THE EFFECT OF SCARCITY ON PRODUCT EVALUATION

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ABSTRACT

Marketers often use scarcity to influence consumers, with announcements such as "limited quantities," "until stocks last," "few tickets left for this event," "limited time offer," or "24 hour sale." Past research indicates that scarcity often has a positive effect on product evaluation. In essay 1, I show that the positive effect of scarcity can be attenuated when consumers' persuasion knowledge is activated. Specifically, I identify four factors – salience of persuasion knowledge (study 1), frequency of exposure to scarcity (study 2), disconfirmation of scarcity (study 3), and decision reversibility (study 4) – that activate persuasion knowledge and hence moderate the effect of scarcity on product evaluation. I also show that these effects are mediated by inferences about falsity of the scarcity claim. In summary, my results suggest that scarcity claims benefit products only when persuasion knowledge is not salient, frequency of exposure to scarcity is low, disconfirmation of scarcity is absent, or decision reversibility is high.

In essay 2, I build on reactance theory to argue that scarcity can reduce consumers' perceived flexibility and hence create feelings of inconvenience. Based on this argument, I show that the positive effect of scarcity on product evaluation is moderated by time pressure (study 1), time precision (study 2), store flexibility (study 3), and incentive flexibility (study 4). I also show that these moderating effects are driven by perceived inconvenience associated with scarcity. In summary, my results suggest that scarcity claims benefit products only when time pressure is low, time precision is low, store flexibility is high, or incentive flexibility is high.

RÉ SUMÉ

Les marketeurs utilisent souvent la rareté pour influencer les consommateurs, avec des annonces du type « quantités limitées, » « jusqu'à épuisement des stocks, » « seulement quelques billets restant pour cet événement, » « offre à durée limitée, » ou « vente 24 heures. » Des recherches précédentes indiquent que la rareté a souvent un effet positif sur l'évaluation de produit. Dans l'essai 1, je démontre que l'effet positif de la rareté peut être atténué quand les connaissances des consommateurs relatives aux techniques de persuasion sont activées. Plus spécifiquement, j'identifie quatre facteurs – la saillance des connaissances relatives aux techniques de persuasion (étude 1), la fréquence d'exposition à la rareté (étude 2), la réfutation de la rareté (étude 3), et la réversibilité de la décision (étude 4) – qui activent les connaissances relatives aux techniques de persuasion et qui modèrent donc l'effet de la rareté sur l'évaluation de produit. Je démontre également que ces effets sont médiés par les inférences faites par les consommateurs quand à la véracité de l'affirmation de rareté. En résumé, mes résultats suggèrent que les affirmations de rareté sont profitables pour un produit uniquement lorsque les connaissances relatives aux techniques de persuasion ne sont pas saillantes, la fréquence d'exposition à la rareté est faible, la réfutation de la rareté est absente, et la réversibilité de la décision est élevée.

Dans l'essai 2, je me base sur la théorie de la réactance pour affirmer que la rareté peut réduire la flexibilité perçue par les consommateurs et donc créer un sentiment de désagrément. En me basant sur cette affirmation, je démontre que

l’effet positif de la rareté sur l’évaluation de produit est modéré par une contrainte temporelle (étude 1), une précision temporelle (étude 2), la flexibilité du magasin (étude 3), et la flexibilité des incitatifs (étude 4). Je démontre également que ces effets modérateurs sont occasionnés par la perception de désagrément qui est associée à la rareté. En résumé, mes résultats suggèrent que les affirmations de rareté sont profitable pour un produits uniquement lorsque la contrainte temporelle est faible, la précision temporelle est faible, la flexibilité du magasin est élevée, ou la flexibilité des incitatifs est élevée.

CHAPTER 1 – OVERVIEW OF THESIS

Marketers often use scarcity to influence consumers, with announcements such as "Hurry, limited quantities," "Limit 2 per customer," "Special deal, one day only," "Sale on for only 48 hours," and "Last three days of sale." I define scarcity as restriction on the quantity available (e.g., "limited quantities"), or time available (e.g., "24 hour sale") to purchase a product (Inman, Peter, and Raghubir 1997; Van Herpen, Pieters, and Zeelenberg 2009). Past research has found that scarcity often increases product evaluation (Balachander, Liu, and Stock 2009; Dai, Wertenbroch, and Brendl 2008; Eisend 2008; Inman et al. 1997; Jung and Kellaris 2004; Van Herpen et al. 2009). This positive effect of scarcity has been explained in past research with a signaling account. Specifically, it has been argued that scarcity acts as a signal of product quality, with consumers inferring that scarcity is due to high demand – which in turn is likely to arise if the product offers high quality (Cialdini 2001; Inman et al. 1997; Van Herpen et al. 2009). In my dissertation, I go beyond a signaling perspective on scarcity by incorporating two new theoretical perspectives: persuasion knowledge theory (essay 1) and reactance theory (essay 2).

In my first essay, I take a persuasion knowledge perspective to argue that consumers can interpret scarcity as a false claim being made by marketers to increase sales. When consumers infer that scarcity is a false claim by marketers, scarcity would no longer be an accurate signal of demand and hence product value. As a result, the positive effect of scarcity on product evaluation would be attenuated. Based on these arguments, I identify four new moderators of the effect

of scarcity on product evaluation, namely salience of persuasion knowledge (study 1), frequency of exposure to scarcity (study 2), disconfirmation of scarcity (study 3), and decision reversibility (study 4). In summary, my studies show that scarcity has a positive effect on product evaluation only when persuasion knowledge is less salient, frequency of exposure to scarcity is low, disconfirmation of scarcity is absent, or decision reversibility is high. Further, these effects are mediated by falsity inferences about scarcity, whereby consumers infer that scarcity is a false claim being made by marketers to increase sales. Notably, the results were consistent across two manipulations of scarcity, three product categories, lab and field studies, and three measures of product evaluation including choice.

In my second essay, I take a reactance theory perspective to examine the effect of scarcity on product evaluation. I argue that a key characteristic of scarcity is that it reduces consumers' freedom of choice. This is because, in a situation with no scarcity, consumers can make a choice whenever they want; in contrast, when scarcity is present, consumers are forced to decide within a restricted timeframe. Reactance theory predicts that such reduction in consumer freedom or flexibility is likely to create a negative feeling of inconvenience, which in turn should reduce the positive effect of scarcity on product evaluation. Based on these arguments, I identify four new moderators of the effect of scarcity on product evaluation, namely time pressure (study 1), time precision (study 2), store flexibility (study 3), and incentive flexibility (study 4). Consistent with my hypotheses, the studies show that scarcity has a positive effect on product evaluation only when time pressure is low, time precision is low, store flexibility

is high, or incentive flexibility is high. Further, these moderating effects are shown to be mediated by perceived inconvenience. Notably, the results were consistent across four product categories and three measures of product evaluation including choice.

In summary, this thesis presents two essays on the topic of scarcity in marketing communications. The essays make a theoretical contribution by identifying new psychological mechanisms (i.e., why) and new boundary conditions (i.e., when) of the effect of scarcity on product evaluation. The organizing framework of my two essays is shown in Figure 1 below. Tables 1 and 2 in the appendix summarize the constructs used in essay I and essay II.

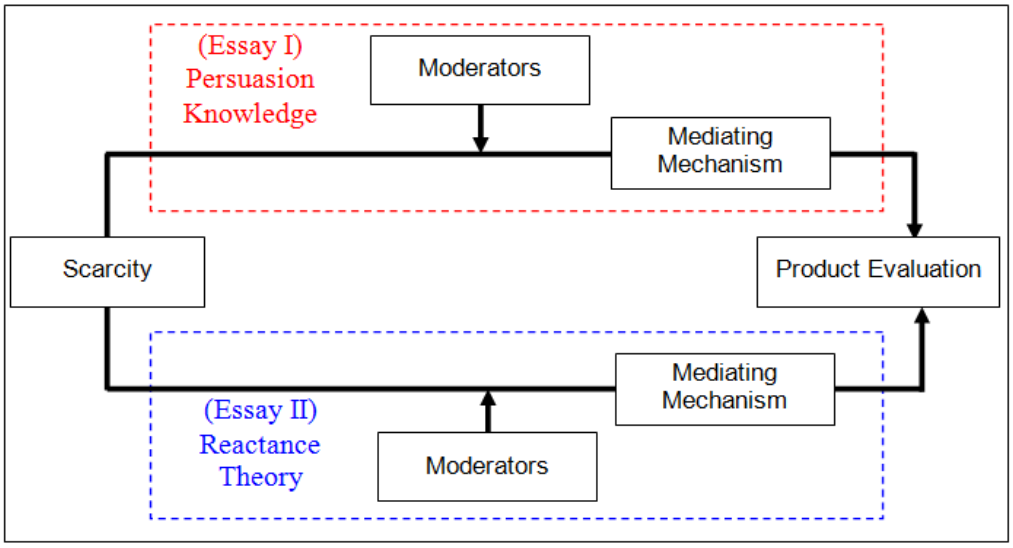

FIGURE 1 – Organizing Framework for Two Essays

CHAPTER 2 – ESSAY I

THE EFFECT OF SCARCITY ON PRODUCT EVALUATION: A PERSUASION KNOWLEDGE PERSPECTIVE

Marketers often use scarcity to influence consumers, with announcements such as "limited quantities", "until stocks last", "few tickets left for this event", "limited time offer", or "24 hour sale" (Eisend 2008; Inman, Peter, and Raghubir 1997; Van Herpen, Pieters, and Zeelenberg 2009). Highly anticipated product launches such as the latest iPad, Wii, PlayStation, and Harry Potter books are often marked by scarcity in stores. Products such as antiques, collectibles, and luxury goods are characterized by scarcity. Salespeople often highlight product scarcity to put pressure on consumers to buy. I define scarcity as restriction on the quantity available (e.g., "limited quantities"), or time available (e.g., "24 hour sale") to purchase a product (Inman et al. 1997; Van Herpen et al. 2009). Note that products could also be subject to restrictions other than quantity and time, such as purchase restriction (e.g., "requires minimum purchase of $__" or "must be purchased together with __"). In this dissertation, I focus on quantity and time restriction; in the future research section, I discuss the possible effects of other types of restrictions.

A broad finding in past research is that scarcity in terms of quantity and time often increases product evaluation. This effect appears to be robust, and has been observed for a variety of products such as laundry detergent, toothpaste, soda, wine, cookies, sunglasses, cars, concert tickets, and paintings (Fitzsimons 2000; Inman et al. 1997; Stock and Balachander 2005; Van Herpen et al. 2009).

For example, individuals prefer recipe books (Verhallen and Roben 1994) and paintings (Lynn 1989) that are relatively rare. Inman et al. (1997) showed that advertising with a scarcity in time appeal (e.g., "Only available for a limited time") increased consumer evaluations of supermarket products (i.e., batteries, audiocassette, and toothbrush). Balachander et al. (2009) showed that scarcity at the time of product launch increases consumer demand for cars. Swami and Khairnar (2003) showed that highlighting limitation in the number of theater tickets available increases box office ticket sales. Devlin, Ennew, McKechnie, and Smith (2007) found that people preferred consumer durables (i.e., TVs) promoted under a limited time offer (e.g., "For one week only") over those promoted without a limited time offer.

A key explanation in past research for the positive effect of scarcity is that scarcity acts as a signal of consumer demand, and hence product quality (Inman et al. 1997; Verhallen and Robben 1995). It has been argued that when consumers see a scarce product, they logically infer that scarcity is caused by other consumers buying the product in large numbers. Such high demand, in turn, should arise when the product is considered valuable by many consumers. In this way, scarcity acts as a market-based signal of product value. Notably, this view of scarcity as a signal of value is consistent with research on the bandwagon effect, which posits that people prefer popular products because popularity prompts inferences of product quality (Caminal and Vives 1996; Kardes, Posovac, and Cronley 2004). Scarcity as a signal of value is also consistent with research on evolutionary psychology (Cialdini 2001; Sundie et al. 2006), which argues that humans have lived for millennia in environments where valuable things such as

food, shelter, and mates were relatively scarce. Consequently, over time, humans are said to have formed an association between scarcity and things of value (i.e., "scarcity = value").

Based on the notion that scarcity is a signal of value, past research has identified several moderators of scarcity such as need for cognition, price discount (Inman et al. 1997), need for closure, product familiarity (Jung and Kellaris 2004), need for uniqueness (Amaldoss and Jain 2005), and spatial distance (Van Herpen et al. 2009). For example, Inman et al (1997) showed that scarcity increases product evaluation for low need for cognition, but not high need for cognition individuals. The proposed reason for this effect was that "scarcity=value" is a heuristic, and is hence more likely to be used by individuals with low need for cognition. Similarly, Inman et al. (1997) showed that scarcity increases product evaluation only when the accompanying price discount is high, since diagnosticity of the "scarcity=value" heuristic is greater when price discount is high compared to low. In a similar manner, other moderators of scarcity in past research such as need for closure, product familiarity, need for uniqueness and spatial distance can be traced back to consumers' reliance on scarcity as a signal of value.

An assumption in the past research summarized above is that individuals make a demand-side inference about scarcity, whereby scarcity is seen as a signal of consumer demand and hence product value. In contrast, I argue that individuals can also make a supply-side inference about scarcity, inferring that scarcity is a false claim being made by marketers to increase sales. For example, individuals could suspect that scarcity claims such as "limited quantities" are false, in the sense that marketers actually have larger quantities of the product for sale, but are

claiming limited availability to increase consumer demand. When individuals infer that scarcity is a false claim by marketers, scarcity would no longer be an accurate signal of demand and hence product value. As a result, the positive effect of scarcity on product evaluation would be attenuated.

In this essay, I take a persuasion knowledge perspective to understand when individuals infer that scarcity is false; and hence when the positive effect of scarcity on product evaluation is attenuated. The rest of this essay is organized as follows. I begin by reviewing the literature on scarcity, and identifying a gap in knowledge about scarcity in marketing. Next, I apply persuasion knowledge theory to address this gap, thereby identifying four new moderators of the effect of scarcity on product evaluation. I then test my moderators in four studies. These studies offer convergent evidence for my theoretical perspective across two manipulations of scarcity, three product categories, lab and field studies, and three measures of product evaluation including choice. In summary, this essay makes a contribution by identifying a new mechanism through which scarcity influences product evaluation, as well as new moderators that determine when scarcity does, and does not increase product evaluation. This essay also offers guidelines to brand managers and advertising agencies for the effective use of scarcity in marketing communications.

LITERATURE REVIEW

Scarcity

Past research on scarcity in quantity and time is summarized in Table 3. This body of research indicates that scarcity often has a positive effect on product evaluation (Balachander, Liu, and Stock 2009; Eisend 2008; Fitzsimons 2000;

Inman et al. 1997; Jung and Kellaris 2004; Swami and Khairnar 2003; Van Herpen et al. 2009; Worchel, Lee, and Adewole 1975). This positive effect appears to be robust, and has been demonstrated for a range of products including TV, laundry detergent, toothpaste, wine product, and snack food. For example, an early study by Worchel, Lee, and Adewole (1975) showed that cookies in scarce supply are considered more desirable than freely available cookies. Verhallen and Roben (1994) reported that people prefer recipe books that are relatively rare, and Lynn (1989) showed that scarcity increases the perceived value of paintings. Simonson (1992) showed that announcements emphasizing the limited time of an offer (e.g., "For one month only") increased purchase intent toward the promoted product. Inman et al. (1997) showed that supermarket brands – in categories such as as batteries, audiocassette, and toothbrush – enjoy greater sales when they are offered in limited quantities or limited time. Using data from a drive-through restaurant, Brannon and Brock (2001) showed that a snack food (i.e., cinnamon twist) promoted under high scarcity in time (i.e., today only) led to greater sales than the same product promoted under low scarcity in time (i.e., all year). In a field study, Swami and Khairnar (2003) showed that highlighting limited number of theater tickets available increased box office sales. Eisend (2008) showed that advertising with a scarcity appeal (e.g., "limited edition") increased consumer evaluations of clothing products. Devlin, Ennew, McKechnie, and Smith (2007) found that people preferred consumer durables, such as television sets, promoted with a time limited offer compared to no time limitation. Balachander, Liu, and Stock (2009) reported that scarcity in quantity at the time of product introduction had a positive effect on consumer demand for cars.

Why might scarcity increase product evaluation? Past research has taken a signaling perspective to explain the positive effect of scarcity on product evaluation. It has been argued that scarcity acts as a signal of product quality, with consumers using a heuristic linking scarcity with value (i.e., "scarce = good"). This heuristic is based a logical reason for scarcity, namely that other consumers are buying the product in large numbers. Such high demand, in turn, should arise when the product is considered valuable by many consumers. Taken together, this logic implies that scarcity is a market-based or social signal of value (Inman et al. 1997). Note that this logic applies to both scarcity in quantity, as well as scarcity in time. Scarcity in quantity is directly related to consumer demand, while scarcity in time is indirectly related to consumer demand since marketers would be expected to put time restrictions on popular products.

Notably, this view of scarcity as a social signal of value is consistent with research on bandwagon effects, which posits that people prefer popular products because popularity prompts inferences of product quality (Caminal and Vives 1996; Kardes, Posovac, and Cronley 2004; Huang and Chen 2006). Bandwagon effects are characterized by increasing preference for a product as the number of people buying the product increases (Van Herpen et al. 2009). For example, when people perceive high demand for a chocolate chip cookie, they themselves also want it (Worchel et al. 1975); similarly, when people perceive that a restaurant is popular, they also want to eat there (Becker 1991). Underlying the bandwagon effect is the inference that products become popular because of their high quality, and it is this quality that leads individuals to join the bandwagon. Notably, the association of scarcity with value is consistent with evolutionary influences on

judgment (Cialdini 2001; Sundie et al. 2006). Research in this tradition argues that humans have lived for millennia in environments where valuable things such as food, shelter, and mates were in relatively short supply. Humans have also learned that such valuable things were quickly taken by others, and hence were available for only a short time period. Consequently, over time, humans would have formed a heuristic association between scarcity and things of value (i.e., "scarce = good").

In addition to a main effect of scarcity, past research has also identified moderators such as price discount, need for cognition (Inman et al. 1997), need for closure, product familiarity (Jung and Kellaris 2004), need for uniqueness (Amaldoss and Jain 2005), and spatial distance (Van Herpen et al. 2009) that determine when scarcity has a strong or weak effect on product evaluation. For example, Inman et al. (1997) showed that the positive effect of scarcity is stronger when individuals are low in need for cognition, and when price discount for the product is high. Jung and Kellaris (2004) showed that the positive effect of scarcity is stronger for consumers in the United States compared to France, when individuals are less familiar with the product, and when individuals' need for cognitive closure is high compared to low. Van Herpen et al. (2009) showed that the positive effect of scarcity is weakened when consumers are spatially close to other users of the product, and when scarcity is caused by the firm trying to minimize inventory costs. Amaldoss and Jain (2005) showed that consumers with a high, versus low desire for uniqueness assign greater value to an exclusive product when the price of the product is relatively high.

Notably, the moderators in previous research are based on the

"scarce=good" heuristic. For example, Inman et al (1997) showed that scarcity increases product evaluation for low need for cognition, but not high need for cognition, individuals. The proposed reason for this effect was that "scarcity=value" is a heuristic, and is hence more likely to be used by individuals with low need for cognition. Similarly, Inman et al. (1997) showed that scarcity increases product evaluation only when the accompanying price discount is high, since diagnosticity of the "scarcity=value" heuristic is greater when price discount is high compared to low. Likewise Amaldoss and Jain (2005) showed that consumers with a high, versus low, desire for uniqueness assign greater value to scarce products. These individuals believe that scarce products are likely to be more unique or exclusive than abundant products, and hence can be used as a way of differentiating themselves from others. Such uniqueness value of scarcity is a factor underlying the "scarce=good" heuristic. In a similar manner, other moderators of scarcity in past research such as need for closure, product familiarity and spatial distance can be traced back to consumers' reliance on the "scarce=good" heuristic.

An assumption in the past research summarized above is that individuals make a demand-side inference about scarcity, whereby scarcity is seen as a signal of consumer demand and hence product value. In contrast, I argue that individuals can also make a supply-side inference about scarcity, inferring that scarcity is a false claim being made by marketers to increase sales. For example, individuals could suspect that scarcity claims such as "limited quantities" are false, in the sense that marketers actually have larger quantities of the product for sale, but are claiming limited availability to increase consumer demand. When individuals

infer that scarcity is a false claim by marketers, scarcity would no longer be an accurate signal of demand and hence product value. As a result, the positive effect of scarcity on product evaluation would be attenuated. In this essay, I take a persuasion knowledge perspective to understand when individuals infer that scarcity is false; and hence when the positive effect of scarcity on product evaluation is likely to be attenuated.

Insert table 3 about here

CONCEPTUAL FRAMEWORK

Persuasion Knowledge

Persuasion knowledge has been broadly defined as individuals' knowledge about persuasion agents' motives and influence techniques (Darke and Ritchie 2007; Campbell and Kirmani 2000; Friestad and Wright 1994). Activation of persuasion knowledge is said to increase consumers' suspicion about marketer's ulterior motives, skepticism towards advertising claims, and perception of firms as deceptive or manipulative (Kirmani and Zhu 2007; Darke and Ritchie 2007). For example, it has been shown that activating persuasion knowledge leads to a negative interpretation of marketing actions such as default options for product features (Brown and Krishna 2004), incomplete comparisons with competing products (Kirmani and Zhu 2007), reference prices (Darke and Ritchie 2007), covert product placements (Wei, Fischer and Main 2008), salesperson flattery (Campbell and Kirmani 2000), and elaborate store displays (Morales 2005). For example, Brown and Krishna (2004) showed that when consumers' persuasion knowledge is activated, consumers tend to interpret default options as a sales

technique being used to manipulate them into buying the product in question. As a result, activating persuasion knowledge decreases consumer preference for products with default options. Morales (2005) indicated that when consumers' persuasion knowledge is activated, consumers perceive retailers' extra effort in designing elaborate product displays to be motivated by persuasion on the part of marketers. As a result, consumers discount the extra effort as a sales tactic, and hence show less interest in visiting the store. Wei, Fischer, and Main (2008) showed that when consumers' persuasion knowledge is activated, consumers interpret marketers' attempts to covertly place brands in non-advertising media as a manipulative tactic. As a result, activating persuasion knowledge decreases consumer preference for brands embedded in non-advertising media, such as product placements in radio programs.

Past research also indicates that persuasion knowledge can be activated by a range of factors (see Table 4). As shown in Table 4, the activators of persuasion knowledge in previous research can be classified into internal and external factors. Internal factors known to activate persuasion knowledge include depth of processing (Campbell and Kirmani 2000), regulatory focus (Kirmani and Zhu 2007), marketplace knowledge (Kirmani and Campbell 2004), marketing tactic knowledge (Hardesty, Bearden, and Carlson 2007), and firm-specific knowledge (Wei, Fischer and Main 2008). For example, Campbell and Kirmani (2000) showed that persuasion knowledge is more likely to be activated when people have high motivation, ability, and opportunity to process information. Kirmani and Zhu (2007) showed that persuasion knowledge is more likely to be activated in prevention-focused people than in promotion-focused people. Hardesty,

Bearden, and Carlson (2007) showed that persuasion knowledge is more likely to be activated when people have high levels of prior knowledge about specific marketing sales tactics.

External factors that activate persuasion knowledge include engaging in a persuasion task (Campbell and Kirmani 2000), nature of the customer-salesperson relationship (Kirmani and Campbell 2004), source independence (Kirmani and Zhu 2007), sponsor identification (Wei, Fischer, and Main 2008), and prior exposure to advertising deception (Darke and Ritchie 2007). For example, Campbell and Kirmani (2000) showed that persuasion knowledge can be activated by a task that prompts thoughts about persuasion tactics in a social context. Kirmani and Zhu (2007) showed that persuasion knowledge can be activated when people know that a product performance claim (e.g., "consumers rated Calan as producing better quality pictures than the leading brand.") is attributed to a biased source (i.e., the Calan company), than to an independent source (i.e., *Consumer Reports*). Darke and Ritchie (2007) showed that people's persuasion knowledge is activated when they learn that they have been personally deceived by an advertisement. Such activated persuasion knowledge then leads people to be suspicious about advertisements from other advertisers. Wei, Fischer, and Main (2008) showed that persuasion knowledge can be activated by informing people that the company paid money in exchange for placing its brand in radio programs.

Insert table 4 about here

In the present essay, I extend this literature by identifying four new external activators of persuasion knowledge relevant to scarcity, namely salience

of persuasion knowledge (study 1), frequency of scarcity (study 2), disconfirmation of scarcity (study 3), and decision reversibility (study 4). I argue that these four factors can prompt falsity inferences about scarcity, and hence moderate the effect of scarcity on product evaluation. My proposed model is shown in Figure 2, and developed in the following four studies.

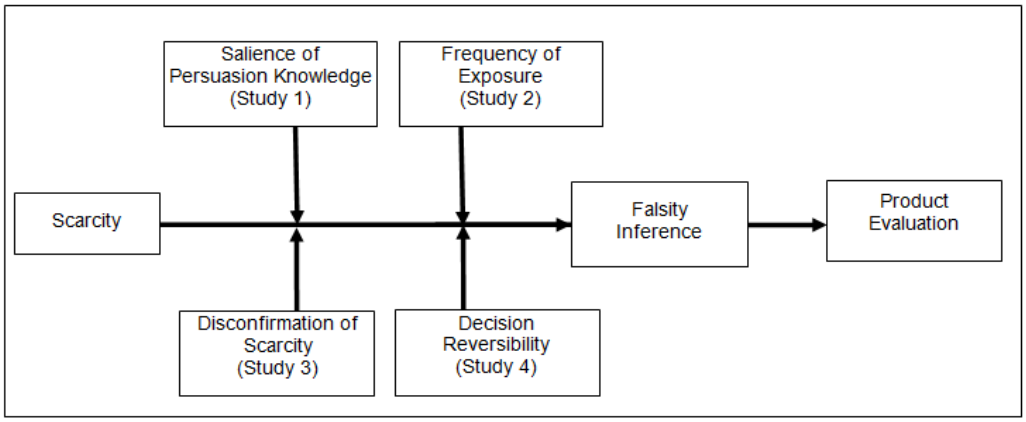

FIGURE 2 – Proposed Model for Essay 1

STUDY 1

Salience of Persuasion Knowledge

Salience of persuasion knowledge refers to the accessibility of persuasion knowledge in memory (Campbell and Kirmani 2000; Friestad and Wright 1994). Past research indicates that the salience of persuasion knowledge can be increased by contextual factors such as engaging in a persuasion task, or exposure to persuasion attempts by others. For example, salience of persuasion knowledge is higher when people try to get others to help them in a social context (Campbell and Kirmani 2000). When salience of persuasion knowledge is high, i.e., persuasion knowledge is activated, past research suggests that individuals are

more likely to be skeptical about advertising claims (Kirmani and Zhu 2007; Darke and Ritchie 2007). In the present context of scarcity, skepticism could be manifested in the inference that scarcity is a false claim being made by marketers to increase sales. Thus in other words, individuals could suspect that marketers are making an inaccurate statement about limited availability, in order to give an artificial signal of popularity for a product that would otherwise be unattractive. When individuals infer that scarcity is a false claim by marketers, scarcity would no longer function as a reliable signal of demand and hence product value. As a result, the positive effect of scarcity on product evaluation would be attenuated.

In contrast, when salience of persuasion knowledge is low, i.e., persuasion knowledge is not activated, individuals are less likely to be skeptical about marketing claims. Instead, they should be more likely to rely on the "scarcity=value" heuristic established by intuition and evolution, and observed in past research (cf. Inman et al. 1997; Van Herpen et al. 2009). Such interpretation of scarcity as a signal of value would predict a positive effect of scarcity on product evaluation. My preceding arguments are summarized in the following hypothesis:

> **H1:** Scarcity has a stronger positive effect on product evaluation when salience of persuasion knowledge is low, compared to high.

Method

This study was designed as a 2 (Salience of Persuasion Knowledge: Low vs. High) x 2 (Scarcity: Low vs. High) between-subjects ANOVA. Ninety six undergraduate students at a large university in Canada were paid $10 each to

participate in the study. Participants were told they were taking part in two studies. The first study, said to be about exam preparation, manipulated the salience of persuasion knowledge using a priming procedure validated by Campbell and Kirmani (2000). In the high salience condition, participants were asked to imagine they have a final exam coming up, and need their roommate's help to prepare for the exam. However, as the roommate is busy, they need to persuade their roommate to help them. Participants were then asked to write down ways in which they could get their roommate to help them prepare for the exam. This task primed persuasion knowledge by prompting thoughts about persuasion tactics in a social context. In the low salience condition, participants were asked to imagine they were studying with their roommate for a final exam. Since the exam is fast approaching, they need to avoid being interrupted while studying. Participants were then asked to list ways of ensuring they would not be interrupted while studying. In this situation, since respondents were not thinking about persuasion tactics, the salience of persuasion knowledge was expected to be relatively low (Campbell and Kirmani 2000; Higgins 1989).

After completing the first study, participants began the second study ostensibly about consumer responses to advertising. With this cover story, participants were shown one of two ads for a fictitious brand of wristwatch (Equinoxe©) which manipulated low versus high scarcity (see Appendix A). The ads were modeled on real-world print ads, and featured a picture of the brand with copy reading: "Add an accent to your business ensemble with the Equinoxe© automatic chronometer." The high scarcity version read: "Limited Edition. Hurry, only a few watches left in stock," while the low scarcity version read: "New

Edition. Many watches currently in stock." After reading the ad, participants responded to measures of product evaluation, manipulation checks, and were debriefed and dismissed.

The dependent variable of product evaluation was measured by purchase intent and willingness to pay. Purchase intent was measured by single item, nine-point scale (1/Not at all Likely, 9/Very Likely): "How likely is it that you would buy this watch, if you saw it in the store." Willingness to pay was measured by an open ended item eliciting the maximum price respondents were willing to pay for the watch if they saw it in the store. Salience of persuasion knowledge was checked as in Campbell and Kirmani (2000) by counting the number of persuasion tactics written by participants in their prime protocols. Supportive of the manipulation, participants listed more persuasion tactics in the high versus low salience condition (M = 4.25 vs. .06; $t(94) = 16.82$, $p < .001$). The scarcity manipulation was checked by a two item, nine-point scale ($\alpha = .90$): "How many watches were available for sale?" (1/Few, 9/Many) and "What was the availability of the watches?" (1/Low availability, 9/High availability). The manipulation was successful with a significant difference between the high and low scarcity conditions (M = 2.36 vs. 8.07; $t(94) = 17.78$, $p < .001$).

Results

Hypothesis H1 proposed that scarcity has a stronger positive effect on product evaluation when salience of persuasion knowledge is low, compared to high. H1 was tested with ANOVA; means and standard deviations are shown in Table 5. Scarcity x persuasion knowledge ANOVA on purchase intent revealed a significant interaction (F (1, 92) = 4.62, $p < .04$), with no main effect of salience

of persuasion knowledge ($F(1, 92) = 1.87$, $p < .17$) or of scarcity ($F(1, 92) = .95$, $p < .33$). Consistent with H1, scarcity increased purchase intent when salience of persuasion knowledge was low ($M = 2.95$ vs. 4.29; $t(46) = 2.20$, $p < .04$), but not when salience of persuasion knowledge was high ($M = 3.29$ vs. 2.79; $t(46) = -.83$, $p < .40$). The results were similar when willingness to pay (WTP) was used as the dependent variable. The scarcity x persuasion knowledge interaction on WTP was significant ($F(1, 92) = 3.97$, $p < .05$), with a positive effect of scarcity on WTP when salience of persuasion knowledge was low ($M = \$52.08$ vs. $\$86.45$; $t(46) = 2.29$, $p < .03$), but no effect when salience of persuasion knowledge was high ($M = \$68.54$ vs. $\$63.95$; $t(46) = -.36$, $p < .71$). Neither persuasion knowledge nor scarcity had a significant main effect on WTP ($F(1, 92) = .09$, $p < .75$; $F(1, 92) = 2.32$, $p < .13$).

Insert table 5 about here

The results of study 1 were consistent with hypothesis H1. As predicted by H1, scarcity increased purchase intent and WTP when salience of persuasion knowledge was low, but not when salience of persuasion knowledge was high.

Note that, in study 1, I activated persuasion knowledge directly by using a persuasion task that primed salience of persuasion knowledge. This direct activation of persuasion knowledge was then verified by coding verbal reports from study participants. In the following three studies (i.e., studies 2-4), I activate persuasion knowledge more indirectly. Specifically, in study 2, I show that frequency of exposure can activate persuasion knowledge, and hence moderate the effect of scarcity on product evaluation. I also empirically validate my

proposed mediating mechanism based on inferences about falsity of the scarcity claim. In addition, study 2 investigates the robustness of my results in a new product category, namely sunglasses.

STUDY 2

Frequency of Exposure

Based on the definition of advertising frequency (e.g., Bronnenberg 1998; Broussard 2000), I define frequency of exposure to scarcity as the number of times scarcity claims are encountered within a given time period. Frequency of exposure to scarcity could vary in the marketplace. It has been reported that an increasing number of real-world ads are now using scarcity claims (Pratkanis and Shadel 2005; CBC News 2010). Scarcity claims are often used by different stores in a mall, and different online retailers in product categories such as airline tickets, shoes, and clothes.

I argue that individuals who are frequently exposed to scarcity claims are more likely to interpret scarcity in the light of persuasion knowledge. For example, consider an individual reading a magazine in which many ads contain claims such as "Hurry, few items left in stock," "Only a limited number of products released," and "Available only in select stores." In a competitive economy, supply should generally match demand, and repeated instances of scarcity should not occur. Thus when individuals actually see repeated scarcity claims, they are likely to conclude the marketers are trying to persuade them into product purchase. As argued earlier, such activation of persuasion knowledge can lead to falsity inferences about scarcity. When individuals infer that scarcity is a false claim,

scarcity would no longer function as a reliable signal of demand and hence product value. As a result, the positive effect of scarcity on product evaluation would be attenuated. In contrast, when frequency of exposure to scarcity is low, i.e., persuasion knowledge is not activated, individuals are less likely to be skeptical about the scarcity claim. Instead, they should be more likely to rely on the "scarcity=value" heuristic, which would predict a positive effect of scarcity on product evaluation. My preceding arguments are summarized in the following hypothesis:

> **H2:** Scarcity has a stronger positive effect on product evaluation when frequency of exposure to scarcity is low, compared to high.

Method

This study was designed as a 2 (Frequency of Exposure: Low vs. High) x 2 (Scarcity: Low vs. High) between-subjects ANOVA. One hundred and four undergraduate students at a large university in Canada were each paid $10 to participate in the study. Participants were told they were taking part in two studies. In the first study, said to be research for a new consumer technology magazine, participants were given a test magazine and asked to browse all its pages. I created the magazine for my study by collating articles and advertisements from real magazines (see Appendix B). Frequency of exposure was manipulated using Photoshop to insert scarcity claims into either one ad (low frequency) or four ads (high frequency) in the magazine. The scarcity claims were "Limited edition. Hurry, few items left," "Until stocks last," "Limit: 1 per customer," and "Selling exclusively in a limited number of stores." All four claims were used in the high

frequency condition, while only one claim (counterbalanced) was used in the low frequency condition. After reading the magazine, participants answered filler questions about the news articles and layout of the magazine.

Next, participants began the second study which was ostensibly about a new e-retailing website soon to be launched in Canada. Participants were told that a leading Japanese retailer called Zen Fashion is planning to offer its products online to North American consumers. Participants were then given a color printout of the proposed English language website of Zen Fashion, which manipulated scarcity of a fictional brand of sunglasses called "Yoshio Mayo sunglasses" (see Appendix C). The website was modeled on real online retailers and featured a picture of Yoshio Mayo sunglasses with ad copy reading: "This new collection of sunglasses by Yoshio Mayo was introduced at the iF Design Conference. Yoshio Mayo sunglasses translate the latest fashions into a range of contemporary products." The high scarcity website then read: "Limited Edition. Hurry, only a few items left in stock", while the low scarcity website read: "New Edition. Many items in stock". After reading the website printout, participants responded to the dependent and mediating variables, as well as manipulation checks. Participants were then debriefed, thanked, and dismissed.

The dependent variable of product evaluation was measured by purchase intent and willingness to pay, using the same scales as in study 1. The mediating variable of falsity inference was measured with a two-item scale ($\alpha = .76$) adapted from a six-item scale used by Campbell (1995): "The ad was being honest about the number of sunglasses available for purchase," "The ad tried to artificially increase sales by mentioning the number of sunglasses available for purchase."

(1/Strongly disagree, 9/Strongly agree). The scarcity manipulation was checked with the two item scale used in study 1 ($\alpha = .92$); this manipulation was successful with a significant difference between high and low scarcity conditions ($M = 3.06$ vs. 8.00; $t(102) = 13.23$, $p < .001$). The frequency of exposure manipulation was checked by asking participants to indicate the number of ads in the test magazine (called 'T3'), in which scarcity claims were used: "In the T3 magazine, how many ads mentioned limited quantity of products available?" This manipulation was successful with a significant difference between high and low frequency conditions ($M = 2.42$ vs. .94; $t(102) = 4.54$, $p < .01$).

Results

Hypothesis H2 proposed that scarcity has a stronger positive effect on product evaluation when frequency of exposure to scarcity is low, compared to high. H2 was tested with ANOVA; means and standard deviations are shown in Table 6. Scarcity x frequency of exposure ANOVA on purchase intent revealed an interaction (F (1, 100) = 4.60, $p < .04$), with a main effect of frequency of exposure ($F(1, 100) = 5.54$, $p < .02$), but no main effect of scarcity ($F(1, 100) = 2.30$, $p < .14$). Consistent with H2, scarcity increased purchase intent when frequency of exposure to scarcity claims was low ($M = 2.61$ vs. 3.96; $t(50) = 2.38$, $p < .03$), but not when frequency of exposure to scarcity claims was high ($M = 2.53$ vs. 2.30; $t(50) = -.49$, $p < .63$). The results were similar with willingness to pay (WTP) as the dependent variable. The interaction of scarcity and frequency of exposure on WTP was significant ($F(1, 100) = 11.02$, $p < .001$), along with a main effect of frequency of exposure ($F(1, 100) = 8.47$, $p < .004$), but no main effect of scarcity ($F(1, 100) = 1.54$, $p < .22$) . Consistent with H2, scarcity increased WTP

when frequency of exposure was low (M = \$37.88 vs. \$65.26; $t(50) = 2.91$, $p < .004$), but not when frequency of exposure was high (M = \$40.34 vs. \$27.88; $t(50) = 1.56$, $p < .13$).

Insert table 6 about here

My proposed mechanism underlying H2 was that individuals are more likely to make falsity inference about scarcity when frequency of exposure to scarcity is high, compared to low**.** As a result, scarcity would have a weaker positive effect on product evaluation when frequency of exposure to scarcity is high, compared to low. Table 7 summarizes results of mediation analyses; means and standard deviations are in Table 6. As shown in Table 7, the four conditions for mediation were met for both WTP and purchase intent as dependent variables (Baron and Kenny 1986). First, the scarcity x frequency interaction was significant on the dependent variable; second, the scarcity x frequency interaction was significant on the mediating variable; third, the mediating variable had a significant effect on the dependent variable; fourth, the scarcity x frequency interaction on the dependent variable was reduced when the mediating variable was included, the Sobel test was significant, and the mediating variable remained significant at the fourth step.

Insert table 7 about here

The results of study 2 were consistent with hypothesis H2. Scarcity increased purchase intent and WTP when frequency of exposure to scarcity was low, but not when frequency of exposure to scarcity was high. Further, consistent

with my proposed mechanism, falsity inference mediated the interaction of scarcity and frequency of exposure on product evaluation. In the next study 3, I examine another external factor – disconfirmation of scarcity – which can moderate the effect of scarcity on product evaluation. Study 3 also replicates my results in a field study conducted within a real store, using a new product category (i.e., USB flash drive).

STUDY 3

Disconfirmation of Scarcity

I propose that disconfirmation of scarcity is an external factor that can activate persuasion knowledge, and hence moderate the effect of scarcity on product evaluation. Based on the hypothesis testing literature (Meloy 2000; Paik et al. 2009), I define disconfirmation of scarcity as marketplace information that appears to be inconsistent with the scarcity claim. Consumers can sometimes encounter information in the market that seems to be inconsistent with scarcity claims. For example, consumers told that supplies of a product are limited could see store shelves fully stocked with the product. Fashion products said to be available in limited quantities could be seen as being used by many consumers. Exclusive membership in clubs could be disconfirmed by the presence of numerous members. Time sensitive offers said to be limited to a fixed number of days could be seen to be open for a longer period of time.

I argue that the presence of disconfirmatory information can activate persuasion knowledge, and hence prompt falsity inferences about scarcity. For example, when consumers see store shelves stocked with a supposedly scarce

product, or a time limited offer being kept open after the expiry date, they are likely to conclude that marketers are using scarcity as a persuasion tactic. As shown earlier, such activation of persuasion knowledge can lead to falsity inferences of scarcity. These falsity inferences, in turn, would lead to discounting of scarcity as a signal of value, and hence dilute the positive effect of scarcity on product evaluation. In contrast, when disconfirmation is absent, persuasion knowledge is less likely to be activated, leading to reliance on the default "scarcity=value" heuristic. This, in turn, would predict a positive effect of scarcity on product evaluation. My arguments are summarized in the following hypothesis:

H3: Scarcity has a stronger positive effect on product evaluation when disconfirmation of scarcity is absent, compared to present.

Method

This study was designed as a 2 (Scarcity: Low vs. High) x 2 (Disconfirmation of Scarcity: Absent vs. Present) mixed design, where scarcity was manipulated within subjects and disconfirmation of scarcity was manipulated between subjects. Eighty undergraduate students from a large Asian university participated in the study. Participants were told that they would play the role of a mystery shopper to evaluate their university bookstore. They would visit the bookstore, buy a product assigned to them by random draw, and provide their impressions of the retail environment. To identify the product they needed to purchase while in the bookstore, participants were instructed to draw a random envelope. Unknown to participants, and to control the target product, USB flash

drive was the only product that could be drawn. Participants were given a coupon they could redeem for their drawn product, and told they could keep the product as compensation for taking part in the study.

Participants were asked to walk around the bookstore with a clipboard, noting aspects of the store they felt were good or bad from a typical customer's point of view. During their walk-around, participants visited the USB flash drive display which was located in a low traffic aisle. There were two popular brands of USB flash drives on display, namely Samsung and LG. A pilot study among a similar group of students indicated equivalent attitudes towards these two brands on the following two-item scale: 1/Dislike a Lot, 9/Like a Lot and 1/Low Quality, 9/High Quality (M = 5.23 vs. 5.16; $t(39) = .90$, $p > .37$). The two brands were mounted on hanging displays that allowed participants to easily see the brand names, as well as the number of items of each brand available for sale (see Appendix D). One of the two brands was assigned to the high scarcity condition while the other was in the low scarcity condition, counterbalanced across brands. In the high scarcity condition, a scarcity claim (i.e., "Hurry, last item in stock") appeared on a 3 x 5 inch sign below the display; and there was only one unit of the brand on display. In the low scarcity condition, there were ten units of the brand on display without any scarcity claim. The two brands had the same price (approximately $10) and the same storage capacity (2GB).

Disconfirmation of scarcity was manipulated by visibility of additional quantities of the brand with the scarcity claim (see Appendix D). When disconfirmation of scarcity was present, an additional nine items of the brand with the scarcity claim were visible in a half-open box on the floor below the USB

drive display. The box was haphazardly arranged to suggest that it had been left behind by store employees. I expected that seeing nine additional USB drives would disconfirm the scarcity claim on the display (i.e., "Hurry, last item in stock"). In contrast, when disconfirmation of scarcity was absent, there is no box on the floor that contains USB drives. After finishing their walk-around, participants answered filler questions about the store's environment (e.g., "What did you think about the organization of products in the store?" "What did you think about the cleanliness of the store?"). The dependent variable of product evaluation was measured by participants' choice of USB brand, i.e., Samsung or LG. Finally, participants were debriefed, thanked, and dismissed.

Results

H3 proposed that scarcity would have a stronger positive effect on product evaluation when disconfirmation of scarcity is absent versus present. Consistent with H3, and as shown in Figure 4, choice of the scarce product was higher when disconfirmation of scarcity was absent compared to present, $\chi^2(1) = 8.49$, $p < .004$. When disconfirmation of scarcity was absent, 70% of participants chose the high scarcity USB drive and 30% chose the low scarcity USB drive. In contrast, when disconfirmation of scarcity was present, only 38% of participants chose the high scarcity USB drive while 62% chose the low scarcity USB drive. It is worth noting that, in contrast to the preceding studies which showed a dilution, the present study showed a reversal of the positive effect of scarcity on product evaluation. I discuss this issue further in the future research section.

Insert figure 4 about here

The studies so far show that scarcity has a positive effect on product evaluation within certain boundary conditions – outside these boundaries, scarcity fails to improve and can even reduce product evaluation. Since firms often use scarcity in marketing communications, managers would be interested in tools to maximize the positive effect of scarcity on product evaluation. In study 4, I identify a moderating factor – reversibility of decision – that is within managerial control, and can facilitate a positive effect of scarcity on product evaluation. Note that the previous three studies (i.e., studies 1-3) focused on scarcity in terms of quantity restriction (e.g., "limited quantities"). Study 4 extends my investigation to another type of scarcity commonly used in marketing, namely time restriction (e.g., "limited time offer"). To facilitate comparability of our results across studies, the next study utilizes the product category of sunglasses which was used earlier in study 1.

STUDY 4

Reversibility of Decision

Advertisements can contain information about reversibility of the consumer's decision, where reversibility is defined as the ability to undo a purchase decision (Tsiros and Mittal 2000). For example, an advertisement announcing "All sales are final" would be low reversibility; the same ad with the announcement "30 day unconditional money-back guarantee" would be relatively high reversibility. I argue that reversibility of decision can influence consumers' interpretation of scarcity, and hence moderate the effect of scarcity on product evaluation. Notably, reversibility is a factor under managerial control, since

managers can choose to offer their product with a liberal or restrictive return policy.

Consider the case when scarcity is accompanied by low reversibility (e.g., "All sales are final"). Since low reversibility protects marketers from the consequences of selling defective items, individuals are likely to focus on marketers and their persuasion objectives. As argued earlier, such activation of persuasion knowledge about marketers can lead to falsity inferences of scarcity. When individuals infer that scarcity is a false claim, scarcity would no longer function as a reliable signal of demand and hence product value. As a result, the positive effect of scarcity on product evaluation would be attenuated. In contrast, when scarcity is accompanied by high reversibility (e.g., "30 day unconditional money-back guarantee"), individuals are less likely to think of the marketer's persuasion objectives. As a result, they should be more likely to rely on the "scarcity=value" heuristic, which would predict a positive effect of scarcity on product evaluation. These arguments are summarized in the following hypothesis:

H4: Scarcity has a stronger positive effect on product evaluation when reversibility of decision is high, compared to low.

Method

This study was designed as a 2 (Reversibility of Decision: Low vs. High) x 3 (Scarcity: Quantity vs. Time vs. Control) between-subjects ANOVA. One hundred fifty undergraduate students at a large university in Canada were paid $10 each to participate in the study. Similar to study 2, participants were told that a leading Japanese retailer called Zen Fashion is planning to offer its products online to North American consumers. Participants were then given a printout of

the proposed website of Zen Fashion, which manipulated scarcity of a fictional brand of sunglasses ("Yoshio Mayo sunglasses"). The scarcity in quantity claim website then read: "Hurry, only a few items left", while the scarcity in time claim website read: "Hurry, limited time offer." In the control condition, the website did not include scarcity information. Reversibility was manipulated in the website by adding the phrase "All sales are final" or "30 day unconditional money-back guarantee" (see Appendix E). After reading the website printout, participants responded to the dependent and mediating variables, and the manipulation checks.

Purchase intent, willingness to pay, and manipulative intent were measured using the same scales as before. The scarcity in quantity manipulation was checked with the two-item scale used earlier ($\alpha = .81$); the manipulation was successful with a significant difference between the scarcity in quantity and control conditions ($M = 2.95$ vs. 7.79; $t(98) = 15.36$, $p < .001$). The scarcity in time manipulation was checked by a two-item scale ($\alpha = .92$): "how much time were you given to take advantage of the deal for the sunglasses?" (1/Very little time, 9/Lot of time) and "for how long was the deal for the sunglasses valid?" (1/Not at all long, 9/Very long). The scarcity manipulation was successful with a significant difference between the scarcity in time versus control conditions ($M = 3.10$ vs. 5.40; $t(98) = 7.91$, $p < .001$). The reversibility manipulation was checked by a three-item scale developed for the present study ($\alpha = .91$): "If you bought a pair of Yoshio Mayo sunglasses, you could easily return them for a full refund (replacement pair / your money back) if you were not satisfied." This manipulation was successful with a significant difference between high and low reversibility conditions ($M = 2.74$ vs. 6.68; $t(148) = 12.13$, $p < .001$).

Results

Hypothesis H4 proposed that scarcity has a stronger positive effect on product evaluation when reversibility of decision is high compared to low. H4 was tested with ANOVA; means and standard deviations are shown in Table 8. Scarcity x reversibility ANOVA on purchase intent revealed a significant interaction (F (2, 144) = 3.12, $p < .05$), with a main effect of reversibility (F(1, 144) = 11.68, $p < .001$), but no main effect of scarcity (F(2, 144) = 1.08, $p < .34$). Consistent with H4, scarcity in quantity increased purchase intent when reversibility of decision was high (M = 3.36 vs. 4.84; t(48) = 2.30, $p < .02$), but not when reversibility of decision was low (M = 3.40 vs. 3.08; t(48) = - .57, $p > .57$). Similarly, scarcity in time increased purchase intent when reversibility of decision was high (M = 3.36 vs. 4.76; t(48) = 2.26, $p < .03$), but not when reversibility of decision was low (M = 3.40 vs. 2.96; t(48) = - .82, $p > .41$).

Analysis with WTP as dependent variable showed similar results. The interaction of scarcity and reversibility on WTP was significant (F(2, 144) = 3.09, $p < .05$), with a main effect of reversibility of decision (F(1, 144) = 11.02, $p < .001$), but no main effect of scarcity (F(2, 144) = 1.45, $p < .23$) . Consistent with H4, scarcity in quantity increased WTP when reversibility of decision was high (M = \$39.80 vs. \$62.47; t(48) = 2.65, $p < .01$), but not when reversibility of decision was low (M = \$40.59 vs. \$37.20; t(48) = - .44, $p > .65$). Similarly, scarcity in time increased WTP when reversibility of decision was high (M = \$39.80 vs. \$57.20; t(48) = 2.31, $p < .03$), but not when reversibility of decision was low (M = \$40.59 vs. \$35.28; t(48) = - .65, $p > .51$).

Insert table 8 about here

The proposed mechanism underlying H4 was that people are more likely to make falsity inferences about scarcity when reversibility of decision is high compared to low. As a result, scarcity would have a stronger positive effect on product evaluation when reversibility is high compared to low. As in study 2, I tested this mechanism using a four-step mediation analysis, with falsity inference as the mediating variable (Baron and Kenny 1986). Results supported the mediating role of falsity inferences with regards to scarcity in quantity and scarcity in time, respectively, and for both dependent variables (purchase intent and WTP). Table 9 summarizes the results of mediation analysis; see Table 8 for means and standard deviations. In summary, these results indicate that the effect of time scarcity on product evaluation operates in a similar manner to that for quantity scarcity.

Insert table 9 about here

GENERAL DISCUSSION & FUTURE RESEARCH

Scarcity is used in marketing communications for many products and services. In this essay, I identified four new moderators of the effect of scarcity on product evaluation – salience of persuasion knowledge (study 1), frequency of exposure to scarcity (study 2), disconfirmation of scarcity (study 3), and decision reversibility (study 4). I also showed that these effects are mediated by falsity inferences about scarcity, whereby consumers infer that scarcity is a false claim being made by marketers to increase sales. Notably, the results were consistent

across two manipulations of scarcity, three product categories, lab and field studies, and three measures of product evaluation including choice.

This essay makes two theoretical contributions to the literature on scarcity. First, I identify four new moderators of the effect of scarcity on product evaluation, namely salience of persuasion knowledge, frequency of exposure to scarcity, disconfirmation of scarcity, and reversibility of decision. Past research indicates that scarcity often has a positive effect on product evaluation. In contrast, I show in four studies that scarcity increases product evaluation only within certain boundary conditions. Outside these boundaries, scarcity does not help, and can sometimes hurt product evaluation. In particular, I show that the positive effect of scarcity emerges only when persuasion knowledge is less salient, frequency of exposure to scarcity is low, disconfirmation of scarcity is absent, or decision reversibility is high. When any of these conditions are violated, scarcity ceases to increase product evaluation; in fact, scarcity can actually reduce product evaluation when disconfirmation of scarcity is present. These four boundary conditions indicate that, in contrast to current knowledge, the positive effect of scarcity may be a relatively fragile phenomenon that emerges only when conditions are favorable.

My moderators extend past research which has identified other boundary conditions of scarcity such as price discount, need for cognition (Inman et al. 1997), product familiarity, need for closure, cultural context (Jung and Kellaris 2004), need for uniqueness (Amaldoss and Jain 2005), and spatial distance (Van Herpen et al. 2009). An important distinction between our moderators and those in previous research is that the former are based on the "scarcity=value" heuristic,

while our moderators focus on falsity inferences about scarcity. For example, Inman et al (1997) showed that scarcity increases product evaluation for low need for cognition, but not high need for cognition, individuals. The proposed reason for this effect was that "scarcity=value" is a heuristic, and is hence more likely to be used by individuals with low need for cognition. Similarly, Inman et al. (1997) showed that scarcity increases product evaluation only when the accompanying price discount is high, since diagnosticity of the "scarcity=value" heuristic is greater when price discount is high compared to low. Jung and Kellaris (2004) showed that the positive effect of scarcity is stronger when individuals' need for cognitive closure is high compared to low. Individuals with high needs for closure are motivated to come to a quick decision, and hence more prone to rely on "scarcity=value" heuristic. Further, these authors showed that scarcity has a stronger positive effect when individuals are less familiar with the product. When individuals are more familiar with a product, they are likely to have other evaluative information about the product, and hence rely less on the "scarcity=value" heuristic. Jung and Kellaris (2004) also showed that the positive effect of scarcity is stronger for consumers in the United States than for those in France. Cross-national differences in proneness to scarcity can also be explained by the "scarcity=value" heuristic. Compared to consumers in United States, consumers in France tend to approach purchase decisions more thoughtfully and analytically. Therefore, they are likely to rely less on the "scarce=good" heuristic. Amaldoss and Jain (2005) showed that consumers with a high, versus low, desire for uniqueness assign greater value to scarce products, since scarce products can be used to differentiate individuals from others. Similarly, Van Herpen et al.

(2009) showed that the positive effect of scarcity is weakened when consumers are spatially close to other users of the product, e.g., when a next-door neighbor owns the same ostensibly scarce product that an individual is considering buying. This effect is said to arise because ownership by close others diminishes the uniqueness value underlying the "scarce=good" heuristic. As is evident from the preceding review, the moderators of scarcity examined in past research can be traced back to consumers' reliance on the "scarcity=value" heuristic.

My moderators also add to past research on persuasion knowledge. A growing body of research indicates that consumers are not passive recipients of marketing actions, but instead interpret marketing actions in light of their persuasion knowledge about the marketplace (Darke and Ritchie 2007; Hardesty, Bearden, and Carlson 2007; Kirmani and Campbell 2004). Past research indicates that persuasion knowledge can be activated by a range of factors such as depth of processing (Campbell and Kirmani 2000), regulatory focus (Kirmani and Zhu 2007), source independence (Kirmani and Zhu 2007), and sponsor identification (Wei, Fischer, and Main 2008). In the present research, I extend this research by identifying activators of persuasion knowledge relevant to scarcity, namely salience of persuasion knowledge, frequency of scarcity, disconfirmation of scarcity, and decision reversibility. I showed that these four factors can prompt falsity inferences about scarcity, and hence moderate the effect of scarcity on product evaluation.

It is worth noting that, in contrast to other moderators which led to dilution, disconfirmation of scarcity led to a reversal of the positive effect of scarcity on product evaluation. A possible explanation for this reversal could be that

disconfirmation influences people's confidence about falsity inference. In our study on disconfirmation of scarcity, participants were able to find relatively direct evidence to support a falsity inference of scarcity. Recall that I manipulated disconfirmation of scarcity by visibility of a box containing additional quantities of the supposedly scarce USB drive. These additional quantities are clearly inconsistent with the scarcity claim, and could thus be considered relatively direct evidence to support a falsity inference of scarcity. Seeing such tangible evidence that counters the scarcity claim may lead people to have high confidence about their falsity inference. When people's confidence about their falsity inference is high, they feel certain that marketers are lying to them. This strong feeling of being deceived could reduce attitude towards both the marketer and the product in question. In this way, scarcity can backfire when disconfirmation is direct. Notably, in contrast, in my other studies, people did not get direct disconfirmation of the scarcity claim, which would therefore have led to a low-confidence inference of falsity. Such low confidence inferences could be expected to lead to a discounting of the scarcity claim, rather a reversal. Future research could measure confidence in the falsity inference to verify this foregoing account for reversal versus discounting of scarcity.

A key question about the four moderators identified in this essay is: do these moderators apply uniquely to scarcity, or are these moderators applicable to other marketing claims such as low-price guarantees, incomplete brand comparisons, or default options? I argue that three of my proposed moderators – namely salience of persuasion knowledge, disconfirming evidence, and reversibility of decision – are potentially applicable to other types of marketing

claims. In contrast, I argue that frequency of use is uniquely applicable to scarcity. Consider first the moderating variable of salience of persuasion knowledge. When persuasion knowledge is salient, people are more likely to be skeptical about marketing claims in general – not only scarcity, but also other marketing claims as low-price guarantees, incomplete brand comparisons, and default options. Such skepticism could lead people to perceive all marketing claims as persuasion tactics being employed by marketers to increase sales. Next, consider the moderating variable of disconfirming evidence. When people face marketing claims, they may try to seek disconfirming evidence against any such claim in order to validate its accuracy. For example, when customers see a lowest price guarantee claim on a retailer website, they may check the websites of other retailers to compare advertised prices. Consumers who find that other retailers are selling products at lower prices would have disconfirming evidence against the ostensible lowest price claim. In all such cases, the use of marketing claims could backfire. Third, the moderating variable of reversibility of decision could apply to other marketing claims as well. Returning to the examples above, marketing claims such as price guarantees or default options are likely to be more credible when accompanied by strong return policy – since the return policy would signal product quality and hence positive marketer intent.

In contrast, I argue that frequency of exposure would apply uniquely to scarcity claims, and not to other marketing claims such as price guarantees or default options. Recall that my hypothesis regarding frequency of exposure was based on the logic that scarcity is unlikely to be encountered regularly in a competitive economy. This logic would not readily apply to other marketing

claims such as low-price guarantees or default options, which could conceivably be offered by many firms in a market. Future research could verify the preceding arguments regarding the applicability of my moderators to other marketing claims. Notably, the more applicable are my moderators to other marketing claims, the greater would be the generalizability of my proposed model.

The second theoretical contribution of this essay is the identification of a new psychological mechanism underlying the effect of scarcity on product evaluation. The mechanism utilized in the past research is that individuals make a demand-side inference about scarcity, whereby scarcity is seen as a signal of consumer demand and hence product value. In contrast, I showed that individuals can also make a supply-side inference about scarcity, inferring that scarcity is a false claim being made by marketers to increase sales. For example, individuals could suspect that scarcity claims such as "limited quantities" are false, in the sense that marketers actually have larger quantities of the product for sale, but are claiming limited availability to increase consumer demand. Supportive of my mechanism, falsity inference about scarcity mediated the interaction of scarcity with frequency of exposure (study 2) and decision reversibility (study 4). The role of falsity inference about scarcity in my model is consistent with the persuasion knowledge literature, which shows that consumers can be skeptical about marketing techniques used to sell products and services. I illustrate this general tendency in the context of scarcity, where I showed that people are more likely to make falsity inferences about scarcity when their persuasion knowledge is activated.

More generally, value inference and falsity inference of scarcity are

consistent with research on normative principles of communication (Grice 1975; Xu and Wyer 2010) and the cost-benefit framework of judgment and decision making (Johnson and Payne 1985). According to normative principles of communication, persuasive communications are said to have two functions: to inform and to persuade consumers. In my research, value inference of scarcity corresponds to the informational aspect of advertising, since this inference is premised on scarcity conveying information about product demand. Conversely, falsity inference corresponds to the persuasive aspect of advertising, with scarcity seen as an influence technique being used to increase sales. Against this background, the four moderators of scarcity in my research may be viewed as factors influencing the balance between information and persuasion, since the moderators favor either value or falsity inference of scarcity. My results are also consistent with the cost-benefit framework, which posits that consumer judgments are based on an appraisal of relevant costs and benefits. In this essay, I focus on a key benefit-related (i.e., value inference) and a cost-related inferences (i.e., falsity inference) about scarcity. Notably, past research on new products has also found that consumers make a benefit related inference (i.e., value inference) and cost-related inference (i.e., learning cost inference) about novel product attributes (Mukherjee and Hoyer 2001).

One question that could be posed is whether the proposed mediating variable of falsity inference is different from the dependent variable of product evaluation. I argue that falsity inference is conceptually different from product evaluation due to the following reasons. First, falsity inference and product evaluation have different foci. Falsity inference refers to consumers'

interpretation of whether a scarcity claim is true or false, and thus focuses on the scarcity claim. In contrast, product evaluation refers to consumers' evaluation of the product as a whole, and not just the scarcity claim. These dissimilar foci indicate that two constructs are conceptually different. Second, falsity inference and product evaluation have difference bases. Falsify inference is a cognitive belief; belief about truth or falsity of the scarcity claim. In contrast, product evaluation is affective in nature, since it reflects people's feelings towards a product. Third, mediation analysis indicated that falsity inference and product evaluation are distinct constructs. The mediation analyses (cf. Baron & Kenny 1986) in study 2 and study 4 both indicated that falsity inference mediates the effect of the antecedent variables on product evaluation. Taken together, these reasons indicate that falsity inference is distinct from product evaluation.

From a methodological perspective, the studies in this essay demonstrated the robustness of my model in different ways. First, scarcity of the target products was manipulated in two ways – by using scarcity claims such as "Hurry, only a few watches left in stock" and "Hurry, last item in stock," and also by directly showing the scarcity of the target brand (i.e., only one unit of the target product on display). Second, I replicated my results in three product categories – namely watches, sunglasses, and USB products. Third, my results were replicated using both laboratory studies and a field study (the latter conducted within a real store). Finally, the effect of scarcity on product evaluation in my studies was measured by three dependent variables – namely purchase intent, willingness to pay, and choice of brand. Thus in summary, this essay offers convergent evidence for my model across two manipulations of scarcity, three product categories, two

methodological approaches (lab and field studies), and three measures of product evaluation, including choice.

My research is relevant to practitioners, such as brand managers and advertising agencies, for the effective use of scarcity. My moderators can operate in many real-life situations where consumers are exposed to scarcity. For example, persuasion knowledge can be primed by salesperson behavior or recent persuasion attempts, and frequency of exposure can be influenced by repeated advertising on different platforms such as television, internet, cell phones, and in-store electronic displays. Decision reversibility can be influenced by discount stores selling products with no-return policies, and regular stores restricting product returns during sales events. And disconfirmation of scarcity has been facilitated by the internet and social media, where consumers can find information about the true availability of supposedly scarce products. These aspects of the marketplace indicate that the boundary conditions of scarcity in this essay can have a significant effect on real-life consumer judgment and choice.

My results provide guidelines to practitioners for the effective use of scarcity. First, my results show that scarcity is not likely to work when consumers are high in persuasion knowledge. Hence, managers could segment consumers into different tiers of persuasion knowledge using proxies such as age, education and income, and use scarcity when communicating to segments with low levels of persuasion knowledge. Second, my results indicate that scarcity is not likely to work when consumers see the repeated use of scarcity claims. Hence, managers should not use scarcity claims in media where scarcity is already being widely used by other brands. Third, my results also show that scarcity claims are likely to

be more effective when they are accompanied by a product return guarantee. Since research on the endowment effect indicates that consumers tend not to return products once bought (Wood 2001), return guarantees should accompany scarcity claims as far as possible. Of course, return guarantees would work only if the brand's quality is acceptable. If the brand offers poor quality, then product returns could increase the salience of persuasion knowledge, which in turn could undercut the effectiveness of scarcity claims.

Finally, my results indicate that scarcity can reduce brand choice when consumers have access to disconfirming evidence. This boomerang effect suggests that marketers could face a risk of hurting their product when using scarcity in marketing communications. The risk is heightened by the ease with which consumers can now gather information on the internet about the actual availability of supposedly scarce products. For example, consumers often exchange information on bulletin boards and review websites about products that are likely to be scarce such as the iPad, Wii, and Harry Potter books. Hence, managers should ensure that the scarcity claim being made is accurate, and cannot be disconfirmed by consumers online or offline. Managers could also proactively give confirming evidence of scarcity to consumers, such as by regularly updating the tally of available products during the course of a promotion.

The studies herein suggest several avenues for future research. I used artificial brands to control the influence of brand-specific factors. However, brand-related factors conceptually related to activation of persuasion knowledge, such as brand trust, could moderate the effect of scarcity on product evaluation. Brand trust has been defined as consumers' confidence that the brand will

consistently deliver quality commensurate with its claims (e.g., Chaudhuri and Holbrooke 2001). It is likely that when brand trust is low, consumers may be inclined to doubt the veracity of scarcity claims made by the brand, leading to a dilution of the positive effect of scarcity on product evaluation. Consumer experience with products could also moderate the effectiveness of scarcity. For example, consumers who have recently experienced product failure may be primed to focus on cost or loss. Such consumers may be more likely to interpret scarcity as a false claims being made by marketers to increase sales, leading to dilution of the positive effect of scarcity on product evaluation. Researchers could also investigate if negative consumer experiences in unrelated product categories could spill over to influence the effectiveness of scarcity in a target product category. If such spillover effects are observed, then the effectiveness of scarcity might be compromised by actions of other brands in the marketplace over which managers have little control.

The precision of the scarcity claim could moderate the effect of scarcity on product evaluation. Based on precision of advertising claim (Mobley, Bearden, and Teel 1988), scarcity precision can be defined as the exactness of information on product quantity or time of availability. For example, advertisements often use low scarcity precision claims such as “Hurry, only a few items left” and “Hurry, limited time offer” which are not as precise as a quantity or time restriction in the product. The same ads with the announcement “Hurry, only 10 items left” and “Hurry, only 24 hours” can be considered high scarcity precision claims since they offer relatively precise information on the extent of availability of product quantity or time. When a high scarcity precision claim is used, people may believe

that marketers are conveying accurate information about product quantity or time of availability. Therefore, such high scarcity precision claim could support the inference that the underlying scarcity claim is true. In contrast, when a low scarcity precision claim is used, individuals would be more likely to infer that a marketer is using a false scarcity claim. This is because the use of an ambiguous scarcity claim reduces the informational value of this claim. In this case, people are likely to interpret the use of an ambiguous scarcity claim as a marketer's attempt to persuade them to buy the product, leading to a dilution of the positive effect of scarcity on product evaluation.

This essay focused on scarcity defined as restriction on the quantity and time available to purchase a product. Products could also be subject to restrictions other than quantity and time. Future research could investigate other types of restrictions such as purchase restriction (e.g., "requires minimum purchase of $__" or "must be purchased together with __"). A key characteristic of such purchase restrictions is that they reduce consumers' freedom of choice. For example, consumers could perceive the purchase precondition restriction claim (e.g., "Deal price available only if the buyer spends $50 or more") as intended to limit purchase-oriented freedom. According to reactance theory, when people perceive that their freedom or flexibility has been restricted, they feel inconvenienced, and hence react negatively against the source of the restriction on their freedom (Brehm 1966; Grabitz-Gniech 1971; Edwards, Li, and Lee 2002; Fitzsimons and Lehmann 2004). Reactance theory predicts that the reduction in consumer freedom due to purchase restrictions can create a negative feeling of inconvenience, which in turn should lead people to react negative towards

purchase restrictions. In my second essay, based on a reactance theory perspective, I discuss the possible effects of such purchase restrictions.

In the study 3, I manipulated disconfirmation of scarcity by using additional items of the USB brand with a scarcity claim. This could be considered a direct manipulation of disconfirmation of scarcity, since people could see directly disconfirming evidence against the scarcity claim. Future research could investigate how indirect disconfirming evidence influences the effect of scarcity on product evaluation. Instead of using a half-open box directly showing additional items of the USB brand with a scarcity claim, future research could use a closed box to manipulate disconfirmation of scarcity indirectly. Using the same experimental procedure as study 3, a closed box with the name of the firm on the box would be placed below the USB display. This would make it look as if the box has been delivered by the firm that manufactured the USB brand with the scarcity claim. In this case, people would not directly see additional items of the USB brand with scarcity claim, but they could infer that there might be additional items of the product inside the box. This is one possible indirect method of manipulating disconfirmation of scarcity. Since in this case people do not receive direct disconfirmation of the scarcity claim, people are likely to make a low-confidence inference of falsity. Such low confidence inferences could be expected to lead to discounting of the scarcity claim and hence dilution of the positive effect of scarcity, rather than the reversal effect observed in my study.

There are some limitations of the present research that should be noted. In the four studies, I did not directly measure activation of persuasion knowledge. Instead, activation of persuasion knowledge was inferred through verbal reports

(study 1) or the measurement of falsity inferences (studies 2 and 4). Note that these measures are the consequences of activation of persuasion knowledge. Future research could directly measure the degree to which persuasion knowledge is activated by using response times. One response time approach to measuring activation of persuasion knowledge has been validated by Williams, Fitzsimons, and Block (2004). These researchers used a computer administered task, where single words were presented on the computer screen, and participants were asked to indicate whether they thought the word was good or bad. Participants were instructed to press 1 if the word they saw was good and 0 if it was a bad word to them. They were asked to be both accurate and fast when giving their response. With this procedure, activation of persuasion knowledge was measured by how quickly participants responded negatively to three persuasion knowledge-related words ("suspicious," "manipulate," and "coerce"). Notably, these three target words were interspersed with seven words unrelated to the activation of persuasion knowledge. The seven persuasion knowledge-unrelated words were used as a baseline response time for each individual, and the average response time to the three persuasion knowledge-related words was used as the measure of persuasion knowledge activation. Future research could employ a similar approach to directly measure the degree to which persuasion knowledge is activated by the moderators examined in this essay. Such research would confirm that activation of persuasion knowledge mediates the effects of the moderators identified in this essay.

In contrast to my other studies, which were run at a Canadian university, study 3 was conducted in a South Korean university. It could be argued that there

are cultural differences between Canadian and South Korean participants toward scarcity. However, it is worth noting that in both cases participants were undergraduate students at similar-sized universities located in large cities (i.e., Montreal and Seoul) with a globalized population. As such, cultural differences may be less significant than suggested by the characteristics of their host countries. In order to address this issue empirically, future research could conduct a pilot study using the watch advertisement from study 1, taking half of its participants from a Canadian university and the other half from a South Korean university. Through this pilot study, researchers could investigate the role of cultural differences in determining the scarcity on product evaluation.

In summary, in this essay, I took a persuasion knowledge perspective to examine the effect of scarcity on product evaluation. Based on a persuasion knowledge perspective, this essay makes a contribution by identifying a new mechanism through which scarcity influences product evaluation, as well as four new moderators that determine when scarcity does, and does not increase product evaluation. The studies in this essay demonstrated the robustness of my model across two manipulations of scarcity, three product categories, two methodological approaches (lab and field studies), and three measures of product evaluation, including choice. This essay also offers guidelines to brand managers and advertising agencies for the effective use of scarcity in marketing communications.

CHAPTER 3 – ESSAY II

THE EFFECT OF SCARCITY ON PRODUCT EVALUATION: A REACTANCE THEORY PERSPECTIVE

Scarcity is used in marketing communications for many products and services. As stated earlier, a general finding in past research has been that scarcity increases product evaluation (Balachander, Liu, and Stock 2009; Dai, Wertenbroch, and Brendl 2008; Eisend 2008; Inman et al. 1997; Jung and Kellaris 2004; Van Herpen, Pieters, and Zeelenberg 2009). As discussed earlier, past research has taken a signaling perspective to explain the positive effect of scarcity on product evaluation. It has been argued that scarcity acts as a signal of product quality, with consumers inferring that scarcity is due to high demand – which in turn is likely to arise if the product offers high quality (Cialdini 2001; Inman et al. 1997; Van Herpen et al. 2009).

In my first essay, I went beyond a signaling approach to scarcity by taking a new theoretical perspective – that of persuasion knowledge. In my second essay, I go beyond a signaling approach in a different way by incorporating a second theoretical perspective, that of reactance theory. A key characteristic of scarcity is that it reduces consumers' freedom of choice. In a situation with no scarcity, consumers can make a choice whenever they want; in contrast, when scarcity is present, consumers are forced to make a choice within a restricted timeframe. Reactance theory predicts that such reduction in consumer freedom or flexibility could create a negative feeling of inconvenience, which in turn could reduce the positive effect of scarcity on product evaluation. In this essay, I identify factors

that magnify reactance, increase feelings of inconvenience, and hence reduce the positive effect of scarcity on product evaluation. The rest of this essay is organized as follows. I begin by reviewing the literature on reactance theory. Building on this review, I identify four new moderators of the effect of scarcity on product evaluation. I then test my moderators in four studies. These studies offer convergent evidence for my moderators across four product categories and three measures of product evaluation including choice. The studies also provide evidence for my hypothesized mediating mechanism based on perceived inconvenience. In summary, this essay makes a contribution by identifying a new psychological mechanism through which scarcity influences product evaluation, and new moderators that determine when scarcity does, and does not increase product evaluation. This essay also offers guidelines to brand managers and advertising agencies for the effective use of scarcity in marketing communications.

CONCEPTUAL FRAMEWORK

Reactance Theory

Reactance can be defined as a motivational state of the person whose freedom is threatened (Brehm 1966; Grabitz-Gniech 1971; Edwards, Li, and Lee 2002). According to reactance theory, when people perceive that their freedom or flexibility has been restricted, they feel inconvenienced, and hence react negatively against the source of the restriction on their freedom (Brehm 1966; Grabitz-Gniech 1971; Edwards, Li, and Lee 2002; Fitzsimons and Lehmann 2004).

Past research indicates that reactance can be increased by factors internal

and external to the individual (see Table 10). Internally, it has been shown that the personality trait of dispositional reactance increases reactance (Wiium, Aaro and Hetland 2009; Hong and Faedda 1996). When individuals are high on dispositional reactance, they tend to react negatively toward any threat to their behavioral freedom. For example, Wiium, Aaro and Hetland (2009) showed that regular smokers with high dispositional reactance react more negatively against strong smoking control measures rather than those with low disposition reactance. Studies in consumer behavior have measured an individual's dispositional reactance through a reactance scale (Hong and Faedda 1996). The scale is comprised of 11-items designed to measure the degree to which individuals are likely to experience reactance (see Appendix N). For example, items in this scale ask respondents to indicate agreement with statements such as "Regulations trigger a sense of resistance in me," and "I become angry when my freedom of choice is restricted," on a 1 (Strongly Disagree) and 9 (Strongly Agree) scale.

External factors that increase reactance include forced exposure (Edwards, Li, and Lee 2002), choice restriction (Fitzsimons and Lehmann 2004; Kivetz 2005), choice elimination (Fitzsimons 2000), and spatial confinement (Levav and Zhu 2009). Forced exposure refers to the involuntary exposure to commercial messages. For example, web surfers are sometimes forced to view a commercial message before they are allowed to access a website. Such forced exposure can magnify reactance, leading to heightened feelings of inconvenience (Edwards, Li, and Lee 2002). Reactance can be magnified by choice restriction. For example, Kivetz (2005) showed that when marketing promotions require expenditure of future consumption effort (e.g., "Kellogg's offers 1,000 AAdvantage® frequent

flyer miles for consumers who buy 10 cereal boxes"), consumer reactance is heightened. Unwanted recommendations offered by a salesperson can also be seen as threats to freedom of choice, thus increasing reactance on the part of consumers. Fitzsimons and Lehmann (2004) indicated that when consumers with initial product preferences received a given retailers' unsolicited recommendations contradicting these preferences, they perceived such unwanted advice as an intrusion and constraint against their freedom of product choice. This increased reactance, in turn, led consumers not only to ignore the retailers' recommendations but to intentionally go against them. Elimination of choice can also magnify reactance. For example, Fitzsimons (2000) showed that when consumers are exposed to a stockout of an attractive alternative, this loss of the option to choose an out-of-stock alternative increases reactance. Increased reactance, in turn, leads consumers to react negatively to the stockout – leading to lower satisfaction with the decision process and higher likelihood of switching stores on subsequent shopping trips.

Finally reactance can be increased by spatial confinement. Consumers can sometimes be restricted by spatial constraints, such as crowding or narrow aisles in stores. Such spatial constraints can be seen as a threat to freedom of personal space, thereby increasing reactance. For example, Levav and Zhu (2009) showed that when consumers were spatially restricted by physical arrangements such as narrow aisles, they felt inconvenienced. Such feelings of inconvenience increased consumer reactance, which was manifested in the form of more varied product choices.

Insert table 10 about here

In the present essay, I add to this literature by identifying new factors that increase reactance to scarcity. An important, yet unexamined characteristic of scarcity is that it reduces consumers' freedom of choice. This is because, in a situation with no scarcity, consumers can make a choice whenever they want. However, when scarcity (e.g., "One day only" or "Hurry, limited quantities") is present, consumers are forced to decide within a restricted timeframe. For example, when people face a scarcity in time scenario (i.e., "One day only"), they are forced to make a choice within a restricted time period (i.e., 24 hours). In this situation, consumers may feel that their flexibility related to potential purchase has been restricted by scarcity. This same basic logic can be applied to scarcity in quantity. When people face a scarcity in quantity (i.e., "Hurry, limited quantities"), they know that if they do not make a choice as soon as possible, the limited quantities of a product may not be available any more. Thus consumers may feel that their flexibility in terms of purchase timing has been restricted by scarcity. Reactance theory predicts that such reduction in consumer freedom or flexibility could create a negative feeling of inconvenience, which in turn could reduce the positive effect of scarcity on product evaluation. Building on this idea, I identify factors that magnify reactance to scarcity, hence creating feelings of inconvenience, and reducing the positive effect of scarcity on product evaluation. Specifically, these factors are time pressure (study 1), time precision (study 2), store flexibility (study 3), and incentive flexibility (study 4). My proposed model is shown in Figure 3, and developed in the following four studies.

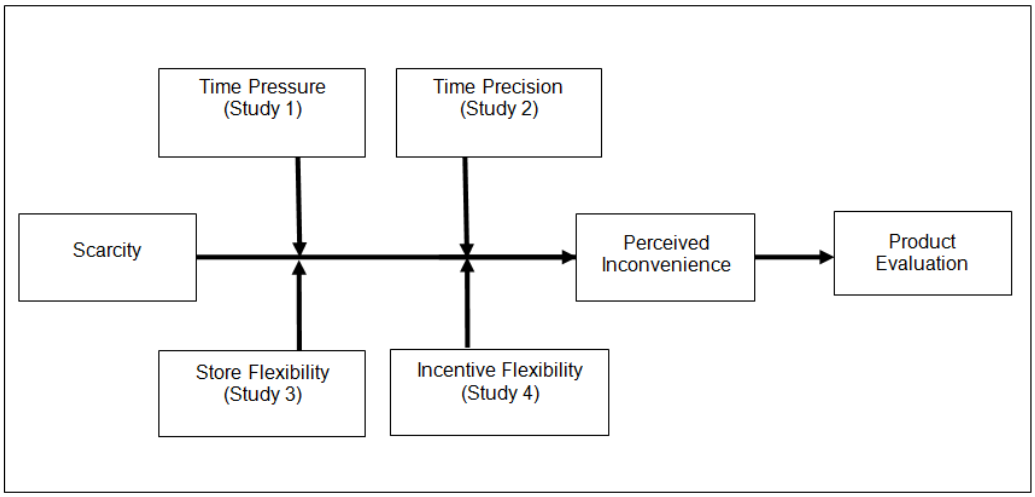

FIGURE 3 – Proposed Model for Essay 2

STUDY 1

Time Pressure

Time pressure can be defined as the amount of time remaining to complete a task (Beatty and Ferrell 1998). For example, consider an individual who checks today's schedule in his or her agenda book. If that individual realizes that the schedule for that day is packed full of appointments, that individual feels high time pressure. It is because that individual has less available time at their disposal that day. In contrast, consider the situation wherein that individual realizes that that individual does not have any appointments for the day. Under the latter circumstance, that individual will experience low time pressure because s/he has more available time that day.

When people under high time pressure (e.g., individuals who have many things to do during a day) face a deal promoted under scarcity, they have less available time in their schedule to take advantage of such a deal. That is, high

time pressure reduces time flexibility in taking advantage of such a deal. According to reactance theory (Hui and Bateson 1991; Rezek and Leary 1991; Levav and Zhu 2009), reduced flexibility in one domain can motivate people to seek to restore their sense of flexibility in other domains. Thus reactance theory predicts that reduced flexibility due to high time pressure could prompt people to restore their flexibility in product choice. Therefore, when people under high time pressure are forced to make a product choice within a restricted time frame, they are more likely to be sensitive to such a restriction of flexibility due to scarcity. Thus, reduced flexibility due to high time pressure can magnify reactance against scarcity. Such magnification of reactance against scarcity should lead people to feel inconvenience, which is a negative feeling about the offer promoted under scarcity. This negative feeling, in turn, can transfer to the product promoted under such an offer, and hence would reduce the positive effect of scarcity on product evaluation.

In contrast, when people under low time pressure (e.g., individuals who do not have any appointments during a particular day) face a deal promoted under scarcity, they have high freedom in their schedule when they take advantage of such a deal. That is, low time pressure provides high time flexibility in taking advantage of such a deal. Therefore, people under low time pressure have sufficient time flexibility in their schedule to adapt to the constraints of the offer promoted under scarcity. Therefore, these people are less likely to be sensitive to the restriction of time flexibility due to scarcity. In this case, low time pressure would minimize reactance against scarcity. Thus these people are less likely to experience a negative feeling of inconvenience driven by scarcity. Instead, they

should be more likely to rely on the "scarcity=value" heuristic which has been reinforced by intuition and evolution and widely observed in past research (cf. Inman et al. 1997; Van Herpen et al. 2009). Such interpretation of scarcity as a signal of value would predict a positive effect of scarcity on product evaluation. My preceding arguments are summarized in the following hypothesis:

H1: Scarcity has a stronger positive effect on product evaluation when consumers are under low time pressure, compared to high time pressure.

Method

This study was designed as a 2 (Time Pressure: Low vs. High) x 2 (Scarcity: Absent vs. Present) between-subjects ANOVA. Ninety eight undergraduate students at a large university in Canada were paid $10 each to participate in the study.

Participants began the study, which was ostensibly about consumer responses to advertising. Time pressure was manipulated by using a scenario method. Participants were asked to imagine that they've gotten up at 8:00 in the morning. While eating breakfast, they decide to check today's schedule in their daily planner. Under this scenario, participants were shown one of two daily planners which manipulated low versus high time pressure (see Appendix F). The daily planners were modeled on real-world daily planners. In the high time pressure condition, the daily schedule showed that the day is packed fully of appointments (i.e., a morning class, a lunch appointment, buy some items in the campus bookstore, summer job interview, group presentation preparation, and go to grocery shop). In the low time pressure condition, the daily schedule showed

that the day has only two appointments (a morning class and go to grocery shop) and they don't have any appointments in the afternoon. All participants were asked to read the daily schedule carefully, and take a moment to imagine how they would feel on a day like this. Participants were then asked to imagine that while reading the morning newspaper, they see an ad for a new brand of digital camera. Participants were shown one of two ads for a fictitious brand of digital camera (BOSIN©) which manipulated scarcity absent versus present (see Appendix G). The ads were modeled on real-world advertising flyers, and featured a picture of the brand with copy reading: "BOSIN© digital camera, making special memories." The scarcity present version of the ad read: "ONE DAY ONLY! $120 Special Deal," while the scarcity absent version read: "$120 Special Deal." After reading the ad, participants responded to measures of product evaluation, and were debriefed and dismissed.

The dependent variable of product evaluation was measured by attitude toward the product and purchase intent. Attitude towards the product was measured by a three-item scale ($\alpha = .84$): "the BOSIN digital camera is" (1/Undesirable, 9/Desirable; 1/Unattractive, 9/Attractive; and 1/Not Valuable, 9/Valuable). Purchase intent was measured by single item, nine-point scale (1/Not at all Likely, 9/Very Likely): "How likely is it that you would buy this digital camera."

The scarcity manipulation was checked by a two-item scale ($\alpha = .92$): "how much time were you given to take advantage of the special deal for the digital camera?" (1/Very little time, 9/Lot of time) and "for how long was the special deal for the digital camera valid?" (1/Not at all long, 9/Very long). The

scarcity manipulation was successful with a significant difference between the scarcity absent versus present conditions (M = 2.09 vs. 4.52; $t(96) = 7.12$, $p < .001$). Time pressure was measured by a three-item ($\alpha = .93$) adapted by Srinivasan and Ratchford (1991): "Thinking back about your daily schedule, how much time pressure do you expect to have on a day like this?" (1/No pressure, 9/Very high pressure), "Thinking back about your daily schedule, how much time would you have at your disposal on a day like this?" (1/Very little time, 9/A lot time), and "Thinking back about your daily schedule, how busy do you expect to be on a day like this?" (1/Not at all busy, 9/Very busy). The time pressure manipulation was successful with a significant difference between the low versus high time pressure conditions (M = 6.36 vs. 2.27; $t(96) = 14.65$, $p < .001$).

Results

Hypothesis H1 proposed that scarcity has a stronger positive effect on product evaluation when consumers are under low time pressure, compared to high time pressure. H1 was tested with ANOVA; means and standard deviation are shown in Table 11. Scarcity x time pressure ANOVA on attitude towards the product revealed a significant interaction (F (1, 94) = 6.14, $p < .02$), with no main effects of either time pressure ($F(1, 94) = 2.47$, $p > .11$) or scarcity ($F(1, 94) = .92$, $p > .33$). Consistent with H1, scarcity increased attitude towards the product when time pressure was low (M = 5.65 vs. 6.70; $t(47) = 2.39$, $p < .03$), but not when time pressure was high (M = 5.93 vs. 5.46; $t(47) = -1.09$, $p > .28$). The results were similar when purchase intent was used as the dependent variable. The scarcity x time pressure interaction on purchase intent was significant ($F(1, 94) = 4.09$, $p < .05$), with a positive effect of scarcity on purchase intent when time

pressure was low (M = 3.95 vs. 5.52; $t(47) = 2.84$, $p < .007$), but no effect when time pressure was high (M = 4.29 vs. 4.12; $t(47) = -.26$, $p > .79$). Neither time pressure nor scarcity had a significant main effect on purchase intent ($F(1, 94) = 1.54$, $p > .21$; $F(1, 94) = 2.63$, $p > .10$).

Insert table 11 about here

The results of study 1 were consistent with hypothesis H1. As predicted by H1, scarcity increased attitude towards the product and purchase intent when time pressure was low, but not when time pressure was high. Note that, in study 1, I investigated a moderating factor – namely time pressure – that reduces the actual time available to consumers to take advantage of the offer promoted under scarcity. This reduced flexibility, in turn, heightens perceived inconvenience due to scarcity. In study 2, I test another moderating factor – time precision – that reduces time flexibility perceptually by magnifying the passage of time remaining before deal expiration – which in turn heightens perceived inconvenience due to scarcity. I also empirically validate my proposed mediating mechanism, whereby the proposed moderator heightens perceived inconvenience due to the scarcity claim. Additionally, study 2 investigates the robustness of my results in a new product category, namely a portable DVD player.

STUDY 2

Time Precision

Based on the definition of information precision (Kruglanski 1989), I define time precision as the degree of accuracy with which time is represented. When using scarcity in advertising, marketers sometimes use digital countdown

clocks to show how much time is left before the deal expires (see Appendix H). The digital clock can count down with varying degrees of precision such as a second or a millisecond. For instance, the website of Air Canada offers special deals under constraints of limited time. Its special deals include a countdown clock showing time left before deal expiration to the nearest second (e.g., "Offer will expire in: 7 hours 42 minutes 56 seconds"). In contrast, Verizon Wireless Inc. has offered special promotions for mobile phones with a scarcity appeal (e.g., "24 Hours Sale"), including a countdown clock showing time left before deal expiration in milliseconds (e.g., "3 hours 32 minutes 8 seconds 97 milliseconds left").

Consider the case when time precision is high. This might be the case, for example, when the digital clock counts down the time left before deal expiration in milliseconds. When the clock counts down by the millisecond, time will literally fly by before people's eyes. Thus, the passage of time would be perceptually magnified, leading people to feel that the time remaining before deal expiration is running out very quickly. That is, high time precision reduces perceived time flexibility by magnifying the passage of time remaining before deal expiration. Therefore, this perceptually reduced time flexibility due to high time precision would highlight the restricted time frame for product choice, and hence would lead people to feel that their product choice has to be made within the restricted time frame. Thus, reduced perceived time flexibility due to high time precision can increase reactance against scarcity. Increased reactance against scarcity should lead people to feel inconvenience, which is a negative feeling about the offer promoted under scarcity. This negative feeling, in turn, can

transfer to the product promoted under such an offer, and hence would reduce the positive effect of scarcity on product evaluation.

Conversely, consider the case when time precision is low. When the digital clock counts down time left before deal expiration in seconds, the passage of time will be not perceptually magnified. This is because people are accustomed to viewing time representations consistent with an "hour-minute-second" presentation, whether on their wristwatches, their wall clocks, or their other instruments. Therefore, when time precision is low, people feel that the time before deal expiration is running out naturally. Thus low time precision would not lead to perceptually reduced time flexibility. Therefore, low time precision would not highlight the restricted time frame for product choice. In this case, low time precision would not increase reactance against scarcity. In this circumstance, people are less likely to experience a negative feeling of inconvenience driven by scarcity. Instead, they should be more likely to rely on the "scarcity=value" heuristic, which would predict a positive effect of scarcity on product evaluation. My preceding arguments are summarized in the following hypothesis:

H2: Scarcity has a stronger positive effect on product evaluation when time precision is low, compared to high.

Method

This study was designed as a two factor (Time Precision: Low vs. High) between-subjects ANOVA with a control condition ('Scarcity: Absent'). The time precision conditions were nested within the 'Scarcity: Present' condition because the degree of time precision can only vary when the ad contains a scarcity claim. One hundred undergraduate students at a large university in Canada were each

paid $10 to participate in the study.

The experiment was run on a computer. Through a computer screen, participants were told that a leading Japanese retailer called "Digital World" is planning to offer its products online to North American consumers. On the computer screen, participants were then given the proposed English language website of Digital World, which manipulated scarcity absent versus present (see Appendix I). The websites were modeled on real online retailers, and featured a picture of a fictitious brand of portable DVD player (BOSIN©) with ad copy reading: "Enjoy your favorite movies on the go with BOSIN© Portable DVD Player." The scarcity present website then read: "ONE DAY ONLY! $120 Special Deal", while the scarcity absent website read: "$120 Special Deal."

Time precision was manipulated in the website by adding a digital countdown clock showing time is left before the deal expires. In the high time precision website, the digital countdown clock displayed time left before the deal expiration to the millisecond ("Offer will expire in: 23 hours 56 minutes 23 seconds 00 millisecond"). In the low time precision website, the digital countdown clock displayed time left before the deal expiration to the second ("Offer will expire in: 23 hours 56 minutes 23 seconds"). The digital clock kept counting down time while participants perused the website. After reading the website, participants responded to the dependent and mediating variables. Finally, participants were debriefed, thanked, and dismissed.

The dependent variable of product evaluation was measured by purchase intent, using the same scale as in study 1. The mediating variable of perceived inconvenience was measured using a four-item scale ($\alpha = .84$): "It would be

inconvenient for me to take advantage of the special deal for the BOSIN portable DVD player," "I feel it might be bothersome to take advantage of the special deal for the BOSIN portable DVD player," "I feel it might be a hassle to take advantage of the special deal for the BOSIN portable DVD player," and "It might be difficult for me to take advantage of the special deal for the BOSIN portable DVD player." (1/Strongly disagree, 9/Strongly agree). My four-item scale was based on a three scale for perceived inconvenience validated by Sinha, Chandran, and Srinivasan (1999).

The scarcity manipulation was checked with the two item scale used in study 1(α = .84). The scarcity manipulation was successful with a significant difference between the scarcity absent and present conditions (M = 2.97 vs. 4.92; $t(98) = 6.56$, $p < .001$). The time precision manipulation was checked by measuring the degree to which respondents perceived that time passes quickly by a three-item (α = .97) adapted by Gorn, Chattopadhyay, Sengupta, and Tripathi (2004): "When you read the webpage, how did you perceive time to be passing? (1/Very slowly, 9/Very fast; 1/Not speedily, 9/Very speedily; 1/Not quickly, 9/Very quickly). The manipulation was successful with a significant difference between time precision low and high conditions (M = 4.99 vs. 5.85; $t(66) = 2.22$, $p < .03$).

Results

Hypothesis H2 proposed that scarcity has a stronger positive effect on product evaluation when time precision is low, compared to high. H2 was tested with ANOVA; means and standard deviations are shown in Table 12. Scarcity increased purchase intent when time precision is low and high respectively (M =

3.68 vs. 5.76; $t(64) = 4.73$, $p < .006$ & $M = 3.68$ vs. 4.73; $t(64) = 2.23$, $p < .05$). Consistent with H2, scarcity was more effective when time precision was low, compared to high. Respondent showed higher purchase intent toward the portable DVD player when time precision was low, compared to high ($M = 4.73$ vs. 5.76; $t(66) = 2.32$, $p < .03$).

Insert table 12 about here

My proposed mechanism underlying H2 was that scarcity is more likely to be perceived as causing inconvenience when time precision is high, compared to low. As a result, scarcity would have a weaker positive effect on product evaluation when time precision is high, compared to low. I tested this mechanism using a four-step mediation analysis within 'scarcity: present' condition, with perceived inconvenience as the mediating variable (Baron and Kenny 1986). Table 13 summarizes the results of the mediation analyses – see Table 12 for means and standard deviations. As shown in Table 13, the four conditions for mediation were met for purchase intent as dependent variable. First, the time precision had a significant effect on the dependent variable; second, the time precision had a significant effect on the mediating variable; third, the mediating variable had a significant effect on the dependent variable; fourth, the effect of time precision on the dependent variable was reduced to non-significance when the mediating variable was included, and the Sobel test for reduction in effect was significant – and the mediating variable remained significant at the fourth step.

Insert table 13 about here

The results of study 2 supported hypothesis H2. Scarcity had a stronger positive effect on purchase intent when time precision was low, compared to high. Further, consistent with my proposed mechanism, perceived inconvenience mediated the effect of time precision on product evaluation. Note that study 1 and study 2 focused on moderators which are related to time flexibility.. Time pressure (study 1) was associated with reducing flexibility of the time available for consumers to take advantage of the offer promoted under scarcity; time precision (study 2) was associated with reducing perceived time flexibility by magnifying the passage of time remaining before deal expiration. In the next two studies (study 3 and study 4), I focus on moderators which are related to contextual flexibility. In particular, study 3 examines the role of store flexibility in moderating the effect of scarcity on product evaluation. In addition, study 3 replicates results in a new product category, namely wine.

STUDY 3

Store Flexibility

Store flexibility can be defined as the degree of freedom that consumers have in how they navigate through a specific store (Dabholkar, Thorpe, and Rentz 1996; Vrechopoulos et al. 2004). Store flexibility plays an important role in directing consumers' in-store navigation. It can influence how customers walk around the store and browse products displayed in the store. For example, some stores like IKEA are often designed with a one-way layout, which leads customers along specific paths through as many store sections or departments as possible (see Appendix J). This one-way store layout constricts consumers' navigations to

pre-determined paths, and hence reduces flexibility in the choice of ways to navigate through a store and browse products. In contrast, some stores are designed in a grid layout. A grid layout is a rectangular arrangement of displays and long aisles that generally run parallel to one another (see Appendix J). Past research shows that such a grid layout provides consumers with a high degree of flexibility in choosing ways of navigating through a store and browsing products (Levy and Weitz, 2001; Vrechopoulos et al. 2004).

Consider the case when store flexibility is low. This might be the case, for example, when consumers shop in a store with a one-way layout. Since the one-way store layout constricts consumers' navigations to pre-determined paths, consumers feel low flexibility in the choice of ways to navigate the store and browse products. Reactance theory predicts that such reduced store flexibility could prompt consumers to seek to restore their flexibility in product choice. Therefore, when consumers make a product choice with scarcity in a store with low flexibility, they are more likely to be sensitive to the restriction of flexibility due to scarcity. Thus, reduced flexibility due to low store flexibility can increase reactance against scarcity. Such increase of reactance against scarcity should lead people to feel inconvenience, which is a negative feeling about the offer promoted under scarcity. This negative feeling, in turn, can transfer to the product promoted under such an offer, and hence would reduce the positive effect of scarcity on product evaluation.

Conversely, consider the case when store flexibility is high. This might be the case, for example, when consumers shop in a store with a grid store layout. In this case, consumers feel high degrees of flexibility in choosing ways of

navigating through the store and browsing products. Such increased store flexibility is less likely to motivate people to restore their sense of flexibility in product choice. Therefore, consumers in a high store flexibility situation are less likely to be sensitive to the restriction of time flexibility due to scarcity. In this case, high store flexibility would not increase reactance against scarcity. Thus these consumers are less likely to experience a negative feeling of inconvenience driven by scarcity. Instead, they should be more likely to rely on the "scarcity=value" heuristic, which would predict a positive effect of scarcity on product evaluation. My preceding arguments are summarized in the following hypothesis:

H3: Scarcity has a stronger positive effect on product evaluation when store flexibility is high, compared to low.

Method

This study was designed as a 2 (Store Flexibility: Low vs. High) x 2 (Scarcity: Absent vs. Present) mixed design, where scarcity was manipulated within subjects and store flexibility was manipulated between subjects. One hundred and ten undergraduate students at a large university in Canada were paid $10 each to participate in the study.

The study was ostensibly about consumer responses to new wine brands. Participants were asked to imagine a shopping situation in which were invited to a party and needed to pick up a bottle of wine at a wine store. When they enter the wine store, they are handed a flyer describing special deals currently being offered on two wine brands. They decide to buy one of these two wine brands on special. With this scenario, participants' store shopping experiences at the wine store were

simulated using a color slide showing the layout of the wine store where participants are shopping. This protocol has been found to be effective for examining the effects of shopping environments on customers perceptions (e.g., Eroglu and Machleit 1990; Hui and Bateson 1991; Machleit, Eroglu, and Mantel 2000). The store flexibility was manipulated by using color slides showing two different layout patterns at the wine store (see Appendix K). The low store flexibility slide represented the wine store with a one-way layout design, while the high store flexibility slide represented the wine store with a grid layout design. Since all other variables (e.g., the number of wine shelves and size of each wine shelf) were kept the same in the color slides, the only difference between the slides was the layout pattern. After seeing the color slide showing the inside of the store and their current position in the store, participants were asked to take a moment to think about how they would navigate through the store and browse products on the shelves, from the store entrance where they are currently standing to the shelves containing the special wine deals.

After then, participants were shown a flyer describing special wine promotion, which manipulated scarcity of two fictitious wine brands under special deals. The flyer was modeled on real-world advertising flyers (see Appendix L), and feature pictures of two wines with the following descriptions – "Maison Mylène 2008: The 2008 Maison Mylène displays impressive depth and sweetness, with a good texture, sweet tannins, and a well-balanced finish" and "Pierrot 2008: The 2008 Pierrot is rich and intense, displaying soft and sweet tannins. It has impressive texture and a lovely lingering finish". The scarcity was manipulated within subjects by varying the amount of time available for each brand. For the

brand under scarcity present condition, a scarcity claim "ONE DAY ONLY! BUY NOW" was placed under the picture of brand. For the brand under scarcity absent condition, there is no scarcity claim. The two levels of scarcity (absent versus present) were counterbalanced across the two wine brands, and both brands were promoted with the phrase "Special Deal $15." After perusing the flyer for the wine brands, participants responded to the dependent variable of product evaluation, the mediating variable, and manipulation checks for scarcity and store flexibility. Finally, participants were debriefed, thanked, and dismissed.

Product evaluation was measured by choice of wine: "If you had to choose between Maison Mylène 2008 and Pierrot 2008, which wine brand would you buy?" The mediating variable of perceived inconvenience was measured using the same four-item scale ($\alpha = .94$ for brand with scarcity claim, $\alpha = .85$ for brand without scarcity claim) used in study 2. The scarcity manipulation was checked with the same two-item scale used earlier ($\alpha = .84$ for brand with scarcity claim, $\alpha = .74$ for brand without scarcity claim). The scarcity manipulation was successful with a significant difference between the scarcity absent versus present conditions ($M = 2.15$ vs. 6.74; $t(109) = 19.48$, $p < .001$). The store flexibility manipulation was checked by a three-item scale ($\alpha = .84$) developed for this study: "I had a lot of / freedom / control / flexibility in the way I could browse all the wines on shelves at this wine store (1/Strongly Disagree, 9/Strongly Agree). The store flexibility manipulation was successful with a significant difference between the low store flexibility versus high conditions ($M = 3.93$ vs. 6.19; $t(108) = 6.36$, $p < .001$).

Results

H3 proposed that scarcity would have a stronger positive effect on product evaluation when store flexibility is high, compared to low. Consistent with H3, and as shown in Figure 5, choice of the wine brand under scarcity claim was higher when store flexibility was high compared to low, χ^2 (1) = 10.73, p < .001. When store flexibility was high, 73% of participants chose the wine brand promoted with scarcity and 27% chose the wine brand promoted without scarcity. In contrast, when store flexibility was low, only 42% of participants chose the wine brand promoted with scarcity while 58% chose the wine brand promoted without scarcity. These results show that the usually positive effect of scarcity on product evaluation can be weakened when store flexibility is low.

Insert figure 5 about here

My proposed mechanism underlying H3 was that scarcity is more likely to be perceived as causing inconvenience when store flexibility is low, compared to high. As a result, the positive effect of scarcity on product evaluation would be diluted when store flexibility is low compared to high. I tested this mechanism using a four-step mediation analysis (Baron and Kenny 1986), with perceived inconvenience for the wine brand promoted with scarcity as the mediating variable and the dependent variable as the selection of the wine brand promoted with scarcity (1 = choice of the wine brand promoted with scarcity; 0 = no choice). Results supported the mediating role of perceived inconvenience, where perceived inconvenience mediated the interaction of scarcity and store flexibility for choice of the wine brand promoted with scarcity as dependent variable. Table 14 summarizes the results of the mediation analyses. As shown in Table 14, the four

conditions for mediation are met for choice of the wine brand promoted with scarcity. First, the scarcity x store flexibility interaction was significant on the dependent variable; second, the scarcity x store flexibility interaction was significant on the mediating variable; third, the mediating variable had a significant effect on the dependent variable; fourth, the scarcity x store flexibility interaction on the dependent variable was reduced to non-significance when the mediating variable was included, and the mediating variable remained significant at the fourth step.

Insert table 14 about here

Study 3 supported H3 by showing scarcity increases the choice of product when store flexibility is high, but not when store layout flexibility is low. Further, consistent with my proposed mechanism, perceived inconvenience mediated the interactive effect of scarcity and store flexibility on product evaluation. Note that study 3 focused on a moderator – store flexibility – which is related to contextual flexibility in the store. In study 4, I examine another moderator – incentive flexibility – which is related to contextual flexibility within the offer. Note that the previous three studies (i.e., studies 1-3) focused on scarcity in terms of time restriction (e.g., "limited time offer"). Study 4 extends my investigation to another type of scarcity commonly used in marketing, namely quantity restriction (e.g., "limited quantities"). Study 4 also replicates results in a new product category, namely compact camcorders.

STUDY 4

Incentive Flexibility

Based on the definition of flexibility in consumer choice (Chernev 2003), I define incentive flexibility as the degree of freedom that consumers have to select specific components of an incentive. Marketers frequently use scarcity together with incentives, as in the following example: "One day only. Special Deal $120. Bonus: Choose a free gift worth $20 if you buy now." Such incentives can vary in terms of their flexibility. For example, an advertisement announcing "Bonus: Choose one of the following accessories free" would provide the consumer with high degree of incentive flexibility. In this case, consumers can control the selection of the specific form of the incentive (i.e., additional bonus item). In contrast, the same ad with the announcement "Bonus: We will include one of the following accessories free. Note that the choice of accessory is at the seller's discretion" would provide the consumer with low incentive flexibility. In this case, the selection of the specific form of the incentive (i.e., additional bonus item) is determined by the marketer.

Consider the case when scarcity is accompanied by low incentive flexibility. Since a marketer does not provide consumers with the freedom to choose incentive options based on their own preference, consumers feel a low degree of flexibility in selection of their incentive. Reactance theory predicts that such reduced flexibility could prompt consumers to seek to restore their flexibility in product choice. Therefore, when people in low incentive flexibility situations are forced to make a product choice within a restricted time frame, they are more likely to sensitive to such a restriction of flexibility due to scarcity. Thus, reduced flexibility due to low incentive flexibility can increase reactance against scarcity. Such increase of reactance against scarcity should lead people to feel

inconvenience, which is a negative feeling about the offer promoted under scarcity. This negative feeling, in turn, can transfer to the product promoted under such an offer, and hence would reduce the positive effect of scarcity on product evaluation.

Conversely, consider the case when scarcity is accompanied by high incentive flexibility. Since a marketer provides consumers with the high freedom to choose incentive options based on their own preference, consumers feel a high degree of flexibility in selection of their incentive. Such increased flexibility is less likely to prompt people to restore their sense of flexibility in product choice. Therefore, people in high incentive flexibility situations are less likely to be sensitive to the restriction of time flexibility due to scarcity. In this case, high incentive flexibility would not increase reactance against scarcity. Thus these people are less likely to experience a negative feeling of inconvenience driven by scarcity. Instead, they should be more likely to rely on the "scarcity=value" heuristic, which would predict a positive effect of scarcity on product evaluation. My preceding arguments are summarized in the following hypothesis:

H4: Scarcity has a stronger positive effect on product evaluation when incentive flexibility is high, compared to low.

Method

This study was designed as a 2 (Incentive flexibility: Low vs. High) x 3 (Scarcity: Quantity vs. Time vs. Control) between-subjects ANOVA. One hundred fifty undergraduate students at a large university in Canada were paid $10 each to participate in the study.

The experiment runs through computers individually. Participants were

told that a leading Japanese online store called "Digital World" is planning to offer its products online to North American consumers. On the computer screen, participants were then given the proposed English language website of Digital World, which manipulates scarcity of a fictional brand of compact camcorder (see Appendix M). The websites were modeled on real online retailers, and feature a picture of a brand of compact camcorder (BOSIN©) with ad copy reading: "Capture the true beauty of every moment with the BOSIN© HD camcorder." The scarcity in time claim website then reads: "ONE DAY ONLY! $290 Special Deal," while the scarcity in quantity claim website reads: "ONLY A FEW ITEMS LEFT! $290 Special Deal." In the control condition, the website did not include any sales restriction and read: "$290 Special Deal."

Incentive flexibility was manipulated in the website by varying the degree of freedom that participants select a bonus item offered with the product promoted. The 'high incentive flexibility' website included the phrase "Bonus. You can choose one of the following accessories free," while the 'low incentive flexibility' website included the phrase "Bonus. We will include one of the following accessories free. Note that the choice of accessory is at the seller's discretion." Three camcorder accessories (i.e., 'Camcorder Case', 'Camcorder Tripod', and 'Camcorder Remote Control') were presented as bonus accessories. A pilot study among a similar group of students indicated these three bonus accessories had similar attitudes on a two-item scale: 1/Dislike a Lot, 9/Like a Lot and 1/Not Attractive At All, 9/Very Attractive ($M = 5.25$ vs. 5.18 vs. 5.23; $t(39) = .68$, $p > .49$; $t(39) = .09$, $p > .92$; $t(39) = -.41$, $p > .67$). After reading the website,

participants responded to the dependent and mediating variables. Finally, participants were debriefed, thanked, and dismissed.

The dependent variable of product evaluation was measured by purchase intent, using the same scale as before. The mediating variable of perceived inconvenience was measured using the same four-item scale used earlier. Both the scarcity in time manipulation was checked with the two item scale used earlier ($\alpha = .96$); the manipulation was successful with a significant difference between the scarcity in time and the scarcity absent conditions ($M = 2.58$ vs. 5.90; $t(98) = 9.07$, $p < .001$). The scarcity in quantity manipulation was checked by a two-item scale ($\alpha = .87$): "How many camcorders were available for sale?" (1/Few, 9/Many) and "What was the availability of the camcorders?" (1/Low availability, 9/High availability). The scarcity manipulation was successful with a significant difference between the scarcity in quantity versus the scarcity absent conditions ($M = 2.99$ vs. 6.24; $t(98) = 15.27$, $p < .001$). The incentive flexibility manipulation was checked by a three-item scale developed for the present study ($\alpha = .93$): "I had a lot of / freedom / control / flexibility / in choosing the bonus accessories offered with the BOSIN camcorder (1/Strongly Disagree, 9/Strongly Agree). This manipulation was successful with a significant difference between high and low incentive flexibility conditions ($M = 3.24$ vs. 6.61; $t(148) = 10.92$, $p < .001$).

Results

H4 proposed that scarcity has a stronger positive effect on product evaluation when incentive flexibility is high, compared to low. H4 was tested with ANOVA; cell means and standard deviations are shown in Table 15. Scarcity x incentive flexibility ANOVA on purchase intent revealed a significant interaction

(F(2, 144) = 3.00, p < .05), along with a main effect of incentive flexibility (*F*(1, 144) = 18.01, *p* < .001), but no main effect of scarcity (*F*(1, 144) = 1.94, *p* > .14). Consistent with H4, scarcity in time increased purchase intent when incentive flexibility was high (*M* = 4.44 vs. 5.88; *t*(48) = 2.45, *p* < .02), but not when incentive flexibility was low (*M* = 4.20 vs. 4.04; *t*(48) = -.29, *p* > .77). Similarly, scarcity in quantity increased purchase intent when incentive flexibility was high (*M* = 4.44 vs. 5.68; *t*(48) = 2.60, *p* < .02), but not when incentive flexibility was low (*M* = 4.20 vs. 4.08; *t*(48) = - .26, *p* > .79).

Insert table 15 about here

My proposed mechanism underlying H4 was that scarcity is more likely to cause inconvenience when incentive flexibility is low, compared to high. As a result, scarcity would have a weaker positive effect on product evaluation when incentive flexibility is low, compared to high. I tested this mechanism using a four-step mediation analysis, with perceived inconvenience as the mediating variable (Baron and Kenny 1986). Results supported the mediating role of perceived inconvenience with regards to scarcity in time and scarcity in quantity, respectively, and for purchase intent as dependent variable. Table 16 summarizes the results of the mediation analyses – means and standard deviations are shown in Table 15. These results indicate that the effect of the product quantity-limit restriction on product evaluation operates in a similar manner to the time-limit restriction on product evaluation.

Insert table 16 about here

Study 4 supported H4 by showing scarcity increases purchase intent when incentive flexibility is high, but not when incentive flexibility is low. Further, consistent with my proposed mechanism, perceived inconvenience mediated the interactive effect of scarcity and incentive flexibility on product evaluation.

GENERAL DISCUSSION & FUTURE RESEARCH

Scarcity is used in marketing communications for many products and services. In this essay, I identified four new moderating variables –time pressure (study 1), time precision (study 2), store flexibility (study 3), and incentive flexibility (study 4). I also showed that these effects are mediated by perceived inconvenience due to scarcity. The results were consistent across four product categories and three measures of product evaluation including choice.

This essay makes two theoretical contributions to the literature on scarcity. First, I identify new moderators of the effect of scarcity on product evaluation. Past research indicates that scarcity often has a positive effect on product evaluation. As discussed earlier, this positive effect has been explained by a "scarcity = value" heuristic established by intuition and evolution. In contrast, I show in four studies that scarcity increases product evaluation only within certain boundary conditions namely when time pressure is low, time precision is low, store flexibility is high, or incentive flexibility is high. When any of these conditions are violated, scarcity ceases to increase product evaluation.

My moderators extend past research which has identified other boundary conditions of scarcity such as such as price discount, need for cognition (Inman et al. 1997), need for closure (Jung and Kellaris 2004), need for uniqueness

(Amaldoss and Jain 2005), and spatial distance (Van Herpen et al. 2009). An important distinction between my moderators and those in previous research is that the latter are based on the "scarcity=value" heuristic, while my moderators focus on of the role of scarcity in reducing consumers' freedom of choice. For example, as discussed earlier in essay 1, Inman et al (1997) showed that scarcity increases product evaluation for low need for cognition, but not high need for cognition, individuals. The proposed reason for this effect was that "scarcity=value" is a heuristic, and is hence more likely to be used by individuals with low need for cognition. Similarly, Inman et al. (1997) showed that scarcity increases product evaluation only when the accompanying price discount is high, since diagnosticity of the "scarcity=value" heuristic is greater when price discount is high compared to low. Likewise Amaldoss and Jain (2005) showed that consumers with a high, versus low, desire for uniqueness assign greater value to scarce products. These individuals believe that scarce products are likely to be more unique or exclusive than abundant products, and hence can be used as a way of differentiating themselves from others. Such uniqueness value of scarcity is a factor underlying the "scarce=good" heuristic. In a similar manner, other moderators of scarcity in past research such as need for closure, product familiarity and spatial distance can be traced back to consumers' reliance on the "scarce=good" heuristic.

My moderators add to past research on reactance theory. Past research on reactance theory indicates that when people perceive that their freedom or flexibility has been restricted, they feel inconvenienced, and hence react negatively against the source of the restriction on their freedom (Brehm 1966;

Grabitz-Gniech 1971; Edwards, Li, and Lee 2002; Fitzsimons and Lehmann 2004). Past research also indicates that reactance can be increased by a range of external factors such as forced exposure (Edwards, Li, and Lee 2002), choice restriction (Fitzsimons and Lehmann 2004; Kivetz 2005), choice elimination (Fitzsimons 2000), and spatial confinement (Levav and Zhu 2009). In this essay, I extend this literature by identifying new external factors that increase reactance against scarcity, namely time pressure, time precision, store flexibility, and incentive flexibility. Two of my moderators, namely time pressure and time precision, reduce time flexibility; while the other two moderators of moderators of store flexibility and incentive flexibility reduce contextual flexibility. Across four studies, I showed that these four factors increase consumers' reactance against scarcity, and hence moderate the effect of scarcity on product evaluation.

A key question about the four moderators identified in this essay is: do these moderators apply uniquely to scarcity, or are these moderators applicable to other marketing claims? I would argue that my proposed moderators are potentially applicable to other types of marketing claims. The studies in this essay showed that scarcity claims can be considered as a restriction introduced by marketers on quantity and time. Marketers also use claims drawing upon other types of restrictions to influence consumers, such as purchase precondition restriction (e.g., "requires minimum purchase of $__") or additional purchase restriction (e.g., "must be purchased together with __"). The moderators proposed in this essay would be applicable to many such marketing claims based on restrictions. For example, consumers could perceive the purchase precondition restriction claim (e.g., "Deal price available only if the buyer spends $50 or

more") as intended to limit purchase-oriented flexibility. When people are under high time pressure, the reduced time flexibility due to this pressure could magnify reactance against the purchase precondition restriction claim. Similarly, time precision, store flexibility, and incentive flexibility could lead to increase of reactance against such restriction-based marketing claims. Future research could verify these propositions regarding the applicability of my moderators to other marketing claims. As an aside, the more applicable are my moderators to other marketing claims, the greater would be the generalizability of my model.

A second theoretical contribution of my research is a new psychological mechanism underlying the effect of scarcity on product evaluation. The mechanism proposed in the past research is that individuals perceive scarcity as a signal of consumer demand and hence product value. In contrast, I showed that individuals perceive scarcity as causing inconvenience. A key characteristic of scarcity is that it reduces consumers' freedom of choice – in a situation with no scarcity, consumers can make a choice whenever they want; in contrast, when scarcity is present, consumers are forced to make a choice within a restricted timeframe. This reduction in consumer freedom or flexibility can create a negative feeling of inconvenience, which in turn should reduce the positive effect of scarcity on product evaluation. Supportive of my mechanism, perceived inconvenience due to scarcity mediated the interaction of scarcity with time precision (study 2), store flexibility (study 3), and incentive flexibility (study 4). The role of perceived inconvenience in my model is consistent with the reactance theory literature, which shows that when people perceive that their freedom has been restricted, they feel inconvenienced, and hence react negatively against the

source of the restriction on their freedom (Brehm 1966; Edwards, Li, and Lee 2002; Fitzsimons and Lehmann 2004). I illustrate this general tendency in the context of scarcity, where I showed that people are more likely to perceive scarcity as causing inconvenience when their reactance against scarcity is magnified.

From a methodological perspective, the studies in this essay demonstrated the robustness of my model in different ways. First, my results were also replicated in four product categories, namely digital camera, DVD player, wine products, and Camcorder. Also, the effect of scarcity on product evaluation in my studies was measured by three different dependent variables – namely attitude towards a product, purchase intent, and choice of brand. In summary, this essay offers convergent evidence for my moderators across four product categories and three measures of product evaluation, including choice.

My research is relevant to practitioners, such as brand managers and advertising agencies, for the effective use of scarcity. Notably, my moderators can operate in many real-life situations where consumers are exposed to scarcity. As our society has become modernized, our life has become busier than ever before. Therefore, people are more frequently under high time pressure due to their busy schedules. It is more likely that people face scarcity claims while in high time pressure situations. The representation of time in scarcity claims, i.e., the time precision, can be influenced by internet advertisements using digital countdown clocks with varying degrees of precision. Store flexibility could be influenced by retail shops with a one-way layout constricting customers' navigations to pre-determined paths whose purpose is to force people to visit as many sections of the

store as possible. As well, incentive flexibility can be influenced by marketers using scarcity together with additional incentives such as bonus gifts. These aspects of the marketplace indicate that the boundary conditions of scarcity in the present research can have a significant effect on real-life consumer judgment and choice.

My studies can also provide guidance to practitioners for the effective use of scarcity. First, my results show that scarcity is not likely to work when people are under high time pressure. Hence, managers should avoid using scarcity claims when consumers' time schedule is likely to be relatively busy (e.g., on weekdays). Instead, they can use scarcity claims more effectively when consumers' time schedules are likely to be relatively flexible (e.g., during weekends or over holiday periods). Second, my results report that the use of digital countdown clocks with high time precision can unnecessarily magnify the passage of time, and thus highlight perceived inconvenience due to scarcity. Hence, when managers want to use the digital countdown clocks showing time left before deal expiration, they should avoid using time representations in milliseconds. Scarcity claims are likely to be more effective when such clocks deliver the time left before deal expiration in a natural way (i.e., hours-minutes-seconds). Third, my results also indicate that scarcity claims are likely to be more effective when consumers feel a high degree of freedom within the store environment. For example, scarcity claims are not likely to work well if consumers can feel spatial restrictions by such physical arrangements as one-way layout and narrow aisles. Hence, managers should put scarcity-promoted products in store environments where consumers are likely to feel a high degree of freedom. Scarcity claims are

likely to work well when products promoted under scarcity claims are placed on shelves around open space or near wide aisles. Finally, my results report that when marketers use scarcity claims together with incentives, scarcity claims are likely to be more effective when marketers give consumers freedom in the choice of incentives rather than predetermining the nature of the incentive. Hence, managers should ensure that they provide consumers with the freedom to choose incentive options based on their own preferences when they use scarcity claims together with other incentives.

The studies herein suggest several avenues for future research. Factors conceptually related to consumers' perception of time flexibility, such as time horizon, could moderate the effect of scarcity on product evaluation. Time horizon can be defined as people's perception regarding the length of time left in life (Volder and Lens 1982; Williams and Drolet 2005), According to time horizon theory (Carstensen, Isaacovitz, and Charles 1999; Williams and Drolet 2005), people tend to assess time as either limited or expansive. People with a limited time horizon are more feel that they are approaching the end of their lives and their time left in life is short. In contrast, people with an expansive time horizon are more feel that their future is infinite and their time left in life is long. Past research indicates that time horizon perspective is strongly associated with chronological age. Older adults tend to view their time as limited, while younger adults tend to view their time as expansive. This is because older adults recognize that they are approaching the end of their lives and their time left in life is running out (Carstensen, Isaacovitz, and Charles 1999). It is likely that older adults having a sense that future time is limited (e.g., life is short) may feel that they have a

large number of things to do in the short period before the end of their lives. Therefore, when such older adults face an offer promoted under scarcity, they may be more likely to feel that they don't have sufficient flexibility in their time schedule to adapt to the constraints of such an offer. Therefore, older adults may be more likely to be sensitive to lack of time flexibility due to scarcity, leading to the dilution of positive effect of scarcity on product evaluation. If so, scarcity claims maybe be relative ineffective in older adults. Thus, future research could examine the influence of age and its associated time horizon perspective on responses to scarcity claims. This future research could reveal that certain market segments may be less "scarcity-influenced" than others.

Researchers could also investigate store environment-related factors, such as consumer density, that highlight perceived inconvenience and hence moderate the effectiveness of scarcity. Consumer density can be defined as the number of consumers present in a given unit of physical space (Hui and Bateson 1991; Machleit, Eroglu, and Mantel 2000). When many people occupy a limited space, the individual will perceive the environment as being one of high density; in contrast, when few people occupy a limited space, that individual will perceive that environment as being one of low density (Machleit, Eroglu, and Mantel 2000). It is possible that when consumers are in a cramped store setting occupied by many people, they feel low degrees of spatial flexibility in their physical activities. Such a reduced spatial flexibility could highlight lack of time flexibility driven by scarcity; if so, scarcity could be relatively ineffective in cramped stores.

Individual different variables conceptually related to reactance, such as dispositional reactance, could also moderate the effect of scarcity on product

evaluation. Dispositional reactance can be defined as one's tendency to react negatively toward any kind of threats to one's behavioral freedom (Wiium et al. 2009). When people have high dispositional reactance, they react negatively toward any kind of threats to their behavioral freedom. Therefore, it is likely that when people high in dispositional reactance face scarcity, they are more likely to be sensitive to the restriction driven by scarcity, leading to a dilution of the positive effect of scarcity on product evaluation.

Male and female shopping styles differ, and these gender differences could influence the effectiveness of scarcity. For example, research has shown that women shopping together spend almost twice as long in a store than do men shopping with women or with other men (Underhill 1999). Given this finding, it seems plausible that when women shop together, they are more likely to want to browse longer without any time restriction. Therefore, women shopping together may be more likely to be sensitive to reduced flexibility due to scarcity, thereby diluting the positive effect of scarcity on product evaluation. Future research focusing on the gender differences could empirically clarify this issue.

Future research could examine whether emotions other than inconvenience can mediate the effect of scarcity on product evaluation. A particularly interesting emotion in this regard is anxiety, which is a negative feeling that can arise when people face uncertainty (Maister 1985). A negative feeling of anxiety may lead to dilution of an otherwise positive effect of scarcity on product evaluation. However, I argue that feelings of inconvenience offer a clearer explanation for the results in my second essay, compared to feelings of anxiety. As stated above, anxiety is related to uncertainty. However, there was little or no scope for

uncertainty in this essay. For example, the ads in my studies clearly mentioned time restriction or quantity restriction without any uncertainty about their occurrence. Since uncertainty is absent, I argue that that anxiety would be low and irrelevant to my proposed model. However, in order to address this issue empirically, future research could anxiety using the PANAS scale (Watson, Clark, and Tellegen 1988) and test its mediating role my proposed model.

There are some limitations of the present research that should be noted. In the four studies, I communicated scarcity using a "One day only" claim. The impact of scarcity on product evaluation could, however, differ with the use of different durations. It is likely that as time restriction periods become shorter (e.g., "One hour only"), consumers may be more likely to perceive it as too restrictive to take advantage of such an offer. Therefore, compared to using a longer time restriction period (e.g., "One day only"), using a shorter time restriction period (e.g., "One hour only") may be more likely to elicit reactance on the part of consumers, leading to dilution of the positive effect of scarcity. However, at the same time, as time restriction periods become longer (e.g., "One month only"), consumers may feel less attracted to an offer promoted under scarcity. This is because when a time restriction period lasts too long, consumers may not perceive the promoted offer promoted as being special, leading to interpretation of less value for such an offer. Thus, future research could investigate whether scarcity claims using different time restriction periods lead to different impacts on the positive effect of scarcity on product evaluation.

In this essay, all the experiments were conducted in the laboratory. As with any experimental method, questions could be raised about the external

validity of the results. These questions are partly addressed by the convergence of my results across different experimental setup, and by my use of relatively realistic stimuli. However, it would be useful to replicate my findings in real-world settings such as retail stores. For example, future research could run a replication of study 3 that investigates the moderating role of store flexibility. The level of store flexibility could be manipulated by physical arrangements in an actual retail store. In the low store flexibility condition, products promoted under scarcity claims would be placed on shelves near narrow aisles that constrain the movement of shoppers. In contrast, in the high store flexibility condition, products promoted with scarcity claims would be placed on shelves near wide aisles that allow for fairly free movement of shoppers. In such a study, the hypothesis would be that scarcity claims are more effective when scarcity-promoted products are placed in open spaces, compared to closed spaces.

In this essay, I did not directly measure the degree of increase of reactance against scarcity. Instead, such increased reactance was inferred by measuring perceived inconvenience (studies 2, 3, and 4). Note that this measure is a consequence of magnification of reactance. Recent research has developed a measure of state reactance by assessing whether individuals experience a perceived threat to their freedom (Dillard and Shen 2005; Quick and Stephenson 2008), using the four-item scale with such statements as "The message threatened my freedom to choose," "The message tried to make a decision for me," and "The message tried to pressure me." Future research could consider directly measuring the degree to which reactance is magnified by using a self-report scale. This would enable us to determine whether magnification of reactance against scarcity

mediates the interactive effect between the proposed moderators in my second essay and scarcity. Such research would support the argument that the moderators in my second essay are indeed logically related to reactance (and hence to perceived inconvenience).

Past research has shown that scarcity has a main effect on product evaluation. However, the results of my studies do not show a main effect of scarcity. What is the reason for this discrepancy? Note that the main effect of scarcity represents its average effect on product evaluation across boundary conditions. In my studies, I examined moderators that determine when scarcity does or does not increase product evaluation. As such, the average main effect of scarcity would be diluted by the different levels of my moderators. To replicate the main effect observed in past research, it would be necessary to collect data on scarcity in the absence of moderators. To address this issue empirically, I conducted a follow up study where I manipulated only scarcity (high versus low) within the digital camera ad used in study 1 of Essay 2. The dependent variable was purchase intent. Data from this follow up study confirmed that, in the absence of moderators, scarcity has a positive main effect on product evaluation (M = 4.32 vs. 5.76; $t(48) = 2.61$, $p < .02$).

In my first essay, I argued that my proposed moderators are logically related to persuasion knowledge (and hence to falsity inference). However, it could be argued that perceived inconvenience – rather than falsity inference, which is the underlying mechanism that I address – mediates the interactive effects between the proposed moderators in Essay 1 and scarcity. For example, reversibility of decision as a moderator in my first essay could highlight

inconvenience associated with scarcity. Low reversibility reduces flexibility for product returns, and hence could create inconvenience. However, it worth noting that product returns are a post-purchase event – where people have already made a purchase decision and the purchased product failed to perform to expectations. In contrast, study 4 of Essay 1 focused on a pre-purchase scenario. In this study, the dependent variables (WTP and purchase intent) were measured when people were considering whether they to buy a scarce product or not. Under such circumstances, people should be more likely to focus on whether the marketers are confident regarding product quality. Therefore, under the scenario considered in study 4 of Essay 1, I argue that interpretation of scarcity claims as false should be relatively more salient than feelings of inconvenience.

To address the above issue empirically, I conducted a follow-up study to examine whether perceived inconvenience mediates the interactive effect of the reversibility of decision and scarcity. In this study, I repeated the reversibility of decision study with the sunglasses webpage stimulus used in study 4 of Essay 1. However, in this follow-up study, I measured both 'falsity inference' and 'perceived inconvenience', and tested whether perceived inconvenience mediates the interactive effect of reversibility of decision and scarcity. In this follow-up study, I found that the interactive effect of reversibility of decision and scarcity was mediated by falsity inferences, but not by perceived inconvenience. Table 17 summarizes the results of the mediation analyses. These results support to the argument that my moderators in Essay 1 are logically related to persuasion knowledge (and hence to falsity inference), rather than reactance (and hence to perceived inconvenience).

A corresponding argument can be made when considering the moderators in my second essay. It could be claimed that falsity inference about scarcity – rather than perceived inconvenience, which is the underlying mechanism that I address – mediates the interactive effects between the proposed moderators in my second essay and scarcity. I empirically investigated this issue by conducting a follow-up study where I measured both falsity inference and perceived inconvenience. Specifically, I ran a replication of study 2 in Essay 2 which investigated the moderating role of time precision. Using the same design, procedure, and stimuli as reported earlier for study 2, I ran a follow up replication study where I measured both 'falsity inference' and 'perceived inconvenience.' Results of this follow-up study indicated that the interactive effect of time precision and scarcity was mediated only by perceived inconvenience, and not by falsity inference about scarcity. Table 18 summarizes the results of the mediation analyses. These results support the argument that my moderators in Essay 2 are logically related to reactance (and hence to perceived inconvenience), rather than persuasion knowledge (and hence to falsity inference).

In summary, in this essay, I took a reactance theory perspective to examine the effect of scarcity on product evaluation. This essay makes a contribution by identifying a new mechanism through which scarcity influences product evaluation, as well as four new moderators that determine when scarcity does, and does not increase product evaluation. The studies in this essay demonstrated the robustness of my model across four product categories and three measures of product evaluation including choice. This essay also offers guidelines to brand managers and advertising agencies for the effective use of scarcity in

marketing communications.

In my dissertation, I go beyond a signaling perspective on scarcity by incorporating two new theoretical perspectives: persuasion knowledge theory (essay 1) and reactance theory (essay 2). Based on these perspectives, the two essays make a theoretical contribution by identifying two new psychological mechanisms, i.e., falsify inference (essay 1) and perceived inconvenience (essay 2). In addition, the two essays identify two sets of boundary conditions relevant to the effect of scarcity on product evaluation. Future research could investigate situational or decision-making contexts where one theoretical mechanism is likely to be more dominant than the other. For example, it is possible that a combination of two moderating variables – one drawn from each of the psychological mechanisms identified above – could determine when one theoretical mechanism is more dominant than the other. The four moderating variables in essay 1 could activate or deactivate the falsity inference mechanism, while the four moderating variables in essay 2 could activate or deactivate the perceived inconvenience mechanism. For example, people shopping in a store with low store flexibility could encounter the product under the scarcity claim which is accompanied by a product return guarantee. In this case, low store flexibility could activate the perceived inconvenience mechanism, while high decision reversibility could deactivate the falsity inference mechanism. As a result, people's response toward the scarcity claim is more likely to work though the perceived inconvenience mechanism rather than the falsify inference mechanism. My dissertation could thus help managers predict the likely consumer response toward scarcity in situations related to the proposed two mechanisms.

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TABLE 1
CONSTRUCTS AND OPERATIONALIZATIONS: ESSAY 1

Study	Independent Variable		Moderating Variable		Mediating Variable		Dependent Variable	
	Name	Manipulation	Name	Manipulation	Name	Measure	Name	Product Category/ Measure
Study 1	Scarcity	High: "Hurry, only a few watches left" Low: "Many watches currently in stock"	Salience of persuasion knowledge	High: Prompting thoughts about persuasion tactics in a social context (i.e., a final exam) Low: Not thinking about persuasion tactics in a social context (i.e., a final exam)			Purchase intent Willingness to pay	Watch/ Single-item scale: "How likely is it that you would buy this watch?" Open ended scale eliciting the maximum price participants were willing to pay for the watch
Study 2	Scarcity	High: "Hurry, only a few items left" Low: "Many items currently in stock"	Frequency of exposure	High: Scarcity claims into four ads in a magazine Low: Scarcity claims into one ad in a magazine	Falsity inference	Two-item scale: "The ad was being honest about the number of sunglasses available for purchase," and "The ad tried to artificially increase sales by mentioning the number of sunglasses available for purchase."	Purchase intent Willingness to pay	Sunglasses/ Single-item scale used in other studies Open ended scale used in other studies
Study 3	Scarcity	High: One unit of the brand on display with the scarcity claim (i.e."Hurry, last item in stock") Low: Ten units of the brand on display without any scarcity claim	Disconfirmation of scarcity	Present: Additional quantities of the brand with the scarcity claim are visible in a box Absent: There is no box showing additional quantities of the brand with the scarcity claim			Choice of brand	USB products/ It was measured by participants' actual choice of USB brand
Study 4	Scarcity	High: Scarcity present (Quantity): "Hurry, only a few items left" Scarcity present (Time): "Hurry, limited time offer" Scarcity absent: (Control) Did not include any scarcity claim	Reversibility of decision	High: Adding the phrase "30 day unconditional money-back guarantee" Low: Adding the phrase "All sales are final"	Falsity inference	Two-item scale: "The ad was being honest about the number of sunglasses available for purchase (time available for purchase)," and "The ad tried to artificially increase sales by mentioning the number of sunglasses available for purchase (time available for purchase)."	Purchase intent Willingness to pay	Sunglasses/ Single-item scale used in other studies Open ended scale used in other studies

TABLE 2
CONSTRUCTS AND OPERATIONALIZATIONS: ESSAY 2

Study	Independent Variable		Moderating Variable		Mediating Variable		Dependent Variable	
	Name	Manipulation	Name	Manipulation	Name	Measure	Name	Product Category/ Measure
Study 1	Scarcity	Present: "One day only" Absent: No scarcity claim	Time pressure	High: The day is packed by full of appointments Low: The day has only two appointments			Attitude towards the product Purchase intent	Digital camera/ Three-item scale: "The digital camera is" (1/Undesirable, 9/Desirable; 1/Unattractive, 9/Attractive; and 1/Not Valuable, 9/Valuable Single-item scale: "How likely is it that you would buy this digital camera?"
Study 2	Scarcity	Present: "One day only" Absent: No scarcity claim	Time precision	High: The digital countdown clock displays time left before the deal expiration to the millisecond Low: The digital countdown clock displays time left before the deal expiration to the second	Perceived inconvenience	Four-item scale: "It would be inconvenient for me to take advantage of the special deal," "I feel it might be bothersome to take advantage of the special deal," "I feel it might be a hassle to take advantage of the special deal," and "It might be difficult for me to take advantage of the special deal."	Purchase intent	DVD player/ Single-item scale used in other studies
Study 3	Scarcity	Present: "One day only" Absent: No scarcity claim	Store flexibility	High: The wine store is described as having a one-way layout Absent: The wine store is described as having a grid layout	Perceived inconvenience	Four-item scale used in other studies	Choice of brand	Wine products/ It was measured by choice of wine: "If you had to choose between Maison Mylène 2008 and Pierrot 2008, which wine brand would you buy?"
Study 4	Scarcity	Scarcity present (Time): "One day only" Scarcity present (Quantity): "Only a few items left" Scarcity absent (Control): Did not include any scarcity claim	Incentive flexibility	High: Adding the phrase "You can choose one of the following accessories free" Low: Adding the phrase "We will include one of the following accessories free. The choice of accessory is at the seller's discretion"	Perceived inconvenience	Four-item scale used in other studies	Purchase intent	Camcorder/ Single-item scale used in other studies

TABLE 3
PAST RESEARCH ON SCARCITY

Article	Manipulation of Scarcity	Dependent Variable(s)	Moderating Variable(s)	Key Result(s)	Product Category (ies)
Balachander, Liu, and Stock (2009)	Product supply: abundant vs. scarce	Consumer demand		Scarcity at the time of product introduction had a positive effect on consumer demand for cars	Car brands
Ge, Paul, and Jin (2009)	Sold-out products in choice set: absent vs. present	Purchase intent toward available options, choice deferral		The presence of soldout product increases purchase intent toward available options and decreases choice deferral	Ski pass tickets, wine products, gym pass tickets
Van Herpen, Pieters, and Zeelenberg (2009)	Level of product inventory: low vs. high	Choice	Cause of scarcity, ownership by close others	The positive effect of scarcity is weakened under conditions of possible ownership by close others of the scarce product. The positive effect of scarcity is weakened when scarcity is said to be caused by limited supply. The positive effect of scarcity is strengthened when scarcity is seen to arise as a result of excess customer demand	Wine products
Eisend (2008)	Scarcity claims (e.g., "Limited edition"): absent vs. present	Value perception, purchase intent		Advertising with a scarcity appeal (e.g., "limited edition") increased consumer evaluations of clothing products	Clothing products
Kurtz (2008)	Level of temporal scarcity: low vs. high	Preference and participation intent		Perceived temporal scarcity of the events increases preference and participation intent for the events	College-related events
Devlin, Ennew, McKechnie and Smith (2007)	Scarcity in time claims (e.g., "For one week only"): absent vs. present	Purchase intent		Scarcity in time claim increases purchase intent	TVs
Abendroth and Diehl (2006)	Limited Purchase opportunity: low vs. high	Anticipated regret		Limited purchase opportunity increases anticipated regret associated with non-purchase decision	Shirt and Music CDs

TABLE 3

PAST RESEARCH ON SCARCITY

Article	Manipulation of Scarcity	Dependent Variable(s)	Moderating Variable(s)	Key Result(s)	Product Category (ies)
Amaldoss and Jain (2005)	Exclusivity of product	Consumer demand, product price	Desire for uniqueness	Consumers with a high desire for uniqueness show increased demand for an exclusive product as its price increases. In contrast, consumers with a low desire for uniqueness show decreased demand for an exclusive product as its price increases	Conspicuous products
Jung and Kellaris (2004)	Product supply: abundant vs. scarce	Purchase intent	Cross-national difference (U.S. vs. France), need for cognitive closure, product familiarity	The positive effect of scarcity is stronger for consumers in the United States compared to France, when individuals are less familiar with the product, and when individuals' need for cognitive closure is high compared to low	Wine products
Swami and Khairnar (2003)	Scarcity due to limited availability of seats	Sales of the event ticket at a theater		Highlighting limited number of theater tickets available increased box office sales	Event ticket
Brannon and Brock (2001)	Scarcity in time claims (e.g., "Today only"): absent vs. present	Sales of snack food	Product arguments	The positive effect of scarcity in time is stronger when product arguments are strong	Snack food
Fitzsimons (2000)	Out-of-stock product in choice set: absent vs. present	Decision satisfaction, likelihood of switching stores on subsequent shopping trips	Personal commitment to the out-of-stock product	Consumers with high personal commitment to the out-of-stock option react negatively to the stockout – they report lower satisfaction with the decision process and show a higher likelihood of switching stores on subsequent shopping trips. In contrast, consumers with low personal commitment to the out-of-stock option react positively to the stockout – the presence of an out-of-stock option leads to decreased decision difficulty, and hence increases consumers' satisfaction with their decision process	Granola bar, music CDs

TABLE 3

PAST RESEARCH ON SCARCITY

Article	Manipulation of Scarcity	Dependent Variable(s)	Moderating Variable(s)	Key Result(s)	Product Category (ies)
Inman, Peter, and Raghubir (1997)	Scarcity claims (e.g., "Limited X per customer"): absent vs. present	Product sales, deal evaluation, purchase intent	Need for cognition, price discount for the product	The positive effect of scarcity is stronger when need for cognitive is low or price discount is high	Supermarket brands
DeGraba (1995)	The scarcity induced by the sellers	Product price, purchase intent		The scarcity induced by sellers prompts consumers to buy the product at a higher price	Video games
Inman and McAlister (1994)	Length of coupons expiration dates: low vs. high	Coupons redemptions		Coupons with expiration dates are redeemed more	Coupons for spaghetti sauce
Verhallen and Roben (1994)	Product availability: low vs. middle vs. high	Choice		People prefer recipe books that are relatively rare	Recipe books
Simonson (1992)	The limited time offer: absent vs. present	Product choice		Scarcity in time increases product choice	Camcorder and VCR
Lynn (1989)	Abundant supply vs. scarce supply	Desirability, purchase intent		Scarcity increases the perceived value of paintings	Paintings and wines
Worchel, Lee, and Adewole (1975)	Abundant supply vs. scarce supply	Attitude toward a product		Cookies in scarce supply are considered more desirable than freely available cookies	Cookies

TABLE 4

PAST RESEARCH: ACTIVATORS OF PERSUASION KNOWLEDGE

Article	Persuasion Knowledge Activator	Dependent Variable(s)	Moderating Variable(s)	Key Result(s)	Product Category (ies)
Wei, Fischer, and Main (2008)	Persuasion knowledge activated by sponsor identification: absent vs. present	Overall attitude toward brands	Brand familiarity	When consumers' persuasion knowledge is activated, consumers interpret marketers' attempts to place brands into non-advertising media as manipulative tactics. As a result, activating persuasion knowledge decreases consumer preference for brands embedded in non-advertising media (i.e., through product placements in radio programs)	Macaroni and cheese, shoes
Hardesty, Bearden, and Carlson (2007)	Persuasion knowledge activated by consumers' knowledge of pricing tactics: high vs. low	Purchase Intent		Consumers with higher levels of prior knowledge of the pricing tactics are more suspicious of pricing-persuasion appeals and evaluate the product with such appeals less favorably than those with low levels of prior knowledge of the pricing tactics	Running shoes
Kirmani and Zhu (2007)	Persuasion knowledge activated by source independence: absent vs. present	Attitude and perceived quality toward a product	Regulatory focus	When persuasion knowledge is activated, prevention-focused people are more likely to be suspicious about advertising claims for the product and evaluate the product less favorably than promotion-focused people	Digital cameras
Morales (2005)	Persuasion knowledge activated by engaging a persuasion task: absent vs. present	Willingness to pay for products sold by retailers who exert extra effort in marketing or displaying their products		When consumers' persuasion knowledge is activated, consumers perceive retailers' extra effort in designing elaborate product displays to be motivated by persuasion on the part of marketers. As a result, consumers become skeptical, discount such extra effort as a mere sales device, and hence show less favorite attitude toward the products sold by the retailers	Paper towels, canned soup, and bath towels

TABLE 4

PAST RESEARCH: ACTIVATORS OF PERSUASION KNOWLEDGE

Article	Persuasion Knowledge Activator	Dependent Variable(s)	Moderating Variable(s)	Key Result(s)	Product Category (ies)
Darke and Ritchie (2007)	Persuasion knowledge activated by prior exposure to advertising deception: absent vs. present	Overall attitude toward brands		When people learn that they have been personally deceived by an advertisement, their persuasion knowledge is activated. Such activated persuasion knowledge leads people to approach subsequent advertisements from other advertisers suspiciously	Answering machine, television set, portable stereo
Brown and Krishna (2004)	Persuasion knowledge activated by engaging a persuasion task: absent vs. present	Attitude and Choice toward products		Activating persuasion knowledge decreases consumer preference for products that include the features recommended by marketers as default options	Music keyboards, computers, vacation packages
Campbell and Kirmani (2000)	Persuasion knowledge activated by engaging a persuasion task: absent vs. present	Consumer impressions of salesperson	Cognitive Load	Activated persuasion knowledge is more likely to lead to perceptions of salesperson insincerity when consumers have low (as opposed to high) cognitive loads	Jackets

TABLE 5

SALIENCE OF PERSUASION KNOWLEDGE: ESSAY 1/ STUDY 1

	High Persuasion Knowledge		Low Persuasion Knowledge	
	Low Scarcity	High Scarcity	Low Scarcity	High Scarcity
Purchase Intent	3.29 (2.51)	2.79 (1.53)	2.95 (1.94)	4.29 (2.23)
WTP ($)	68.54 (45.69)	63.95 (41.25)	52.08 (48.13)	86.45 (55.19)

NOTE. – Values in the table are means (standard deviations)

TABLE 6

FREQUENCY OF EXPOSURE TO SCARCITY: ESSAY1/ STUDY 2

	High Frequency of Exposure		Low Frequency of Exposure	
	Low Scarcity	High Scarcity	Low Scarcity	High Scarcity
Purchase Intent	2.53 (1.63)	2.30 (1.76)	2.61 (1.35)	3.96 (2.53)
WTP ($)	40.34 (33.74)	27.88 (22.45)	37.88 (28.53)	65.26 (35.87)
Falsity Inference	4.09 (1.58)	7.69 (1.36)	5.00 (1.72)	5.38 (2.09)

NOTE. – Values in the table are means (standard deviations)

TABLE 7

MEDIATION ANALYSIS: ESSAY 1/ STUDY 2

Mediating Variable	Dependent Variable	Step 1	Step 2	Step 3	Step 4
Falsity Inference	WTP	Scarcity x Frequency of Exposure → WTP $p < .001$	Scarcity x Frequency of Exposure → Falsity Inference $p < .001$	Falsity Inference → WTP $p < .007$	Scarcity x Frequency of Exposure → WTP (Covariate: Falsity Inference) $p > .07$ Sobel $p < .002$
	Purchase Intent	Scarcity x Frequency of Exposure → Purchase Intent $p < .04$	Scarcity x Frequency of Exposure → Falsity Inference $p < .001$	Falsity Inference → Purchase Intent $p < .008$	Scarcity x Frequency of Exposure → Purchase Intent (Covariate: Falsity Inference) $p > .40$ Sobel $p < .002$

TABLE 8

DECISION REVERSIBILITY: ESSAY1/ STUDY 4

	High Decision Reversibility			Low Decision Reversibility		
	Control	Scarcity in Quantity	Scarcity in Time	Control	Scarcity in Quantity	Scarcity in Time
Purchase Intent	3.36 (1.99)	4.84 (2.51)	4.76 (2.36)	3.40 (2.06)	3.08 (1.89)	2.96 (1.67)
WTP ($)	39.80 (24.47)	62.47 (35.08)	57.20 (28.54)	40.59 (29.30)	37.20 (24.15)	35.28 (28.23)
Falsity Inference	3.94 (1.46)	4.54 (1.96)	4.98 (2.25)	3.50 (1.55)	6.60 (1.79)	6.78 (1.73)

NOTE. – Values in the table are means (standard deviations)

TABLE 9

MEDIATION ANALYSIS: ESSAY1/ STUDY 4

Mediating Variable	Outcome Variable	Step 1	Step 2	Step 3	Step 4
Falsity Inference	WTP	Scarcity in Quantity x reversibility of decision → WTP $p < .02$	Scarcity in Quantity x reversibility of decision → Falsity Inference $p < .001$	Falsity Inference → WTP $p < .02$	Scarcity in Quantity x reversibility of decision → WTP (Covariate: Falsity Inference) $p > .19$ Sobel $p < .001$
	Purchase Intent	Scarcity in Quantity x reversibility of decision → Purchase intent $p < .04$	Scarcity in Quantity x reversibility of decision → Falsity Inference $p < .001$	Falsity Inference → Purchase intent $p < .01$	Scarcity in Quantity x reversibility of decision → Purchase intent (Covariate: Falsity Inference) $p > .25$ Sobel $p < .001$
Falsity Inference	WTP	Scarcity in Time x reversibility of decision → WTP $p < .05$	Scarcity in Time x reversibility of decision → Falsity Inference $p < .002$	Falsity Inference → WTP $p < .001$	Scarcity in Time x reversibility of decision → WTP (Covariate: Falsity Inference) $p > .30$ Sobel $p < .03$
	Purchase Intent	Scarcity in Time x reversibility of decision → Purchase intent $p < .03$	Scarcity in Time x reversibility of decision → Falsity Inference $p < .002$	Falsity Inference → Purchase intent $p < .001$	Scarcity in Time x reversibility of decision → Purchase intent (Covariate: Falsity Inference) $p > .27$ Sobel $p < .02$

TABLE 10

PAST RESEARCH: MAGNIFIERS OF REACTANCE

Article	Reactance Magnifier	Dependent Variable(s)	Moderating Variable(s)	Key Result(s)	Product Category (ies)
Levav and Zhu (2009)	Reactance increased by spatial constraints: absent vs. present	Tendency to seek varied product choices		Spatially constraining people – by crowding them with others or using physical arrangements such as narrow aisles – led them to feel inconvenienced. Such feelings consequently motivated reactions against the source of the restriction. As a result, spatially confined consumers reacted against a constraint against their freedom of personal space by seeking and making more varied product choices	Candy bars and pens
Wiium, Aaro and Hetland (2009)	Reactance increased by strong smoking control measures	Attitude toward smoking control measures	Dispositional reactance	Strong smoking control measures (e.g., restrictions on marketing and sales of tobacco, tax on tobacco products, and restrictions on smoking in public places) are perceived as threatening the individual's freedom to choose among behavioral alternatives. When regular smokers are exposure to the strong smoking control measures, regular smokers with high dispositional reactance react more negatively against the strong smoking control measures rather than those with low dispositional reactance. As a result, regular smokers with high dispositional reactance showed stronger negative attitude toward the strong smoking control measure compared to those with low dispositional reactance	Tobacco
Kivetz (2005)	Reactance increased by incentive promotions: absent vs. present	Choice toward incentives given by promotions	dispositional reactance	Consumers can perceive the incentive promotions that involved the investment of future consumption effort as intended to influence their consumption behavior and limit their brand choice. Such threats to perceived freedom magnified consumer reactance. As a result, in an attempt to escape such threats, consumers tended to choose rewards that are congruent with the promoted consumption or effort activity. Effort-reward congruity of this type can allow consumers to conclude that they are engaging in the required effort activity for its own sake and not due to an externally driven restriction. Such preference for effort-reward congruity was stronger for people with a high dispositional reactance than those with a low dispositional reactance	Music CDs, movie DVDs, and books

TABLE 10

PAST RESEARCH: MAGNIFIERS OF REACTANCE

Article	Reactance Magnifier	Dependent Variable(s)	Moderating Variable(s)	Key Result(s)	Product Category (ies)
Fitzsimons and Lehmann (2004)	Reactance increased by unwanted recommendations: absent vs. present	Attitude and choice toward products	Dispositional reactance	When consumers with initial product preferences received retailers' unsolicited recommendations contradicting these preferences, they perceived such unwanted recommendations as a constraint against their freedom of product choice. As a result, such unsolicited recommendations that contradict initial impressions can lead to a heightened reactant state on the part of the consumers. This increased reactance, in turn, led consumers not only to ignore the retailers' recommendations but to intentionally go against them. Such reactance was stronger for people with a high dispositional reactance than those with a low dispositional reactance	Granola bars and automobiles
Edwards, Li, and Lee (2002)	Reactance increased by forced ad exposure: absent vs. present	Attitude toward advertisement in a forced exposure		When people were forced to view an ad if they wish to subsequently see a website, they perceived that their freedom was restricted by the ad in a forced exposure situation. Such ad in a forced exposure can magnify reactance, leading to heightened feelings of inconvenience. Such negative feelings resulted in negative attitudes toward the ad	Movie advertisement
Fitzsimons (2000)	Reactance increased by the loss of a specific choice option (e.g., a out-of-stock product in choice set)	Decision satisfaction, likelihood of switching stores on subsequent shopping trips	Personal commitment to the out-of-stock product	When consumers were exposed to a stockout of an attractive alternative, such loss of an option to choose an out-of-stock alternative magnified reactance on the part of consumers. This increased reactance, in turn, led consumers to react negatively to the stockout – they reported lower satisfaction with the decision process and showed a higher likelihood of switching stores on subsequent shopping trips. Consumers with high personal commitment to the out-of-stock option reacted more substantially and negatively to the stockout compared to those with low personal commitment to the out-of-stock option	Granola bar, music CDs

TABLE 11

TIME PRESSURE: ESSAY 2/ STUDY 1

	Low Time Pressure		High Time Pressure	
	Scarcity Absent	Scarcity Present	Scarcity Absent	Scarcity Present
Attitude toward the Product	5.65 (1.66)	6.70 (1.41)	5.93 (1.45)	5.46 (1.52)
Purchase Intent	3.95 (2.13)	5.52 (1.68)	4.29 (2.45)	4.12 (2.14)

NOTE. – Values in the table are means (standard deviations)

TABLE 12

TIME PRECISION: ESSAY 2/ STUDY 2

	Scarcity Absent	Scarcity Present	
	Control Condition	Low Time Precision	High Time Precision
Purchase Intent	3.68 (1.85)	5.76 (1.70)	4.73 (1.94)
Perceived Inconvenience	3.73 (1.49)	4.12 (1.43)	5.11 (1.87)

NOTE. – Values in the table are means (standard deviations)

TABLE 13

MEDIATION ANALYSIS: ESSAY 2/ STUDY 2

Mediating Variable	Dependent Variable	Step 1	Step 2	Step 3	Step 4
Perceived Inconvenience	Purchase Intent	Time Precision → Purchase Intent $p < .03$	Time Precision → Perceived Inconvenience $p < .02$	Perceived Inconvenience → Purchase Intent $p < .001$	Time Precision → Purchase Intent (Covariate: Perceived Inconvenience) $p > .17$ Sobel $p < .005$

TABLE 14

MEDIATION ANALYSIS: ESSAY 2/ STUDY 3

Mediating Variable	Dependent Variable	Step 1	Step 2	Step 3	Step 4
Perceived Inconvenience	Choice of the wine brand promoted with scarcity	Store flexibility → Choice of the wine brand promoted with scarcity $p < .001$	Store flexibility → Perceived Inconvenience $p < .001$	Perceived Inconvenience → Choice of the wine brand promoted with scarcity $p < .001$	Store flexibility → Choice of the wine brand promoted with scarcity (Covariate: Perceived Inconvenience) $p > .90$

Note. – In the study 3, the mediation analysis was conducted using logistic regression, since the dependent variable (i.e., choice) was dichotomous.

TABLE 15

INCENTIVE FLEXIBILITY: ESSAY 2/ STUDY 4

	Low Incentive Flexibility			High Incentive Flexibility		
	Scarcity Absent	Scarcity in Time	Scarcity in Quantity	Scarcity Absent	Scarcity in Time	Scarcity in Quantity
Purchase Intent	4.20 (1.89)	4.04 (1.94)	4.08 (1.28)	4.44 (2.12)	5.88 (2.02)	5.68 (1.06)
Perceived Inconvenience	3.24 (1.91)	5.33 (2.12)	4.92 (1.29)	3.11 (1.51)	3.69 (1.93)	3.57 (1.26)

NOTE. – Values in the table are means (standard deviations)

TABLE 16

MEDIATION ANALYSIS: ESSAY 2/ STUDY 4

Mediating Variable	Outcome Variable	Step 1	Step 2	Step 3	Step 4
Perceived Inconvenience	Purchase Intent	Scarcity in Time x Incentive flexibility → Purchase Intent $p < .05$	Scarcity in Time x Incentive flexibility → Perceived Inconvenience $p < .05$	Perceived Inconvenience → Purchase Intent $p < .001$	Scarcity in Time x Incentive flexibility → Purchase Intent (Covariate: Perceived Inconvenience) $p > .34$ Sobel $p < .05$
	Purchase Intent	Scarcity in Quantity x Incentive flexibility → Purchase Intent $p < .04$	Scarcity in Quantity x Incentive flexibility → Perceived Inconvenience $p < .05$	Perceived Inconvenience → Purchase Intent $p < .001$	Scarcity in Quantity x Incentive flexibility → Purchase Intent (Covariate: Perceived Inconvenience) $p > .37$ Sobel $p < .05$

TABLE 17

MEDIATION ANALYSIS: FOLLOW-UP ESSAY 1/ STUDY 4

Mediating Variable	Outcome Variable	Step 1	Step 2	Step 3	Step 4
Falsity Inferences	Purchase Intent	Reversibility of Decision → Purchase Intent $p < .05$	Reversibility of Decision → Falsity Inference $p < .008$	Falsity Inference → Purchase Intent $p < .001$	Reversibility of Decision → Purchase Intent (Covariate: Falsity Inference) $p > .68$ Sobel $p < .02$
Perceived Inconvenience	Purchase Intent	Reversibility of Decision → Purchase Intent $p < .05$	Reversibility of Decision → Perceived Inconvenience $p < .001$	Perceived Inconvenience → Purchase Intent $p > .88$	Reversibility of Decision → Purchase Intent (Covariate: Perceived Inconvenience) $p < .08$ Sobel $p > .88$

TABLE 18

MEDIATION ANALYSIS: FOLLOW-UP ESSAY 2/ STUDY 2

Mediating Variable	Outcome Variable	Step 1	Step 2	Step 3	Step 4
Falsity Inferences	Purchase Intent	Time Precision → Purchase Intent $p < .02$	Time Precision → Falsity Inference $p > .16$	Falsity Inference → Purchase Intent $p < .002$	Time Precision → Purchase Intent (Covariate: Falsity Inference) $p < .04$ Sobel $p > .19$
Perceived Inconvenience	Purchase Intent	Time Precision → Purchase Intent $p < .02$	Time Precision → Perceived Inconvenience $p < .02$	Perceived Inconvenience → Purchase Intent $p < .001$	Time Precision → Purchase Intent (Covariate: Perceived Inconvenience) $p > .14$ Sobel $p < .05$

FIGURE 4
DISCONFIRMATION OF SCARCITY: ESSAY 1/ STUDY 3

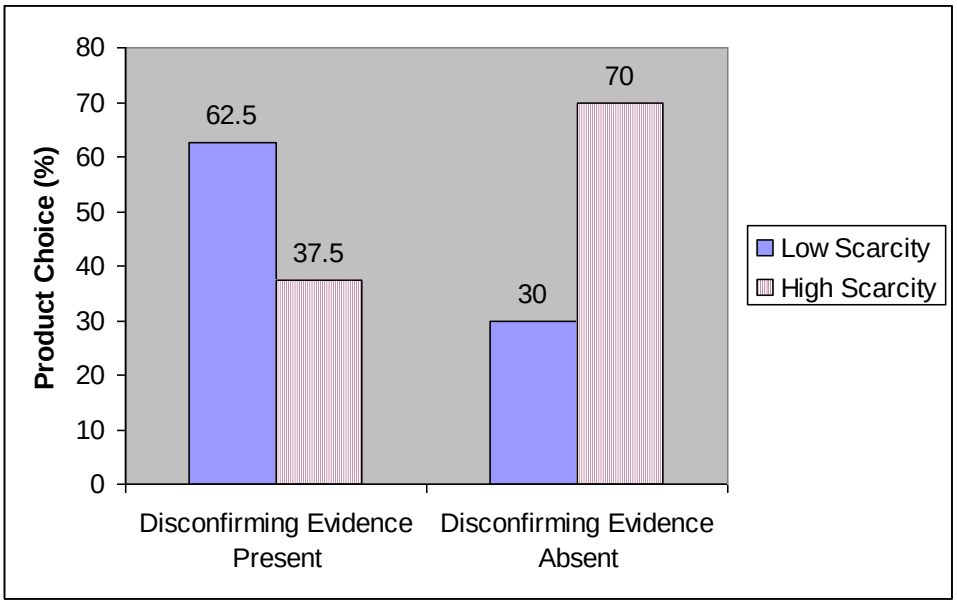
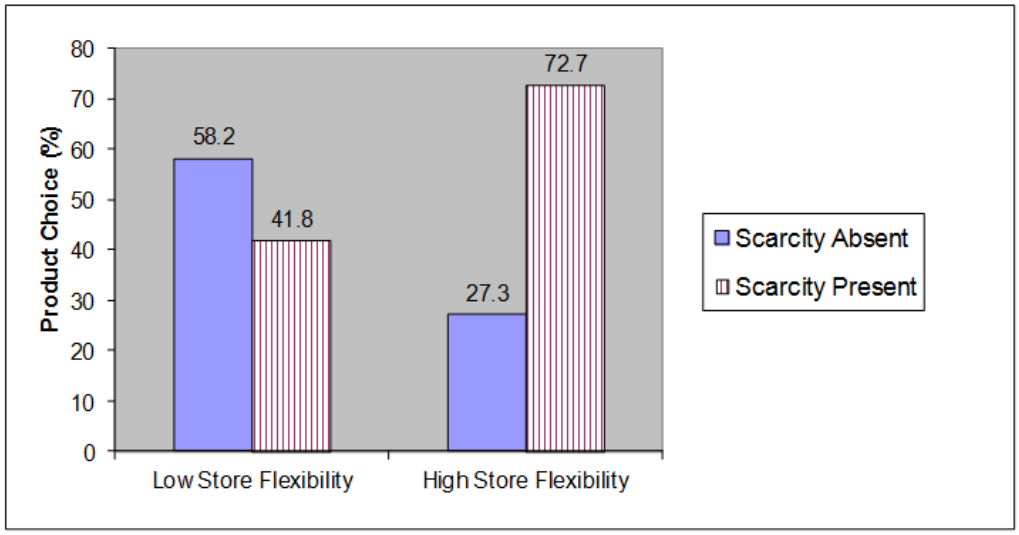


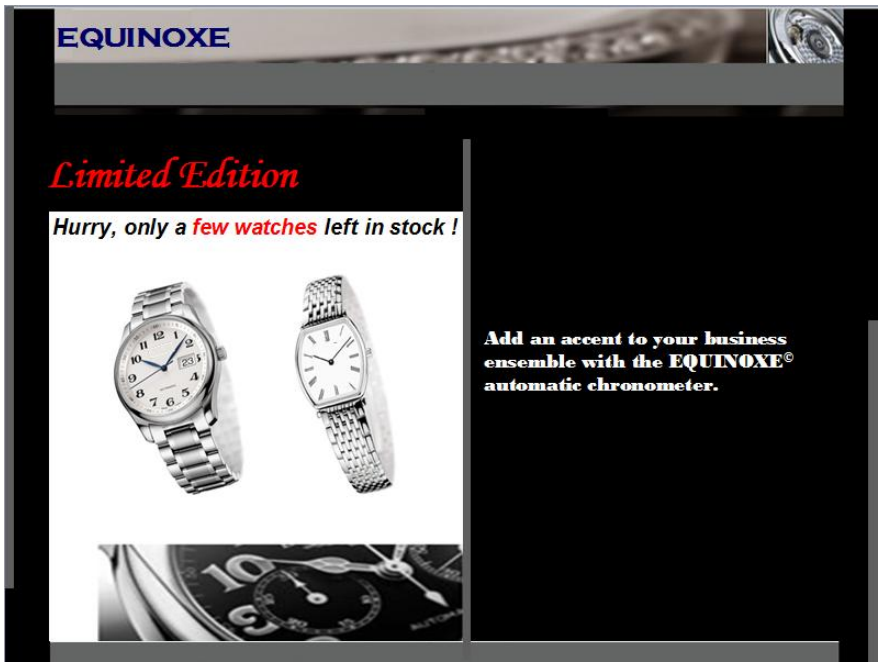
FIGURE 5

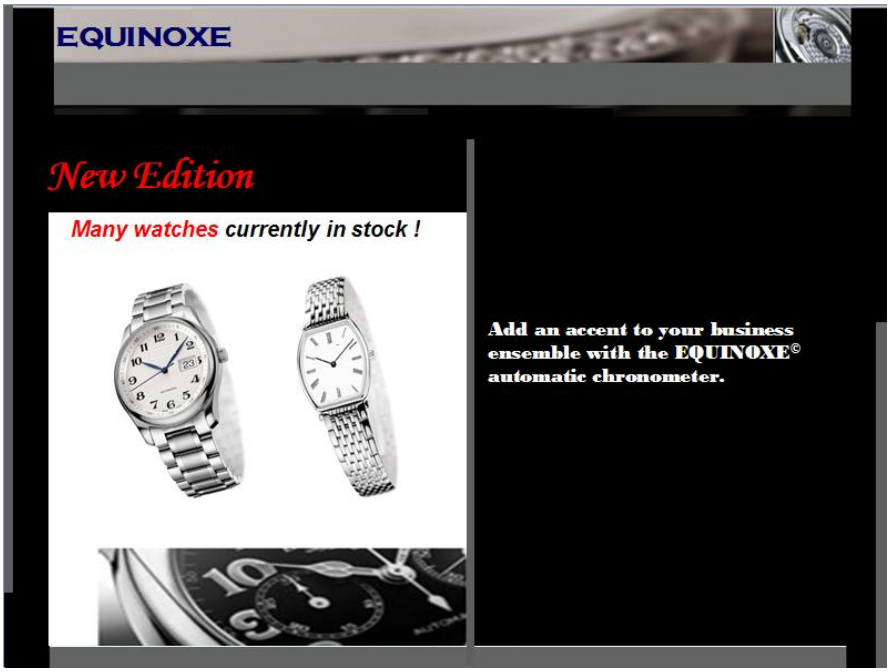
STORE FLEXIBILITY: ESSAY 2/ STUDY 3



APPENDIX A

WRISTWATCH AD: ESSAY 1/ STUDY 1



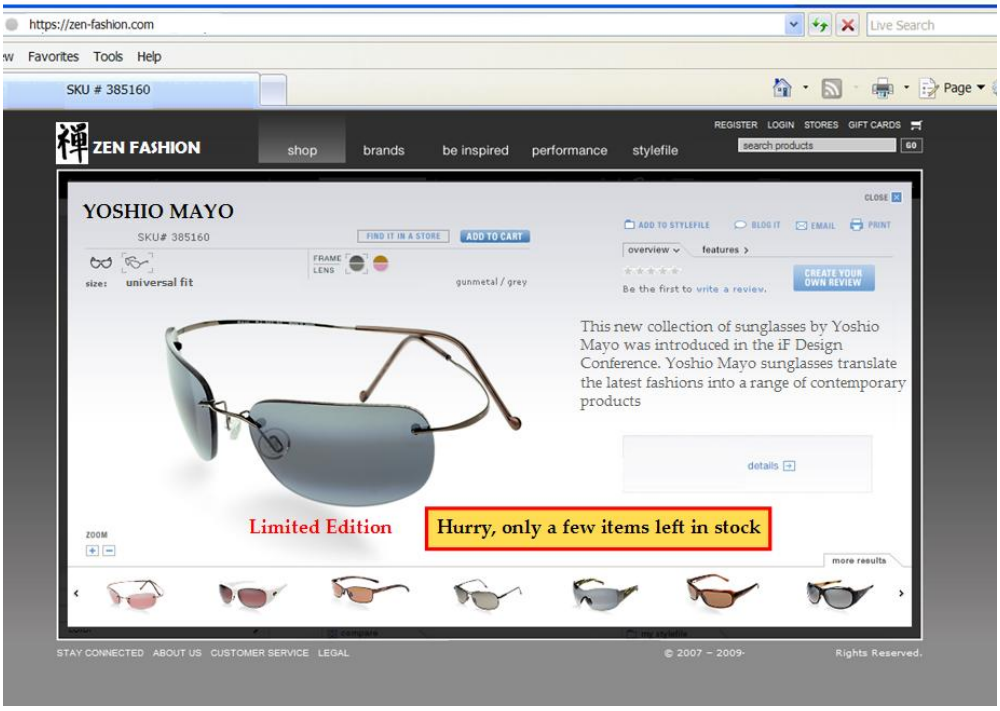


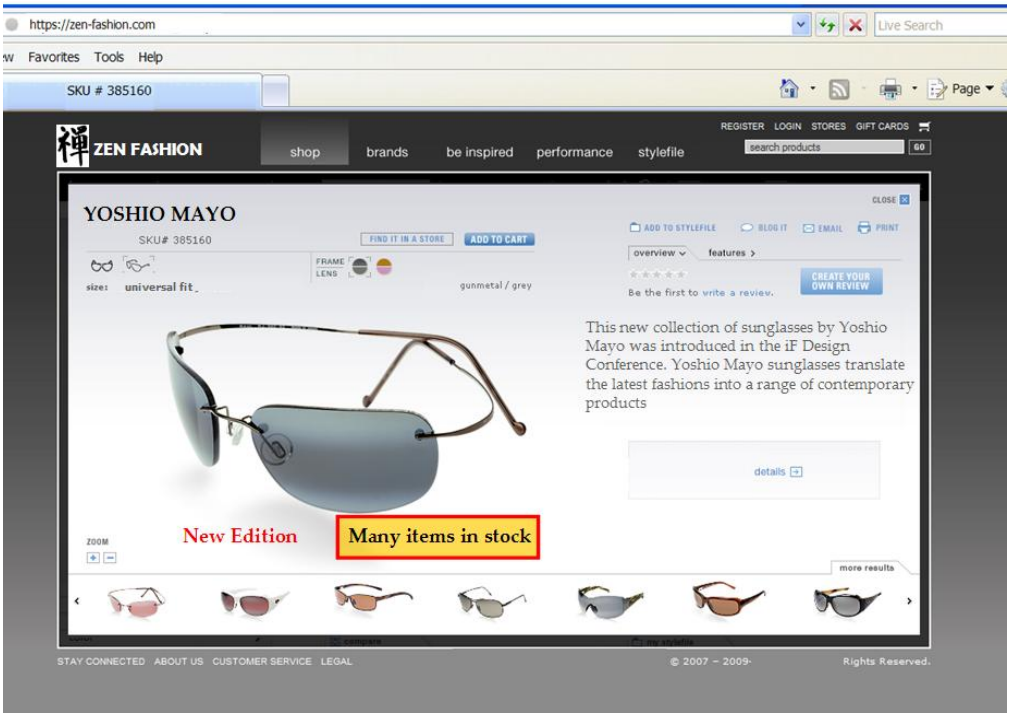
APPENDIX B

CONSUMER TECHNOLOGY MAGAZINE: ESSAY 1/ STUDY 2

APPENDIX C

SUNGLASSES AD: ESSAY 1/ STUDY 2



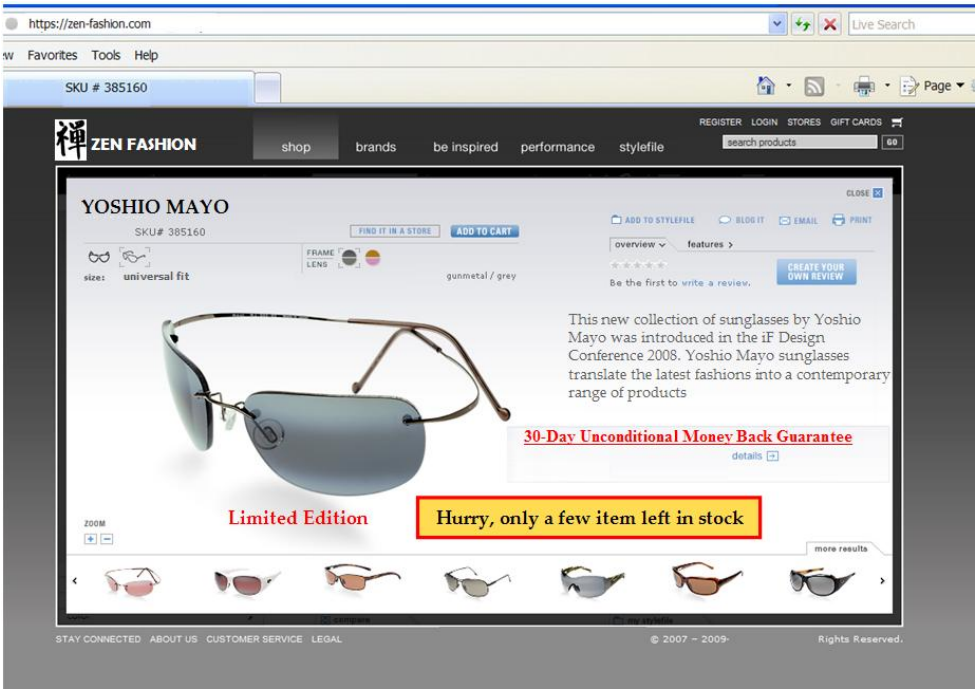


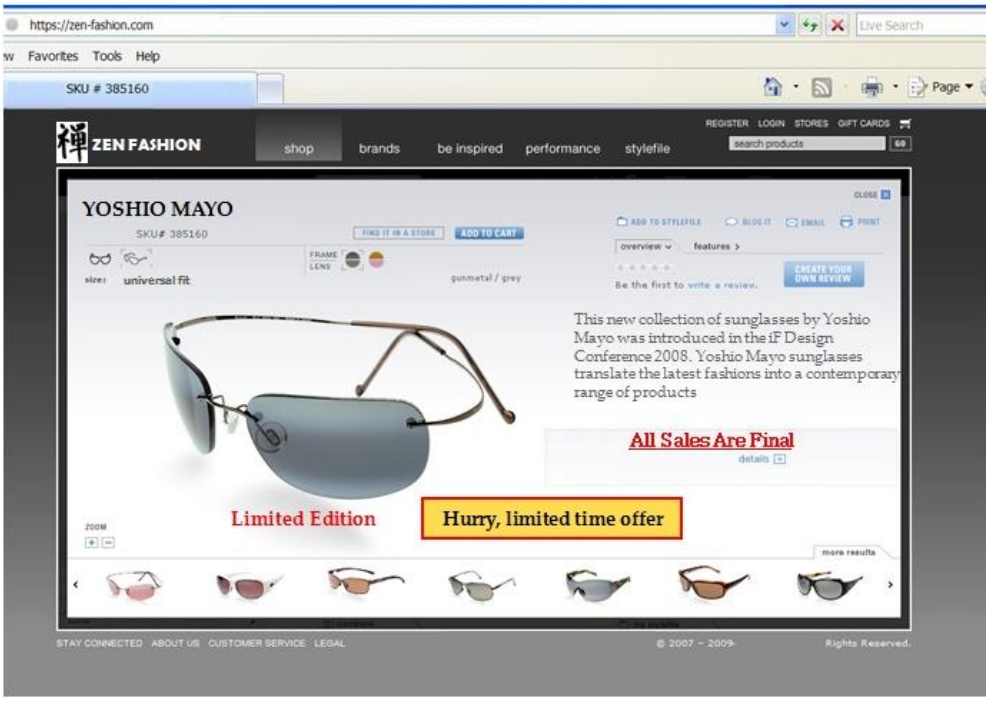
APPENDIX D

USB DRIVE DISPLAY: ESSAY 1/ STUDY 3

APPENDIX E

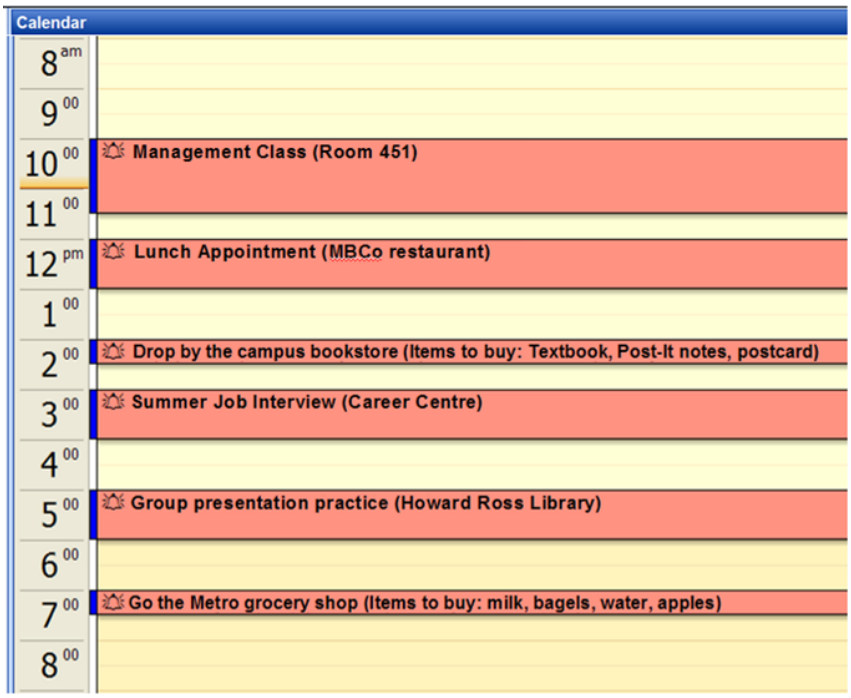
SUNGLASS AD: ESSAY 1/ STUDY 4

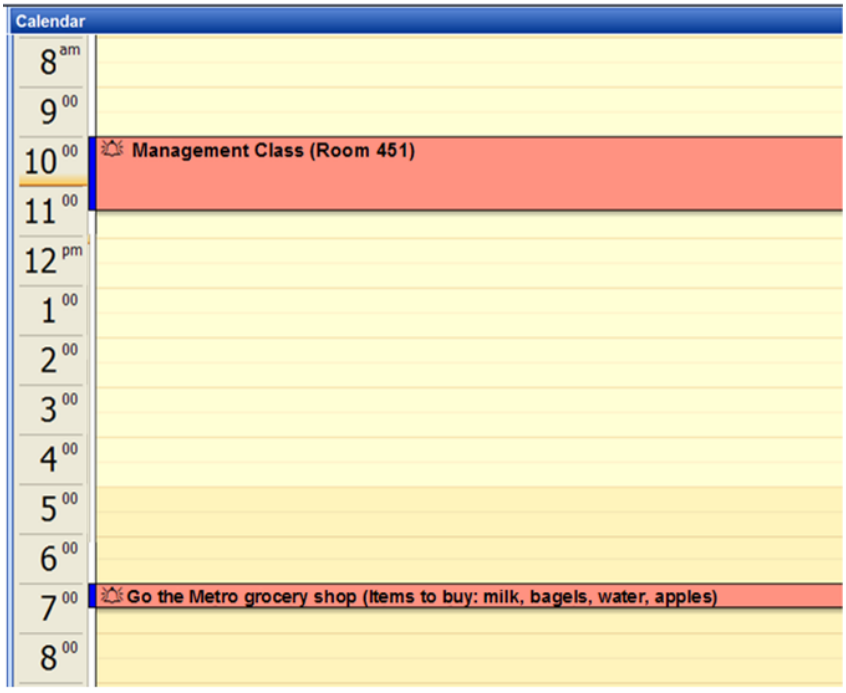




APPENDIX F

DAILY PLANNER: ESSAY 2/ STUDY 1



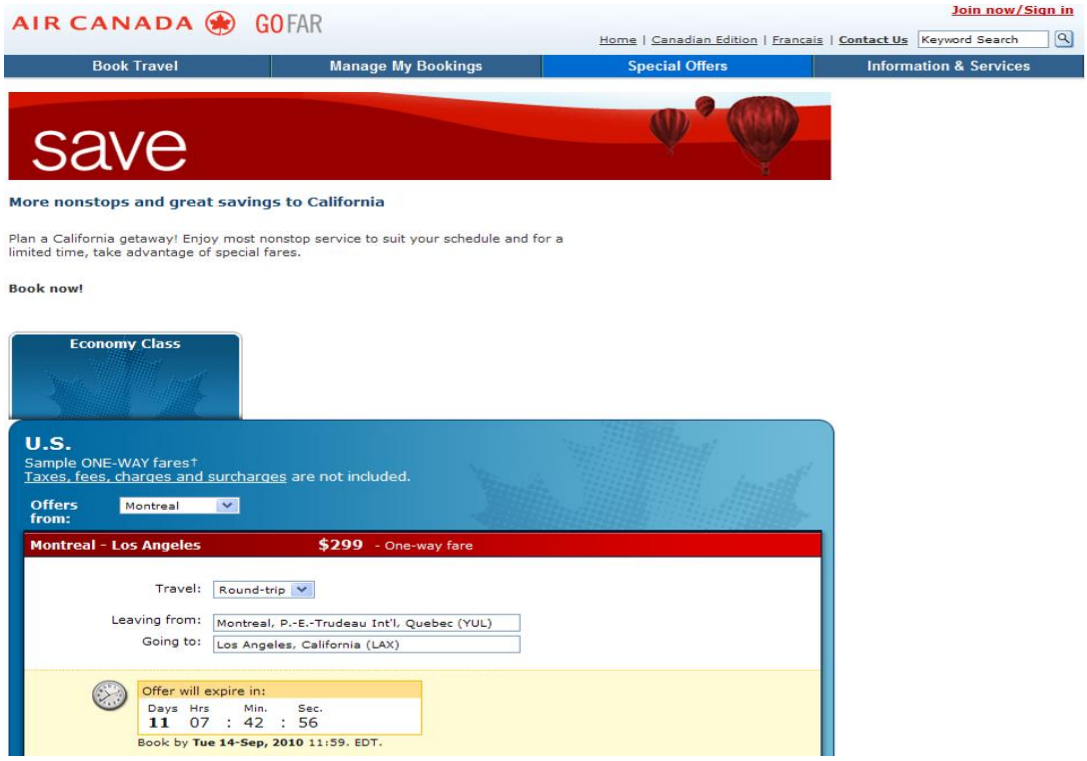


APPENDIX G

DIGITAL CAMERA AD: ESSAY 2/ STUDY 1

APPENDIX H

AD EXAMPLES: TIME PRECISIONS

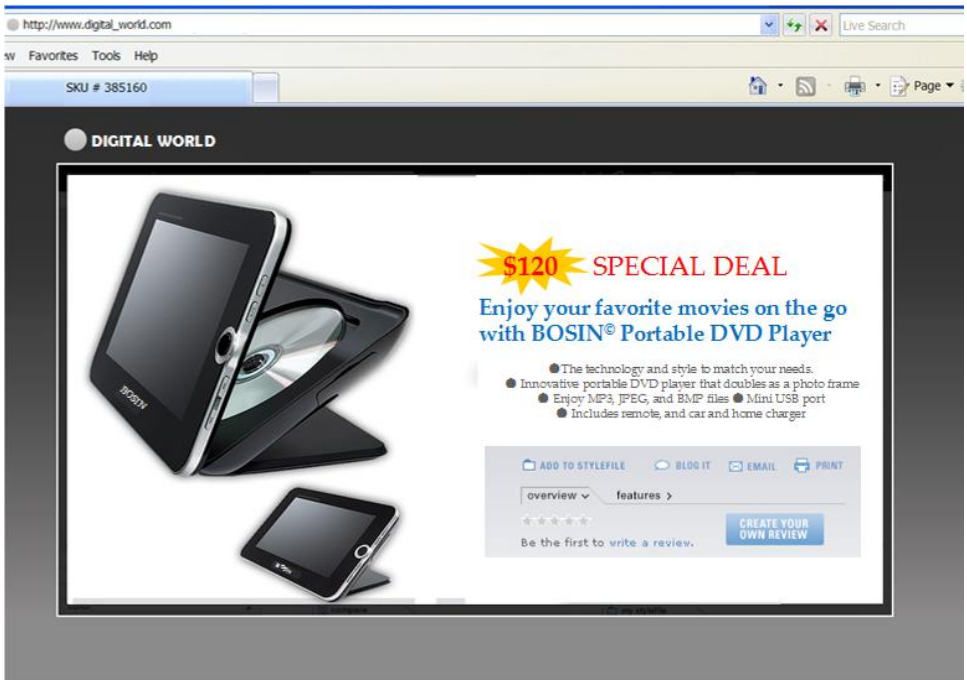


APPENDIX I

PORTABLE DVD PLAYER AD: ESSAY 2/ STUDY 2

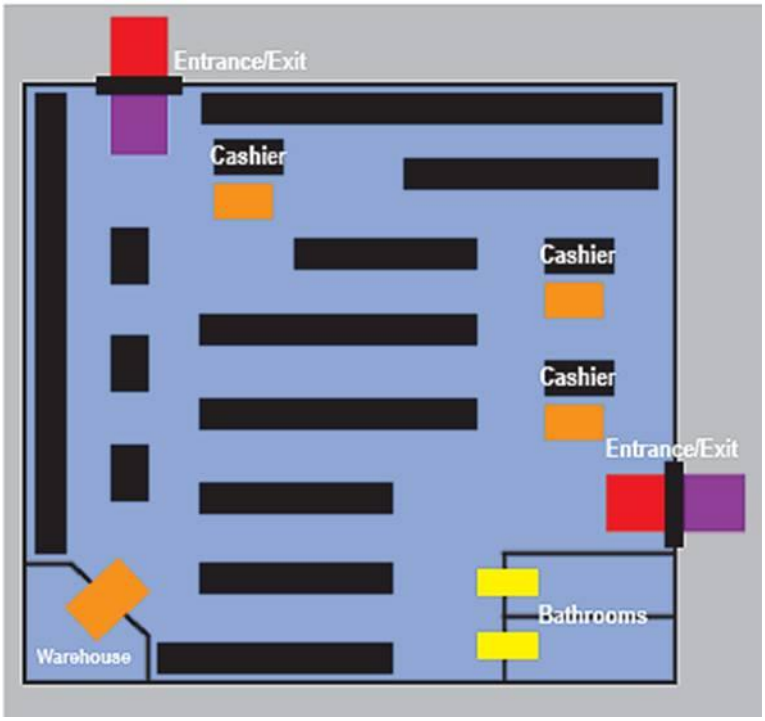
APPENDIX I

PORTABLE DVD PLAYER AD: ESSAY 2/ STUDY 2



APPENDIX J

STORE LAYOUT EXAMPLES: STORE FLEXIBILITY

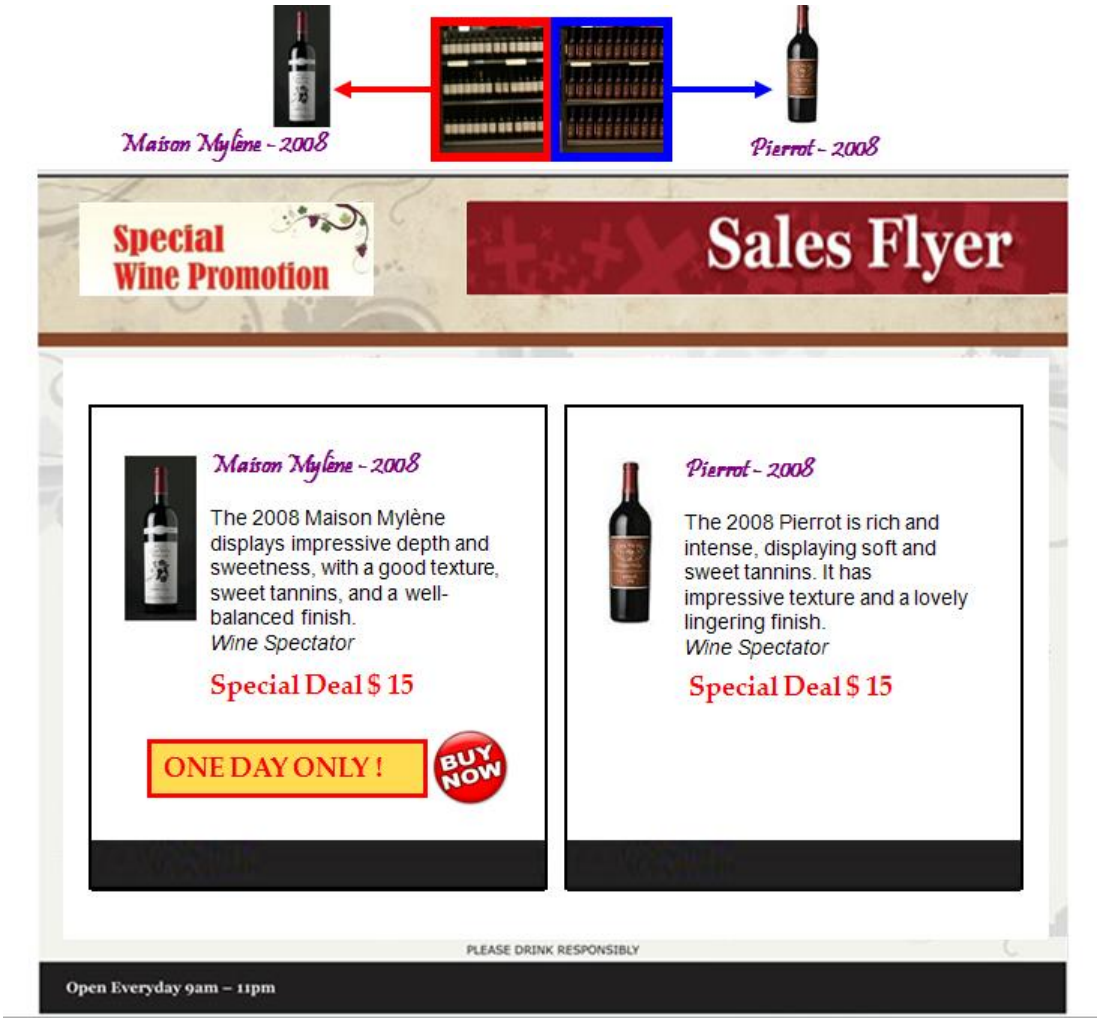


APPENDIX K

WINE RETAIL SHOP: ESSAY 2/ STUDY 3

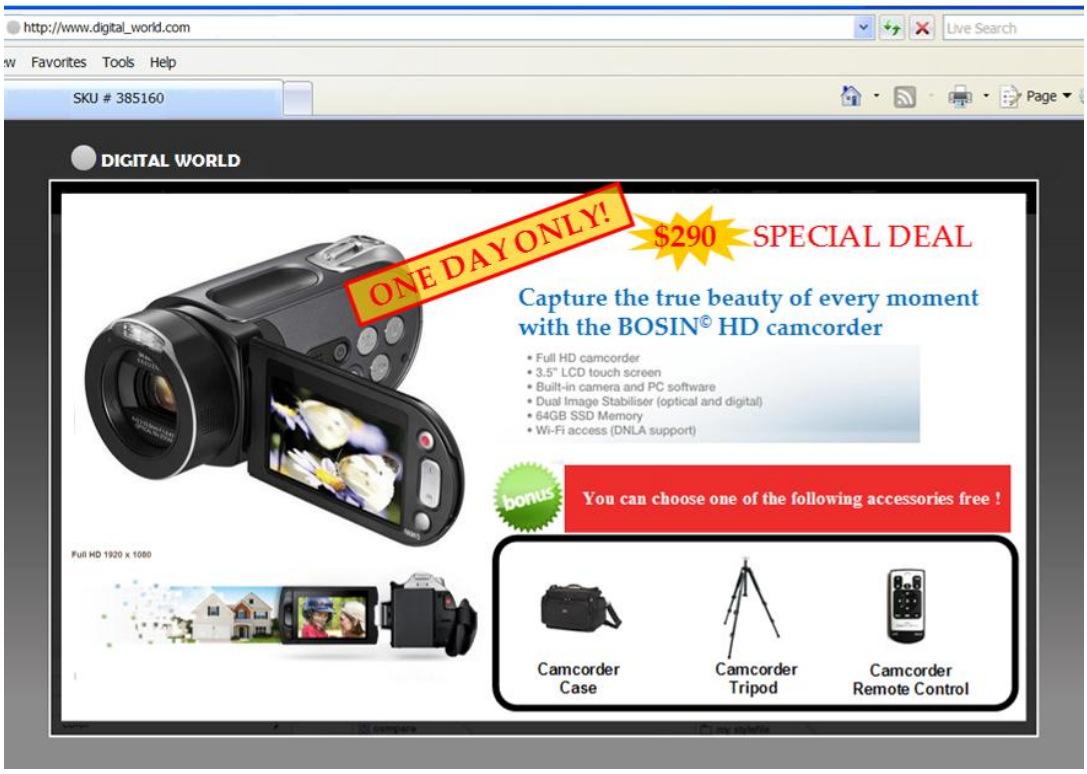
APPENDIX L

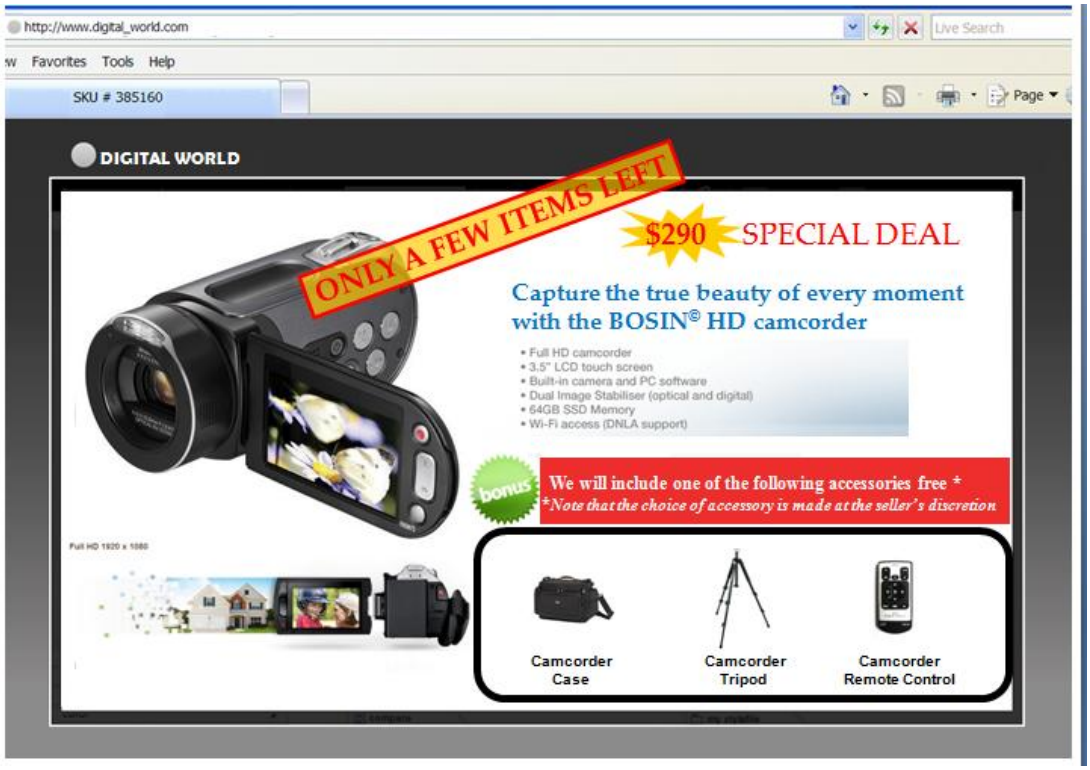
WINE FLYER: ESSAY 2/ STUDY 3



APPENDIX M

CAMCORDER AD: ESSAY 2/ STUDY 4





APPENDIX M

CAMCORDER AD: ESSAY 2/ STUDY 4

APPENDIX N

REACTANCE SCALE

Item Number	Item Wording
1	Regulations trigger a sense of resistance in me
2	I find contradicting others stimulating
3	When something is prohibited, I usually think, “That’s exactly what I am going do to”
4	I consider advice from others to be an intrusion
5	I become frustrated when I am unable to make free and independent decisions
6	It irritates me when someone points out things which are obvious to me
7	I become angry when my freedom of choice is restricted
8	Advice and recommendations usually induce me to do just the opposite
9	I resist the attempts of others to influence me
10	It makes me angry when another person is held up as a role model for me to follow
11	When someone forces me to do something, I feel like doing the opposite