

# How Does the Purchase of a Product Affect the Next Purchase?

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## Abstract

The purpose of this article is to clarify the effect of previous purchases on later purchases using shopping path data collected from RFID. We focus on licensing effect as a concept that explains the phenomenon where previous purchases affect later purchases. This research uses shopping path data to verify the existence of licensing effects in a supermarket in Japan, and to clarify the differences between the purchasing behaviors of consumers in Japan and in the U.S. According to the results, we found that previous purchasing conditions also affect later purchases for consumers in Japan. However, contrary to the results of Hui, Bradlow and Fader (2009), we found that for consumers in Japan, previous purchases of virtue category products do not encourage purchases of vice category products; previous virtue category purchases correlate with less probability of buying vice category products later.

## Keywords

Licensing effect, shopping path, purchase probability, virtue category product, vice category product

## 1. Introduction and Objectives

In recent years, advancements in information measuring devices have made it possible to accumulate detailed information on phenomena that previously could not be understood. Such novel data is steadily expanding the frontiers of research on consumer purchasing processes. Shopping path research is one of the most prominent research areas currently attracting the most attention. The purpose of this article is to clarify the effect of previous purchases on later purchases using shopping path data collected from RFID.

A choice made by a consumer consists of a series of decisions, and prior purchase decisions affect subsequent purchase decisions. "Licensing effect" (Khan and Dhar 2006, Hui, Bradlow and Fader 2009) is a concept proposed to explain such phenomena. Khan and Dhar (2006) argue that a prior intent to be virtuous boosts self-concepts and reduces negative self-attributions associated with the purchase of relative luxuries. Hui, Bradlow and Fader (2009) categorize products into two categories; virtue categories, which are relative necessities such as vegetables and organic foods, and vice categories,

which are relative luxuries such as beer and ice cream. They think licensing effect is present when consumers who previously purchased more virtue items than vice items buy vice items subsequently.

Hui, Bradlow and Fader (2009) used shopping path data collected in a U.S. supermarket, and examined the dynamics of a consumer's shopping trip. They noted especially that features of previously purchased products affect later purchase decisions, and derived important knowledge for in-store marketing. However, many issues remain from previous research. As Hui, Bradlow and Fader (2009) pointed out, they collected data in a U.S. supermarket, and clarified mutual effects in a series of decision making, but it was unclear whether such effects also exist in other stores, especially supermarkets in other countries, such as in Asia or Europe. In particular, it is not clear if the licensing effect is a phenomena which can be commonly observed in consumers, even in culturally different environments.

This research aims to clarify the effect of previous purchases on later purchases using shopping path data collected from RFID. It also aims to clarify licensing-effect-related purchasing behavior differences between consumers in Japan and the U.S. We organize the rest of this paper as follows. In section 2, we make a brief review of the sequential view of consumer's choices, especially focusing on licensing effect. In section 3, we develop behavioral hypotheses and a method. In section 4, we show the result and findings based on our empirical test. Finally, we conclude with a discussion of our results and provide limitations and directions for future research.

## 2. Literature Review

A series of prior decisions made by consumers influence subsequent choices. This has been explained by at least three approaches (Khan and Dhar 2006): goal theoretic, cognitive priming and moral licensing approach. First, drawing on the goal theoretic approach, Dhar and Simonson (1999) show that prior purchase of goal-consistent items enhance the value of subsequent purchases of other goal-consistent items to attain a specific goal in a consumption episode, which is the set of items belonging to the same event and occurring in temporal proximity. In addition, initial outcomes influence one's target goal (Novemsky and Dhar 2005). For example, a positive (negative) initial outcome leads to an upward (downward) shift in one's goal target causing one to seek a higher (lower) level of goal attainment.

Second, the cognitive priming approach explores the perception-behavior link which originates from the notion that mental representations are responsible for perception and behavior and the link is direct and unconscious (Dijksterhuis et al. 2005). This approach assumes that an initial task primes a certain representation or

self-concept that affects behavior (Khan and Dhar 2006). Certain initial tasks sometimes lead to counterproductive behavior. For example, Nenkov and Scott (2014) examine the priming effect of a whimsically cute product on indulgent consumption. Also, marketing tactics entail not only a priming effect, but also reverse the priming effect. Laran, Dalton and Andrade (2011) find that slogans cause a reverse priming effect because of their persuasive nature.

Finally, the moral licensing approach we adopt in this article is based on Nisan's (1990, 1991) moral balance model, which argues that people's deviation from their moral ideal is caused by their view of their own moral self, which is tied to their own moral balance (Klotz and Bolino 2013). This approach addresses the reasons why prior good actions can liberate people to act in an unethical manner (Merritt, Effron and Monin 2010). For example, if a person has made many donations to one particular charity, that person might feel they have a license not to donate to another charity. This state of psychological licensing is defined as "people's perception that they are permitted to take an action or express a thought without fear of discrediting themselves" (Miller and Effron 2010, p.118).

Khan and Dhar (2006) applied this moral licensing approach to consumer choice settings. They argued that a person's commitment to virtuous acts in a prior choice activates a positive self-concept and reduces negative self-attribution to purchase relative luxuries, causing more indulgent consumption. Herein, as to the labeling of products, we use the term relative luxuries and vice items interchangeably. Because purchasing relative luxuries or vice items is associated with negative self-attribution, we need to assume a logic to legitimate consumer's indulgent behavior.

Hui, Bradlow and Fader (2009) examine licensing effects in the context of the consumer's in-store behavior using field data on actual supermarket shopping paths and purchases. Relying on Khan and Dhar (2006), they posit that purchasing virtue items (e.g., vegetables, organic food) boosts a consumer's self-concept, thus reducing the negative self-attributions associated with the purchase of vice categories (e.g., beer, ice cream). In other words, the licensing effect is present if a consumer's current shopping basket has a positive virtue/vice balance (i.e., contains more virtue categories than vice categories). They tested their behavioral hypothesis in three exhaustive sequential and interrelated in-store decisions - visits, shopping and buying. In the next section, we provide a hypothesis and method relying mainly on Hui, Bradlow and Fader (2009).

### 3. Hypothesis and Method

A consumer's shopping path is the in-store behavior process, from when s/he goes

into the store entrance, until s/he pays for purchased items at the register. A shopping path can be denoted by a three-tuple  $P=\{S, i, X_i(t)\}$  (Hui et al. 2009, p.322).  $S$  is the environment where data was obtained,  $i$  is each customer whose movements are identified by RFID, and  $X_i$  is that customer's  $i$ 's movements in the store.  $X_i(t)$  shows the position in the store of customer  $i$  at time  $t$ . The hopping path data is a set of  $X_i(t)$  for each customer.

Generally, a choice in the real world is part of a continuous series of decision making. The existing research (Novemsky and Dhar 2005) found that customer product choices are affected by previous behavior. However, until recently, it was difficult to quantitatively record and scientifically verify such customer behavior in stores, and many studies were only qualitative survey methods using questionnaire surveys and interviews, etc. Advances in information devices in recent years have transformed this situation, as RFID and video monitoring technology have enabled detailed tracking of customer in-store behavior. This paper uses RFIDs to grasp customer in-store behavior in Japan, where movement information is accumulated as data, and the data are analyzed to obtain important information on consumers. By using these data, we are able to verify following hypotheses.

H1: Previous purchasing behavior affects later purchase-related behavior.

This paper follows the framework of Hui et al. (2009), and uses data collected in Japan to verify the three hypotheses below. First, based on Hui et al. (2009, p.486), relative necessities, such as vegetables, organic foods and health-oriented products, were classified as virtue category products; relative luxuries that harm the body, such as beer and ice cream, were classified as vice category products. Using these classifications, previous purchasing conditions can be expressed as having a virtue-vice balance. That is, this balance? defines that if there are more virtue category products than vice category products in the basket that were purchased before going to a sales location, then there is a licensing effect.  $|C_{all}|$  is the purchase quantity in the basket;  $|C_r|$  is the quantity of virtue category products in purchased products, and  $|C_v|$  is the quantity of vice category products. The situation in the basket at time  $t$  is

$$\frac{|C_r|}{|C_{all}|} > \frac{|C_v|}{|C_{all}|} \quad (1)$$

If (1) is true, then one can say there is a licensing effect. And the degree of a licensing effect ( $L_i$ ) is defined as,

$$L_i = \frac{C_r}{|C_{all}|} \quad (2)$$

According to the definition of previous purchase conditions described in this paper, the existence of licensing effects are identified, and effects on later purchasing behavior are measured. Later purchasing behavior is comprised of three stages (visits, shopping, buying), based on the decision-making process. If customer  $i$  visits a sales area, this is expressed as  $V_i=1$ ; if customer  $i$  does not visit, this is expressed as  $V_i=0$ . Next, if customer  $i$  shops at that sales location (stops and considers a product purchase), this is expressed as  $S_i=1$ ; if customer  $i$  passes by without stopping, this is expressed as  $S_i=0$ . The licensing effect means that previous purchasing behavior affects purchases of vice category products; at a sales location, if vice category products were purchased, this is expressed as  $B_i=1$ ; if not purchased,  $B_i=0$ .

For this paper, we attach RFID to carts (Fig. 1) and track them, then use data collected on customer paths in the store. Furthermore, we integrate this data with sales transaction data and floor layout information (Fig. 2) and analyze them together. The data was collected from August to October, 2012, at a supermarket in a suburb of Tokyo, Japan. The sample size is 8905; the average customer purchase was of 3216 yen, and the average number of purchased items was 13.



Fig. 1. An RFID tag is attached to each shopping cart.

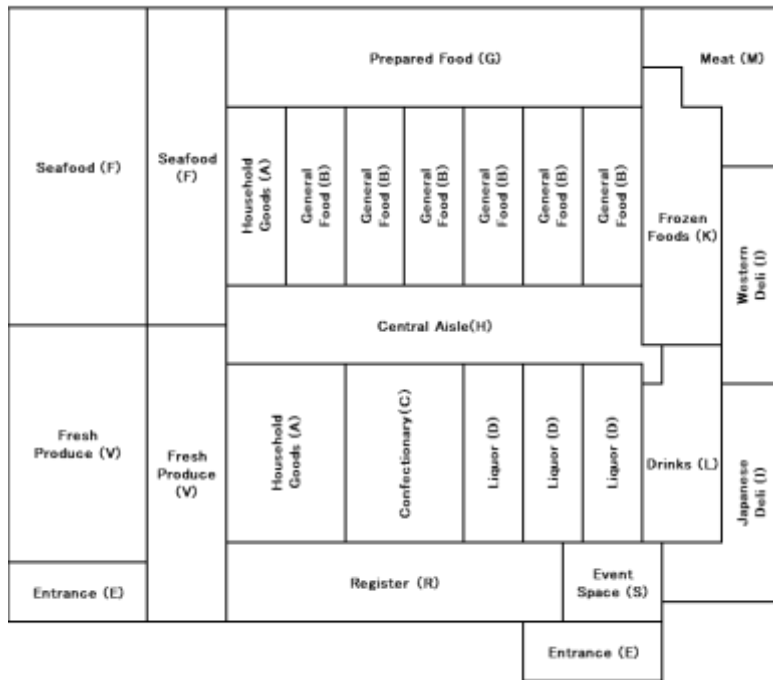


Fig. 2. Sales floor layout in a store.

Vice category products include various products: confectionary, liquor, coffee, etc. It is difficult to study all product categories in just this paper, so for vice category products, we focus on customer behavior for the confectionary sales location, which generates the largest sales among vice category products. As a result of preprocessing, we were able to see the previous purchase conditions: 2893 customers did not visit the confectionary sales location; 2438 customers did visit confectionaries.

This paper relied on the research of Hui et al. (2009), and in order to observe the licensing effects along with the purchase process, we verify the hypotheses below. The first hypothesis concerns the relationship between licensing effect and visits to a vice category product sales location. According to Hui et al. (2009), if there is a licensing effect in the virtue-vice balance, there is a stronger tendency to visit vice category product sales locations. This paper focuses on customer behavior regarding the confectionary sales location, and we pose the following hypothesis.

H2: When there are many virtue category products in the customer's basket, that customer tends to visit a vice products sales location (confectionary sales location).

Hui et al. (2009) point out that when there is a licensing effect, there is a stronger tendency to go into a shopping mode at vice category products' sales locations. The shopping mode is when the customer's mindset is in a state prepared to make purchase

decisions. Hui et al. use shopping paths, and define “shopping mode” as the state of stopping at a sales location. Therefore, as this paper focuses on customer behavior at the confectionary sales location, we pose the following hypothesis.

H3: When there are many virtue category products in the customer’s basket, that customer tends to go into shopping mode at a vice products' sales location (confectionary sales location).

Hui et al. (2009) point out that when there is a licensing effect, there is a stronger tendency to buy vice category products at their sales locations. Therefore, as this paper focuses on customer behavior at the confectionary sales location, we pose the following hypothesis.

H4: When there are many virtue category products in the customer’s basket, that customer tends to buy confectionary at a vice products' sales location (confectionary sales location).

#### 4. Results and Findings

Logistic regression analysis was used to verify hypotheses H2, H3 and H4. For all hypotheses, the explanatory variable is  $L_i$ , the ratio of virtue category products in the customer’s basket. In H2, the dependent variable,  $V_i$ , is whether the customer visits the vice products sales location (confectionary sales location, binary data: 0 = no visit, 1 = does visit). In H3, the dependent variable,  $S_i$ , is whether the customer goes into shopping mode at the vice products sales location (confectionary sales location, binary data: 0 = does not go into shopping mode, 1 = does go into shopping mode). In H4, the dependent variable,  $B_i$ , is whether the customer buys confectionary at the vice products' sales location (confectionary sales location, binary data: 0 = does not buy, 1 = does buy).

For H2, the regression coefficient for the number of virtue category products is -0.199; it was not significant ( $\chi^2(1) = 2.863, p > .05$ ). For H3, the regression coefficient for the number of virtue category products is -0.255; it was significant ( $\chi^2(1) = 4.466, p < .05$ ). For H4, the regression coefficient for the number of virtue category products is -0.766; it was also significant ( $\chi^2(1) = 23.35, p < .05$ ).

From these results, one can conclude that greater numbers of virtue category products in the customer’s basket correlate with less probability of shopping mode at the vice products' sales location, and purchase tendency also lessens, but it does not affect visit tendency. That is, H2 is not supported, and we obtained opposite results for



H3 and H4.

We conclude that hypothesis H1 is supported. That is, we found that in Japan, prior purchasing-related behavior affects later purchases. However, Hui et al. found that after customers bought many virtue category products, it was easier for them to buy vice category products; but in Japan, we found the opposite: customers tend to avoid buying vice category products. This paper found that licensing effects on later purchasing behavior differ for consumers in the U.S. and consumers in Japan.

## 5. Conclusions

This paper's findings provide important suggestions for management. The knowledge that prior purchasing behavior affects later purchase acts means there is a specific tendency in the order of product purchases; this theoretically means store layout affects purchasing behavior. It may be insufficient to only analyze basket contents (results of purchases), and important to understand the order of customer purchases in the store. Also, these purchases differ depending on the country, so for the globally expanding retail industry, one can say that sufficient knowledge about purchase acts in stores is needed.

This research leaves many remaining issues. This paper focused on a confectionary sales location for vice category products, and studied confectionary purchase-related consumer behavior. However, this paper was unable to sufficiently study the reasons that licensing effects are different in Japan and the U.S. Also, vice category products include many products, and further study should show whether similar tendencies are also seen at other sales locations. With further study, it is also important to clarify the differences between categories regarding licensing effects on consumer behavior. Moreover, as Hui et al. (2009) pointed out, there is a need to verify the effects on virtue category product purchase acts when many vice category products are bought.

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