Dissertation 2021

Understanding Consumer Behavior Based on Behavioral Economics Findings: Empirical Analysis Using New Purchase Behavior Data

(Summary)

Graduate School of Economics, Keio University

Yuki Saito

Chapter 1

Introduction

According to the consumer model of traditional economics, consumer decisions do not depend on the situation or context in which the decision is made. On the other hand, the consumer model of behavioral economics, which incorporates cognitive psychology, posits that consumer decisions depend on the situation and context in which the decision is made (e.g., Dhar and Gorlin 2013). According to behavioral economics findings, for example, the following situational factors influence consumer decision-making: If we consider that a realistic aspect of consumer decision-making is that choices are sequential (e.g., shopping in a supermarket), then prior decisions influence subsequent decisions (sequential choice effect) (e.g., Dhar and Simonson 1999). In addition, when making decisions under a time constraint, consumers change their decision-making process (time pressure effect) (e.g., Payne et al. 1988).

These behavioral economics findings may provide interesting insights (e.g., judgments about when to intervene) for interventions that encourage consumers to change their behavior (e.g., Dolan and Galizzi 2015). On the other hand, since these findings are primarily based on laboratory experiments with students, their reproducibility should be tested with real data in terms of target audience (e.g., size, representativeness) and ecological validity.

Observing these situational factors (i.e., prior decision-making and time constraints) surrounding consumer decision-making in the real world (rather than in the laboratory) has been difficult in the past, but it has recently become possible owing to "big data" (e.g., Bradlow et al. 2017). Big data is not only new in terms of data size, but also new in terms of data acquisition. The evolution of information technology makes it possible to acquire consumer behavioral data in an immediate and diverse manner (McAfee et al. 2012). For example, in the retail industry, including supermarkets, point-of-sale (POS) systems capture consumer behavioral data at the time of payment (i.e., at the register). Recently, in addition to this system, location-based and self-payment systems have been introduced to capture consumer behavioral data (e.g., purchase order and time spent in the store) from the beginning of shopping to the time of payment (e.g., Bradlow et al. 2017; Grewal et al. 2020). These new systems will allow us to measure consumer behavior in an immediate and diverse manner, which was previously a black box.

By utilizing these new consumer behavioral data, we can variablize the situational factors involved in the consumer decision-making described above and examine their effects (e.g., Gilbride et al. 2015; Hui et al. 2009). In this study, I investigate the relationship between consumer decision-making and situational factors by utilizing data collected through a self-payment system called smart cart as new consumer behavior data. Smart cart data is a log of consumer behavior in a store, including information such as the order in which items are purchased and the time spent at the store.

The purpose of this study is to utilize this smart cart data to analyze the effect of prior decision-making (e.g., pre-purchased products) on focal decision-making (e.g., product selection) in sequential choices such as supermarket shopping (Chapters 3 and 4). It also identifies time constraints by focusing on the setting of a time budget for supermarket shopping or the routine nature of supermarket shopping (e.g., the tendency to shop at certain times of the day), and it analyzes the impact of such time constraints on shopping behavior (Chapters 3 and 5).

Smart Cart Data

In this study, I consistently used smart cart data for analysis. A Japanese supermarket chain provided us with smart cart data. The general characteristics of shopping with a smart cart payment system are self-scanning of products during shopping, instant and sequential feedback of payment amount, and self-payment (Van Ittersum et al. 2013). The company implemented this payment system with a shopping cart equipped with a barcode reader and touchscreen tablet. The consumers log into the smart cart system and start using the smart cart as soon as they arrive at the store. They can then sequentially select and scan products, make self-payments, and log out. This new system allows the company to obtain information about the purchased products as well as the order in which they are purchased when shopping with the smart cart. Additionally, the timestamp in the operation log of the smart cart allows the company to obtain information such as the login time (i.e., check-in time to the store) and the time spent shopping (e.g., when a certain item was selected or logged out). To the best of our knowledge, such data cannot be obtained from POS systems.

Chapter 2

Previous Literature Review

The purpose of this study is to investigate the influence of situational factors on consumer decision-making using real-world data. Among such influences, this study is interested in 1) sequential choice effect and 2) time pressure effect. Previous research on these two findings has been briefly reviewed.

Sequential Choice Effects: Impact of Prior Decision-Making

A practical aspect of consumer decision-making is that choices are sequential, that is, one decision is often followed by another. According to recent behavioral economic findings, in sequential choice, the decision that the consumer is facing now (the focal decision) is systematically influenced by prior decisions (e.g., Dhar and Simonson 1999; Khan and Dhar 2006).

According to Dhar and Simonson (1999), a pioneering study on sequential choice, when faced with a trade-off between goals (e.g., pleasure) and resources (e.g., money), consumers tend to choose an option with the same characteristics as those of the prior selected option in the subsequent decision. For example, if a consumer chooses a high-quality, expensive option in preference to a goal (as a result of a trade-off), they will continue to choose the expensive option in subsequent choices. Alternatively, if a consumer chooses a low-quality, low-price option in favor of resources, they tend to continue to choose the low-price option in subsequent choices.

On the other hand, according to Dhar and Simonson (1999), when faced with a trade-off between two different objectives (e.g., pleasure and good health), consumers tend to choose an option with characteristics different from those of the prior selected option in subsequent decisions. For example, if a consumer prioritizes pleasure as one goal and chooses a tasty but unhealthy option, they tend to choose a less tasty but healthier option in the subsequent choice, prioritizing health as the other goal.

Khan and Dhar's (2006) study is also quite prominent in terms of making choices that contrast with prior choices. According to them, consumers tend to make vicious decisions after making virtuous decisions in advance. This is called the licensing effect.

When shopping in a supermarket, consumers are thought to employ sequential choices. If there is a sequential choice effect, such that prior decisions influence subsequent decisions, then in-store decision-making is dynamic; that is, the tendency to prefer one option over another becomes stronger or weaker depending on the situation as defined by prior decisions (e.g., Hui et al. 2009; Gilbride et al. 2015; Sheehan and Van Ittersum 2018).

Hui et al. (2009) test the licensing effect reported by Khan and Dhar (2006) using real data. The results show that when consumers' shopping baskets are full of products considered to be provident or virtuous, such as vegetables and organic foods, they are more likely to consider buying products considered to be indolent or vicious, such as beer and ice cream.

Sheehan and Van Ittersum (2018) also report that consumers tend to buy expensive products (e.g., national brand beer) after buying cheaper products (e.g., private label milk) beforehand (or vice versa). More precisely, they report that the tendency is nonlinear (quadratic in time of choice), that is, the tendency to buy cheaper goods at the beginning of the sequential choice opportunities, more expensive goods at the middle, and cheaper goods again at the end (and vice versa). According to Sheehan and Van Ittersum (2018), especially when there is an explicit budget constraint in shopping, the opportunity cost is recognized as a reference point, and consumers feel the "pain of paying" (Prelec and Lowernstein 1998) when they spend their budget on sequential choices. As a result, it has been reported that consumers make dynamic decisions, such as buying inexpensive products in the early stages because the pain is strong, buying expensive products in the middle stages because of the perceived budget surplus, and buying inexpensive products in the final stages because the pain is strong again due to perceived budget depletion.

Time Pressure Effects: Impact of Available Time on Decision-Making

In the real world, consumers often make decisions under time constraints. Behavioral economics findings show that time constraints influence consumer decision-making, which is called the "time pressure" effect (e.g., Payne et al. 1988). According to the literature on time pressure, because of the limited information-processing capacity of real consumers (i.e., bounded rationality) (Bettman et al. 1998; Simon 1955), when the available time for decision-making is limited, it becomes difficult for consumers to perform complex information processing, and they will "simplify" their information processing (Wright 1974).

Often emphasized as the impact of time pressure on consumer decision-making are the findings that 1) information processing is accelerated, 2) information processing becomes partial, and 3) there is a shift from compensatory to non-compensatory decision-making strategies (e.g., Payne et al. 1988; Payne et al. 1996). Payne et al. (1988) examine the time pressure effect in consumer decision-making (gambling choice behavior) through a laboratory experiment. Participants are divided into two groups: one with unlimited time for decision-making (no time pressure condition) and the other with a time limit (e.g., 15 seconds) (time pressure condition). The results show that participants in the time pressure condition accelerate their information processing (i.e., decreased time per information acquisition) and focus on the information they consider most important (i.e., spend more time looking up specific information). In addition, participants in the time pressure condition shift their decision-making strategies from evaluating one option from several perspectives (i.e., attributes of the options) to evaluating several options from one perspective.

In short, under time pressure, decisions are made without deliberate and systematic information processing. As a result, consumer preferences change under time pressure and without time pressure (e.g., Nowlis 1995; Dhar and Nowlis 1999). According to Nowlis

(1995), under time pressure, consumers tend to focus on the price of a product, and if the price is high, they tend to consider it to be of high quality and choose the higher-priced option. According to Dhar and Nowlis (1999), under time pressure, consumers' decision strategies tend to be non-compensatory, which makes decision-making relatively easier and results in less choice deferral (i.e., choosing nothing from a set of presented options).

Several studies have examined the effect of time pressure on consumer behavior in supermarkets (e.g., Herrington and Capella 1995; Hui et al. 2009; Park et al. 1989). Hui et al. (2009) examine the relationship between time pressure and consumer behavior in an actual (rather than experimental) shopping experience. They attach a device to a cart that measures the consumer's in-store route and time spent in the store during shopping. According to them, when consumers stay in a store for a long time, they tend to feel time pressure due to the depletion of time resources and change their shopping behavior: they become less likely to explore the sales floor; instead, they become more likely to consider and buy on the sales floor they are on.

Chapter 3

Impact of Prior Purchasing Behavior on Subsequent Choice of High-priced Products: Empirical Analysis of Consumer Behavior in Stores

In Chapter 3, I examine whether the preference for expensive options in the focal decision is influenced by situational factors such as prior purchasing behavior. When shopping in supermarkets, people purchase multiple items in a single shopping trip. In addition, the payment for each purchase is measured by the same criteria, such as the "financial budget for the shopping trip" (e.g., Stilley et al. 2010), and each purchase decision is made at close intervals in time and space (Dhar and Simonson 1999; Loewenstein and Prelec 1993), which is considered "sequential choice" (e.g., Laran 2010). In sequential choice, prior decisions have an impact on subsequent decisions (e.g., Dhar and Simonson 1999; Khan and Dhar 2006).

In retail brick-and-mortar stores, POS data can tell us about the products purchased on a given shopping trip, but not about the order in which the products are purchased. On the other hand, when shopping with a smart cart, the purchase order of the products can be observed (i.e., prior purchased products). I have analyzed 45,094 shopping trips by 8,924 consumers using smart carts, applying a fixed-effects logit model (controlling for heterogeneity across shopping trips), and found that consumers are more likely to choose high-priced products when they buy discounted or couponed products in advance. This suggests a psychological income effect of encountering and purchasing promotional products in advance (e.g., Thaler 1985; Arkes 1994; Heilman et al. 2002; Milkman and Beshears 2009).

In addition to the monetary budget, consumers set a "time budget," which is the amount of time they are willing to spend on a shopping trip (Hui et al. 2009). Consumers may also feel time pressure from the depletion of their budget (i.e., an increase in time spent in the store) (Hui et al. 2009). In the case of shopping with a smart cart, the time spent to reach a focal decision can be observed through time stamps (i.e., time spent in advance). Similarly, when shopping with a smart cart is analyzed using a fixed-effects logit model, it is found that shoppers are more likely to choose high-priced items when they have already stayed in the store long enough to make a focal decision. This suggests that time pressure simplifies consumers' decision-making processes and, as a result, consumers regard price as a guarantee of quality (Nowlis 1995).

Furthermore, I consider that the impact of these prior purchase behaviors on subsequent decisions, in other words, the "effect" of prior purchase behaviors, is heterogeneous across consumers (e.g., Athey 2017). Therefore, I have investigated whether consumer heterogeneity variables, defined by past purchase behavior, moderate the effects of prior purchase behavior. The results of the hierarchical logit model analysis show, among other things, that consumers who were originally more likely to buy discounted products were more likely to choose expensive options owing to time pressure.

Chapter 4

Promotion Spillover Effects: Empirical Analysis of Heterogeneity in Sequential Choice Effects across Stores and Categories

In Chapter 4, I examine whether the sequential choice effect of prior promotional purchases (shown in Chapter 3), which encourages the selection of expensive options in subsequent decisions, is moderated not only by consumer factors but also by factors such as the store and the category in which the focal decision is being made. The impact of prior promotional purchases on subsequent decision-making is related not only to the sequential choice literature (e.g., Dhar and Simonson 1999), but also to the promotional spillover literature (e.g., Heilman et al. 2002; Janakiraman et al. 2006). In other words, promotional effects may appear not only for the promoted product, but also for other products (Janakiraman et al. 2006), which raises a question regarding the characteristics of products and categories that are sensitive to promotional spillovers (Heilman et al. 2002). It also raises a question regarding the characteristics of stores that are most likely to generate promotional spillover effects through shopping (Hoch et al. 1995).

In the context of this relationship between sequential choice and promotional spillover, to examine the heterogeneity of the impact of prior promotional purchases across stores and categories, the store factor I consider is the competitive structure around the store (e.g., Hoch et al. 1995), and the category factor is category penetration, purchase interval, and number of products (e.g., Narasimhan et al. 1996). How these store and category factors moderate the sequential choice effect is predicted based on the following literature: price sensitivity (e.g., Hoch et al. 1995; Khan et al. 2005), context-dependent promotion evaluation (e.g., Sheehan et al. 2019), and mental accounting compatibility (e.g., Hossain 2018; Thaler 1999). As in Chapter 3, the results of a fixed-effects logit model analysis of 644,557 purchases by 86,839 consumers using smart carts show that the sequential choice effect of discounts, that is, the promotional spillover effect of discounts, is stronger when shopping in stores with more competitors. This suggests that consumers find it difficult to evaluate a discount promotion in a single store alone; that is, they are more likely to perceive the attractiveness of the economic reward of a discount if they evaluate it through multiple retailers (Hsee 1996; Sheehan et al. 2019; Yeung and Soman 2005).

The spillover effect of discounted promotions is also found to be stronger when choosing products from categories with high penetration or high-product counts. This suggests that consumers have a mental accounting compatibility between a category with high penetration or a large number of products and the financial reward for purchasing a discounted product in advance; in other words, consumers perceive these categories as a use of temporary income (Heilman et al. 2002) because they are easily recalled during shopping if they are categories with high penetration (i.e., categories that are frequently purchased by consumers in the store), or if they are categories with a large number of products, because they offer more opportunities for product switching in the store (Narasimhan et al. 1996). In addition, the stronger promotional spillover effect of discounting on product selection from categories with a large number of products is consistent with the expectation that consumers are less price sensitive to such categories in the first place (i.e., higher-priced options are preferred) (Gao et al. 2017; Wakefield and Inman 2003). In other words, it is a relatively cognitively loaded decision because of the large number of options (Bettman et al. 1998), and to simplify decision-making, consumers intuitively view price as a guarantee of quality (Rao and Monroe

1988; Suri and Monroe 2003). When consumers view price as a quality collateral, they are predicted to prefer expensive options (Nowlis 1995; Suri and Monroe 2003). On the other hand, the sequential choice effect of price discounting (i.e., the promotional spillover effect of price discounting) is found to be weaker for product selection from categories with longer purchase intervals. This suggests that consumers do not make mental accounting compatibility between categories with high penetration and the economic rewards of prior coupon purchases. I also find that these results do not necessarily hold for the sequential choice effect of coupons; coupon promotion spillovers are not heterogeneous, at least not by the competitive structure around the store, and are weaker for product choices from high-penetration categories.

Chapter 5

Time Pressure Effects: Empirical Analysis of the Relationship between Later-than-Routine Shopping Starts Times and Shopping Behavior

In Chapter 5, I examine the time pressure effect in the context of the relationship between shopping start time (i.e., store check-in time) and shopping behavior. In Chapter 3, I follow Hui et al. (2009) in defining the time pressure variable by the time spent in the store and examine whether the time pressure perceived by increasing the time spent (i.e., depleting the time budget) changes the decision-making process of consumers. In the time pressure literature, the work of Hui et al. (2009) is new, important, and well-known from the perspective of examining the time pressure effect using real-world data. However, even if the increased time spent in the store changes consumers' decision-making process, it may not necessarily be due to time pressure; for example, time spent may be related to cognitive resources rather than time budget, and the depletion of such resources (due to the effort devoted to shopping behavior) may have simplified consumers' decision-making processes (e.g., Stilley et al. 2010; Muraven and Baumeister 2010). Therefore, in Chapter 5, I propose to identify the time pressure effect on consumer decision-making by a new consumer behavioral variable, such as check-in time, to "refine" the study of time pressure.

In addition to the sequential choice aspect, another characteristic of supermarket shopping is the repetitive experience of consumers from the past to the present (e.g., Hoyer 1984). In this repetition, consumers have a "habitual" behavior of completing tasks such as shopping at a certain time, and they may feel time pressure when shopping starts later than this time (i.e., routine; Betsch et al. 1998). A smart cart system can measure check-in time to the store and allow analysis of the relationship between shopping that starts later than routine and behavior in that shopping. I have analyzed this relationship using a fixed effects model (controlling for consumer heterogeneity) on 335,436 smart cart shopping trips by 36,359 consumers and found that the effect of time pressure on 1) time spent shopping and purchase volume, 2) category purchase behavior, and 3) product purchase behavior is significant. For example, in later-than-routine shopping, consumers 1) accelerate in-store decision-making (Payne et al. 1988; Herrington and Capella 1995), 2) rely more on visual stimuli (i.e., purchase categories with more products) (Park et al. 1989), and 3) make simplistic decisions, such as considering price as quality (i.e., purchase of high-priced products increases) (Nowlis 1995; Suri and Monroe 2003).

Chapter 6

Conclusion

Rather than reject the consumer models of traditional economics, behavioral economics findings suggest that situational factors often have explanatory and predictive powers to better understand the behavior of real consumers. This study aimed to understand consumer behavior based on situational factors, such as 1) prior decision-making in sequential choice (e.g., Dhar and Simonson 1999) and 2) time pressure (e.g., Payne et al. 1988), which is said to arise from time constraints, among other behavioral economics findings. To do so, I used consumer behavioral data obtained from a new payment system called smart cart (e.g., Van Ittersum et al. 2013) in retail physical stores (e.g., order of purchase, check-in time to the store, and time spent in the store). This study examined the influence of the above situational factors on consumers' decision-making in a supermarket shopping setting. In conclusion, this study found that prior purchase of promotional products through in-store decision-making promotes the subsequent choice of high-priced products, and that the influence of such prior purchase is heterogeneous among consumers, stores, and categories. I also found that consumers changed their in-store behavior depending on whether they stayed longer in the store or started shopping later than usual.

Academic Contributions

This study contributes to the academic literature by providing a better understanding of consumer behavior. First, I provide empirical evidence using real-world data for the behavioral economics findings that situational factors are important in consumer decision-making (e.g., Bettman et al. 1998; Dhar and Gorlin 2013; Edwards 1954). Although the importance of concepts such as sequential choice and time pressure has been shown through laboratory experiments, we do not know whether these concepts are applicable to real consumer behavior. In addition, the predictions derived from previous studies are often conflicting. Recently, there has been a trend to verify such behavioral economic findings by actively using real-world data (e.g., Gilbride et al. 2015; Hui et al. 2009; Kawaguchi et al. 2019). This study also follows this trend, using real-world data, such as smart cart data, to clarify how situational factors influence consumer decision-making.

Second, I show the use of new consumer behavior data, the so-called "big data," from an economic standpoint (Einav and Levin 2014). Big data has so far been utilized in the form of "prediction of consumer behavior," with a focus on machine learning. In general, machine learning methodologies have excellent predictive power, but only in limited situations, such as when past and future behavior patterns do not change (Athey 2017). In addition, even if a model leads to a prediction (e.g., whether a consumer will buy a certain product), the reason for that prediction is a "black box" (i.e., "why that prediction?") (Wedel and Kannan 2016). Moreover, machine learning methodologies do not always explicitly control for consumer heterogeneity, which is not observed in the data, but influences the results of the analysis. In short, a simple analysis of machine learning to "predict the future from patterns in past data" does not allow for an understanding of consumer behavior, at least in terms of the mechanisms of consumer behavior and as a generalized outcome (e.g., Wedel and Kannan 2016). In contrast to such machine learning methodologies, this study demonstrates the use of big data based on behavioral economics findings, considering the "human" decision-making mechanisms behind behavioral patterns. By using an econometric model (i.e., a panel data model), the analysis explicitly considers the unobserved heterogeneity of consumers and shopping trips.

Implications for Society

Finally, this study has implications for organizations that are interested in consumer-behavior change, such as corporations and governments. This study shows that consumer decisions (i.e., choices) are influenced by situational factors. This implies that the "timing of intervention" plays an important role in the success of any policy intervention aimed at changing consumer behavior (e.g., Dolan and Galizzi 2015; Sheehan et al. 2019). The penetration of the "Internet of things" is expected to enable behavioral data acquisition through smart devices in a wide range of fields, as well as real-time consumer engagement (e.g., Bradlow et al. 2017; Wedel and Kannan 2016). Using marketing as an example of this study's findings, it is found that retailers who can implement a system similar to the smart cart could increase their profit margins by recommending relatively more expensive products to customers who choose discounted or couponed products. Similarly, for time pressure, it may be effective to recommend high-priced products to customers as their time in the store increases.

References

Arkes Hal, R., Joyner Cynthia, A., Pezzo Mark, V., Gradwohl, N. J., Karen, S. J., & Eric, S. (1994). The psychology of windfall gains. *Organizational Behavior and Human Decision Processes*, 59 (3), 331–47.

Athey, S. (2017). Beyond prediction: Using big data for policy problems. *Science*, 355(6324), 483–485. https://doi.org/10.1126/science.aal4321

Betsch, T., Fiedler, K., & Brinkmann, J. (1998). Behavioral routines in decision making: The effects of novelty in task presentation and time pressure on routine maintenance and deviation. *European Journal of Social Psychology*, 28(6), 861-878.

Bettman, J. R., Luce, M. F., & Payne, J. W. (1998). Constructive consumer choice processes. *Journal of consumer research*, 25(3), 187-217.

Bradlow, E. T., Gangwar, M., Kopalle, P., & Voleti, S. (2017). The Role of Big Data and Predictive Analytics in Retailing. *Journal of Retailing*, 93(1), 79 – 95. https://doi.org/10.1016/j.jretai.2016.12.004

Dhar, R., & Gorlin, M. (2013). A dual-system framework to understand preference construction processes in choice. *Journal of Consumer Psychology*, 23(4), 528−542. https://doi.org/10.1016/j.jcps.2013.02.002

Dhar, R., & Nowlis, S. M. (1999). The Effect of Time Pressure on Consumer Choice Deferral. *Journal of Consumer Research*, 25(4), 369 – 384. https://doi.org/10.1086/209545

Dhar, R., & Simonson, I. (1999). Making Complementary Choices in Consumption Episodes: Highlighting versus Balancing. *Journal of Marketing Research*, 36(1), 29. https://doi.org/10.2307/3151913

Dolan, P., & Galizzi, M. M. (2015). Like ripples on a pond: Behavioral spillovers and their implications for research and policy. *Journal of Economic Psychology*, 47, 1–16. https://doi.org/10.1016/j.joep.2014.12.003

Edwards, W. (1954). The theory of decision making. *Psychological bulletin*, 51(4), 380.

Einav, L., & Levin, J. (2014). Economics in the age of big data. *Science*, 346(6210).

Gao, H., Zhang, Y., & Mittal, V. (2017). How Does Local–Global Identity Affect Price Sensitivity? *Journal of Marketing*, 81(3), 62–79. https://doi.org/10.1509/jm.15.0206

Gilbride, T. J., Inman, J. J., & Stilley, K. M. (2015). The Role of Within-Trip Dynamics in Unplanned versus Planned Purchase Behavior. *Journal of Marketing*, 79(3), 57–73. https://doi.org/10.1509/jm.13.0286

Grewal, D., Noble, S. M., Ahlbom, C.-P., & Nordfält, J. (2020). The Sales Impact of Using Handheld Scanners: Evidence from the Field. *Journal of Marketing Research*, 57(3), 527-547.

Heilman, C. M., Nakamoto, K., & Rao, A. G. (2002). Pleasant Surprises: Consumer Response to Unexpected In-Store Coupons. *Journal of Marketing Research*, 39(2), 242–252. https://doi.org/10.1509/jmkr.39.2.242.19081

Herrington, J. D., & Capella, L. M. (1995). Shopper reactions to perceived time pressure. *International Journal of Retail & Distribution Management*.

Hoch, S. J., Kim, B.-D., Montgomery, A. L., & Rossi, P. E. (1995). Determinants of Store-Level Price Elasticity. *Journal of Marketing Research*, 32(1), 17. https://doi.org/10.2307/3152107

Hossain, M. T. (2018). How Cognitive Style Influences the Mental Accounting System: Role of Analytic versus Holistic Thinking. *Journal of Consumer Research*. https://doi.org/10.1093/jcr/ucy020

Hoyer, W. D. (1984). An Examination of Consumer Decision Making for a Common Repeat Purchase Product. *Journal of Consumer Research*, 11(3), 822. https://doi.org/10.1086/209017

Hsee, C. K. (1996). The Evaluability Hypothesis: An Explanation for Preference Reversals between Joint and Separate Evaluations of Alternatives. *Organizational Behavior and Human Decision Processes*, 67(3), 247–257. https://doi.org/10.1006/obhd.1996.0077

Hui, S. K., Bradlow, E. T., & Fader, P. S. (2009). Testing Behavioral Hypotheses Using an Integrated Model of Grocery Store Shopping Path and Purchase Behavior. *Journal of Consumer Research*, 36(3), 478–493. https://doi.org/10.1086/599046

Janakiraman, N., Meyer, R. J., & Morales, A. C. (2006). Spillover Effects: How Consumers Respond to Unexpected Changes in Price and Quality. *Journal of Consumer Research*, 33(3), 361–369. https://doi.org/10.1086/508440

Kawaguchi, K., Uetake, K., & Watanabe, Y. (2019). Effectiveness of Product

Recommendations Under Time and Crowd Pressures. *Marketing Science*, 38(2), 253–273. https://doi.org/10.1287/mksc.2018.1132

Khan, U., & Dhar, R. (2006). Licensing Effect in Consumer Choice. *Journal of Marketing Research*, 43(2), 259–266. https://doi.org/10.1509/jmkr.43.2.259

Khan, U., Dhar, R., & Wertenbroch, K. (2005). A behavioral decision theory perspective on hedonic and utilitarian choice. Inside consumption: *Frontiers of research on consumer motives, goals, and desires*, 1, 144-165.

Laran, J. (2010). Goal Management in Sequential Choices: Consumer Choices for Others Are More Indulgent than Personal Choices. *Journal of Consumer Research*, 37(2), 304–314. https://doi.org/10.1086/652193

Loewenstein, G. F., & Prelec, D. (1993). Preferences for sequences of outcomes. *Psychological review*, 100(1), 91.

McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D. J., & Barton, D. (2012). Big data: the management revolution. *Harvard business review*, 90(10), 60-68.

Milkman, K. L., & Beshears, J. (2009). Mental accounting and small windfalls: Evidence from an online grocer. *Journal of Economic Behavior & Organization*, 71(2), 384–394. https://doi.org/10.1016/j.jebo.2009.04.007

Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle?. *Psychological bulletin*, 126(2), 247.

Narasimhan, C., Neslin, S. A., & Sen, S. K. (1996). Promotional Elasticities and Category Characteristics. *Journal of Marketing*, 60(2), 17. https://doi.org/10.2307/1251928

Nowlis, S. M. (1995). The effect of time pressure on the choice between brands that differ in quality, price, and product features. *Marketing Letters*, 6(4), 287 – 295. https://doi.org/10.1007/BF00996192

Park, C. W., Iyer, E. S., & Smith, D. C. (1989). The Effects of Situational Factors on In-Store Grocery Shopping Behavior: The Role of Store Environment and Time Available for Shopping. *The Journal of Consumer Research*, 15(4), 422–433.

Payne, J. W., Bettman, J. R., & Johnson, E. J. (1988). Adaptive strategy selection in decision making. *Journal of experimental psychology: Learning, Memory, and Cognition*, 14(3), 534.

Payne, J. W., Bettman, J. R., & Luce, M. F. (1996). When Time Is Money: Decision Behavior under Opportunity-Cost Time Pressure. *Organizational Behavior and Human Decision Processes*, 66(2), 131–152. https://doi.org/10.1006/obhd.1996.0044

Prelec, D., & Loewenstein, G. (1998). The Red and the Black: Mental Accounting of Savings and Debt. *Marketing Science*, 17(1), 4–28. https://doi.org/10.1287/mksc.17.1.4

Rao, A. R., & Monroe, K. B. (1988). The moderating effect of prior knowledge on cue utilization in product evaluations. *Journal of consumer research*, 15(2), 253-264.

Sheehan, D., & Van Ittersum, K. (2018). In-Store Spending Dynamics: How Budgets Invert Relative-Spending Patterns. *Journal of Consumer Research*, 45(1), 49 – 67. https://doi.org/10.1093/jcr/ucx125

Sheehan, D., Hardesty, D. M., Ziegler, A. H., & Chen, H. (Allan). (2019). Consumer reactions to price discounts across online shopping experiences. *Journal of Retailing and Consumer Services*, 51, 129–138. https://doi.org/10.1016/j.jretconser.2019.06.001

Simon, H. A. (1955). A Behavioral Model of Rational Choice. *The Quarterly Journal of Economics*, 69(1), 99. https://doi.org/10.2307/1884852

Stilley, K. M., Inman, J. J., & Wakefield, K. L. (2010). Planning to Make Unplanned Purchases? The Role of In-Store Slack in Budget Deviation. *Journal of Consumer Research*, 37(2), 264–278. https://doi.org/10.1086/651567

Suri, R., & Monroe, K. B. (2003). The Effects of Time Constraints on Consumers' Judgments of Prices and Products. *Journal of Consumer Research*, 30(1), 92–104. https://doi.org/10.1086/374696

Thaler, R. (1985). Mental Accounting and Consumer Choice. *Marketing Science*, 4(3), 199–214.

Thaler, R. H. (1999). Mental accounting matters. *Journal of Behavioral Decision Making*, 12(3), 24.

Van Ittersum, K., Wansink, B., Pennings, J. M., & Sheehan, D. (2013). Smart shopping carts: How real-time feedback influences spending. *Journal of Marketing*, 77(6), 21-36.

Wakefield, K. L., & Inman, J. J. (2003). Situational price sensitivity: The role of consumption occasion, social context and income. *Journal of Retailing*, 79(4), 199–212. https://doi.org/10.1016/j.jretai.2003.09.004

Wedel, M., & Kannan, P. K. (2016). Marketing Analytics for Data-Rich Environments. *Journal of Marketing*, 80(6), 97–121. https://doi.org/10.1509/jm.15.0413

Wright, P. (1974). The harassed decision maker: Time pressures, distractions, and the use of evidence. *Journal of applied psychology*, 59(5), 555.

Yeung, C. W. M., & Soman, D. (2005). Attribute Evaluability and the Range Effect. *Journal of Consumer Research*, 32(3), 363–369. https://doi.org/10.1086/497547