CONSUMER INFORMATION PROCESSING DIFFERENCES IN RESPONSE TO FIRM PRICING: REMEMBERING VERSUS REASONING

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Business Administration—Doctor of Philosophy

2014

ABSTRACT

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Previous literature has found evidence of firm's motivation to encourage consumers' stockpiling behavior as well as benefits occurred from stockpiling. Stockpiling in this dissertation refers to the propensity of consumers to increase their inventory level for future consumption of stock-up products which are nonperishable and in a unit size that consumers frequently purchase. A sales promotion (i.e., a price discount) is a fundamental condition for consumers' stockpiling behavior. Four experiments of this dissertation intend to make contributions to literature of sales promotions, stockpiling, and price knowledge by answering (1) What types of price discounts trigger stockpiling behavior? and (2) Would types of discounts operate differently for different products (i.e., benefit changed products) and for different situations (i.e., an introduction of a new product under an established brand name or under new brand name)? as well as additionally investigating the direct effects depth and frequency of a discount on consumers' price knowledge and perceived similarity with overall shopping experiences. Across all of four experiments, significant direct effects of discount depth and frequency on stockpiling; that interaction are found. Such main effects are moderated by benefit changes, new product introduction, and new brand introduction and also directionality among moderators vary. Lastly, evidence for proposed mediators which are price recall error, price comparison error, and consumers' perceived similarity with overall shopping experiences is not found.

ACKNOWLEDGEMENTS

Without the support, patience, and guidance of many people, this dissertation would not have been completed

First and foremost, I would like to express my sincerest gratitude to Dr. Roger J. Calantone, for his excellent guidance, unstinting support, and genuine concern. I would also like to thank my committee members, Dr. R. Dale Wilson, Dr. Thomas J. Page, Dr. Clay M. Voorhees, and Dr. Donald E. Conlon. Their academic support and encouragement are greatly appreciated.

Also I would like to thank Praneet Randhawa and Hannah S. Lee who are my special friends. I could make it through all the challenges, thanks to them.

My lovely wife, Sujeong Lee, and my sweet daughter, Claire S. Yeo, you all are my reasons for living and for walking forward. Thank you so much for your generous support and love. My father and mother, Tae Yeol Yeo and Youngsook Kim, words would not be enough to express my appreciation and love. Father, I believe you are watching all from heaven and really hope you could be here with me. I send my special appreciation and recognition to my parents. Also I thank my parents-in-law, Moonseok Lee and Jongsu Lee, for their patience as well as emotional support.

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INTRODUCTION

For marketing managers, how to design a sales promotion in a way that it motivates consumers to purchase more than usual (i.e., stockpiling behavior) and more frequently is an important strategic decision (e.g., Wansink 1994; Wansink, Kent, and Hoch 1998) along with purchase incidence and brand choice of consumers. Managers would encourage consumers to stockpile, if doing so allows them to passes inventory holding costs to consumers (e.g., Blattberg, Fppen, and Liebemian 1981). The transmission of inventory holding costs reduces the level of firm's inventory which may be out-of date and to be shipped back. Moreover, while conventionally stockpiling was deemed as a loss factor because it is commonly driven by a sales promotion which reduces profit margin as well as because promotion induced stockpiling delays consumers' subsequent purchases (i.e., post-promotion dip) in which they would buy the promoted brand at regular price (e.g., Ailawadi, Gedenk, Lutzky, and Neslin 2007). However, Ailawadi, Gedenk, Lutzky, and Neslin (2007) finds evidence of important benefits of stockpiling (e.g., preemptive brand switches and repeat purchases). On consumers' side, a trade-off is between the promotional savings for future consumption and the added costs incurred by carrying extra inventory (Assuncao and Meyer 1993; Helsen and Schmittlein 1992; Krishna 1992, 1994).

Stockpiling is to be defined as the inclination of consumers to increase their inventory level by purchasing more items than usual at a purchase occasion and/or by advancing their purchase time before the expected time of their subsequent purchase (e.g., Neslin, Henderson, and Ouelch 1985; Macé and Neslin 2004; Blattberg and Neslin 1990). Stockpiling would occur for nonperishable and stockable products. Thus, stock-up products are the focus of this dissertation which refer to products that are nonperishable and in a unit size consumers frequently purchase and consume (Litback, Calantone, and Warshaw 1985).

A sales promotion is a fundamental condition to trigger consumes' stockpiling behavior (Blattberg, Eppen, and Lieberman 1980; Neslin 2002). The propensity of consumers to stockpile the promoted brand would be intensified when a sales promotion is infrequently provided, when the promotional saving is greater than expected, and when consumers are more certain about the regular as well as the deal price of the product (Kristiaan and Schmittlein 1992). In addition, consumers who have higher income Stilley, Inman, and Wakefield (2010) and loyal Sun, Neslin, and Srinivasan (2003) to the promoted brand are more likely to stockpile.

There have been various studies investigating consumers' behavior on firm's promotional deals, but less attention was directed toward comprehending the underlying psychological process of stockpiling behavior. One primary exception is Wansink, Kent, and Hoch (1998). They examined an anchoring and adjustment judgment process as a psychological process through which consumers go to make their purchase quantity decision. Also we have paucity in our understanding of how the relationship between a discount and stockpiling would vary.

Thus, four experiments of this dissertation designs and implements various types of price discounts and consumers' price knowledge and their perceived overall similarity with shopping experiences are introduced as mediators of the relationship between a price discount and stockpiling. Furthermore, this dissertation investigates how proposed direct and indirect relationships would vary when there is a change in product size as well as in market situation (i.e., new product introduction and new brand introduction). In general, this dissertation intends to answer the following questions: (1) What types of price discounts trigger stockpiling behavior? and (2) Would types of discounts operate differently for different products (i.e., benefit changed products) and for different situations (i.e., an introduction of a new product under an established brand name or under new brand name)? In addition to the main effects of a price discount on

consumers' stockpiling behavior, its direct effects on price consumers' price knowledge and perceived similarity with overall shopping experiences are tested. A product category focused here is carefully chosen. It should be nonperishable, stockable, regularly purchased, and commonly discounted product.

This dissertation attempts to make the following contributions by answering those research questions above. The importance of understanding how a sales promotion should be designed to motivate consumers' stockpiling behavior is addressed in a recent study examining effects of stockpiling (Ailawadi, Gedenk, Lutzky, and Neslin 2007). Thus, first, this dissertation attempts to make a contribution to the literature of sales promotion and stockpiling by demonstrating how a sales promotion can be configured and scheduled to drive consumers' stockpiling and how such relationships vary across product types as well as situations. Attractiveness of a sales promotion is to be determined by how deep a discount is and how frequently a discount has been offered over time. If a given sales promotion is suffice for attracting consumers to stockpile, a firm will enable to capture benefits (e.g., reduced inventory costs, increased repeat purchases, preempted switches to competitors' brands) and, in turn, to achieve its strategic goals. Also the attractiveness of the same price discount may vary when the product size of the promoted brand is changed and when a new product is launched under the established brand or the new brand. As a result, firms will understand how to better calibrate their pricing discounts when trying to trigger stockpiling behavior for different products and for different situations.

The need to understand consumers' process through which they make "how much" decision pulled our attention (e.g., Wansink, Kent, and Hoch 1998). The second contribution is to identify key mediating mechanisms which underlie the relationship between a price discount and consumers' stockpiling behavior. Proposed mediators are price knowledge and consumers'

perceived similarity between their shopping events over time. In addition, both absolute (i.e., price recall) and relative (i.e., price comparison) price knowledge are measured and utilized in hypotheses testing to capture more aspects of consumer price knowledge. That is, it is argued that both measures are necessary to more fully capture and comprehend consumer price knowledge which is a direct response to the necessity of multiple measures of price knowledge by Anderson and Simester (2009, p. 153).

Overall, four experiments find that stockpiling behavior is more likely to occur when a deeper discount is less frequently offered. Regarding to price knowledge, when a shallower discount is more frequently provided, consumers show the propensity to more thoroughly search price and their price knowledge is less error prone. Also among proposed moderators, benefit change and new product introduction attenuate the main effects of discount depth and frequency on stockpiling while new brand introduction amplified such main effects on stockpiling.

CONCEPTUAL BACKGROUND

Consumer Stockpiling Behavior

Consumers' stockpiling behavior has been commonly found in various studies (Bucklin and Gupta 1992; Bucklin, Gupta, and Siddarth 1998; Chintagunta and Haldar 1998; Gupta 1988; Macé and Neslin 2004; Van Heerde, Leeflang, and Wittink 2000, 2004). A fundamental drive consumers' stockpiling behavior is a deal which allows consumers to have promotional savings (Blattberg, Eppen, and Lieberman 1981; Neslin 2002) which induces them to buy more or sooner than usual (Blattberg, Eppen, and Lieberman 1981; Neslin, Henderson, and Quelch 1985). In other words, price and an offered sales promotion are important criteria consumers utilize to decide "what to buy" as well as "how many to buy" (e.g., Tellis and Zufryden 1995). Retailers offer promotional activities because promotion-induced stockpiling shifts inventory holding costs of retailers to consumers (Blattberg, Eppen, and Lieberman (1981). Retailers' inventory holding costs comes from two sources that are the capital entangled in inventory as well as the space utilized to hold inventory. Consumers' costs generated by carrying a couple more products than usual would not be as costly as retailers'. One of motivations for manufacturers to trigger consumers' stockpiling behavior is to boost nonusers' trial of their brands (Blattberg, Eppen, and Lieberman 1981). Ailawadi, Gedenk, Lutzky, and Neslin (2007) find that, after consumers leveraging a sales promotion, the resultant extra inventory results in the increased consumers' consumption of the promoted brand (i.e., flexible consumption), the preempted future purchases of the promoted brand (i.e., postpromotion dip) (e.g., Neslin, Powell, and Stone 1995), the preempted future purchases of competitors' brands (e.g., Lodish 1986), and the probable repeat purchase of the promoted brand. Also they showed preempted switching to competitors' brands and consumers' repeated purchases of the promoted brand enable manufacturers to compensate their financial loss from delayed

subsequent purchase in which consumes would have bought at a regular price. Consumers' stockpiling behavior increases the sales of the promoted brand and such an effect was greater for higher-share brands than for the smaller-share brands (Chan, Narasimhan, and Zhang 2008; Macé and Neslin 2004).

For consumers, buying more is a trade-off between costs engendered by carrying more items than usual and savings from a reduced price for future consumption. Promotional savings encourage consumers' stockpiling behavior for future consumption (Chintagunta 1993; Heilman, Nakamoto, and Rao 2002; Nijs, Dekimpe, Steenkamp, and Hanssens 2001; Pauwels, Hanssens, and Siddarth 2002). Overall stockpiling is a rational purchase behavior of consumers to minimize their costs (Dellaert, Golounov, and Prabhu 2005). Consumers' purchase quantity decision may be based on the utility of a sales promotion in the long term as well as the short term (e.g., Litvack, Calantone, and Warshaw 1985) or consumers simply cannot go by a deal (e.g., Meyer and Assuncao 1990). Also consumers' long-term exposure to sales promotion leads to "lie-in-wait" which manifests consumers' stockpiling behavior on a given purchase incidence and the postponement of their subsequent purchase incidence till another promotion is available (Mela, Jedidi, and Bowman 1998). That is, previously paid prices influence on consumers to develop their future price expectation (or expectation on a sales promotion) (e.g., Gonul and Srinvasan 1996; Jacobson and Obermiller 1990). In other words, consumers adapt their purchase quantity decision to a price pattern over time (Meyer and Assuncao 1990). Krishna (1994) shows, when deals are provided in regular pattern and consumers can predict a future deal, they purchase more. However, the same study finds that irregularity in firm's deal offering plan increased purchase quantity. The latter may appear because consumers do not want to miss a chance to get promotional savings for future consumption of the promoted product.

Furthermore previous literature unveiled consumers' heterogeneous characteristics in their reactions to a sales promotion. Stockpiling behavior is more likely to occur for consumers with higher income than those who with lower income (Stilley, Inman, and Wakefield 2010). The sensitivity to future savings is higher for consumers with tighter budget. (Hoch et al. 1995). Consumers who are loyal to the promoted brand may more recognize the utility in their tradeoff between the incurred inventory holding costs and the increased future consumption with promotional savings than non-loyal consumers do (Krishna 1994; Sun, Neslin, and Srinivasan 2003). In contrast, a sales promotion does not motivate brand switchers to stockpile at all (Chan, Narasimhan, and Zhang 2008). They also found that incurred promotional savings by stockpiling the promoted brand on future consumption are more significant for heavy users than for light users.

Consumer Price Search Behavior

Various studies argue that a large proportion of consumers' price search is limited and also only a small fraction of alterative products constitute consumers' purchase options (Lapersonne, Laurent, and LeGoff 1995; Moorthy, Ratchford, and Talukdar 1997; Ratchford and Srinivasan 1993). In the similar vein, Dickson and Sawyer (1990, p. 47) find that "slightly more than half (57%) of the shoppers claimed to have checked the price of the chosen item and fewer than one in four (21.6%) reported checking the price of an alternative brand … only 13.9% said they checked prices to remember until next time and 12.8% checked the price to compare prices between supermarkets." In addition, Murthi and Srinivasan (1999) show that inclusion of consumers' partial evaluation behavior across alternatives increased the predictive power of a model compared with other models without it. Vanhuele and Dreze (2002) argue that consumers may actively search price information or incidentally notice price information.

By leveraging consumers' limited price search behavior, which leads to limited price knowledge, firms can charge higher price. However, marketers should be aware that even a moderate level of knowledge can induce consumers to actively pursue available information (i.e., the concave relationship between knowledge and the extent of consumer price search; Moorthy, Ratchford, and Talukdar 1997). Cherry pickers show no significant differences from those who do not conduct within-store search (Vanhuele and Dreze 2002). Overall, the amount of past price knowledge and the mental calculation of gains and losses from additional search may explain consumers' limited search behavior (Carlson and McAfee 1983; Dahlby and West 1986). In the next two sections, I will briefly discuss representation and judgment of a price as well as the feeling of familiarity.

Price Cognition and Representation of Price Information

Consumers' price perception is an indispensable factor in their purchase decision making (e.g., Monroe 2003). During searching and processing price information, consumers judge a focal price by comparing it to the latitude of their internal reference price as well as the external reference prices (i.e., prices of brands in a product category). Such a process of price search and judgment is subjective and relativistic (e.g., DelVecchio, Krishnan, and Smith 2007; Janiszewski and Lichtenstein 1999; Kalyanaram and Little 1994). Price cognition, by definition, is the cognitive processes consumers undergo when they make price magnitude judgments, and price cognition consists of rule-based processes and instinctive-associative processes (i.e., heuristics) (Thomas and Morwtiz 2009). Consumer responses to price information are also determined by online arithmetic computation and by stored information in their memories (i.e., associative knowledge structure) (e.g., Ashcraft 1995). When consumers are repetitively exposed to a similar numeric, their responses tend to get faster and they perceive similar questions as easier the next

time. Price cognition consists of multiple psychological tasks that occur simultaneously or sequentially in one's mind: the *retrieval* of price information stored from previous events, the *pursuit* of price information from a current event, and the *arithmetic comparison* (i.e., subjective calculation) of prices. Consumes who fail to retrieve previously stored price information do not have accessible information in their memories, or are not motivated to retrieve it likely compare a target price and prices of alternatives at the point of purchase.

The retrieval of price information is influenced by how it was encoded and stored in memory. During a previous shopping event, consumers might encode price information as *symbolic* representation or *analog* representation (see Markman 1999). With *analog* representation, a numeric value serves as a subjective magnitude on a mental numerical continuum, similar to representations of other psychophysical stimuli (e.g., light, size) (Thomas and Morwitz 2009). S*ymbolic* representation is conceptually similar to a *visual Arabic code* of a triple-code model. Under a triple-code model (Dehaene 1992; Dehaene and Akhavein 1995), numeric values are coded in memory as three different forms—namely, *auditory verbal code*, *visual Arabic code*, and *analogue magnitude code*. For example, if a price is encoded as *auditory verbal code*, $7.15 will be represented and stored as "seven dollars and fifteen cents" in one's mind. If *visual Arabic* coding is used, one processes and stores the price as "$7.15." Finally, with *analogue magnitude code*, the price is captured as an approximate magnitude located between "$7 and $8 and closer to $7" on one's subjective numeric continuum.

In line with Thomas and Morwitz's (2009) discussion, a processed numeric *symbol* (e.g., $7.15) can be converted into an *analog magnitude code* (e.g., between $7.00 and $7.50) quite automatically and simultaneously at the encoding stage (Vanhuele and Dreze 2002). This coded price can be compared not only with the latitude of consumers' internal reference price, which

can be retrieved from long-term memory, but also with external reference prices at the point of purchase. Such comparisons stem from online calculations of numeric symbols and/or holistic comparisons of subjective numeric locations on a numeric continuum in one's mind.

The Feeling of Familiarity

When consumers confront a shopping event that is similar to a previously experienced event, they unconsciously or consciously compare them at both the item level (e.g., product, price) and the holistic context level (e.g., overall shopping experience). This section presents a literature review of the psychological processes in play for retrieval or reconstruction of a previously experienced event. In general, recognition includes two types of processes: *feeling of familiarity* and *recollection*. In line with the traditional dual-process perspective of recognition memory, the *feeling of familiarity* does not require intentionality, consciousness, or consumption of conscious resources; in contrast, *recollection* requires people to be effortful in search and retrieval of information in memory and to pay attention to the process. Moreover, an unconscious *feeling of familiarity* triggers people's deliberate effort in *recollection* (Leboe and Whittlesea 2002). Overall, the *feeling of familiarity* is an automatic process that is not consciously controlled, while *recollection* is intentional and controllable (e.g., Atkinson and Juola 1973; Jacoby 1991, 1994, 1998; Mandler 1979, 1980, 1991).

Overall, prior research agrees that the *feeling of familiarity* derives from an unconscious inferential process (e.g., Jacoby and Dallas 1981; Jacoby and Whitehouse 1989; Lindsay and Kelley 1996; Rajaram 1993; Whittlesea 1993). In addition, the *feeling of familiarity* with an item is strengthened by the experience with the same item on a previous occasion (e.g., Jacoby and Dallas 1981). However, studies provide evidence that *recollection* can also be an unconscious inferential process (Bartlett 1932; Loftus, Miller, and Burns 1978; Loftus and Palmer 1974;

Roediger and McDermott 1995, 1996). Thus, *recollection* can be considered the mental reconstruction of a prior event based on the information that comes to mind. The accuracy of the reconstruction is determined by the extent to which the person encoded details of a prior event. If such objective and detailed information is not available, *recollection* can also emerge through an inferential process that assesses a piece of the information that comes to mind with respect to its clarity, completeness, fluency, and relationship to other event-related information. By definition, then, recollection is subject to errors (i.e., illusions of recall; Leboe and Whittlesea 2002).

As discussed previously, although the dual process treats the *feeling of familiarity* as a heuristics-based reconstruction and *recollection* as a controlled retrieval, it is argued that the differentiation of the two processes as automatic versus controlled merely depicts the extensiveness of each process (Leboe and Whittlesea 2002). Leboe and Whittlesea (2002, p. 823) state that a primary difference in the two processes is "the subjective conviction that current processing reflects an influence of the past." Thus, a significant factor influencing consumers' subjective recognition experience is their unconscious assessment of information appearing to their minds in terms of its quality and consistency. In addition *recollection* is more likely to require conscious resources than the *feeling of familiarity*, and the feeling of familiarity may occur with the intention to recall (e.g., Leboe and Whittlesea 2002).

In conclusion, rational assumption on consumers' decision making process is history. Price knowledge developed over time and shopping behavior (e.g., price search) of consumers influences their purchase quantity decision when they face a sales promotion. This dissertation intends to extent our knowledge by designing and implementing four experiments which investigate how the relationships between discount types and stockpiling behavior vary across different product types and situations. Also such experiments examine if price knowledge and

perceived similarity of shopping experiences are mediating mechanisms of the relationships between a discount and stockpiling.

STUDY 1

Study 1 is to establish the baseline effects of a sales promotion on stockpiling behavior. One of primary effects of interest is to investigate how discount depth and frequency influence stockpiling behavior. Another main goal of Study 1 is to introduce initial mediating mechanisms. That is, it is proposed that consumer perceived similarity of the overall shopping experience, price recall error, and price comparison error are mediators of the relationships between a sales promotion and stockpiling behavior. In addition, if the effects of discount depth and frequency on price recall error (PRE) and price comparison error (PCE), and perceived similarity are tested.

Hypothesis Development

The Impact of Discount Depth. The assumption of consumers' perfect rationality in their purchase decision making is unrealistic (e.g., Dickson and Sawyer 1990). In certain cases, due to limited price knowledge, consumers may more rely on prices at the moment rather than ones developed from past prices they paid in order to determine purchase, brand choice, and quantity. Provided that consumers' preferred brand is promoted, they may exert more efforts to process a current discounted price, to compare it to an expected price (i.e., internal reference price), and to update their internal price accordingly (i.e., contrast effect). Such intraitem price search behavior would result in lower PRE (e.g., Vanhuele and Dreze 2002). In addition, they may compare the promoted price to prices of alternative brands in order to evaluate promoted brand's price position in a category and support their decision. However, it is also possible that the attractiveness of a sales promotion available for their preferred brand demotivates such a rational price search behavior, that is to say higher PRE and PCE. In other words, a discount itself may make both inter- and intra-item price search unnecessary tasks for consumers (e.g., Dickson and Sawyer 1990). The negative effect of discount depth on consumers' price knowledge accuracy is to be intensified when a

discount rate gets deeper.

Of the two types of familiarity which are objective familiarity and perceived familiarity, this study builds on self-assessed (perceived) familiarity (e.g., Lichtenstein and Fishhoff 1977), which, by definition, is subject to systematic biases and heuristics in consumer decision making (Park and Lessig 1981). The underlying process for the feeling of familiarity is an inferential and constructive process through which consumers undergo (e.g., Marcel 1983). Thus, consumers in the current shopping context consciously or unconsciously integrate various aspects from this context and evaluate the degree of similarity to such aspects from the previous shopping experience. Fundamentally, consumers' recognition of a discount for their preferred brand would interfere their familiarity judgment. The feeling of dissimilarity will be stronger with an increasing discount depth.

When a price discount is provided on a stock-up product, consumers would take advantage of it by stockpiling items for future consumption and by delaying the time of their subsequent purchase (e.g., Litvack, Calantone, Warshaw 1985). In other words, consumers will be willing to increase their short-term costs in order to reduce long-term costs. Overall the positive relationship between discount depth and purchase quantity is supported (Bell, Chiang, and Padmannabhan 1999).

H_1: The depth of a price discount has a direct, positive effect on price recall error (H_{1a}) and price comparison error (H_{1b}) to the extent that deeper discounts are associated with higher error.

H_2: The depth of a price discount has a direct, negative effect on perceived similarity of the overall shopping experience.

H_3: The depth of a price discount has a direct, positive effect on consumer stockpiling.

The Impact of Discount Frequency. If there is a consistency regarding prices paid over time, consumers' expectation of future price would be more accurate, price knowledge built on past prices paid over time. At the same time, their feeling of confidence with own price knowledge would increase as well. For a given product category, if consumers have a short purchase cycle (i.e., their purchase frequency in a fixed time period), a price stored in their memory from a past purchase occasion will be more accurate and up-to-date. Also their purchase behavior would be a more habitual or routine-based task. This is because price sought, processed and stored in their previous purchase occasion is easy to access due to a small time gap between purchase occasions.

The feeling of familiarity depends on predictiveness, uncertainty, the match between expected information and current information, and the perceived surprise in the current shopping event (Whittlesea and Williams 2001). Notice of any changes in the current shopping occasion would serve as perceived surprise which precedes consumers' judgment of the feeling of familiarity. While shopping, various stimuli can evoke consumers' feeling of familiarity with their shopping experience (e.g., Koriat and Levy-Sadot 2001; Koriat and Lieblich 1977; Marcel 1983). Frequent exposure to the same (or very similar) stimuli over time positively influences consumers' expectations and predictiveness but negatively influences their uncertainty in the current shopping occasion. When consumers face with an unexpected or unusual stimulus (e.g., an unusually deep discount), they might disassociate the current shopping experience with the previous one, resulting in unmet expectation and increased uncertainty about the current occasion (Whittlesea and Williams 2001). Increasing frequency of exposure to a particular stimulus increases the feeling of familiarity with that particular stimulus (e.g., Nhouyvanisvong and Reder 1998; Reder and Ritter 1992; Reder and Schunn 1996; Scunn et al. 1997). If consumers frequently purchase their preferred brand with a discount over time, their perceived frequency of discount availability will increase

(Krishna 1991). In turn, consumers' feeling of familiarity regarding their shopping experience will increase.

Consumers' knowledge about the pattern of sales promotions is highlighted as an important drive of stockpiling (e.g., Krishna 1994). If consumers adapt to increasing sales promotion frequency, the effect of a sales promotion would wear-out over time and/or consumers may not see a discounted price as attractive as before (e.g., Foekens, Leeflang, and Wittink 1999; Kopalle, Mela, and Marsh 1999). Thus consumers will wait for the next sales promotion for future purchase and, on a given purchase occasion, stock up the promoted brand to the necessary inventory level where consumers can consume till a subsequent deal is provided. The lying-in-wait heuristic results from consumes' certainty and expectation about when the next sales promotion would be available (Krishna 1994). Based on behavioral learning perspective (e.g., Blattberg and Neslin 1990), it could be posited that the increasing opportunity for consumers to have a promotional benefit allows them to learn to stockpile the promoted item consistently (Ailawadi, Harlam, Cesar, and Trounce 2006). However, consumers may not more tend to stockpile the promoted brand with increasing promotion frequency (e.g., Ailawadi, Harlam, Cesar, and Trounce 2006). That is, consumers' risk averse propensity combined with their higher uncertainty about when the next sales promotion would be available may encourage them to stockpile the promoted brand. Products with higher regular price and a random discount chance are more likely to be stockpiled by consumers when they are promoted (e.g., Meyer and Assuncao 1990). Consumers may feel an obligation to make a purchase, to stock up the promoted item, and to carry additional items to a subsequent purchase occasion in order to minimize future costs (e.g., Meyer and Assuncao 1990; Krishna 1994). This would be intensified when their preferred brand is discounted.

H_4: The frequency of a price discount has a direct, negative effect on price recall error (H_{4a}) and price comparison error (H_{4b}) to the extent that less frequent discounts are associated with less error.

H_5: The frequency of a price discount has a direct, positive effect on perceived similarity of the overall shopping experience.

H_6: The frequency of a price discount has a direct, negative effect on consumer stockpiling.

The Mediation Effects of PRE, PCE, and Perceived Familiarity of Overall Shopping Experience. For stock-up products, consumers' purchase quantity would be more determined by price they know than one they remember (e.g., Monroe 2003; Monroe and Lee 1999). Remembering prices require consumers to consume conscious resources in order to retrieve or recollect specific price points, but knowing prices is more associated with a sense of familiarity (or the feeling of familiarity) which does not require the consumption of conscious resources (e.g., Gardiner 1988; Rajaram 1993; Tulving 1985). In other words, while knowing is an instinctive and fast task, recollecting specific prices (i.e., past prices of the promoted brand) necessitate (1) the symbolic representation of prices, (2) the deliberative and slow cognitive process, and (3) consumption of conscious resources.

In addition, consumers' perceived familiarity with shopping experience is suggested as another factor which mediates the relationship between types of discount and stockpiling behaviors. Park ad Lessig (1981) finds a positive monotonic relationship between the feeling of familiarity and the confidence with a decision made. Thus, increasing chances to purchase consumers' preferred brand at a promoted price may increase their perceived familiarity across purchase occasions and, in turn, increasing perceived confidence with their choice and quantity will

motivate consumers' stockpiling behavior. This is also associated with the concept of behavioral learning (e.g., Blattberg and Neslin 1990). However, it should be also realized that the unexpected surprise (e.g., unexpected deeper discount) may interfere consumers' feeling of familiarity (i.e., contrast effect).

Purchase decision making and price magnitude judgments of consumes with a long purchase cycle may be determined more by inferences to their perceived similarity to an item itself and/or a context (i.e., price, product, and overall shopping experience). That is, because these consumers' price knowledge gets less accurate and more uncertain over time and because they have some degree of expectations of future price, they will infer previously paid prices and compare them with the current prices. Such an inference and reconstruction process is based on the perceived similarity of various aspects such as current price, brand assortment, shopping purpose, and so on. In turn, stockpiling behavior can be influenced by consumers' perceived familiarity with shopping experiences.

If consumers remember things about the previous shopping event (e.g., brand choice, paid price, shelf location) that match the current event (i.e., affirmation of definite expectations; Whittlesea and Williams 2001) and if such expectations are violated with a surprise (e.g., unusually deep discount, product size reduction) (i.e., violation of expectation; Whittlesea and Williams 2001). If consumers attribute the produced information to the previous shopping event and the feeling of familiarity is strong, they might not actively search but rather depend on price information in the current shopping event (i.e., higher probability of price recall error and price comparison error).

H_7: The effects of the depth of a discount on stockpiling are mediated by price recall error (H_{7a}), price comparison error (H_{7b}), and perceived similarity of the experience (H_{7c}).

H_8: The effects of the frequency of a discount on stockpiling are mediated by price recall error (H_{8a}), price comparison error (H_{8b}), and perceived similarity of the experience (H_{8c}).

Research Design

Study1 employs 2 (high vs. low discount depth) x 2 (high vs. low discount frequency) between-subject design that serves as the base for other three experiments. Total 495 participants were randomly assigned to one of four conditions. The experiment of Study1 consists of two consecutive shopping tasks (i.e., computer simulated shopping events). Each task includes written information (i.e., shopping scenario) and price tags of purchase options. Each price tag displays regular price, discounted price, dollar amount to be saved from a given discount, and unit price and package size. Following sections discuss (1) manipulations of discount depth and frequency, (2) experiment procedure, (3) measures, (4) sample/data collection, and (5) means of data analysis before discussing results and findings of Study1.

Manipulation and Product Category. The primary interest of my dissertation is how price discounts determined by depth and frequency influence consumer stockpiling behavior and what is an underlying psychological process of such relationships, in particular for low-involvement products. Thus, a product category used in this experiment should be one that consumers commonly and/or regularly shop for (e.g., consumer packaged goods). Also the formation of internal reference price standards is more likely to arise with the presence of repurchase intention

in the near future (Mazumdarm, Raj, and Sinha 2005). Previous research investigating effects of sales promotion and consumer stockpiling behavior classified products into two groups. The one category was identified by consumer stockpiling and flexible consumption behaviors (e.g., salted snacks). Consumers for the other category only showed stockpiling behavior (e.g., coffee) (Bell, Chiang, and Padmanabhan 1999; Bell, Iyer, and Padmanabhan 2002). Taking all together, ground coffee was chosen as the focal product category for the current experiment and 12oz package size was used.

Four between-subject conditions were determined by manipulations of high vs. low discount depth as well as high vs. low discount frequency. Levels of manipulations were determined based on pre-studies and previous literature. Any price discounts below are not to be easily recognizable (Litvack, Calantone, and Warshaw 1985). Kalwani and Yim (1992) found a significant difference in the level of expected price between high and low discount depth groups (i.e., 20% vs. 30%; 10% vs.20%; and 30% vs. 40%). DelVecchio, Krishnan, and Smith (2007) found that participants perceive 43% (vs. 13%), 40% (vs.15%), and 50% (vs. 10%) discounts higher than their corresponded lower discount rates. For the product category with consumer stockpiling behavior and flexible consumption behavior, the average discount rate provided was 36% and the other one where consumers showed stockpiling behavior only, the average discount rate was 26% (Bell, Iyer, and Padmanabhan 2002). Study1 chose 10% and 40% as low and high level discounts and they were checked through two pre-studies. Results indicated that participants perceived 40% discount rate significantly higher than 10% discount. The regular price for a focal product (i.e., participant's preferred brand) was set at $7.15 in the current experiment. Thus, 10% discounted price is $6.44 and 40% discounted price is $4.29.

Furthermore, an alternative brand option is a hypothetical brand, Café Value. Its price was set at $4.78 that is between $6.44 and $4.29.

One's perception on discount frequency over time was more accurate when the regularity was employed than when not (Krishna 1991). In the same research, discount frequency was manipulated by providing three discounts for low discount frequency vs. six discounts for high discount frequency over a 12-week period regardless of regularity. Here discount frequency was manipulated by a combination of written information given in each shopping scenario and the number of discounts available across two shopping tasks. Participants in low discount frequency group had only one discount which was available at the second shopping and those who in high discount frequency group had total four discounts sequentially (i.e., two discounts from the written information and two discounts provided at all of two shopping tasks).

Procedure of Shopping Tasks. In order to complete the experiment, participants conducted two consecutive shopping tasks. For each task, they were required to answer which brand they chose to purchase and how many items they decided to purchase. Prior to these main shopping tasks, participants answered an array of questions. In particular, three questions were used to complete shopping scenarios. The first question was about participant's preferred brand name of ground coffee that one purchases most often. Such brand name (i.e., the focal brand) was presented in shopping tasks as one of choice options and also was manipulated in terms of discount depth and frequency. The second question was about one's current product inventory level at home. The current level of product inventory would have a significant effect on one's purchase quantity decision. Thus, of the two shopping tasks, the current inventory information was embedded in the first shopping scenario and one could defer the first purchase. The last question was about the level of product inventory where one usually decides to purchase to refill one's inventory. This

information was piped in the second shopping scenario. In the second shopping task, one cannot defer one's purchase. In addition, by asking one to imagine s/he is shopping a ground coffee in retail store where they often shop for grocery products, the potential influence from the store location on one's decision making was to be controlled. As the last step, questions for predicting variables and covariates were asked and demographic information were collected. Appendices (i.e., Appendix A – D) present the complete scenarios of the experiment.

Measures. This section only discusses sources of measurement items. The means of assessment of the measures and evidences of reliabilities and validities are discussed in later sections.

Stockpiling. This is measured by purchase quantity in the second shopping task. If a participant chose to purchase one of alternative options, his or her purchase quantity is recoded to zero.

Price recall error (PRE) represents represents consumer's absolute price knowledge and is adapted from the measure Zeithaml (1982) used to examine consumers' cognitive response to price information. It is operationalized as the absolute difference between actual price and recalled price. Unlike PRE, *price comparison error (PCE)* reflects consumer's relative price knowledge and is adopted from Zeithaml (1982). It is operationalized as the number of incorrect rankings made by participants. *Similarity* which is participants' perceived similarity between shopping tasks is measured with regard to overall shopping experience. Participants used a seven-point scale (1 = "very different," 7= "very similar") to respond to the following statement: "Please indicate how *similar* your current shopping trip you just made and your previous shopping trip is, in terms of the following…." *Category knowledge*, participants' product category knowledge, is operationalized by adapting two measures of subjective knowledge from Brucks (1985). To form a single scale, the average score of two measures is used. To measure *deal proneness*, six measurement items are adopted from Lichtenstein, Ridgway, and Netemeyer

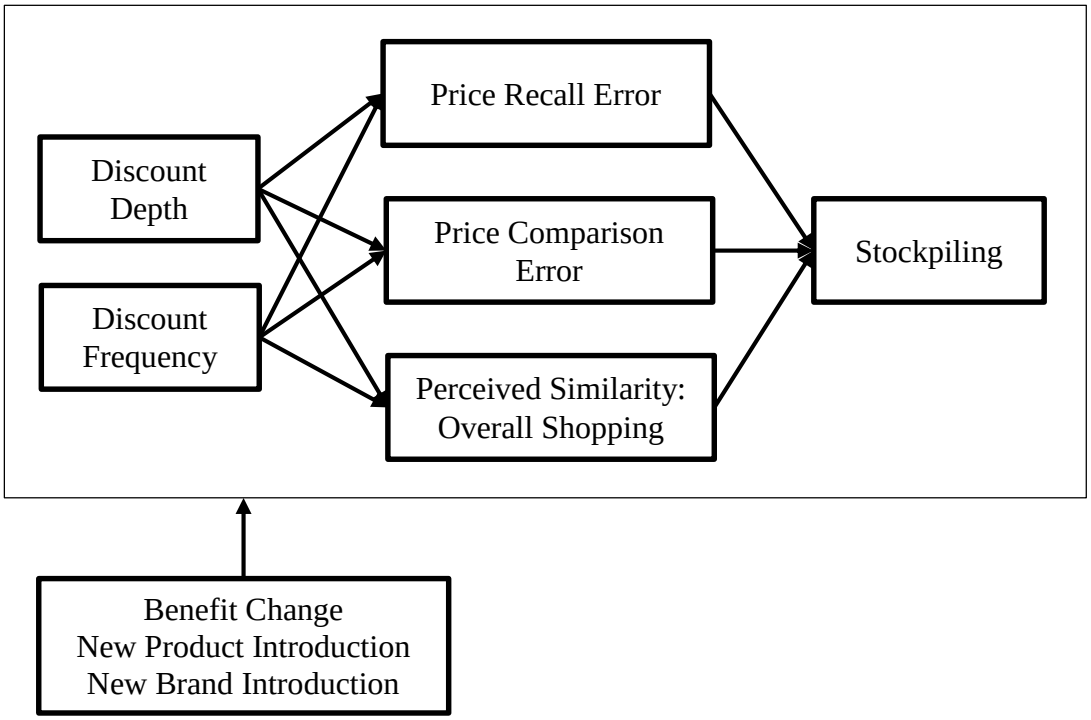
(1993). According to Murthi and Rao (2012), deal proneness is one of the reasons for consumer price unawareness. All six items are measured on a seven-point Likert scale, and an average score is used for hypotheses testing. *Certainty of recalled price* is measured by single measurement item which is adapted from the measure of consumers' affective (i.e., attitude) response to price information in Zeithaml's (1982) conceptual model. It asks a participant to answer the degree of certainty about one's recalled price. For *purchaser* variable, before a participant conducts two shopping tasks, one was asked to identify oneself as a buyer or a non-buyer. Lastly, as *demographic* variables, household size and household income are collected as covariates. In particular, household size is operationalized as the number of people in a household

Data Collection and Samples. Data were collected through Amazon Mechanical Turk (MTurk), which is based on Internet crowdsourcing and is a popular platform to find participants. Various researchers have used MTurk as a source to select participants from the general population and have noted its usefulness and reliability (e.g., Buhrmester, Kwang, and Gosling 2011; Goodman, Cryder, and Cheema 2013; Paolacci, Chandler, and Ipeirotis 2010; Rand 2011). In their research noting differences between participants from MTurk and those from other sources (e.g., community members, students), Goodman, Cryder, and Cheema (2013) suggests that researchers use screening/filtering measures and also consider demographic properness of participants for their studies. Thus, for this study, data were collected in such a way that only those who met two preset conditions were able to participate in one of experiment conditions: (1) incentive approval ratio (i.e., >89%) and (2) country in which they reside (i.e., United States). Some additional screening questions were asked prior to experimental tasks. Last, in exchange for one's

participation, a monetary compensation was granted. For the current experiment, cell sizes are in the range of 88 to 139. Total sample size is 495.

Means of Analysis. Overall, data analysis was a three-stage process. First, reliabilities and validities of measures were assessed. Second, main effects of discount depth and frequency on purchase quantity, PRE, PCE, and similarity were tested along with potential interaction effects. Finally, mediation effects of similarity, PRE, and PCE were examined with counting covariates into the proposed model in Figure 1.

Figure 1: Proposed Conceptual Model



The first is the assessment of the measures. For single item measures, the existence of overlapping confidence intervals was checked, That is, a variable should not have correlations which overlapping 1 with other separate variables. For two multi-item measures, category knowledge and deal proneness, a Confirmatory Factor Analysis (CFA) was used. To check reliabilities and validities of the measures, Cronbach's alpha, average variance extracted (AVE),

and composite reliability (CR) were calculated (Fornell and Larcker 1981). To form a single scale for those two multi-item measures, the average score in indicators is used for hypotheses testing.

Secondly, Multivariate Analysis of Variance (MANOVA) was used to test Hypotheses 1 – 6 associated with main effects of discount depth and frequency on PRE, PCE, and similarity. The primary focus is on between-subject tests and comparisons. First of all, overall Wilk's Lambdas were checked as evidence of multivariate test. If the multivariate tests shows statistical significance, univariate tests for each mediator and purchase quantity were followed. Here Bonferroni adjustments were made.

Lastly, PROCESS macro in SPSS (Hayes and Preacher 2014) was used to test mediation effects, H7 – 8. In particular, for Study 1, Model 4 template was applied. This approach allowed a direct effect of single predicting variable on a dependent variable and its multiple indirect effects (i.e., multiple mediators) to be examined simultaneously. The magnitude and significance of the indirect effects were assessed by looking at upper and lower bounds for the confidence intervals surrounding each indirect effect.

Results

Manipulation Checks. Indicated average discount rates between high discount depth group (33.81%) and low discount depth group (16.97) were significantly different ($F_{1,493}$=142.718, p<.01). The difference between average perceptions on a given discount rate between two groups was also significant ($F_{1,493}$=124.044, p<.01). Between high and low discount frequency groups, their perceived number of discounts was significantly different (1.11 vs. 1.88) ($F_{1,493}$=138.239, p<.01). Frequency perception was significantly different between two groups ($F_{1,493}$=274.418, p<.01).

Table 1-1: Correlation Matrix

	Knowledge	Deal	Quantity	PRE	PCE	Certainty	Similarity	Household Size	Household Income
Knowledge	**.796**	.0002							
Deal	-.012	**.536**							
Lower 95% CI	-.100								
Upper 95% CI	.076								
Quantity	.046	-.028	.						
Lower 95% CI	-.042	-.116							
Upper 95% CI	.134	.060							
PRE	.097*	-.135**	-.040	.					
Lower 95% CI	.009	-.221	-.128						
Upper 95% CI	.184	-.047	.048						
PCE	.014	-.090*	-.027	.032	.				
Lower 95% CI	-.074	-.177	-.115	-.056					
Upper 95% CI	.102	-.002	.061	.120					
Certainty	.070	.047	.142**	-.241**	-.005	.			
Lower 95% CI	-.018	-.041	.055	-.322	-.093				
Upper 95% CI	.157	.135	.227	-.156	.083				
Similarity	.035	.060	-.026	-.023	-.050	.119**	.		
Lower 95% CI	-.053	-.028	-.114	-.111	-.138	.031			
Upper 95% CI	.123	.147	.062	.065	.038	.205			
Household Size	.066	-.033	.090*	.023	-.026	.087	.019	.	
Lower 95% CI	-.022	-.121	.002	-.065	-.114	-.001	-.069		
Upper 95% CI	.153	.055	.177	.111	.062	.174	.107		
Household Income	.016	-.154**	.140**	-.031	-.020	.076	.046	.288**	.
Lower 95% CI	-.073	-.239	.053	-.119	-.108	-.012	-.042	.205	
Upper 95% CI	.104	-.067	.225	.057	.068	.163	.134	.367	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Notes: Correlations are in the lower triangle. Shared variances are in the upper triangle. AVE is on the diagonal.

Assessment of the Measures. As shown in Table1-1, single item measures did not show any correlations overlapping 1 for separate variables. Table1-2 presents a measurement model estimated by CFA. This model composed of two reflective multi-item latent constructs (i.e., category knowledge and deal proneness). Fit indices indicated a good-fit between the proposed model and the data (CFI=.976; SRMR=.039; RMSEA=.069) (Hu and Bentler, 1999). Evidence of reliabilities and validities was found on category knowledge (AVE=.7964, CR=.887, Cronbach's alpha=.868) and on deal proneness (AVE=.5369, CR=.87, Cronbach's alpha=.888). AVE was greater than the shared variance (Table1-1). In addition, Table1-4 has the descriptive information of measures.

Table 1-2: Measurement Model

	λ
Category Knowledge (CR=.887; AVE=.7964)	
• Rate your overall knowledge of "ground coffee", as compared to the average consumer.	.89
• Please check the scale that best describes your familiarity with "ground coffee".	.89
Deal Proneness (CR=.87; AVE=.5369)	
• If a product is on sale, that can be a reason for me to buy it.	.55
• When I buy a brand that is on sale, I feel that I am getting a good deal.	.61
• I have favorite brand, but most of time I buy the brand that is on sale.	.70
• One should try to buy the brand that is on sale.	.73
• I am more likely to buy brands that are on sale.	.87
• Compared to most people, I am more likely to buy brands that are on sale.	.87
Goodness-of-Fit Indexes	
CFI=.976; SRMR=.039; RMSEA=.069	

Table 1-3: Descriptive Statistics

	DEP	Mean	SD	95% CI	
Quantity	Low	1.548	0.079	1.392	1.704
	High	2.127	0.071	1.987	2.266
PRE	Low	44.638	6.778	31.321	57.955
	High	56.728	6.078	44.785	68.67
PCE	Low	1.243	0.06	1.125	1.361
	High	0.903	0.054	0.797	1.009
Similarity	Low	5.106	0.091	4.927	5.285
	High	5.123	0.082	4.962	5.284
	FRQ				
Quantity	Low	2.007	0.07	1.869	2.145
	High	1.668	0.08	1.511	1.824
PRE	Low	52.354	6.023	40.519	64.189
	High	49.012	6.827	35.599	62.425
PCE	Low	1.045	0.053	0.94	1.15
	High	1.101	0.06	0.982	1.22
Similarity	Low	4.914	0.081	4.755	5.073
	High	5.315	0.092	5.135	5.495

	DEP	FRQ	Mean	SD	95% CI	
Quantity	Low	Low	1.619	0.099	1.425	1.812
		High	1.477	0.124	1.234	1.721
	High	Low	2.396	0.1	2.198	2.593
		High	1.858	0.1	1.661	2.055
PRE	Low	Low	44.64	8.44	28.057	61.223
		High	44.636	10.607	23.795	65.478
	High	Low	60.067	8.596	43.178	76.957
		High	53.388	8.596	36.499	70.278
PCE	Low	Low	1.201	0.075	1.055	1.348
		High	1.284	0.094	1.099	1.469
	High	Low	0.888	0.076	0.738	1.038
		High	0.918	0.076	0.768	1.068
Similarity	Low	Low	5.007	0.114	4.784	5.23
		High	5.205	0.143	4.924	5.485
	High	Low	4.821	0.116	4.594	5.048
		High	5.425	0.116	5.198	5.653

Table 1-4: Descriptive Information of Measures

	N	Mini	Max	Mean	SD
Quantity	495	1.00	6.00	1.869	1.209
PRE	495	0.00	570.00	51.184	99.417
PCE	495	0.00	2.00	1.0545	.895
Similarity	495	1	7	5.11	1.355
Certainty	495	1	7	4.21	1.513
Household Size	495	1	5	2.63	1.280
Household Income	492	1	14	6.30	3.631
Knowledge	495	1.00	7.00	4.211	1.459
Deal Proneness	495	1.00	7.00	4.740	1.134
Valid N	492				

Assessment of the Main Effects. The main effect of discount depth on mediators and the main predicted variable was significant (Wilks'λ=.905, p<.01). Also that of discount frequency confirmed its significance (Wilks'λ=.957, p<.01. Given the fact that overall multivariate tests of discount depth and frequency are significant (Table1-5), univariate tests of each mediator and a predicted variable (quantity) are discussed.

Table 1-5: Multivariate Tests

	Wilks' λ	$F_{4,488}$	Sig.	Partial Eta Squared	Power[c]
Intercept	.050	2305.699[b]	.000	.950	1.00
DEP	.905	12.872[b]	.000	.095	1.00
FRQ	.957	5.479[b]	.000	.043	.976
DEP*FRQ	.987	1.605[b]	.172	.013	.496

a. Design: Intercept + DEP + FRQ + DEP * FRQ
b. Exact statistics
c. Computed using alpha = .05

Table1-6 and Figure2 present the significance of each test and directions of relationships. (also see Table1-3). Discount depth showed its positive association with purchase quantity ($F_{1,491}$=29.642, p<.01). In contrast, discount frequency revealed its negative relationship with purchase quantity ($F_{1,491}$=10.188, p<.01). Thus H3 and H6 are supported. In terms of PCE, an increase in discount depth decreased PCE ($F_{1,491}$=17.743, p<.01). This may tell that when

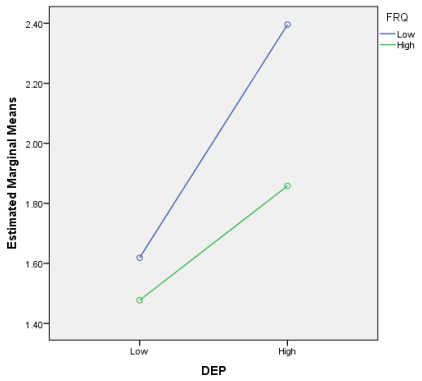
consumers' preferred brand is more deeply discounted than the price they paid (i.e., internal price reference) in their previous shopping, they might be more likely to compare the price to those of other brands in a product category. The relationship between discount frequency and similarity was significant and positive ($F_{1,491}$=10.716, p<.01).

Table 1-6: Univariate Tests

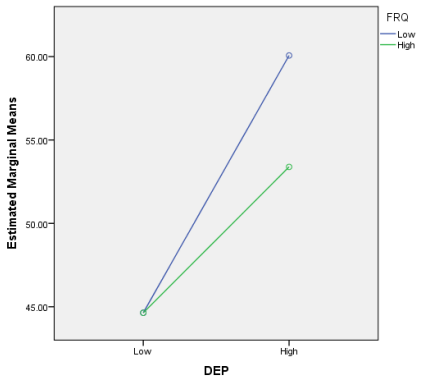
DEP						
		MS	$F_{1,491}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	40.032	29.642	.000	.057	1.00
	Error	1.350				
PRE	Contrast	17459.574	1.763	.185	.004	.263
	Error	9901.512				
PCE	Contrast	13.792	17.743	.000	.035	.988
	Error	.777				
Similarity	Contrast	.036	.020	.888	.000	.052
	Error	1.792				
FRQ						
		MS	$F_{1,491}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	13.759	10.188	.002	.020	.890
	Error	1.350				
PRE	Contrast	1333.887	.135	.714	.000	.066
	Error	9901.512				
PCE	Contrast	.378	.486	.486	.001	.107
	Error	.777				
Similarity	Contrast	19.202	10.716	.001	.021	.904
	Error	1.792				

Figure 2: Mean Plots for Discount DEP and FRQ

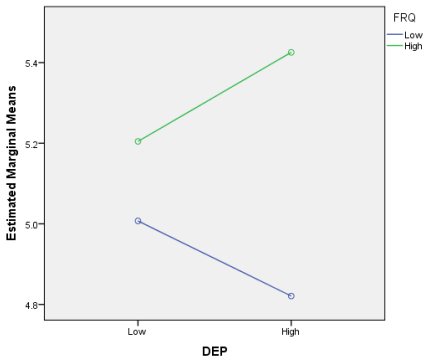
Quantity



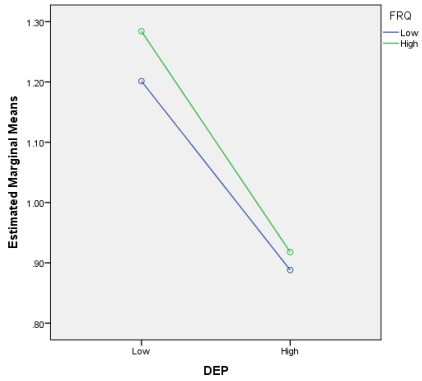
PRE



Similarity



PCE



Assessment of the Mediation Effects. Table1-7 presents results of mediation tests for PRE, PCE, and similarity. Discount depth showed its positive and significant direct effect on quantity (t=5.068, p<.01). Discount frequency indicated its negative and significant direct effect on quantity (t=-2.889, p<.01). However, all of proposed mediators did not have significant indirect effects. 95% confidence intervals (CI) of each indirect effect when it was tested with discount depth are (1) PRE: -0.058 ~ 0.027, (2) PCE: -0.048 ~ 0.030, and (3) similarity: -0.022 ~ 0.015. 95% CIs of indirect effects which were tested with discount frequency are (1) PRE: -.007 ~ .014), (2) PCE: -.021 ~ .008), and (3) similarity (-0.022 ~ 0.015).

Table 1-7: Test of Mediation Effects

DIRECT AND INDIRECT EFFECTS

Direct effect of DEP on Quantity

Effect	SE	t	p	LLCI	ULCI
.549	.108	5.068	.000	.336	.762

Indirect effect of DEP on Quantity

	Effect	Boot SE	BootLLCI	BootULCI
TOTAL	-.013	.023	-.058	.027
PRE	-.005	.008	-.030	.004
PCE	-.008	.020	-.048	.030
Similarity	-.0003	.008	-.022	.015

DIRECT AND INDIRECT EFFECTS

Direct effect of FRQ on Quantity

Effect	SE	t	p	LLCI	ULCI
-.314	.109	-2.889	.004	-.528	-.101

Indirect effect of FRQ on Quantity

	Effect	Boot SE	BootLLCI	BootULCI
TOTAL	-.013	.020	-.061	.021
PRE	.001	.005	-.007	.014
PCE	-.001	.006	-.021	.008
Similarity	-.013	.018	-.057	.017

Discussion

Study1 examined direct relationships between types of discounts determined by its depth and frequency and consumer stockpiling behavior (i.e., purchase quantity) as well as indirect relationships through three mediators (i.e., PRE, PCE, similarity). Table 5 summarizes results of the hypotheses testing.

In general, primary findings of Study1 are two folds. First, if a firm provides relatively deeper discount comparing to previously offered discount, consumers may purchase more. As hypothesized, if a firm make a discount available frequently and regularly, consumers may decrease their purchase quantity. Second, with regard to customer price search behavior and price

knowledge, when customers recognize an available high depth discount, they seems to be more motivated to search and compare prices at the category level (i.e., interitem search) than usual.

Based on the findings of Study1, we need to extend our understanding to how consumer stockpiling behavior may vary when another pricing strategic aspect is employed. Thus, Study2 add benefit change into the model of Study1. Benefit change is to be manipulated by changing product size. It is a pervasive way of changing price in order for firms to stabilize their profit margin when there is an increase in price of raw materials. Thus, Study2 introduces benefit change as a moderator and examines how established relationships between types of price discounts and purchase quantity would be varied by benefit change.

STUDY 2

The primary goals of Study 2 are two folds. The first one is to replicate the baseline effects noted in Study 1 and the second one is to introduce moderating effects of benefit change. In other words, Study 2 investigates, when product size is changed for consumers' preferred brand, how the established relationships in Study 1 change. Because reducing product size means less product benefit for consumers, consumers may adjust their purchase behavior accordingly.

If a benefit change is recognized, it would make consumers necessary to update their knowledge because it overall influences the value calculation. Under concepts of behavioral learning (e.g., Blattberg and Neslin 1990) and feeling of familiarity (e.g., Whittlesea and Williams 2001), because of consumers' learned benefits over time through promotional savings, even though there is a change in product size (i.e., reduced product benefit), consumers may not reevaluate product value. Even if consumers notice a change, if a given discount is unusual and deeper, they are less likely to update their price knowledge and more likely to stockpile the promoted item to maximize benefits. Updating their knowledge by reevaluating product value may occur under a condition in which a change in stimulus is distinctive enough for consumers to be encouraged to do so. However, as a recent article addresses, it seldom appears (The New York Times 2011). This may because firms make a change under the level of just-noticeable-difference of consumers and/or because consumers limited information search behavior.

H_9: A benefit change moderates the effects of depth/frequency to the extent that the effects of both discounts are amplified when there is a benefit change.

Research Design

The experiment of Study2 employs 2 (high vs. low discount depth) x 2 (high vs. low discount frequency) x 2 (high vs. low benefit/ between-subject design. A primary difference of Study2 from Study1 is the addition of benefit change (i.e., change in product size) into the base model tested in Study1. Study2 retains manipulations of discount depth and frequency from Study1.

Benefit (i.e., product size) was operationalized by changing price information in price tag. After a 9% reduction in product size (i.e., low benefit group), unit price increased from 60 cents per oz. to 65 cents per oz. and product size decreased from 12 oz. to 11 oz. For both numerical information, the left digits were kept the same. However, with a 33% reduction (i.e., high benefit group), product size decreased from 12 oz. to 8 oz. The two-digit number decreased to a single digit; the single digit number, 8, also was greater than each digit of the base size (i.e., 1 and 2). Product unit price increased from 60 cents to 85 cents and involved a change in the left digit. Of the two shopping tasks, benefit manipulation is introduced in the second shopping task. Study2 kept other experimental aspects exactly same with those of Study2 including procedure, scenarios, data collection platform, and all of the measures. Lastly, for Study2, cell sizes are in the range of 72 to 174. Total sample size is 625.

In terms of means of data analysis, hypotheses testing was conducted by following the same process of Study1 with the addition of the moderating effect of benefit change. So, in order to test the moderated mediation, a new model template in PROCESS macro was used (i.e., model 8 for moderated mediation).

Results

Manipulation Checks. Indicated average discount rates between high discount group (32.83%) and low discount depth group (18.34%) were significantly different ($F_{1,623}$=146.769, p<.01). The difference between average perceptions on a given discount rate between two groups were also significant ($F_{1,623}$=134.782, p<.01). Indicated number of discounts showed a significant difference between low discount frequency group (1.08) and high discount frequency group (1.96) ($F_{1,623}$=225.710, p<.01). Also participants' frequency perception between two groups was significantly different ($F_{1,623}$=418.388, p<.01). Checking the manipulation of benefit change was two step approach. First, whether participants recognized benefit change or not was asked. Second, those who recognized a given benefit change were led to questions associated with their objective and subjective perceptions on the given level of manipulation. Of the participants, 22.2% (i.e., 139 of 625) recognized the change. High benefit group answered there was a decrease in product size by 3.45oz and low benefit group indicated a decrease by 2.38oz ($F_{1, 137}$ = 8.178, p<.01). In addition, with regard to participants' perception on a given amount of benefit change, there was a significant difference between two groups ($F_{1,137}$=2/.618, p<.01).

Table 2-1: Correlation Matrix

	Knowledge	Deal	Quantity	PRE	PCE	Certainty	Similarity	Household Size	Household Income
Knowledge	**.837**	.016							
Deal	-.127**	**.462**							
Lower 95% CI	-.203								
Upper 95% CI	-.049								
Quantity	.122**	-.037	.						
Lower 95% CI	.044	-.115							
Upper 95% CI	.199	.042							
PRE	.026	-.160**	.024	.					
Lower 95% CI	-.053	-.235	-.055						
Upper 95% CI	.104	-.083	.102						
PCE	.046	-.024	-.039	.072	.				
Lower 95% CI	-.033	-.102	-.117	-.006					
Upper 95% CI	.124	.055	.040	.150					
Certainty	.032	.058	.102*	-.175**	.031	.			
Lower 95% CI	-.047	-.021	.024	-.250	-.048				
Upper 95% CI	.110	.136	.179	-.098	.109				
Similarity	.086*	.064	-.050	-.007	.000	.017	.		
Lower 95% CI	.008	-.015	-.128	-.085	-.078	-.062			
Upper 95% CI	.163	.142	.029	.071	.078	.095			
Household Size	-.048	.024	.027	-.027	-.041	.052	.025	.	
Lower 95% CI	-.126	-.055	-.052	-.105	-.119	-.027	-.054		
Upper 95% CI	.031	.102	.105	.052	.038	.130	.103		
Household Income	-.012	-.118**	.032	-.041	-.063	.023	-.043	.272**	.
Lower 95% CI	-.090	-.195	-.047	-.119	-.141	-.056	-.121	.198	
Upper 95% CI	.066	-.040	.110	.038	.016	.101	.036	.343	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Notes: Correlations are in the lower triangle. Shared variances are in the upper triangle. AVE is on the diagonal.

Assessment of the Measures. Table 2-1 indicates there are no signle measure which has a correlation overlapping 1 with other variables. Table 2-2 presents a measurement model estimated by CFA. It shows a good fit between the model and the data (CFI=.974; SRMR=.036; RMSEA=.075) (Hu and Bentler, 1999). Acceptable level of reliability and validity were found for both category knowledge (AVE=.837, CR=.911, Cronbach's alpha=.901) and deal proneness (AVE=.462, CR=.835, Cronbach's alpha=.880). In addition, AVE was greater than its shared variances. Table 2-3 shows descriptive information of measures.

Table 2-2: Measurement Model

	λ
Category Knowledge (CR=.911; AVE=.837)	
• Rate your overall knowledge of "ground coffee", as compared to the average consumer.	1.0
• Please check the scale that best describes your familiarity with "ground coffee".	.82
Deal Proneness (CR=.835; AVE=.462)	
• If a product is on sale, that can be a reason for me to buy it.	.63
• When I buy a brand that is on sale, I feel that I am getting a good deal.	.65
• I have favorite brand, but most of time I buy the brand that is on sale.	.73
• One should try to buy the brand that is on sale.	.73
• I am more likely to buy brands that are on sale.	.87
• Compared to most people, I am more likely to buy brands that are on sale.	.85
Goodness-of-Fit Indexes	
CFI=.974; SRMR=.036; RMSEA=.075	

Table 2-3: Descriptive Information of Measures

	N	Mini	Max	Mean	SD
Quantity	625	1.00	6.00	1.810	1.113
PRE	625	.00	570.00	41.4906	80.985
PCE	625	.00	2.00	1.013	.904
Similarity	625	1	7	5.16	1.379
Certainty	625	1	7	4.20	1.542
Household Size	625	1	5	2.59	1.196
Household Income	622	1	14	6.09	3.417
Knowledge	625	1.00	7.00	4.295	1.513
Deal Proneness	625	1.00	7.00	4.755	1.124
Valid N	622				

Assessment of the Main Effects. Multivariate tests revealed significant main effects of benefit change (Wilks'λ=.984, $p < .001$, discount depth (Wilks'λ=.954, $p < .001$), and discount depth (Wilks'λ=.910, $p < .001$). In addition, a significant interaction between discount depth and frequency was found (Wilks'λ=.982, $p < .005$). Table 2-4 presents means, standard deviations, and sample sizes for all four pricing groups. Given the fact that overall multivariate tests of discount depth, discount frequency, and an interaction between discount depth and frequency were significant (Table2-5), univariate tests of such each mediator and a predicted variable as well as between-subjects tests of an interaction effect on those variables are discussed.

Table 2-6, 2-7 and Figure3 present the significance of each test and directions of relationships (also see Table 2-4). An increase in benefit change caused a decrease in PCE ($F_{1,617}$=8.191, p<.01) which would indicate that those who recognize any changes in product size will deliberately search and compare price information across products (i.e., interitem search) at the product category level. Discount depth was positively associated with quantity ($F_{1,617}$=28.893, p<.01). Discount frequency showed a significant negative relationship with quantity ($F_{1,617}$=30.934, p<.01) and a significant positive relationship with similarity ($F_{1,617}$=28.125, p<.01).

Table 2-4: Descriptive Statistics

	BEF	Mean	SD	95% CI	**DEP**	Mean	SD	95% CI	**FRQ**	Mean	SD	95% CI
Quan	Low	1.847	0.059	1.73; 1.964	Low	1.608	0.058	1.494; 1.723	Low	2.055	0.06	1.939; 2.172
	High	1.788	0.062	1.667; 1.909	High	2.027	0.063	1.904; 2.15	High	1.579	0.062	1.459; 1.7
PRE	Low	44.307	4.533	35.406; 53.208	Low	40.577	4.448	31.842; 49.312	Low	42.841	4.537	33.932; 51.75
	High	38.423	4.693	29.206; 47.64	High	42.153	4.774	32.779; 51.527	High	39.889	4.689	30.68; 49.098
PCE	Low	0.907	0.05	0.809; 1.006	Low	1.071	0.049	0.974; 1.168	Low	1.038	0.05	0.939; 1.137
	High	1.114	0.052	1.012; 1.216	High	0.95	0.053	0.847; 1.054	High	0.983	0.052	0.881; 1.085
Sim	Low	5.199	0.075	5.052; 5.347	Low	5.258	0.074	5.113; 5.402	Low	4.876	0.075	4.728; 5.023
	High	5.126	0.078	4.973; 5.278	High	5.067	0.079	4.912; 5.222	High	5.449	0.078	5.296; 5.601

Quan	DEP	FRQ	BEF	Mean	SD	95% CI		Sim	DEP	FRQ	BEF	Mean	SD	95% CI	
	Low	Low	Low	1.681	0.112	1.462	1.901		Low	Low	Low	5.253	0.141	4.976	5.53
			High	1.807	0.117	1.577	2.037				High	4.904	0.148	4.614	5.194
		High	Low	1.471	0.116	1.244	1.698			High	Low	5.506	0.146	5.219	5.793
			High	1.474	0.122	1.234	1.714				High	5.368	0.154	5.065	5.672
	High	Low	Low	2.487	0.122	2.247	2.727		High	Low	Low	4.566	0.154	4.263	4.869
			High	2.247	0.125	2.002	2.492				High	4.781	0.158	4.471	5.09
		High	Low	1.75	0.126	1.503	1.997			High	Low	5.472	0.159	5.161	5.784
			High	1.623	0.128	1.371	1.875				High	5.449	0.162	5.131	5.767
PRE	Low	Low	Low	49.495	8.516	32.77	66.219	PCE	Low	Low	Low	1.055	0.094	0.87	1.24
			High	42.735	8.917	25.223	60.247				High	1.145	0.099	0.951	1.339
		High	Low	36.659	8.812	19.354	53.964			High	Low	0.953	0.098	0.761	1.145
			High	33.421	9.319	15.12	51.722				High	1.132	0.103	0.929	1.334
	High	Low	Low	40.382	9.319	22.081	58.683		High	Low	Low	0.816	0.103	0.613	1.019
			High	38.753	9.509	20.08	57.427				High	1.137	0.105	0.93	1.344
		High	Low	50.694	9.574	31.892	69.497			High	Low	0.806	0.106	0.597	1.014
			High	38.783	9.78	19.576	57.99				High	1.043	0.108	0.831	1.256

*Quan=purchase quantity; Sim=similarity

Table 2-5: Multivariate Tests

	Wilks' λ	$F_{4,488}$	Sig.	Partial Eta Squared	Power[c]
Intercept	.050	2918.666[b]	0.000	.950	1.000
BEF	.984	2.552[b]	.038	.016	.722
DEP	.954	7.393[b]	.000	.046	.997
FRQ	.910	15.194[b]	.000	.090	1.000
BEF*DEP	.991	1.394[b]	.235	.009	.436
BEF*FRQ	1.000	.018[b]	.999	.000	.054
DEP*FRQ	.982	2.871[b]	.022	.018	.779
BEF*DEP*FRQ	.996	.542[b]	.705	.004	.182

a. Design: Intercept + BEF + DEP + FRQ + BEF * DEP + BEF * FRQ + DEP * FRQ + BEF * DEP * FRQ
b. Exact statistic
c. Computed using alpha = .05

In addition, there was a significant interaction effect between discount depth and frequency on quantity ($F_{1,617}$=5.678, p<.05). The positive relationship between discount depth and quantity was significantly attenuated by an increase in discount frequency, while an increase in discount depth strengthened the negative relationship between discount frequency and quantity. Another significant effect between discount depth and frequency was found for similarity ($F_{1,617}$=3.929, p<.05). That is, the positive relationship between discount frequency and similarity was significantly strengthened by an increase in discount depth.

Table 2-6: Between-Subjects Tests for an Interaction between DEP and FRQ

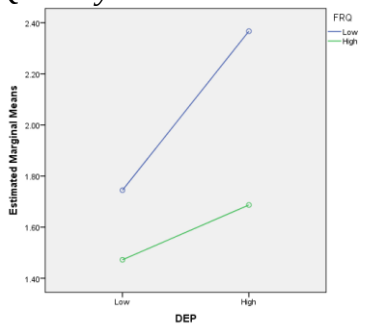
DEP*FRQ					
	MS	$F_{1,617}$	Sig.	Partial Eta Squared	Power[a]
Quantity	6.451	5.678	.017	.009	.662
Error	1.136				
PRE	10229.903	1.550	.214	.003	.237
Error	6600.284				
PCE	.001	.002	.969	.000	.050
Error	.810				
Similarity	7.116	3.929	.048	.006	.508
Error	1.811				

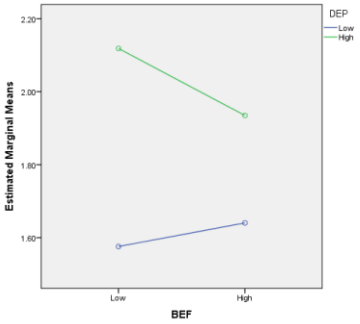
Table 2-7: Univariate Test

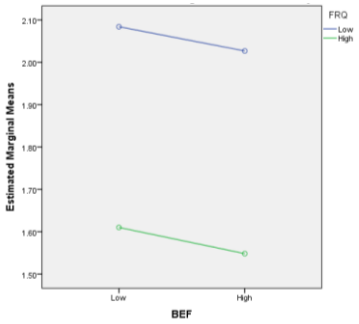
BEF						
		MS	$F_{1,617}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	.549	.483	.487	.001	.107
	Error	1.136				
PRE	Contrast	5368.378	.813	.367	.001	.147
	Error	6600.284				
PCE	Contrast	6.634	8.191	.004	.013	.815
	Error	.810				
Similarity	Contrast	.840	.464	.496	.001	.104
	Error	1.811				
DEP						
		MS	$F_{1,617}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	27.147	23.893	.000	.037	.998
	Error	1.136				
PRE	Contrast	384.935	.058	.809	.000	.057
	Error	6600.284				
PCE	Contrast	2.253	2.782	.096	.004	.384
	Error	.810				
Similarity	Contrast	5.635	3.111	.078	.005	.421
	Error	1.811				
FRQ						
		MS	$F_{1,617}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	35.147	30.934	.000	.048	1.000
	Error	1.136				
PRE	Contrast	1350.971	.205	.651	.000	.074
	Error	6600.284				
PCE	Contrast	.464	.573	.450	.001	.118
	Error	.810				
Similarity	Contrast	50.942	28.125	.000	.044	1.000
	Error	1.811				

Figure 3: 2x2 Mean Plots for Discount DEP, Discount FRQ, and BEF

Quantity







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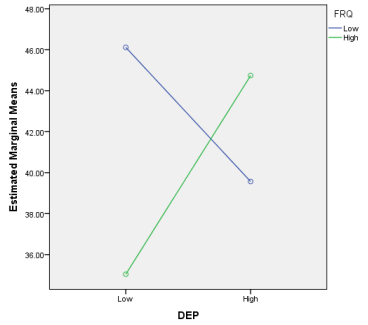
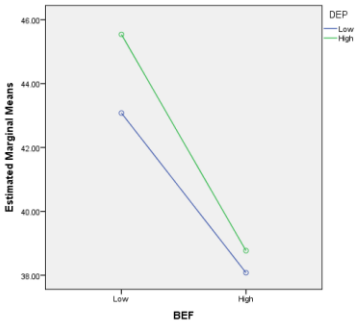
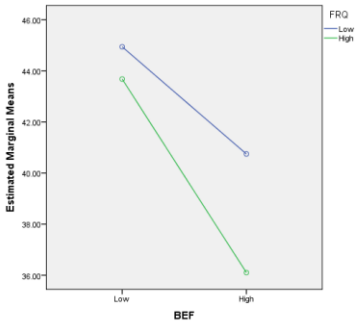
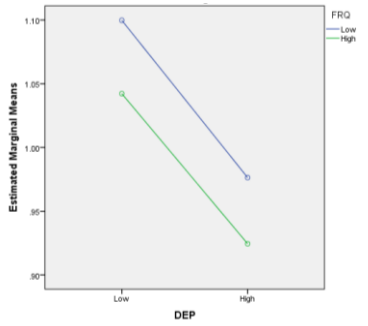
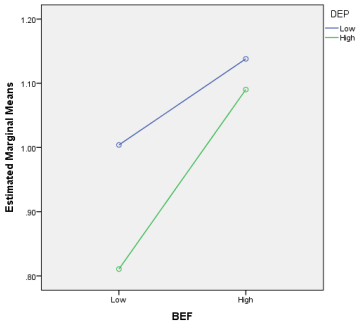


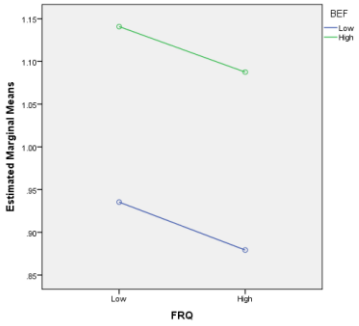




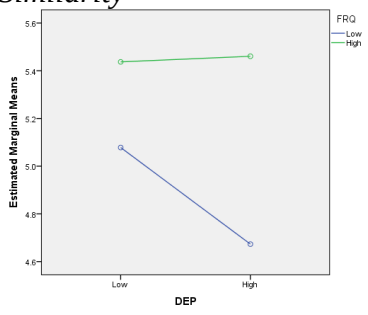
PCE

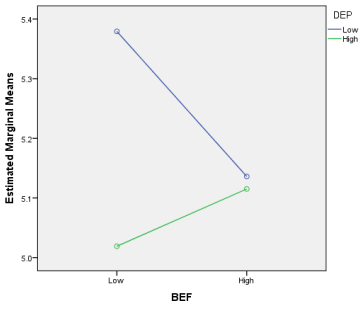


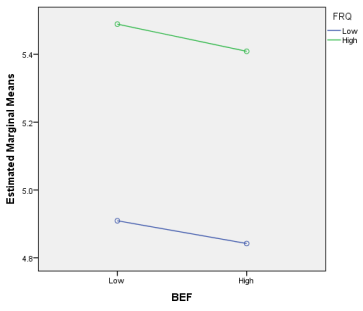




Similarity







Assessment of the Mediation Effects. Table 2-8 presents results of moderated mediation tests. The positive and significant effect of discount depth on quantity was attenuated by an increase in benefit change. That is its effect was reduced from .529 (t=4.292, $p<.01$) to .253 (t=2.001, $p<.05$). The negative association between discount frequency and purchase quantity also was weakened by an increasing level of benefit change. The strength of such relationship changed from -.514 (t=-4.181, $p<.01$) to -.443 (t=-.3.508, $p<.01$).

Table 2-8: Tests of Mediation Effects

DIRECT AND INDIRECT EFFECTS

Conditional Direct effects of DEP on Quantity at values of the moderator (BEF)

BEF	Effect	SE	t	p	LLCI	ULCI
Low	.529	.123	4.292	.000	.287	.772
High	.253	.127	2.001	.046	.005	.502

Conditional Indirect effect of DEP on Quantity at values of the moderator (BEF)

	Effect	Boot SE	BootLLCI	BootULCI
PRE at Low BEF	.002	.007	-.006	.033
PRE at High BEF	.002	.007	-.005	.029
PCE at Low BEF	.008	.012	-.010	.042
PCE at High BEF	.002	.007	-.006	.026
Similarity at Low BEF	.014	.014	-.006	.052
Similarity at High BEF	.0014	.0077	-.0089	.0276

Indirect effect of highest order interaction

	Effect	Boot SE	BootLLCI	BootULCI
PRE	-.001	.010	-.023	.017
PCE	-.006	.013	-.046	.008
Similarity	-.012	.015	-.060	.006

INDEX OF MODERATED MEDIATION

	Index	Boot SE	BootLLCI	BootULCI
PRE	-.001	.010	-.023	.017
PCE	-.006	.013	-.046	.008
Similarity	-.012	.015	-.060	.006

Table 2-8: (cont'd)

DIRECT AND INDIRECT EFFECTS

Conditional Direct effects of FRQ on Quantity at values of the moderator (BEF)

BEF	Effect	SE	t	p	LLCI	ULCI
Low	-.514	.123	-4.181	.000	-.756	-.273
High	-.443	.126	-3.508	.001	-.692	-.195

Conditional Indirect effect of FRQ on Quantity at values of the moderator (BEF)

	Effect	Boot SE	BootLLCI	BootULCI
PRE at Low BEF	.001	.008	-.009	.028
PRE at High BEF	-.004	.008	-.035	.004
PCE at Low BEF	.004	.009	-.006	.034
PCE at High BEF	.003	.009	-.007	.046
Similarity at Low BEF	-.008	.018	-.049	.024
Similarity at High BEF	-.008	.019	-.051	.028

Indirect effect of highest order interaction

	Effect	Boot SE	BootLLCI	BootULCI
PRE	-.005	.012	-.052	.006
PCE	-.001	.012	-.038	.015
Similarity	-.001	.009	-.029	.012

INDEX OF MODERATED MEDIATION

	Index	Boot SE	BootLLCI	BootULCI
PRE	-.005	.012	-.052	.006
PCE	-.001	.012	-.038	.015
Similarity	-.001	.009	-.029	.012

However, regardless of the level of benefit change, all of indirect effects were not significant. 95% CI of index of moderated mediation of the model with discount depth for each mediator is (1) PRE: -0.023 ~ 0.017, (2) PCE: -0.046 ~ 0.008, and (3) similarity: -0.060 ~ 0.006. 95% CI of index moderated mediation of the model with discount frequency for each mediator is (1) PCE: -0.052 ~ 0.006, (2) PRE: -0.038 ~ 0.015, and (3) similarity: -0.029 ~ 0.012.

Discussion

Table 5 shows the results of Study 2 hypotheses testing. First, consumers who recognize changed benefit in their preferred product may conduct thorough price search at the category level. Second, direct effects of discount depth and frequency revealed the same directional effects with those from Study1. Third, an interaction between discount depth and frequency was found for purchase quantity. That is, if high depth discount is frequently and regularly provided, its positive impact on purchase quantity will be reduced. Furthermore, a firm should expect larger sales reduction when high discount is provided than when low discount is provided, provided that a firm is planning to increase discount frequency over time.

Study1 and 2 examined how different types of price discount influence stockpiling behavior and how such effects may vary when product benefit is changed. However, little is known about whether those effects would vary with an introduction of new product. Thus, Study3 will investigate the relationships between types of discount and purchase quantity under the condition in which a new product is launched.

STUDY 3

The primary goal of Study 3 is to replicate main and mediating effects tested in Study 1 and to introduce the second moderating effect. A major difference from Study 2 is, in Study 3, a new product which is under the established brand (i.e., consumers' preferred brand) is added in the experiment and serves as a moderator. Unlike a change in product size in Study 2, an introduction of new product under consumers' preferred brand is relatively easier to notice. In other words, a launched new product would suffice to catch consumers' attention at a category level. If it serves as a wake-up call for consumers, they would be motivated to be more rational on their purchase decision making. However, consumers may not be motivated to update their price knowledge, if consumers have high satisfaction with the established product, the new product requires them to change their behavior to use it, and they are risk averse (i.e., high possibility to have cognitive dissonance). Thus, in general, the presence of new product may make consumers more committed to the established product and more strive to leverage benefits of a sales promotion by stockpiling.

H_{10}: A new product moderates the effects of depth/frequency to the extent that the effects of both discounts are amplified when a new product under the same brand with an established product is introduced.

Research Design

The experiment of Study3 employs 2 (high vs. low discount depth) x 2 (high vs. low discount frequency) x 2 (with vs. without new product) between-subject design. A major difference from previous two studies is an introduction of new product. Study3 retains manipulations of discount depth and frequency from Study1.

For Study 3, a new product was added into the second shopping task as an alternative purchase option. This new product is under the same preferred brand name provided by a participant. Its difference from the established product under the same brand is a product benefit (i.e., brew ready packet). The price of new product is set at $7.44 which is slightly higher than the regular price $7.15.

In terms of means of data analysis, hypotheses testing is conducted by following the exact same process of Study 2 with the addition of the new product introduction as a moderator. That is, in order to test the moderated mediation, the model8 template in PROCESS macro was used. Lastly, the cell sizes of Study3 are in the range of 49 to 139 and total sample is 720.

Results

Manipulation Checks. Indicated average discount rates between high discount group (33.74%) and low discount depth group (16.58%) were significantly different ($F_{1,718}$=243.973, p<.01). The difference between average perceptions on a given discount rate between two groups were also significant ($F_{1,718}$=203.541, p<.01). Indicated number of discounts showed a significant difference between low discount frequency group (1.11) and high discount frequency group (1.89) ($F_{1,718}$=215.608, p<.01). Also participants' frequency perception between two groups was significantly different ($F_{1,718}$=381.091, p<.01).

Assessment of the Measures. Table 3-1 indicates there are no signle measure which has a correlation overlapping 1 with other variables. Table 3-2 presents a measurement model estimated by CFA. It shows a good fit between the model and the data (CFI=.981; SRMR=.034; RMSEA=.067) (Hu and Bentler, 1999). Acceptable level of reliability and validity were found for

both category knowledge (AVE=.831, CR=.907, Cronbach's alpha=.896) and deal proneness (AVE=.440, CR=.822, Cronbach's alpha=.867). In addition, AVE was greater than its shared variances. Table 3-3 shows descriptive information of measures.

Table 3-1: Correlation Matrix

	Knowledge	Deal	Quantity	PRE	PCE	Certainty	Similarity	Household Size	Household Income
Knowledge	**.831**	.000							
Deal	-.008	**.440**							
Lower 95% CI	-0.081								
Upper 95% CI	0.065								
Quantity	.091*	-.013	.						
Lower 95% CI	0.018	-0.086							
Upper 95% CI	0.163	0.060							
PRE	.068	-.136**	-.012	.					
Lower 95% CI	-0.005	-0.207	-0.085						
Upper 95% CI	0.140	-0.064	0.061						
PCE	.049	-.111**	-.008	.061	.				
Lower 95% CI	-0.024	-0.183	-0.081	-0.012					
Upper 95% CI	0.122	-0.038	0.065	0.133					
Certainty	.118**	.058	.119**	-.233**	-.002	.			
Lower 95% CI	0.045	-0.015	0.046	-0.301	-0.075				
Upper 95% CI	0.189	0.131	0.190	-0.163	0.071				
Similarity	.063	.025	-.036	-.049	-.043	.118**	.		
Lower 95% CI	-0.010	-0.048	-0.109	-0.122	-0.116	0.045			
Upper 95% CI	0.135	0.098	0.037	0.024	0.030	0.189			
Household Size	.032	-.043	.061	.023	-.043	.061	.054	.	
Lower 95% CI	-0.041	-0.116	-0.012	-0.050	-0.116	-0.012	-0.019		
Upper 95% CI	0.105	0.030	0.133	0.096	0.030	0.133	0.127		
Household Income	.015	-.174**	.141**	-.007	-.005	.063	.062	.258**	.
Lower 95% CI	-0.058	-0.244	0.069	-0.080	-0.078	-0.010	-0.011	0.188	
Upper 95% CI	0.088	-0.102	0.212	0.066	0.068	0.135	0.134	0.325	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Notes: Correlations are in the lower triangle. Shared variances are in the upper triangle. AVE is on the diagonal.

Table 3-2: Measurement Model

	λ
Category Knowledge (CR=.907; AVE=.831)	
• Rate your overall knowledge of "ground coffee", as compared to the average consumer.	.81
• Please check the scale that best describes your familiarity with "ground coffee".	1.0
Deal Proneness (CR=.822; AVE=.440)	
• If a product is on sale, that can be a reason for me to buy it.	.56
• When I buy a brand that is on sale, I feel that I am getting a good deal.	.62
• I have favorite brand, but most of time I buy the brand that is on sale.	.72
• One should try to buy the brand that is on sale.	.73
• I am more likely to buy brands that are on sale.	.86
• Compared to most people, I am more likely to buy brands that are on sale.	.84
Goodness-of-Fit Indexes	
CFI=.981; SRMR=.034; RMSEA=.062	

Table 3-3: Descriptive Information of Measures

	N	Mini	Max	Mean	SD
Quantity	720	1.00	6.00	1.804	1.153
PRE	720	0.00	570.00	50.211	97.584
PCE	720	0.00	3.00	1.106	0.965
Similarity	720	1	7	5.063	1.356
Certainty	720	1	7	4.286	1.520
Household Size	720	1	5	2.653	1.259
Household Income	716	1	14	6.307	3.547
Knowledge	720	1.00	7.00	4.189	1.470
Deal Proneness	720	1.00	7.00	4.768	1.127
Valid N	716				

Assessment of the Main Effects. Multivariate tests revealed significant main effects of new product (Wilks'λ=.986, $p < .05$, discount depth (Wilks'λ=.929, $p < .001$), and discount depth (Wilks'λ=.969, $p < .01$). In addition, two significant interactions between new product and discount depth (Wilks'λ=.894, $p < .01$) as well as new product and discount frequency

(Wilks'λ=.976, $p < .01$) were found. Table3-4 presents means, standard deviations, and sample sizes for all six pricing groups. Given the fact that overall multivariate tests of new product, discount depth, discount frequency, and two interactions were significant (Table 3-5), univariate tests of such each mediator and a predicted variable as well as between-subjects tests of interaction effects on those variables are discussed. Table 3-6 and Figure 4 present the significance of each test and directions of relationships (also see Table3-7).

The introduction of new product was negatively associated with purchase quantity ($F_{1,712}$=4.076, p<.05) and also positively with PCE ($F_{1,712}$=4.256, p<.05). Discount depth showed its significant and positive relationships with quantity ($F_{1,712}$=30.514, p<.01) and PCE ($F_{1,712}$=19.402, p<.01). Discount frequency was show to have a negative relationship with quantity ($F_{1,712}$=9.381, p<.05) and with PCE ($F_{1,712}$=8.508, p<.01), and a positive relationship with similarity ($F_{1,712}$=4.686, p<.05).

Two significant interactions revealed that PCE is influenced by interactions between new product introduction and discount depth ($F_{1,712}$=82.005, p<.01) as well as new product introduction and frequency ($F_{1,712}$=13.593, p<.01). With new product introduction, an increase in discount depth increased PCE. When a low discount was available, PCE was higher without new product introduction than with new production introduction. However, with an available high discount, participants made more PCE when new product was introduced. In terms of the relationship between discount frequency and PCE, when a discount was provided in low frequency, introduction of new product made participants to make more PCE. However, with high discount frequency, the less amount of PCE was made by participants without new product introduction than with new product introduction.

Table 3-4: Descriptive Statistics

	NP	Mean	SD	95% CI	**DEP**	Mean	SD	95% CI	**FRQ**	Mean	SD	95% CI
Quan	w/o	1.837	0.051	1.738; 1.937	Low	1.498	0.064	1.372; 1.625	Low	1.884	0.061	1.764; 2.005
	w/	1.656	0.074	1.51; 1.802	High	1.995	0.063	1.872; 2.118	High	1.609	0.066	1.480; 1.738
PRE	w/o	50.683	4.47	41.906; 59.46	Low	42.853	5.661	31.739; 53.967	Low	48.853	5.406	38.239; 59.467
	w/	48.838	6.54	35.997; 61.678	High	56.667	5.542	45.786; 67.548	High	50.668	5.791	39.299; 62.037
PCE	w/o	1.073	0.041	0.992; 1.154	Low	0.987	0.052	0.885; 1.09	Low	1.255	0.050	1.157; 1.353
	w/	1.224	0.06	1.105; 1.342	High	1.309	0.051	1.209; 1.409	High	1.042	0.053	0.937; 1.147
Sim	w/o	5.115	0.061	4.994; 5.235	Low	5.113	0.078	4.96; 5.266	Low	4.922	0.074	4.776; 5.068
	w/	4.966	0.09	4.789; 5.143	High	4.967	0.076	4.818; 5.117	High	5.158	0.080	5.002; 5.315

Quan	NP	DEP	FRQ	Mean	SD	95% CI		Sim	NP	DEP	FRQ	Mean	SD	95% CI	
	w/o	Low	Low	1.619	0.094	1.434	1.803		w/o	Low	5.007	0.114	4.783	5.231	5.007
			High	1.477	0.118	1.245	1.709				5.205	0.143	4.923	5.486	5.205
		High	Low	2.396	0.096	2.207	2.584			High	4.821	0.116	4.593	5.049	4.821
			High	1.858	0.096	1.670	2.046				5.425	0.116	5.197	5.653	5.425
	w/	Low	Low	1.491	0.150	1.197	1.784		w/	Low	5.055	0.181	4.699	5.41	5.055
			High	1.407	0.144	1.123	1.69				5.186	0.175	4.843	5.53	5.186
		High	Low	2.032	0.141	1.756	2.309			High	4.806	0.171	4.471	5.142	4.806
			High	1.694	0.158	1.383	2.005				4.816	0.192	4.439	5.193	4.816
PRE	w/o	Low	Low	44.640	8.289	28.367	60.914	PCE	w/o	Low	Low	1.201	0.076	1.051	1.352
			High	44.636	10.417	24.184	65.089				High	1.284	0.096	1.095	1.473
		High	Low	60.067	8.442	43.493	76.641			High	Low	0.888	0.078	0.735	1.041
			High	53.388	8.442	36.814	69.962				High	0.918	0.078	0.765	1.071
	w/	Low	Low	44.509	13.177	18.639	70.379		w/	Low	Low	1.091	0.122	0.852	1.329
			High	37.627	12.722	12.649	62.605				High	0.373	0.117	0.143	0.603
		High	Low	46.194	12.411	21.827	70.56			High	Low	1.839	0.114	1.614	2.063
			High	67.02	13.96	39.612	94.429				High	1.592	0.129	1.339	1.845

*Quan=purchase quantity; Sim=similarity; w/o=without; w/=with

Table 3-5: Multivariate Tests

	Wilks' λ	$F_{4,7/9}$	Sig.	Partial Eta Squared	Power[c]
Intercept	.058	2878.312[b]	0.000	.942	1.000
NP	.986	2.573[b]	.037	.014	.727
DEP	.929	13.477[b]	.000	.071	1.000
FRQ	.969	5.585[b]	.000	.031	.979
NP*DEP	.894	21.082[b]	.000	.106	1.000
NP*FRQ	.976	4.294[b]	.002	.024	.930
DEP*FRQ	.992	1.498[b]	.201	.008	.467
NP*DEP*FRQ	.992	1.401[b]	.232	.008	.439

a. Design: Intercept + NP + DEP + FRQ + NP * DEP + NP * FRQ + DEP * FRQ + NP * DEP * FRQ
b. Exact statistic
c. Computed using alpha = .05

Table 3-6: Univariate Tests

NP						
		MS	$F_{1,712}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	5.011	4.076	.044	.006	.522
	Error	1.230				
PRE	Contrast	518.202	.054	.816	.000	.056
	Error	9549.762				
PCE	Contrast	3.456	4.256	.039	.006	.540
	Error	.812				
Similarity	Contrast	3.358	1.858	.173	.003	.275
	Error	1.807				
DEP						
		MS	$F_{1,712}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	37.517	30.514	.000	.041	1.000
	Error	1.230				
PRE	Contrast	29036.801	3.041	.082	.004	.414
	Error	9549.762				
PCE	Contrast	15.757	19.402	.000	.027	.993
	Error	.812				
Similarity	Contrast	3.240	1.793	.181	.003	.267
	Error	1.807				

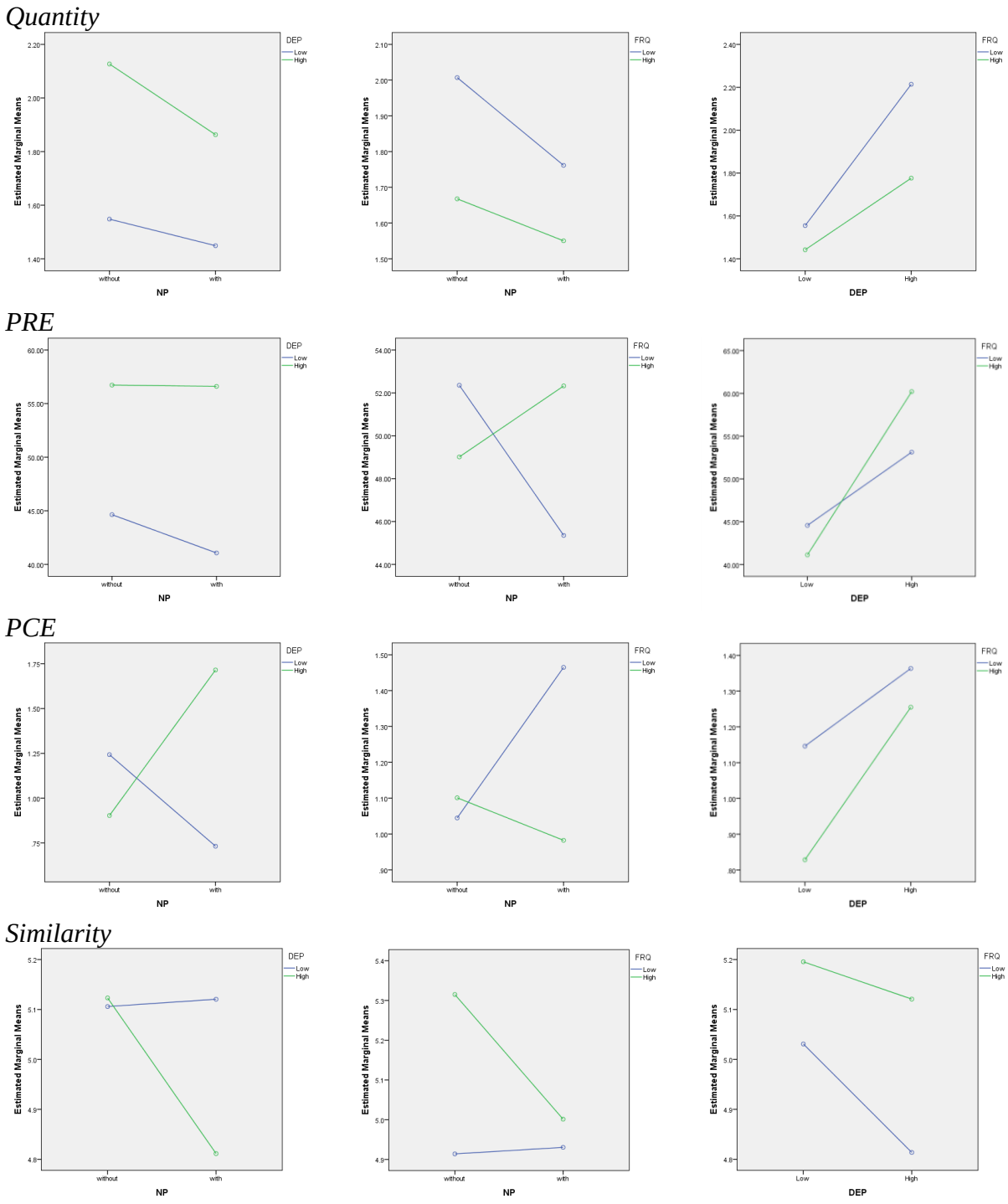
Table 3-6: (cont'd)

FRQ						
		MS	$F_{1,712}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	11.534	9.381	.002	.013	.864
	Error	1.230				
PRE	Contrast	501.511	.053	.819	.000	.056
	Error	9549.762				
PCE	Contrast	6.910	8.508	.004	.012	.830
	Error	.812				
Similarity	Contrast	8.468	4.686	.031	.007	.580
	Error	1.807				

Table 3-7: Between-Subjects Tests for an Interactions

NP*DEP					
	MS	$F_{1,712}$	Sig.	Partial Eta Squared	Power[a]
Quantity	1.031	.839	.360	.001	.150
Error	875.416				
PRE	452.667	.047	.828	.000	.055
Error	6799430.794				
PCE	66.599	82.005	.000	.103	1.000
Error	578.241				
Similarity	4.052	2.242	.135	.003	.321
Error	1286.576				
NP*FRQ					
	MS	$F_{1,712}$	Sig.	Partial Eta Squared	Power[a]
Quantity	.624	.508	.476	.001	.110
Error	875.416				
PRE	4046.649	.424	.515	.001	.100
Error	6799430.794				
PCE	11.039	13.593	.000	.019	.957
Error	578.241				
Similarity	4.143	2.293	.130	.003	.327
Error	1286.576				

Figure 4: 2x2 Mean Plots for Discount DEP, Discount FRQ, and NP



Assessment of the Mediation Effects. Table 3-8 presents results of moderated mediation tests. The introduction of new product decreased the positive direct effect of discount depth on quantity. That

is, its effect was reduced from .527 (t=5.186, p<.01) to .433 (t=2.785, p<.01). While the negative association between discount frequency and purchase quantity, -.303 (t=-2.950, p<.01) without new product introduction was significant, new product introduction made the relationship insignificant as well as weaker, -.187 (t=-1.217, p>.10).

With regard to moderated mediation effects, regardless of the presence of new product, all of indirect effects were not significant. 95% CI of index moderated mediation of the model with discount depth for each mediator is (1) PRE: -.008 ~ .023, (2) PCE: -.133 ~ .107, and (3) similarity: -.002 ~ .069. 95% CI of index moderated mediation of the model with discount frequency for each mediator is (1) PRE: -.0096 ~ .0188, (2) PCE: -.0426 ~ .0702, and (3) similarity: -.0044 ~ .0614.

Table 3-8: Tests of Moderated Mediation Effects

DIRECT AND INDIRECT EFFECTS

Conditional Direct effects of DEP on Quantity at values of the moderator (NP)

NP	Effect	SE	t	p	LLCI	ULCI
Without	.527	.102	5.186	.000	.328	.727
With	.433	.156	2.785	.006	.128	.738

Conditional Indirect effect of DEP on Quantity at values of the moderator (NP)

	Effect	Boot SE	BootLLCI	BootULCI
PRE at w/o NP	-.001	.006	-.019	.008
PRE at w/ NP	-.001	.006	-.019	.007
PCE at w/o BEF	.004	.015	-.026	.036
PCE at w/ BEF	-.013	.046	-.099	.083
Similarity at w/o NP	-.001	.008	-.017	.015
Similarity at w/ NP	.018	.015	-.001	.061

Indirect effect of highest order interaction

	Effect	Boot SE	BootLLCI	BootULCI
PRE	.001	.006	-.008	.023
PCE	-.017	.061	-.133	.107
Similarity	.019	.016	-.002	.069

Table 3-8: (cont'd)

INDEX OF MODERATED MEDIATION

	Index	Boot SE	BootLLCI	BootULCI
PRE	.001	.006	-.008	.023
PCE	-.017	.061	-.133	.107
Similarity	.019	.016	-.002	.069

DIRECT AND INDIRECT EFFECTS

Conditional Direct effects of FRQ on Quantity at values of the moderator (NP)

NP	Effect	SE	t	p	LLCI	ULCI
Without	-.303	.103	-2.950	.003	-.504	-.101
With	-.187	.153	-1.217	.224	-.488	0.114

Conditional Indirect effect of FRQ on Quantity at values of the moderator (NP)

	Effect	Boot SE	BootLLCI	BootULCI
PRE at w/o NP	.000	.003	-.010	.005
PRE at w/ NP	.000	.005	-.008	.014
PCE at w/o BEF	.000	.004	-.010	.008
PCE at w/ BEF	.010	.026	-.040	.066
Similarity at w/o NP	-.020	.015	-.063	.002
Similarity at w/ NP	-.008	.012	-0.049	0.006

Indirect effect of highest order interaction

	Effect	Boot SE	BootLLCI	BootULCI
PRE	.000	.006	-.010	.019
PCE	.010	.027	-.043	.070
Similarity	.012	.015	-.004	.061

INDEX OF MODERATED MEDIATION

	Index	Boot SE	BootLLCI	BootULCI
PRE	.0004	.0061	-.0096	.0188
PCE	.0101	.0266	-.0426	.0702
Similarity	.0122	.0154	-.0044	.0614

Discussion

Study3 examined and compared proposed direct and indirect relationships introduced from Study across two situations, without new product introduction vs. with new product introduction. Table 5 is the summary of results. First, when a firm introduces new product under the same brand, an

increase in discount depth would make consumers less motivated to search and compare prices at the category level opposed to its negative relationship without it. Second, it would be expected for firm's new product introduction to lead to narrower price search and knowledge at the category level, and to change the positive association between discount frequency and PCE into strongly negative association.

Tests of moderated mediation found no significant indirect effects of discount depth or frequency on purchase quantity regardless of the presence of new product. Across two situations, discount depth showed its significant and positive impact on purchase quantity. However, new product introduction made the negative influence of discount frequency on purchase quantity insignificant despite its same directional influence.

Study3 examined how the relationships established in Study1 and 2 would vary across two different situations (i.e., new product introduction). Then would new competitor's entrance (i.e., new brand) would make changes in such relationships? Thus, Study4 is to examine how new brand introduction would influence direct effects of discount on purchase quantity.

STUDY 4

The objectives of Study 4 is similar with ones of Study 3. The only difference from Study 3 is that this current study proposes the introduction of a new product under new brand name as a moderator. Unlike a new product under the same preferred brand name, new brand would be more challenged to catch consumers. Unless consumers perceive it as a better solution, it will be ignored. Furthermore it may encourage consumers more strive to leverage benefits of a sales promotion by stockpiling and make a given promotion to their preferred brand more attractive.

H_{11}: A new brand moderates the effects of depth/frequency to the extent that the effects of both discounts are amplified when a new brand is introduced.

Research Design

The experiment of Study4 employs 2 (high vs. low discount depth) x 2 (high vs. low discount frequency) x 2 (with vs. without new brand) between-subject design. Unlike Study3, Study4 introduces a ground coffee product under new brand. Study4 retails manipulations of discount depth and frequency from Study1.

For Study4, a new brand is introduced as an alternative purchase option in the second shopping task. Like Café Vale, this new brand is hypothetical, Venezia Espresso. The price of new brand is set at $7.44 which is the same regular price of new product in Study3.

In terms of means of data analysis, hypotheses testing is conducted by following the exact same process of Study2 with the addition of new brand introduction as the moderating effect. That is, in order to test the moderated mediation, the template of model8 in PROCESS macro was used. Lastly, cell sizes of Study4 are in the range of 52 to 139 and total sample is 713.

Results

Manipulation Checks. Indicated average discount rates between high discount group (33.18%) and low discount depth group (17.14%) were significantly different ($F_{1,711}$=186.818, p<.01). The difference between average perceptions on a given discount rate between two groups were also significant ($F_{1,711}$=158.006, p<.01). Indicated number of discounts showed a significant difference between low discount frequency group (1.11) and high discount frequency group (1.94) ($F_{1,711}$=230.943, p<.01). Also participants' frequency perception between two groups was significantly different ($F_{1,711}$=444.794, p<.01).

Table 4-1: Correlation Matrix

	Knowledge	Deal	Quantity	PRE	PCE	Certainty	Similarity	Household Size	Household Income
Knowledge	**.805**	.002							
Deal	-.034	**.461**							
Lower 95% CI	-.107								
Upper 95% CI	.040								
Quantity	.111**	-0.036	.						
Lower 95% CI	.038	-.109							
Upper 95% CI	.183	.038							
PRE	.132**	-.150**	-.058	.					
Lower 95% CI	.059	-.221	-.131						
Upper 95% CI	.203	-.077	.015						
PCE	.000	-.94*	.031	.109**	.				
Lower 95% CI	-.073	-.166	-.043	.036					
Upper 95% CI	.073	-.021	.104	.181					
Certainty	.043	.032	.89*	-.258**	-.031	.			
Lower 95% CI	-.031	-.042	.016	-.325	-.104				
Upper 95% CI	.116	.105	.161	-.188	.043				
Similarity	.029	.045	-.067	-.008	-.04	.127**	.		
Lower 95% CI	-.045	-.029	-.140	-.081	-.113	.054			
Upper 95% CI	.102	.118	.006	.065	.034	.199			
Household Size	.081*	.001	.087*	.016	-.032	.072	.039	.	
Lower 95% CI	.008	-.072	.014	-.057	-.105	-.001	-.035		
Upper 95% CI	.154	.074	.159	.089	.042	.145	.112		
Household Income	.036	-.121**	.105**	-.023	-.018	.100**	0.056	.278**	.
Lower 95% CI	-.038	-.193	.032	-.096	-.091	.027	-.017	.209	
Upper 95% CI	.109	-.048	.177	.051	.055	.172	.129	.344	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Notes: Correlations are in the lower triangle. Shared variances are in the upper triangle. AVE is on the diagonal.

Assessment of the Measures. Table 4-1 indicates there are no signle measure which has a correlation overlapping 1 with other variables. Table 4-2 presents a measurement model estimated by CFA. It shows a good fit between the model and the data (CFI=.978; SRMR=.035; RMSEA=.068) (Hu and Bentler, 1999). Acceptable level of reliability and validity were found for both category knowledge (AVE=.805, CR=.891, Cronbach's alpha=.889) and deal proneness (AVE=.461, CR=.834, Cronbach's alpha=.879). In addition, AVE was greater than its shared variances. Table 4-3 shows descriptive information of measures.

Table 4-2: Measurement Model

	λ
Category Knowledge (CR=.891; AVE=.805)	
• Rate your overall knowledge of "ground coffee", as compared to the average consumer.	.85
• Please check the scale that best describes your familiarity with "ground coffee".	.94
Deal Proneness (CR=.834; AVE=.461)	
• If a product is on sale, that can be a reason for me to buy it.	0.59
• When I buy a brand that is on sale, I feel that I am getting a good deal.	0.63
• I have favorite brand, but most of time I buy the brand that is on sale.	0.73
• One should try to buy the brand that is on sale.	0.75
• I am more likely to buy brands that are on sale.	0.88
• Compared to most people, I am more likely to buy brands that are on sale.	0.86
Goodness-of-Fit Indexes	
CFI=.978; SRMR=.035; RMSEA=.068	

Table 4-3: Descriptive Information of Measures

	N	Mini	Max	Mean	SD
Quantity	713	1.00	6.00	1.889	1.236
PRE	713	0.00	570.00	53.993	102.355
PCE	713	0.00	3.00	1.097	.964
Similarity	713	1	7	5.11	1.383
Certainty	713	1	7	4.19	1.521
Household Size	713	1	5	2.66	1.263
Household Income	709	1	14	6.21	3.547
Knowledge	713	1.00	7.00	4.223	1.445
Deal Proneness	713	1.00	7.00	4.732	1.169
Valid N	709				

Assessment of the Main Effects. Multivariate tests revealed significant main effects of discount depth (Wilks'λ=.898, p <.01), and discount frequency (Wilks'λ=.944, p <.01). In addition, two significant interactions between new brand and discount depth (Wilks'λ=.905, p <.01) as well as discount depth and discount frequency (Wilks'λ=.975, p <.01) were found. Table 4-4 presents means, standard deviations, and sample sizes for all six pricing groups. Given the fact that overall multivariate tests of new product, discount depth, discount frequency, and two interactions were significant (Table4-5), univariate tests of such each mediator and a predicted variable as well as between-subjects tests of interaction effects on those variables are discussed. Table 4-6, 4-7 and Figure5 present the significance of each test and directions of relationships.

Discount depth had positive relationships with quantity ($F_{1,705}$=48.590, p<.01), PRE ($F_{1,705}$=11.346, p<.01) and PCE ($F_{1,705}$=12.225, p<.01), and a negative relationship with similarity ($F_{1,705}$=6.837, p<.01). Discount frequency was found to be negatively associated with quantity ($F_{1,705}$=22.271, p<.01) but positively associated with similarity ($F_{1,705}$=19.851, p<.01).

Table 4-4: Descriptive Statistics

	NB	Mean	SD	95% CI	**DEP**	Mean	SD	95% CI	**FRQ**	Mean	SD	95% CI
Quan	w/o	1.837	.054	1.732; 1.943	Low	1.544	.070	1.407; 1.682	Low	2.107	.067	1.976; 2.238
	w/	1.923	.080	1.766; 2.076	High	2.216	.066	2.086; 2.345	High	1.653	.069	1.517; 1.789
PRE	w/o	50.683	4.654	41.546; 58.820	Low	41.077	6.053	29.192; 52.962	Low	52.772	5.765	41.454; 64.090
	w/	59.490	6.895	45.953; 73.027	High	69.096	5.705	57.895; 80.297	High	57.401	5.997	45.627; 69.174
PCE	w/o	1.073	.042	.990; 1.156	Low	.993	.055	.885; 1.101	Low	1.140	.052	1.037; 1.243
	w/	1.177	.063	1.054; 1.300	High	1.257	.052	1.155; 1.359	High	1.110	.055	1.003; 1.217
Sim	w/o	5.115	.062	4.994; 5.235	Low	5.267	.080	5.110; 5.424	Low	4.878	.076	4.728; 5.028
	w/	5.132	.091	4.953; 2.311	High	4.979	.076	4.831; 5.128	High	5.369	.079	5.213; 5.524

Quan	NB	DEP	FRQ	Mean	SD	95% CI		Sim	NB	DEP	FRQ	Mean	SD	95% CI	
	w/o	Low	Low	1.619	.100	1.423	1.815		w/o	Low	5.007	.114	4.783	5.231	5.007
			High	1.477	.125	1.231	1.724				5.205	.144	4.923	5.486	5.205
		High	Low	2.396	.102	2.196	2.595			High	4.821	.116	4.593	5.049	4.821
			High	1.858	.102	1.659	2.058				5.425	.116	5.197	5.654	5.425
	w/	Low	Low	1.736	.162	1.418	2.053		w/	Low	5.434	.185	5.071	5.797	5.434
			High	1.346	.163	1.026	1.667				5.423	.187	5.057	5.790	5.423
		High	Low	2.679	.157	2.370	2.987			High	4.250	.180	3.897	4.603	4.250
			High	1.930	.156	1.624	2.236				5.421	.178	5.071	5.771	5.421
PRE	w/o	Low	Low	44.640	8.628	27.700	61.581	PCE	w/o	Low	1.201	.078	1.047	1.355	1.201
			High	44.636	10.844	23.346	65.927				1.284	.099	1.090	1.478	1.284
		High	Low	60.067	8.788	42.814	77.321			High	.888	.080	.731	1.045	.888
			High	53.388	8.788	36.134	70.642				.918	.080	.761	1.075	.918
	w/	Low	Low	39.434	13.973	12.000	66.868		w/	Low	.755	.127	.505	1.004	.755
			High	35.596	14.107	7.899	63.293				.731	.128	.479	.983	.731
		High	Low	66.946	13.594	40.257	93.636			High	1.714	.124	1.472	1.957	1.714
			High	95.982	13.474	69.528	122.437				1.509	.123	1.268	1.749	1.509

*Quan=purchase quantity; Sim=similarity; w/o=without; w/=with

Table 4-5: Multivariate Tests

	Wilks' λ	$F_{4,702}$	Sig.	Partial Eta Squared	Power[c]
Intercept	.058	2827.127[b]	0.000	.942	1.000
NB	.995	.928[b]	.447	.005	.296
DEP	.898	20.001[b]	.000	.102	1.000
FRQ	.944	10.406[b]	.000	.056	1.000
NB*DEP	.905	18.320[b]	.000	.095	1.000
NB*FRQ	.994	1.053[b]	.379	.006	.334
DEP*FRQ	.975	4.416[b]	.002	.025	.937
NB*DEP*FRQ	.993	1.208[b]	.306	.007	.381

a. Design: Intercept + NB + DEP + FRQ + NB * DEP + NB * FRQ + DEP * FRQ + NB * DEP * FRQ

b. Exact statistic

c. Computed using alpha = .05

Table 4-6: Univariate Tests

NB						
		MS	$F_{1,705}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	1.085	.783	.377	.001	.143
	Error	1.386				
PRE	Contrast	1.085	.783	.377	.001	.143
	Error	1.386				
PCE	Contrast	1.085	.783	.377	.001	.143
	Error	1.386				
Similarity	Contrast	1.085	.783	.377	.001	.143
	Error	1.386				
DEP						
		MS	$F_{1,705}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	67.344	48.590	.000	.064	1.000
	Error	1.386				
PRE	Contrast	117414.320	11.346	.001	.016	.920
	Error	10348.437				
PCE	Contrast	10.463	12.225	.001	.017	.937
	Error	.856				
Similarity	Contrast	12.393	6.837	.009	.010	.743
	Error	1.813				

Table 4-6: (cont'd)

FRQ						
		MS	$F_{1,705}$	Sig.	Partial Eta Squared	Power[a]
Quantity	Contrast	30.866	22.271	.000	.031	.997
	Error	1.386				
PRE	Contrast	3204.364	.310	.578	.000	.086
	Error	10348.437				
PCE	Contrast	.128	.149	.699	.000	.067
	Error	.856				
Similarity	Contrast	35.982	19.851	.000	.027	.994
	Error	1.813				

In addition, two interactions effects were found. First, interaction effects between new brand and discount depth were found for PCE ($F_{1,705}$=63.808, p<.01) and similarity ($F_{1,705}$=7.682, p<.01). With new brand introduction, an increase in discount depth increased PCE. When a low discount was available, PCE was higher without the presence of new brand than with it. However, with a high discount, participants made more PCE when new brand was introduced. In terms of similarity, without new brand, similarity was not significantly difference between high and low depth groups, but after, new brand was introduced, similarity decreased drastically with an increase of discount depth. Second, interaction effects between discount depth and discount frequency were found for similarity ($F_{1,705}$=23.603, p<.01). The level of discount depth strengthened the relationship between discount frequency and similarity and the level discount frequency attenuated the relationship between discount depth and similarity.

Table 4-7: Between-Subjects Tests for an Interactions

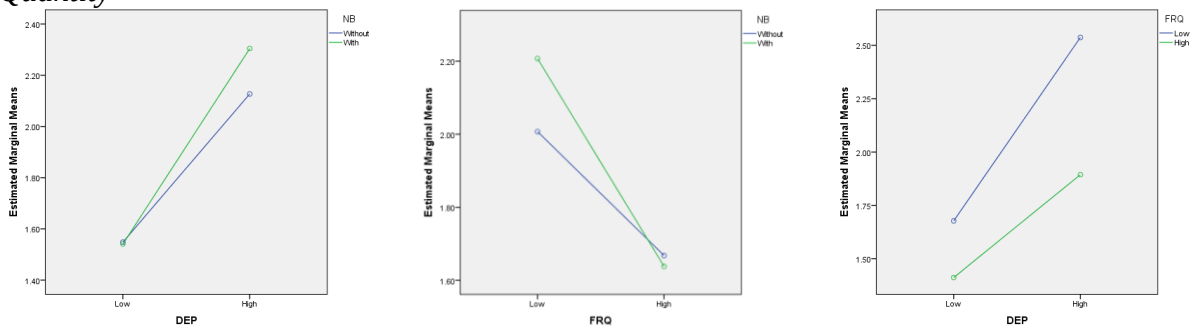
NB*DEP					
	MS	$F_{1,705}$	Sig.	Partial Eta Squared	Power[a]
Quantity	1.270	.917	.339	.001	.159
Error	1.386				
PRE	37952.434	3.667	.056	.005	.481
Error	10348.437				
PCE	54.612	63.808	.000	.083	1.000
Error	.856				
Similarity	13.924	7.682	.006	.011	.790
Error	1.813				
DEP*FRQ					
	MS	$F_{1,705}$	Sig.	Partial Eta Squared	Power[a]
Quantity	5.327	3.844	.050	.005	.499
Error	1.386				
PRE	6415.691	.620	.431	.001	.123
Error	10348.437				
PCE	.513	.600	.439	.001	.121
Error	.856				
Similarity	23.603	13.022	.000	.018	.950
Error	1.813				

Assessment of the Mediation Effects. Table 4-8 presents results of moderated mediation tests. The introduction of new brand increased the positive direct effect of discount depth on quantity. The effect changed from .573 (t=5.265, p<.01) to .728 (t=4.331, p<.01). Also the negative association between discount frequency and purchase quantity was strengthened by new brand introduction. The effect increased from -.308 (t=-2.798, p<.01) to -.607 (t=-3.674, p<.01).

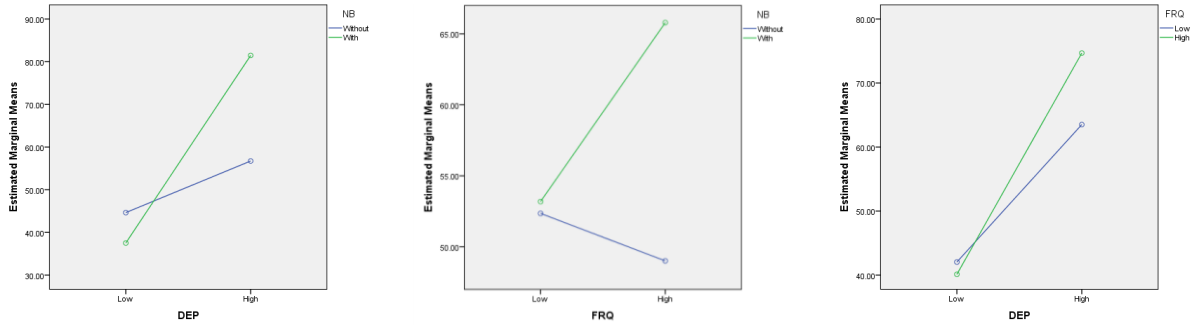
With regard to moderated mediation effects, regardless of the presence of new product, all of indirect effects were not significant. 95% CI of index moderated mediation of the model with discount depth for each mediator is (1) PRE: -.083 ~ .007, (2) PCE: -.082 ~ .165, and (3) similarity: -.00 ~ .110. 95% CI of index moderated mediation of the model with discount frequency for each mediator is (1) PRE: -.054 ~ .005, (2) PCE: -.049 ~ .007, and (3) similarity: -.066 ~ .011.

Figure 5: 2x2 Mean Plots for Discount DEP, Discount FRQ, and NB

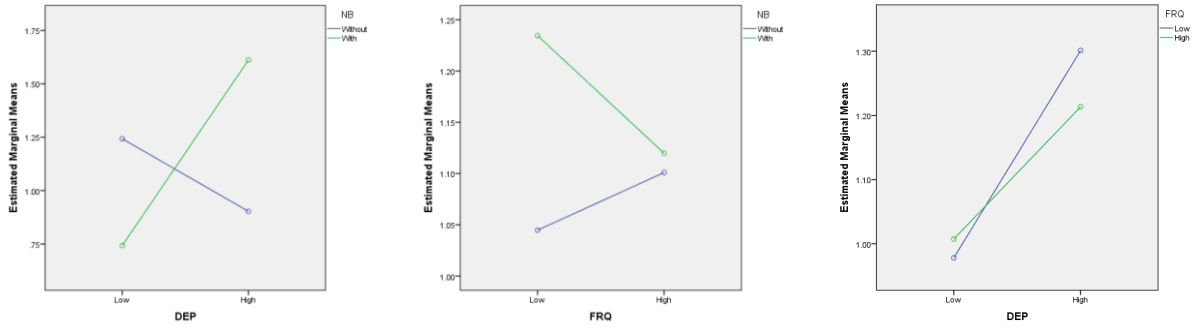
Quantity



PRE



PCE



Similarity

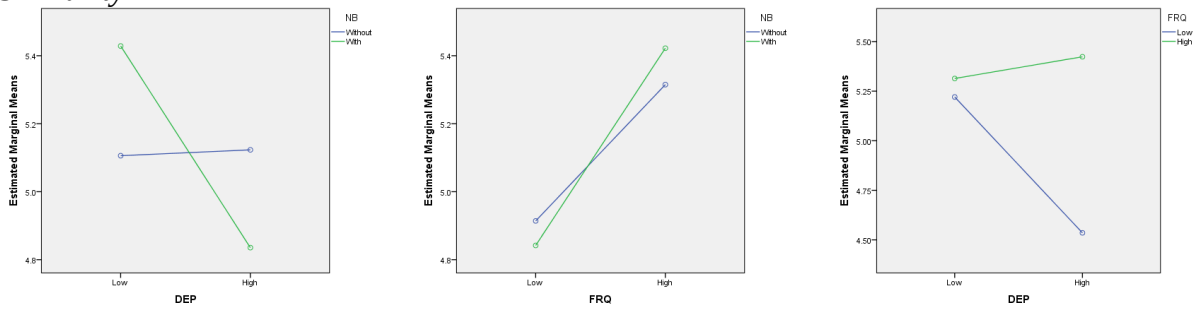


Table 4-8: Tests of Moderated Mediation Effects

DIRECT AND INDIRECT EFFECTS

Conditional Direct effects of DEP on Quantity at values of the moderator (NP)

NB	Effect	SE	t	p	LLCI	ULCI
Without	.573	.109	5.265	.000	.359	.786
With	.728	.168	4.331	.000	.398	1.058

Conditional Indirect effect of DEP on Quantity at values of the moderator (NP)

	Effect	Boot SE	BootLLCI	BootULCI
PRE at w/o NB	-.015	.012	-.047	.002
PRE at w/ NB	-.033	.021	-.091	-.005
PCE at w/o BEF	-.011	.018	-.052	.022
PCE at w/ BEF	.028	.045	-.058	.122
Similarity at w/o NB	-.001	.009	-.019	.018
Similarity at w/ NB	.034	.026	.000	.110

Indirect effect of highest order interaction

	Effect	Boot SE	BootLLCI	BootULCI
PRE	-.018	.020	-.083	.007
PCE	.039	.061	-.082	.165
Similarity	.035	.027	-.001	.110

INDEX OF MODERATED MEDIATION

	Index	Boot SE	BootLLCI	BootULCI
PRE	-.018	.020	-.083	.007
PCE	.039	.061	-.082	.165
Similarity	.035	.027	-.001	.110

DIRECT AND INDIRECT EFFECTS

Conditional Direct effects of FRQ on Quantity at values of the moderator (NP)

NB	Effect	SE	t	p	LLCI	ULCI
Without	-.308	.110	-2.798	.005	-.523	-.092
With	-.607	.165	-3.674	.000	-.931	-.283

Conditional Indirect effect of FRQ on Quantity at values of the moderator (NP)

	Effect	Boot SE	BootLLCI	BootULCI
PRE at w/o NB	.002	.007	-.009	.024
PRE at w/ NB	-.009	.011	-.047	.004
PCE at w/o BEF	.001	.005	-.006	.016
PCE at w/ BEF	-.005	.010	-.039	.006
Similarity at w/o NB	-.022	.018	-.069	.005
Similarity at w/ NB	-.028	.025	-.096	.005

Table 4-8: (cont'd)

Indirect effect of highest order interaction				
	Effect	Boot SE	BootLLCI	BootULCI
PRE	-.011	.014	-.054	.005
PCE	-.006	.012	-.049	.007
Similarity	-.007	.015	-.066	.011
	INDEX OF MODERATED MEDIATION			
	Index	Boot SE	BootLLCI	BootULCI
PRE	-.011	.014	-.054	.005
PCE	-.006	.012	-.049	.007
Similarity	-.007	.015	-.066	.011

Discussion

Study4 examined and compared proposed direct and indirect relationships introduced from Study1 across two situations, without new brand introduction vs. with new brand introduction. Table 5 summarizes the results of hypotheses testing.

A significant interaction effect between new brand and discount depth on PCE suggests inherent complexity in consumer price interitem search behavior. In addition, with newly launched brand product, consumers may purchase more with the presence of a high discount. However, at the same time, negative influence of discount frequency was strengthened.

GENERAL DISCUSSION

Across all of four experiments, a positive association between discount depth and stockpiling and a negative association between discount frequency and stockpiling are found. Regarding to the effect of discount depth on purchase quantity, consumers are not likely to miss the chance to purchase more items for future consumption. It could be posited that, for stock-up products (i.e., nonperishable and frequently purchased consumed products), if there is an increasing opportunity to purchase consumers' preferred brand at a discounted price, they strive to minimize costs by purchasing the normal quantity on each purchase occasion which does not increase their inventory level above the normal level.

Table 5: Summary of Hypotheses Testing

Hypothesis		Study1	Study2	Study3	Study4
DEP → $PRE_{(H1a)}$	+	n/s	n/s	n/s	Supported
DEP → $PCE_{(H1b)}$	+	Non supported	n/s	Supported	Supported
DEP → $SIM_{(H2)}$	–	n/s	n/s	n/s	n/s
DEP → $Q_{(H3)}$	+	Supported	Supported	Supported	Supported
FRQ → $PRE_{(H4a)}$	–	n/s	n/s	n/s	n/s
FRQ → $PCE_{(H4b)}$	–	n/s	n/s	Supported	n/s
FRQ → $SIM_{(H5)}$	+	Supported	Supported	Supported	Supported
FRQ → $Q_{(H6)}$	–	Supported	Supported	Supported	Supported
DEP → PRE → $Q_{(H7a)}$			n/s		
DEP → PCE → $Q_{(H7b)}$			n/s		
DEP → SIM → $Q_{(H7c)}$			n/s		
FRQ → PRE → $Q_{(H8a)}$			n/s		
FRQ → PCE → $Q_{(H8b)}$			n/s		
FRQ → SIM → $Q_{(H8c)}$			n/s		
BEF $moderator_{(H9)}$[a]	+	n/a	Not support[b]	n/a	n/a
NP $moderator_{(H10)}$[a]	+	n/a	n/a	Not support[b]	n/a
NB $moderator_{(H11)}$[a]	+	n/a	n/a	n/a	Supported

DEP = discount depth; FRQ = discount frequency; BEF = benefit change; NP = new product; NB = new brand; PRE = price recall error; PCE = price comparison error; SIM = perceived similarity; Q = purchase quantity; n/a = not applicable; n/s = not significant

[a]Moderating effects are found significant only for the main effects of discount depth (frequency) on quantity.

[b]"Not support" means the result is significant but directionally opposite.

Those relationships are negatively influenced by a moderating effect of a benefit change (i.e., a reduction in product size) (Study 2) and of an introduction of new product under the same preferred brand name (Study3). In contrast, an introduction of new brand (Study 4) amplified the relationships. A greater reduction in product benefit weakened the positive relationship between discount depth and stockpiling behavior and the negative relationship between discount frequency and stockpiling. It may be posited that, when a given negative change in product size is recognized and is greater, consumers are likely to have less confidence with their purchase quantity decision making which may come from greater expected cognitive dissonance regarding to purchase quantity and lower level satisfaction with regard to the current shopping experience. New product introduction shows the same effects with benefit change and it may increase consumers' cognitive dissonance on a forgone new alternative. However, with an introduction of new brand, a greater discount frequency more decreases purchase quantity than without the introduction. The new brand introduction strengthened the positive association of discount depth and purchase quantity. The presence of new brand might increase consumers' anticipated regret on their current purchase quantity which will be based on discount depth and frequency.

With regard to consumers' price search behavior and price knowledge, Study 1 shows a provided deeper discount on their preferred brand more motivate their interitem price search and have more accurate price knowledge at the category level than a shallower discount. In Study 2, benefit change shows its negative association with PCE. It can be posited that benefit change encouraged consumers to search and compare prices at the category level under one important condition of consumers' recognition of a given change occurred in their preferred brand. However, in Study 2 and 3 when a new option is introduced which can be under the same

preferred brand or new brand, consumers are more error-prone regarding to their price knowledge.

Managerial Implications

Similar with the findings of Helsen and Schmittlein (1992) and Assuncao and Meyer (1993), the increasing probability to purchase a product at a discounted price increases negatively influence the effect of discount regarding on stockpiling behavior. Overall stockpiling is positively related with discount depth and negatively with discount frequency. The negative direct effect of discount frequency on stockpiling can be attenuated by offering a deeper discount. Promotion induced stockpiling can be weakened by increasing discount frequency. These results indicate that developing a plan for sales promotions (i.e., price discounts) is inherently complex firm activity. A well-crafted discount plan will allow a firm to achieve its marketing objectives (e.g., market share) by increasing the sales promotion efficiency as well as a tactical tool to compete. For example, a firm may be want to put non stockpiling-inducing discount rate earlier and offer a discount rated in which it triggers consumers' stockpiling followed by the previous level discount offers. In other words, by managing tactical pricing practices, firms could have a better control on timing of stockpiling and more accurate forecasts for future sales as well as profits.

At first blush, discount depth and frequency seems to be sufficient elements of firm's sales promotion action plan. However, this dissertation unveiled the greater complexity by proposing three moderators. According to Rao (1984), they are elements which all are closely related to firm pricing. A change in product size is one of common pricing practices used by a firm in order to keep the specific level of its profit margin. If the change made is beyond consumers' threshold of just noticeable difference, its established discount plan should adjusted accordingly. Furthermore, unlike situations where product size was changed and a new product is introduced, a new brand

introduction amplified established direct effects of discount depth and frequency. Industries where consumers are price sensitive and not loyal to a specific brand, how a firm plans its short- and long-term sales promotions would determine its market share and sales revenue.

This study also sheds some light on capturing how consumers develop price knowledge. Specifically, the study argues that, rather than a dichotomous investigation of price knowledge (i.e., short-term and long-term), firms need to understand how consumers' price search and knowledge change over time and across pricing practices by measuring price recall and price comparison on a regular basis to better understand price knowledge evolution. Because understanding consumers' price knowledge as it evolves over time is a significant criterion for firms' pricing decision making (Vanhuele and Dreze 2002) in terms of the effectiveness of using price cues (e.g., Anderson, Cho, Harlam, and Simester 2008; Anderson and Simester 1998) and also managers generally overestimate the proportion of consumers who are conscious of and accurately aware of price (e.g., Urbany, Dickson, and Key 1990; Urbany, Dickson, and Sawyer 2000). Results here show that consumers' price search behavior and, in turn, price knowledge are influenced by types of a sales promotion available at the moment of purchase. Thus if managers better understand how consumers' price knowledge evolve by regularly collecting consumers' price recall error and price comparison error, they will be able to increase the effectiveness of price cues.

Theoretical Implications

This dissertation extends our theoretical understanding about the effects of sales promotions and consumers' stockpiling behavior. It presents what types of a sales promotion have an influence on consumers' promotion induced stockpiling and what are mediating mechanisms for the relationship between a sales promotion and stockpiling behavior (Study 1). By proposing three

moderators, it also examines how such relationships would vary (Study 2, 3, and 4). Additional objectives of the current dissertation is that how consumes' price search behavior and knowledge is influenced by different types of a sales promotion. Lastly even though all of proposed mediating mechanisms are found insignificant, this dissertation explicitly addresses theoretical and managerial importance of our understanding of underlying psychological process.

Even though the current four experiments are designed to capture a long-term as well as a short-term promotional effects because a carryover effect from past promotional exposures is expected and influential on consumers' current purchase behavior, there are clear limitations. Thus, the first limitation appears because shopping tasks are computer simulated and simplified ones. The current results of theory testing need to be tested by using scanner data and/or in a more realistic retail environment. Second limitation is from the assumption that there is little competitive reaction from competitors. By using participants' own preferred brand as a focal brand and hypothetical brands as alternative options and previous literature finds mixed results on competitors' responses (e.g., Ailawadi, Kopalle, and Neslin 2005), it is plausible that competitors could react differently across types of sales promotion employed and their reactions could have some influences on consumers' stockpiling.

There are some important routes to extend this work. First, how the effects of discount depth and frequency on stockpiling vary according to brand and category traits. Second, although this dissertation only focuses on a price discount and not more on the other options such as coupons, rebates, etc., it might be worthwhile to investigate whether there are any synergy effects when they are combined together. Also, a follow-up question could be "what would be an optimal combination to trigger consumers' stockpiling behavior?" Third, future empirical research should examine competitors' response to types of price discounts and the effects of

competitive reactions to stockpiling behavior. Fourth, future research could compare established effects from four experiments to ones when various sizes of the brand are available and/or more brand alternatives are available. Lastly, future research could bring other consumers' characteristics into the proposed model to examine whether there are significant differences regarding to the effects of a sales promotion on stockpiling.

APPENDICES

APPENDIX A COMPLETE SCENARIOS: STUDY 1

Introduction

Before proceeding to the next page, please carefully read this instruction, From now you will be asked to purchase "ground coffee" for your household.

You need to decide (1) which Brand you will purchase and (2) how many packages of the brand your will purchase. Note that you should choose only one brand and are allowed to buy multiple packages of your brand choice. Lastly, please do this hypothetical shopping as you usually do in a retail store you often go.

Low Depth and Low Frequency

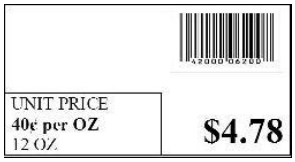
Shopping #1

You just came to a grocery store where you usually purchase groceries. Today there are two available "ground coffee" brands which are <Preferred brand name> (12 oz) and Café Value (12 oz). You know you have <Preferred brand name> of coffee at home now. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–1: Price Tags of Shopping Task #1: Low DEP and Low FRQ

Preferred brand name

Café Value



Shopping #2

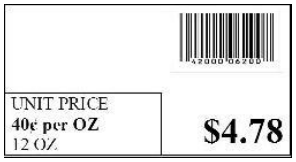
YOUR NEXT SHOPPING TRIP TO THIS STORE:

In this shopping trip, "ground coffee" is on your shopping list, because <Preferred brand name> is left at home. Today there are two available brands which are <Preferred brand name> (12 oz) and Café Value (12 oz). You recall that you have never seen <Preferred brand name> on sale in the past. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–2: Price Tags of Shopping Task #2: Low DEP and Low FRQ

Preferred brand name

Café Value



High Depth and High Frequency

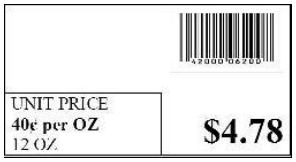
Shopping #1

You just came to a grocery store where you usually purchase groceries. Today there are two available "ground coffee" brands which are <Preferred brand name> (12 oz) and Café Value (12 oz). You know you have <Preferred brand name> of coffee at home now. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–3: Price Tags of Shopping Task #1: High DEP and High FRQ

Preferred brand name

Café Value



Shopping #2

YOUR NEXT SHOPPING TRIP TO THIS STORE:
In this shopping trip, "ground coffee" is on your shopping list,
because ${q://QID2371/ChoiceGroup/SelectedChoices} is left at home. Today there are two available brands which are <Preferred brand name> (12 oz) and Café Value (12 oz). You recall that, in your last three shopping trips you made, <Preferred brand name> was on sale. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–4: Price Tags of Shopping Task #2: High DEP and High FRQ

Preferred brand name

Café Value

High Depth and Low Frequency

Shopping #1

You just came to a grocery store where you usually purchase groceries. Today there are two available "ground coffee" brands which are <Preferred brand name> (12 oz) and Café Value (12 oz). You know you have <Preferred brand name> of coffee at home now. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–5: Price Tags of Shopping Task #1: High DEP and Low FRQ

Preferred brand name

Café Value

Shopping #2

YOUR NEXT SHOPPING TRIP TO THIS STORE:

In this shopping trip, "ground coffee" is on your shopping list, because <Preferred brand name> is left at home. Today there are two available brands which are ${q://QID2183/ChoiceTextEntryValue} (12 oz) and Café Value (12 oz). You recall that you have never seen <Preferred brand name> on sale in the past. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–6: Price Tags of Shopping Task #2: High DEP and Low FRQ

Preferred brand name

Café Value

Low Depth and High Frequency

Shopping #1

You just came to a grocery store where you usually purchase groceries. Today there are two available "ground coffee" brands which are <Preferred brand name> (12 oz) and Café Value (12 oz). You know you have <Preferred brand name> of coffee at home now. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–7: Price Tags of Shopping Task #1: Low DEP and High FRQ

Preferred brand name

Café Value

Shopping #2

YOUR NEXT SHOPPING TRIP TO THIS STORE:

In this shopping trip, "ground coffee" is on your shopping list, because <Preferred brand name> is left at home. Today there are two available brands which are <Preferred brand name> (12 oz) and Café Value (12 oz). You recall that, in your last three shopping trips you made, <Preferred brand name> was on sale. Please decide which brand and how many packages of the brand you will purchase.

Figure 6–8: Price Tags of Shopping Task #2: Low DEP and High FRQ

Preferred brand name

Café Value

APPENDIX B COMPLETE SCENARIOS: STUDY 2

Other than purchase options of Shopping #2, all other parts are the same with Study 1

Low Benefit, High Depth, and High/Low Frequency

Shopping #2

Figure 7–1: Price Tags of Shopping Task #2: Low BEF, High DEP, and High/Low FRQ

Preferred brand name

Café Value

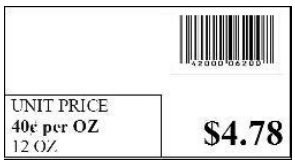
Low Benefit, Low Depth, and High/Low Frequency

Shopping #2

Figure 7–2: Price Tags of Shopping Task #2: Low BEF, Low DEP, and High/Low FRQ

Preferred brand name

Café Value



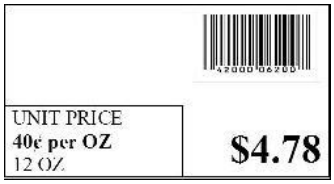
High Benefit, Low Depth, and High/Low Frequency

Shopping #2

Figure 7–3: Price Tags of Shopping Task #2: High BEF, Low DEP, and High/Low FRQ

Preferred brand name

Café Value



High Benefit, High Depth, and High/Low Frequency

Shopping #2

Figure 7–4: Price Tags of Shopping Task #2: High BEF, High DEP, and High/Low FRQ

Preferred brand name

Café Value

APPENDIX C COMPLETE SCENARIOS: STUDY 3

Other than purchase options of Shopping #2, all other parts are the same with Study 1

New Product, Low Depth, and High/Low Frequency

Shopping #2

Figure 8–1: Price Tags of Shopping Task #2: NP, Low DEP, and High/Low FRQ

Preferred brand name

Preferred brand name:
NEW!! Ready to Brew Instant Pack

Café Value

New Product, High Depth, and High/Low Frequency

Shopping #2

Figure 8–2: Price Tags of Shopping Task #2: NP, High DEP, and High/Low FRQ

Preferred brand name

Preferred brand name:
NEW!! Ready to Brew Instant Pack

Café Value

APPENDIX D COMPLETE SCENARIOS: STUDY 4

Other than purchase options of Shopping #2, all other parts are the same with Study 1

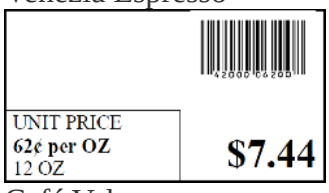
New Brand, High Depth, and High/Low Frequency

Shopping #2

Figure 9–1: Price Tags of Shopping Task #2: NB, High DEP, and High/Low FRQ

Preferred brand name

Venezia Espresso



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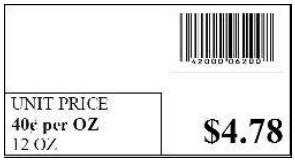


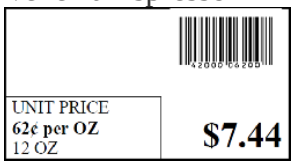
New Brand, Low Depth, and High/Low Frequency

Shopping #2

Figure 9–2: Price Tags of Shopping Task #2: NB, Low DEP, and High/Low FRQ

Preferred brand name

Venezia Espresso



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