the identical products. (Gender effects are tested for H1a and H1b)

H2: Consumers will react more positively when the product is sold-out.

Marketing studies that use the S-O-R framework generally support a relationship between emotion and behavior (Li et al., 2012) and find that consumers' shopping behaviors are tied to their accumulated shopping experiences (Dawson et al., 1990). Dick and Basu (1994) argue that cognitive and emotional factors affect attitudes, and Westbrook and Black (1985) argue that consumers' motives for shopping affect their actions, preferences, and attitudes through their emotions. These studies consistently manifest the relationship between organism (consumer) and response.

Because consumers' shopping experiences, based on both conscious and unconscious stimuli, affect their shopping behaviors and attitudes toward their shopping environments, satisfying consumers is critical. In particular, loyalty is an important construct in Internet shopping. According to Verbeke et al. (1998), out-of-stock products in stores tend to decrease loyalty to the store, including decreasing the amount of time consumers spend at the store. Schary and Christopher (1979) found that out-of-stock products decreased product and brand loyalty negatively influenced market share. However, few studies have investigated the relationship between sold-out products and brand loyalty, and we posit that these findings can be applied in online shopping contexts as well. Specifically, based on the findings above, we formulate the following hypothesis.

H3: Consumers' emotions triggered by unavailability will affect consumer loyalty.

Campo et al. (2000) maintained that characteristics of consumers, situations, and products need to be considered when observing consumers' reactions to product unavailability, and Chiu et al. (2005) confirmed that male and female consumers showed differences in attitudes and purchase intention. In particular, Van Slyke et al. (2002) showed that gender was a main determinant of shopping intention and consumer perceptions. Based on these findings, we formulated the following hypothesis.

H4: The relationship between consumers' emotions and loyalty will be moderated by gender.

Ⅳ. Research Design

4.1. Experiment Designs

4.1.1. Participants

We recruited 380 participants for the study from an online fashion community and from SNSs. 19 participants did not complete the survey, resulting in a sample size of 361. We asked demographic questions such as past shopping experience or education level in preparation for the possibility of further

<Table 1> Participant Demographics

	Participants who entered out-of-stock site	Participants who entered sold-out Site	Total
Age	Under 19: 22 20 - 29: 131 30 - 39: 19 40 - 49: 5 50 - 69: 1	Under 19: 22 20 - 29: 125 30 - 39: 20 40 - 49: 10 50 - 69: 3	Under 19: 44 20 - 29: 256 30 - 39: 39 40 - 49: 15 50 - 69: 4
Gender	Male: 80 Female: 100	Male: 87 Female: 93	Male: 167 Female: 193
Online shopping frequency (number of times per month)	1 - 4: 111 5 - 9: 42 10 - 14: 14 15 or more: 13	1 - 4: 133 5 - 9: 26 10 - 14: 16 15 or more: 5	1 - 4: 244 5 - 9: 68 10 - 14: 30 15 or more: 18
Online shopping amounts (USD/month)	$30 or under: 36 $30 - $50: 55 $50 - $100: 53 $100 or more: 36	$30 or under: 41 $30 - $50: 60 $50 - $100: 57 $100 or more: 22	$30 or under: 77 $30 - $50: 115 $50 - $100: 110 $100 or more: 58
Education level	High school graduate or less: 21 College graduate: 7 University student or graduate: 130 Postgraduate or higher: 21	High school graduate or less: 26 College graduate: 4 University student or graduate: 129 Postgraduate or higher: 21	High school graduate or less: 47 College graduate: 11 University student or graduate: 259 Postgraduate or higher: 42

control. <Table 1> summarizes the demographic profile of the study participants.

4.1.2. Experimental Task and Design

For the experiment, we assigned the subjects to shop online on one of two experimental websites: on one of the sites, 20% products of the products were sold-out and 80% were available, and on the other sites, 20% of the products were out-of-stock and 80% were available. We presented the website types in random order to eliminate possible order effect.

The participants gave their informed agreement by clicking the button to enter the experimental website. We designed the site to resemble common online shopping sites such as Amazon.com. The subjects entered their respective websites and clicked on the products they thought were most attractive; when they clicked on the product, a pop-up window appeared to ask if they had been aware of the product unavailable, and subjects who clicked "Confirm" were redirected to the survey page. At the conclusion of the survey, the participants completed a demographic profile that included their cell phone numbers. Sessions lasted for an average of 15 minutes, and as compensation for their time, participants received vouchers for coffee from a company called Gifticon that sends these vouchers wirelessly for items from Starbucks, McDonald's, and other merchants. Finally, approximately two weeks after the experiment, we conducted cell phone interviews with some of the participants based on stratified sampling by gender.

4.2. A multiple-method Approach

For this study, we used quantitative survey and qualitative interview analysis to test our hypotheses. Because comparing these unavailability markers is

<Table 2> The Experimental Design

Total participants		Interview participants	
Type of Unavailability	Gender	Type of Unavailability	Gender
Out-of-stock 180 (49.9%)	Male 80 (44.4%)	*Out-of-stock* 39 (48.1%)	Male 39 (48.1%)
	Female 100 (55.6%)		
Sold-out 181 (50.1%)	Male 87 (48.1%)	*Sold-out* 42 (51.9%)	Female 42 (51.9%)
	Female 94 (51.9%)		
361 (100%)		81 (22.4%)	

relatively new, we analyzed he interviews to gain greater understanding of why survey respondents responded as they did.

4.2.1. Survey Questionnaire and Instrument Validation

The PAD paradigm (pleasure, arousal, dominance) was developed by Mehrabian and Russell (1974, p. 216) as a kind of semantic differential (Osgood et al., 1957). The instrument measures each emotional dimension on a seven-point bipolar adjectival scale. For our purposes, e measured the dimensions as follows: (a) pleasure: unhappy/happy, melancholic/content, annoyed/pleased, unsatisfied/satisfied; (b) arousal: sluggish/frenzied, calm/excited, relaxed/stimulated, unaroused/aroused; and (c) dominance: controlled/controlling, guided/autonomous, influenced/influential, submissive/dominant.

We used the survey elements we identified in the

<Table 3> Measurement Items

Variable	Operational definition	Measurement items	Reference
Pleasure	Short-term emotional experience with online shopping	P1 (happy - unhappy) P2 (contented - melancholic) P3 (pleased - annoyed) P4 (satisfied - unsatisfied)	Kwak and Choi (2002); Mehrabian and Russell (1974)
Arousal	Short-term emotional experience with online shopping	A1 (frenzied - sluggish) A2 (excited - calm) A3 (stimulated - relaxed) A4 (aroused - unaroused)	Kwak and Choi (2002); Mehrabian and Russell (1974)
Dominance	Short-term emotional experience with online shopping	D1 (controlling - controlled) D2 (autonomous - guided) D3 (influential - influenced) D4 (dominant - submissive)	Kwak and Choi (2002); Mehrabian and Russell (1974)
Loyalty	Loyalty to online shopping site	L1 (intention to revisit) L2 (word of mouth) L3 (intention to recommend)	Anderson and Srinivasan (2003); Kimet al. (2009); Rundle-Thiele (2005)

existing research as references to define the experimental structure and create the survey. The following table shows the fundamental concepts and lists of measurements.

For this study, we needed to measure participants' emotions and states of mind when products were unavailable, and we used Mehrabian and Mehrabian and Russell (1974)'s PAD to measure consumer; as noted above, the PAD dimensions were pleasure, arousal, and dominance.

After the experiment, we questioned the subjects for factor analysis using varimax rotation and principle component analysis, and identified four factors (eigenvalues = 1.626). The Cronbach's *a* values exceeded 0.812, which demonstrated trustworthiness and validity. These results are shown in <Table 4>. P1 ~ 4, A1 ~ 4, D1 ~ 4, L1 ~ 3 in <Table 4> refers to pleasure, arousal, dominance and loyalty respectively as shown in <Table 3>.

4.2.2. Interviews

We next conducted semi-structured interviews with 81 consumers who had participated in the previous experiment; <Table 4> lists the four interview questions. Participants responded by hand, and each

<Table 4> Principle Component Analysis of the Complete15-item Questionnaire

Rotated Component Matrix[a]					Cronbach's Alpha	Eigenvalue
	Component					
	1	2	3	4		
P2	.825	.110	.150	.028	.838	4.328
P1	.823	-.047	.111	.156		
P4	.783	.059	.186	.098		
P3	.772	.041	.148	.111		
A1	.080	.864	.053	.040	.817	2.543
A3	.171	.835	.162	-.019		
A2	.045	.769	.004	-.083		
A4	-.103	.725	.090	.045		
D4	.102	.054	.872	.111	.812	1.783
D3	.176	.074	.818	.157		
D2	.095	.052	.799	.016		
D1	.276	.147	.583	.092		
L2	.106	-.009	.091	.902	.844	1.626
L3	.144	-.010	.179	.840		
L1	.096	-.002	.053	.826		

<Table 5> Interview Questions

Number	Question
1	Do you often see out-of-stock and sold-out products when online shopping?
2	What is the difference between out-of-stock and sold-out?
3	How did you feel about products that were out-of-stock versus sold-out?
4	Which if either of the experimental websites would you shop at?

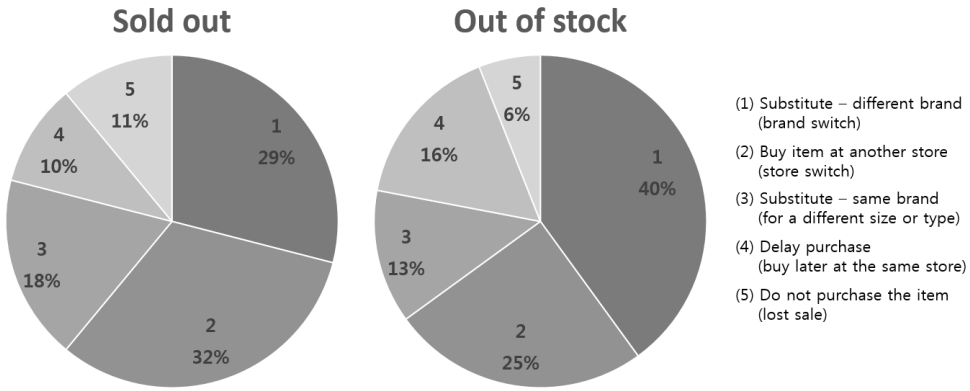
interview lasted approximately 10 to 20 minutes.

Ⅴ. Results and Discussion

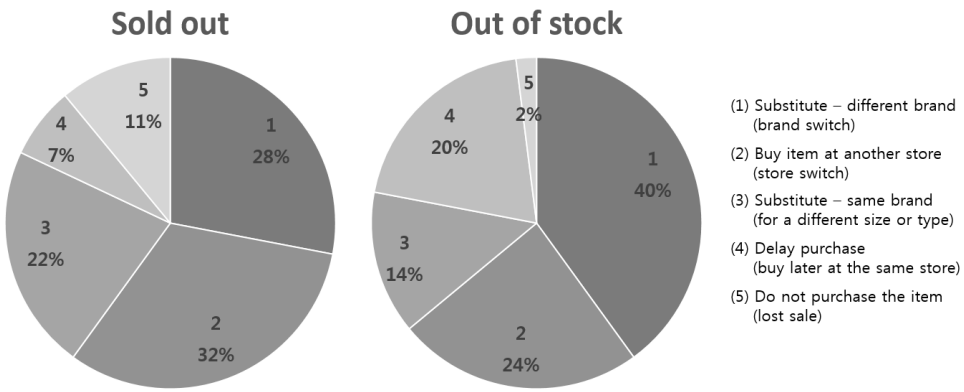
We analyzed the participants by gender among other aspects and found the following. Specifically, <Figure 4> shows the breakdown of Corsten and Gruen (2003)'s five consumer responses to product unavailability according to sold-out versus out-of-stock products.

The figure shows that consumers reacted differently depending on whether the product was sold-out or out-of-stock even when it was actually the same product. Specifically, when products were out-of-stock, consumers switched product brands at 0.01 statistical significance and either delayed their purchases or did not make the purchases at all at 0.05 significance. <Figure 5> and <Figure 6> display how consumers' responses varied by their gender.

As shown in <Figure 5>, men's behaviors differed significantly depending on whether a product was presented as sold-out or out-of-stock; for one, when a product was marked as sold-out, 5.5 times more



<Figure 4> Total Participant Behavior Patterns



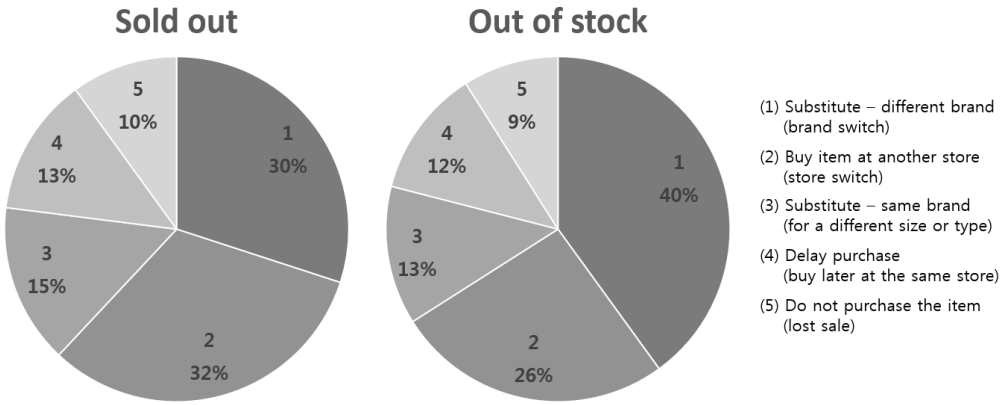
<Figure 5> Male Behavior Patterns

men abandoned their purchase than when the product was marked out-of-stock ($P < 0.1$), and additionally, the number of men who postponed their purchases increased threefold ($P < 0.001$); we learned the reasons for these differing purchase patterns from the interview and survey results. For instance, one male participant answered, "If a product is sold-out, this means that a lot of people have quickly bought the item. This is true for any other shopping outlet, and a lot of people will have to abandon their purchases." Based on our compiled results, we can support the notion that men behave differently depending on whether a product is sold-out or out-of-stock.

<Figure 6>, however, shows that in contract with men, women did not exhibit great differences in behavior patterns depending on whether a product was sold-out or out-of-stock. One female respondent answered, "Whether the product is sold-out or out-of-stock is not important. However, what is important is how much I like the product. If I cannot purchase the product that I want, I will be jealous of the person who purchased the product, and angry at my failure to buy the product. The state of being out-of-stock or sold-out does not matter." The results overall showed that women's purchase behaviors did not differ greatly depending on the reason for the product's unavailability. The above results are consistent with the prior studies why men and women behavior differently when shopping.

5.1. Different Emotions and Loyalties

In terms of participants' emotions and loyalties, as <Table 6> shows, neither emotions nor loyalty differed significantly depending on whether the prod-



<Figure 6> Female Behavior Patterns

<Table 6> All Participants

Classification	*Out-of-stock*	*Sold-out*	*t*-Value
	Mean(STD)	Mean(STD)	
Pleasure	4.7681(0.07)	4.7680(0.07)	0.001
Arousal	3.5639(0.07)	3.5456(0.08)	0.170
Dominance	4.3667(0.07)	4.2371(0.08)	1.199
Loyalty	3.7991(0.08)	3.9429(0.09)	-1.192

uct was out-of-stock or sold-out.

However, we found significant differences when we analyzed participant responses by gender. As <Table 7> shows, the males showed different dominance ($p < .05$) and loyalty ($p < .01$) responses depending on whether the product was sold-out or out-of-stock. Specifically, they expressed more dominant emotions regarding sold-out products (3.9683) than for out-of-stock products (3.6406), and they expressed more loyalty toward sold-out (4.1015) than toward out-of-stock products (3.6145).

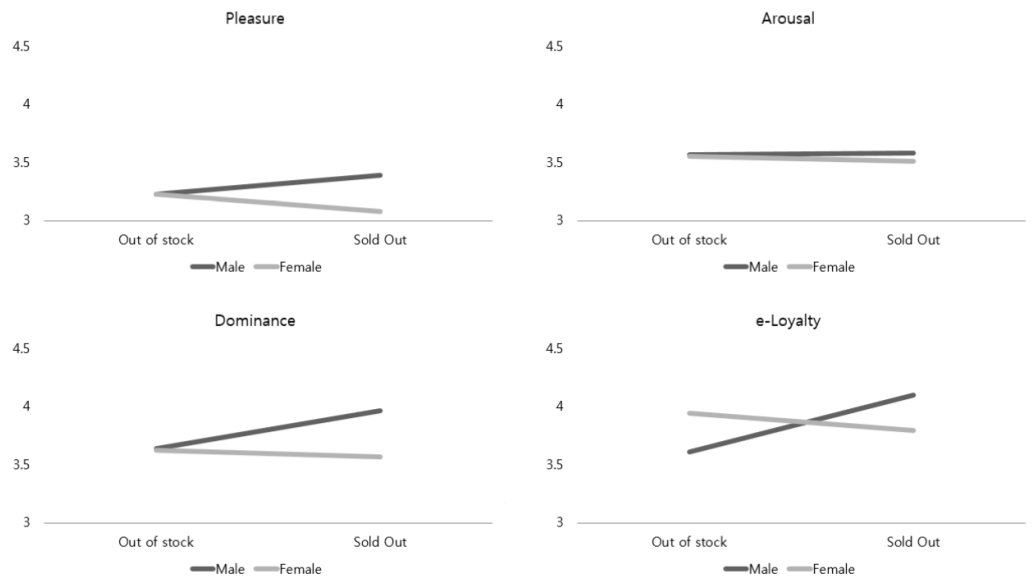
Meanwhile, <Table 8> shows that women showed

<Table 7> Male Participants

Classification	*Out-of-stock*	*Sold-out*	*t*-Value
	Mean(STD)	Mean(STD)	
Pleasure	3.2313(0.96)	3.3937(0.11)	1.074
Arousal	3.5719(0.10)	3.5833(0.13)	0.65
Dominance	3.6406(0.10)	3.9683(0.13)	1.878*
Loyalty	3.6145(0.11)	4.1015(0.13)	2.741**

<Table 8> Female Participants

Classification	*Out-of-stock*	*Sold-out*	*t*-Value
	Mean(STD)	Mean(STD)	
Pleasure	3.2325(0.93)	3.0824(0.83)	1.173
Arousal	3.5575(0.91)	3.5106(0.93)	0.352
Dominance	3.6237(0.95)	3.5659(0.88)	0.431
Loyalty	3.9466(1.09)	3.7960(1.16)	0.927



<Figure 7> Synthesized t-test Results

no differences in loyalty or emotions whether the product was sold-out or out-of-stock.

In <Figure 7>, we graphically present the respondents' differing responses regarding emotions and loyalty depending on why a product was unavailable. Men reported feeling stronger emotions and stronger loyalty than women when a product was sold-out, whereas women felt more strongly when the product was out-of-stock.

5.2. The Effects of Unavailability on Emotion and Loyalty

<Table 9> shows our results for analyzing the full group regardless of gender or why the product was unavailable; as shown, pleasure (β = .197) and dominance (β = .191) had significant effects on loyalty when we did not distinguish whether a product was out-of-stock or sold-out, and the R^2 was 0.100. There were also no significant correlations between emotion and loyalty when products were out-of-stock, but pleasure (β = .292) and dominance (β = .398) had significant effects on loyalty when products were sold-out. Additionally, when products were sold-out, the R^2 increased to 0.194.

<Table 10> and <Table 11> show the regression results for the respondents separated by gender. As <Table 10> shows, for male respondents, pleasure (β = .255) and dominance (β = .286) were significantly influenced and the R^2 was .172 when we did not

<Table 9> Regression Results – Full Group

	IV	B	β	T	F	R^2
Total	Pleasure	.241	.197	3.605***	13.116***	.100
	Arousal	-.066	-.059	-1.139		
	Dominance	.213	.191	3.435**		
Out-of-stock	Pleasure	.142	.120	1.463	2.225	.037
	Arousal	.079	.069	.897		
	Dominance	.077	.069	.829		
Sold-out	Pleasure	.329	.264	3.625***	13.930	.194
	Arousal	-.153	-.139	-2.009*		
	Dominance	.301	.272	3.696***		

<Table 10> Male Regression Results

	IV	B	β	T	F	R^2
Total	Pleasure	.269	.255	2.919**	11.319***	.172
	Arousal	-.033	-.032	-.429		
	Dominance	.295	.286	3.679***		
Out-of-stock	Pleasure	.144	.122	.956	5.480**	.178
	Arousal	.362	.343	3.117**		
	Dominance	.057	.054	.426		
Sold-out	Pleasure	.342	.292	3.037**	11.019***	.285
	Arousal	-.228	-.230	-2.387*		
	Dominance	.399	.398	4.077***		

<Table 11> Female Regression Results

	IV	B	β	T	F	R^2
Total	Pleasure	.220	.175	2.257*	3.804*	.058
	Arousal	-.126	-.103	-1.429		
	Dominance	.107	.088	1.121		
Out-of-stock	Pleasure	.103	.089	.833	1.045	.032
	Arousal	-.166	-.140	-1.342		
	Dominance	.102	.089	.814		
Sold-out	Pleasure	.386	.282	2.405*	3.473*	.107
	Arousal	-.062	-.050	-.487		
	Dominance	.089	.068	.581		

<Table 12> Hypothesis Testing and Results

Hypothesis	Total participants	Male participants	Female participants
H1, H1a, H1b	Supported	Supported	Not supported
H2, H2a, H2b	Not supported	Supported	Not supported
H3, H4, H4	Partially supported	Supported	Partially supported

distinguish between sold-out and out-of-stock products, but the R^2 increased when we made the distinction. For sold-out products, only arousal (β = -.343) was significantly influenced, but for out-of-stock products, pleasure (β = .292), arousal (β = -.230) and dominance (β = .398) all significantly influenced loyalty. The model's R^2 also increased to .285.

Meanwhile, for the women, the model's R^2 was very low, .058, and pleasure was the only influential factor.

Based on our above findings, we summarized our hypothesis testing in <Table 12>.

VI. Conclusion

According to existing research, the unavailability of goods leads to negative reactions (Peckham, 1963; Schary and Christopher, 1979), and these negative reactions affect not only retailers' sales of retailers but also market share (Schary and Christopher, 1979). Therefore, to date, studies have focused their efforts on predicting consumers' actions and measuring costs by quantifying negative consumer reactions. However, this approach creates a number of problems because it is difficult to quantitatively measure dissatisfaction, negative word of mouth, and changes in loyalty (Fitzsimons, 2000; Zinn and Liu, 2001).

Along with the problems stated in the above, the positive impact of "sold-out marks" on sales volume as well as popularity began to be raised. This new viewpoint is also in line with studies in behavioral economics that "people's perception may vary depending on how an event is expressed." We focused on a cognitive process incurring when consumers face out-of-stock or sold-out based on an idea, "consumers may think the reason why the unavailability situation happened."

We divided experiment participants into two groups and made each group face a Webpage containing unavailable products: out-of-stock and sold-out

respectively. Then we measured and compared their behavioral patterns, emotions, and attitudes for the two groups. First of all, we could find out that consumers may behave differently when they face out-of-stock and when they face sold-out. We also found that consumers' expected behaviors may also be different depending on gender. Statistically saying, male participants' behavioral patterns were statistically different when they were exposed to out-of-stock and when they were exposed to sold-out. But female participants' behavioral patterns were not statistically different over cases: out-of-stock vs. sold-out. The bottom line is that men care about the expressions, out-of-stock vs. sold-out while women do not care a lot about the expressions of unavailability situations.

Second, we could find out that participants' emotions for out-of-stock and sold-out marks are not significantly distinctive. But male participants showed distinctive emotional responses over out-of-stock and sold-out marks.

Third, very interestingly, there was no relationship between emotions and loyalty in a group with out-of-stock stimuli. But there was significant relationship between emotions and loyalty in a group with sold-out stimuli. These tendencies become bigger for male participants and much smaller for female participants.

From the above findings, we can conclude that marking sold-out rather than out-of-stock for unavailable products is better idea. Although the results of interview were not stated in the script, interviewees agreed that sold-out feels more positive than out-of-stock.

This study has the following limitations. First, we only considered the product category of clothing, so future studies should investigate more diverse categories to achieve more generalizable results. Second, because we were able to interview relatively few participants, we could not achieve perfect external validity; future studies should interview more participants to increase the external validity of the results. Third, the shopping outlets we designed only considered consumers' intentions, not their regular behaviors because we had no possible way of testing how these consumers would have behaved in their normal shopping routines. Future studies should investigate existing online shopping sites by labeling real products as sold-out or out-of-stock and then recording the actual consumers' IP addresses to enhance the study results.

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◆ About the Authors ◆

Cheul Rhee

Cheul Rhee is an associate professor of e-business department at Ajou University in Korea. He received his Ph.D. from the State University of New York at Buffalo in 2009. He has research interests in e-learning, knowledge management, virtual communities, enterprise systems and e-business strategies. He has published papers in journals such as Communications of the ACM, Journal of Electronic Commerce in Organizations, Online Information Review, Asia Pacific Journal of Information Systems, and others.

Wooseok Park

Wooseok Park is a manager of big data & AI department at EFIL. He received master's degree from the department of Management Information Systems, graduate school, Ajou University in 2015. He worked in an online game company, Netmarble, as an analyst & planner and was in mobile game AI(Artificial Intelligence) service platform division. He has research interests in e-business, big data analysis and AI modeling.

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