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경제학 석사 학위논문

**Two Essays of Grocery Shopping  
Behavior through Mobile Device**

모바일 기기를 통한 식품 구매행동

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엄 하 람

# **Abstract**

## **Two Essays of Grocery Shopping Behavior through Mobile Device**

Haram Eom

Program in Regional Information

Department of Agricultural Economics and Rural Development

Seoul National University

The number of people using mobile devices with a touch-screen interface for online shopping is increasing rapidly. This study focused on the use of mobile devices (as opposed to PCs) when shopping for groceries online. Essay 1 discusses the differences between the use of mobile devices and PCs with regard to consumers' grocery purchasing behaviors in online shopping malls. To achieve the aim of the study, online grocery purchase records from consumer household panels was analyzed. The results show that using a mobile device significantly influences consumers' purchasing behavior. Essay 2 discusses the effect of touching on a product through a screen (vs. clicking on a product) on

consumers in online shopping malls. The experiments were conducted with 107 participants. The results indicate that touch screens positively affect affective thinking style, mental simulation of a product, shopping enjoyment, and price premium. In addition, the main paths that affect the price premium differ when using a touch screen rather than a mouse.

**Keyword:** e-commerce, mobile shopping, touch interface, thinking style, embodied cognition, mental simulation

**Student Number:** 2017-27430

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# I . Essay 1:

## Differences in Online Grocery Purchasing Behaviors when Using Mobile Devices and PCs

### 1. Introduction

#### 1.1 Research Background

Globally, in the past two decades, the e-commerce market has proliferated (Statista, 2019a, 2019b). Notably, over the past few years, the mobile commerce market has seen rapid growth as mobile phone use increased (Statista, 2019c). In Korea, the B2C online market grew about 34 fold from 3.3 trillion won in 2001 to 113.7 trillion won in 2018 (Statistics Korea, 2019). In particular, the mobile device online market increased by about ten times in five years, from 6.6 trillion won in 2013 to 69 trillion won in 2018 (Statistics Korea, 2019).

Many prior studies have found that consumer behavior varies depending on the many differences between online and offline markets (Chu, Arce-Urriza, Cebollada-Calvo, & Chintagunta, 2010; Levin, Levin, & Heath, 2003). Mobile shopping has been brisk with the introduction of mobile devices, and many researchers have studied consumer behavior by separating ‘m-commerce’ from online shopping (Clarke III, 2001; Ngai & Gunasekaran, 2007). The difference in a device (e.g.,

situation used (Shen, Zhang, & Krishna, 2016), computer peripherals use (Oviatt, Cohen, Miller, Hodge, & Mann, 2012), a screen size (Chae & Kim, 2004), portability (Jih, 2007), and interface used (Zhu & Meyer, 2017)) leads to distinct consumers purchasing behaviors.

Purchases made through mobile devices increased by 28% points from 2014 (33% of the country's total e-commerce) to 2018 (61%) (Statistics Korea, 2019). Notably, purchases using a mobile phone in some categories, such as books and office supplies, account for less than 40% of all e-commerce transactions; specific categories, such as fresh foods and processed foods, are more than 65% (Statistics Korea, 2019). Purchases through mobile devices in 2018 accounted for 38% to 74% of online shopping, depending on the product category. The category with the least proportion of mobile purchases is books, with less perceived risk, while the category with a relatively higher proportion is food, which carries more perceived risk (De Figueiredo, 2000). This suggests that the impact on consumer behavior differences between mobile devices and PC varies by category.

Especially, as mobile shopping becomes more and more popular, there has been increased focus on food categories, including fresh and processed foods. For food, the average annual growth rate of e-commerce from 2001 to 2013 before mobile shopping was introduced

was 29% for processed foods and 13% for fresh foods in Korea (Statistics Korea, 2019). However, with mobile shopping becoming increasingly popular, the average annual growth rate of purchases made through mobile devices from 2014 to 2018 was 59% for processed foods and 55% for fresh foods. Also, according to the data by E-Mart Mall (Kim, 2019), the nation's largest online food shopping mall, only 9 percent of its total sales were transactions via mobile devices in 2013, with a steady increase to 73% in 2018. Therefore, an increase in the proportion of mobile transactions in online markets is a noticeable phenomenon in the food sector.

Despite the increasing importance of mobile shopping channels and the existence of differences from e-commerce, only a few researchers have explored the effect of this difference on consumer behavior. Therefore, to fill the gap, this study sought to classify how the food purchase behavior differs according to the device used (i.e., mobile device vs. PC).

## **1.2 Research Objectives**

The purpose of the first essay is to discuss the difference in consumers' grocery purchasing behaviors when using a mobile device versus a PC taking previous literature into account. To this end, the author analyzed data panels from online shopping malls. The first research question for Essay 1 is:

*RQ1: What is the difference in consumers' grocery purchasing behavior when using a mobile device and a PC?*

## **2. Literature Review**

### **2.1 Features of Mobile Commerce**

Since the beginning of commercial use of the Internet in 1993, a new way of commerce, electronic commerce (e-commerce), has been identified (Vladimir, 1996). It is widely recognized by academics and practitioners that e-commerce, non-face-to-face online commerce, is very different compared to traditional face-to-face offline commerce (Alba et al., 1997; Ozok & Wei, 2010). For example, Danaher (2003) suggested that the differences include how to obtain information about a product, perceived risks, and brand loyalty.

Generally, before smartphones became popular, e-commerce was defined as a monetary transaction made using desktop or laptop computers through the Internet (Turban, King, Lee, & Viehland, 2002). Mobile shopping can be included in online shopping, but many researchers regard e-commerce via a mobile device as an area identified as “m-commerce” advantageous for the following reasons:

(1) convenience stemming from a user-friendly interface (Wu & Wang, 2006; Xiaojun, Junichi, & Sho, 2004),

(2) ubiquity (unconstrained by time and space) (Okazaki & Mendez, 2013; Siau, Lim, & Shen, 2001),

(3) personalization (the appropriate way to meet the needs of a

particular customer) (Siau et al., 2001; Xu, 2006),

(4) localization (the user's real-time detail geographical information (Groß, 2015; Siau et al., 2001), and

(5) accessibility (available anywhere, anytime) (Xiaojun et al., 2004).

Figure 1 shows the distinct characteristics of mobile commerce.

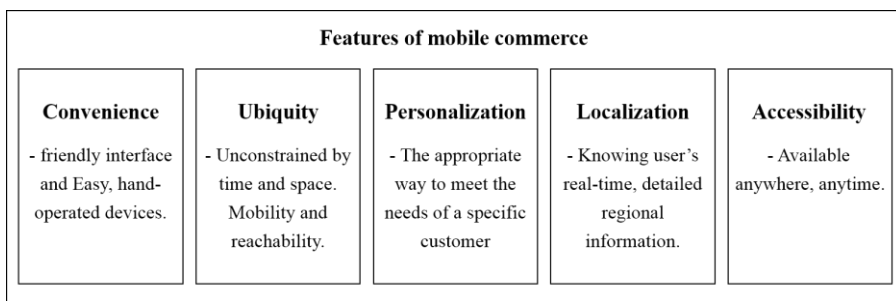


Figure 1. The features of mobile commerce

In summary, the introduction of the smartphone and mobile shopping has changed e-commerce radically. For a retailer, the mobile shopping channel has become the mainstay of online shopping. Consumer shopping is very dissimilar when using a PC or a mobile device. Therefore, it is necessary to determine how consumers' purchasing behaviors differ according to the device they are using.

## **2.2 Differences in Devices (PC vs. Mobile)**

From a consumer's point of view, PCs and smartphones are perceived as entirely different devices and are used in different ways (Maity & Dass, 2014; Niranjnamurthy, Kavyashree, Jagannath, & Chahar, 2013). The following differences lead to distinct purchasing behaviors: (1) screen size (Chae & Kim, 2004; Ghose, Goldfarb, & Han, 2012), (2) portability (Jih, 2007; C. Kim, Mirusmonov, & Lee, 2010), (3) keyboard use (J. H. Kim, Aulck, Bartha, Harper, & Johnson, 2016; Oviatt et al., 2012), (4) usage situation (Shen et al., 2016), and (5) interface (Brasel & Gips, 2015; Zhu & Meyer, 2017). The present study reviewed the extant literature addressing these five factors (Table 1).

Table 1. The literature on the difference in device

<b>Difference in Device</b>	<b>Author (year)</b>	<b>Approach</b>	<b>Dependent Variable</b>
Screen size	Chae & Kim (2004)	E	Between(within)-page navigation, perceived depth, user satisfaction
	Chose et al. (2012)	D	Search cost(ranking effect), local activities
	Maniar et al. (2008)	E	The opinion of learning via video
Portability	Jih (2007)	S	Shopping intention
	Kim et al. (2010)	S	Perceived usefulness, Perceived ease of use, intention to use mobile payment
	Chen (2008)	S	Perceived usefulness, intention to use mPayment
	Teo et al. (2015)	S	Performance expectancy, effort expectancy
Keyboard use	Oviatt et al. (2012)	E	Nonlinguistic representations(diagrams, symbols, numbers)
	Kim et al. (2016)	E	Typing forces, productivity, comfort, preference
	Kim et al. (2012)	E	Typing accuracy, typing speed
Usage situation	Shen et al. (2016)	E	Choice of hedonic food
	De Vries et al. (2018)	E	Shopping enjoyment, vividness, psychological ownership, willingness to pay
Interface (touch vs. click)	Brasel & Gips (2015)	E	Web site behavior, decision attribute information, information source usage
	Hatula et al. (2017)	E	High-risk product selection
	Brasel & Gips (2014)	E	Psychological ownership, the endowment effect

E: experiment, S: survey, D: data



First, the screen size and portability of the devices, that is, the physical characteristics, are primary factors. Smartphones are characterized by portability and mobility with small screens and one-handed operation. On the contrary, desktops are installed in a single location because of their large screen size and weight. According to Chae and Kim (2004), screen size significantly affects the navigation behavior and perceptions of mobile Internet users. Ghose et al. (2012) found that a small screen on a smartphone increases the cost of searching for information (e.g., time). Moreover, the effect of the convenience of the smartphone, such as mobility and compactness, on perceived usefulness and shopping intention in mobile was positively significant (Jih, 2007; C. Kim et al., 2010).

Second, the usage situation and using the keyboard define the purpose of use. Smartphones are often used for fun, and desktops are often used for work (Shen et al., 2016). Therefore, when using a desktop, a variety of computer peripherals, such as a mouse, keyboard, and printer, are used together. According to Oviatt (2012), using a keyboard rather than a stylus increases linguistic expression, and using a virtual keyboard (e.g., touchscreen) rather than a conventional keyboard decreases productivity (H. Kim et al., 2012).

Finally, smartphones are distinct from desktops in that user interface is based on a touchscreen (Zhu & Meyer, 2017). Smartphones are operated using touch interface while a desktop is controlled by clicking a mouse and typing with the keyboard while the user looks at the monitor. Zhu and Meyer (2017) indicated that when using a touchscreen, the intention to purchase hedonic food increased relatively, while the intention to purchase utilitarian food increased when using a mouse. In the same vein, many researchers have recently shown interest in the differences in interfaces, that is, the effect of touching the screen (Brasel & Gips, 2015; Brengman, Willems, & Van Kerrebroeck, 2018; de Vries et al., 2018; Hattula et al., 2017).

In summary, most studies on the difference in consumers' behavior online when using a PC or a mobile device focus on experimental approaches or survey approaches. Few studies have examined the dependent variable associated with consumer purchasing behavior in online shopping malls. Therefore, this study concentrated on how mobile device use affects consumers' purchasing behavior in online shopping malls with empirical analysis using online purchase data.

### 3. Research Model and Hypotheses

#### 3.1 Research Model

After reviewing the current literature, the present study proposes the following research model and hypotheses (Figure 2):

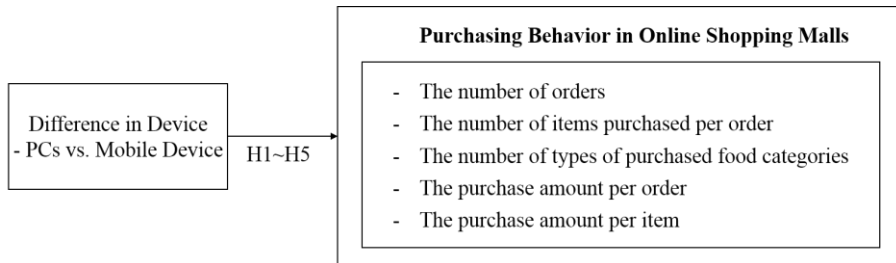


Figure 2. A research model for the present study

#### 3.2 Hypothesis Development

According to Siau (2001), the portability of the mobile device has enabled the consumer to shop online without the restrictions of time and space. Because smartphones perform various functions, they have become part of daily life (Wang, Xiang, & Fesenmaier, 2016), even if shopping is not their primary purpose. Therefore, people can immediately convert ideas into action if they have a desire to buy something, and even if they do not, they can be exposed to advertising while using a smartphone, which can lead to purchases. Therefore, the following hypotheses are proposed:

*H1: Using a mobile device will increase the number of online orders.*

Many studies postulated that consumer perceives risk when shopping online due to various factors for differentiation with offline shopping (Garbarino & Strahilevitz, 2004; Hsin Chang & Wen Chen, 2008; Stone & Grønhaug, 1993). Based on De Figueiredo (2000), the degree of product heterogeneity continuum in the context of online commerce, groceries are classified to high-heterogeneity products where the quality cannot be easily evaluated online. Thus, consumers become more aware of the risks when purchasing groceries online, and are especially reluctant to purchase food that has never been purchased because it is more difficult to grasp its quality.

Hattula (2017) contended that consumers have more confidence in their product choices when using mobile devices than when using PCs. Also, recent studies asserted that touching the screen on a mobile device increases the tactile vividness of the product and has a positive effect on product evaluation (Brasel & Gips, 2014; de Vries et al., 2018; San-Martín, González-Benito, & Martos-Partal, 2017). Hence, the following hypotheses were proposed:

*H2: Using a mobile device will increase the number of items purchased per online order.*

*H3: Using a mobile device will increase the number of food categories purchased.*

In Korea, delivery is quick, and items can be delivered almost anywhere in the country due to the well-established parcel delivery infrastructure (Choi & Park, 2006). Therefore, consumers feel less risk when it comes to processed foods that have relatively consistent quality. Also, consumers tend to purchase large quantities of processed foods (e.g., bottled water, instant rice, and ramen) that are consumed frequently and have a long shelf-life; the relative weight of these products mitigate risks. Nevertheless, a large volume purchase of a single product requires sophisticated decision making (Epstein, Pacini, Denes-Raj, & Heier, 1996; Pham, 2004), so a suitable device is used for the purchase. In this regard, the following hypotheses were proposed:

*H4: Using a mobile device will decrease the purchase amount per online order.*

*H5: Using a mobile device will decrease the purchase amount per item ordered online.*

## **4. Methodology**

### **4.1 Data Collection**

The empirical analysis utilized grocery purchase data from online shopping malls of household panels collected by the Rural Development Administration (RDA) of Korea. Since late 2009, the RDA has selected consumer panels of 1,000 households in the Seoul metropolitan area to collect data on grocery purchases once a month, and they expanded the number of panels to 1,528 outside the capital area in 2015.

The collected panel data has the following characteristics: (1) income, household members, housing type, number of vehicles held, etc., (2) groceries purchased, date of purchase, place of purchase, amount of purchase, etc., and (3) a twice-yearly survey of food-related issues (e.g., agritourism, food-neophobia, and grocery shopping using smartphone).

This study used the online purchase records of the panels for three years (2015–2017) after the popularization of mobile shopping. During that period, the panels had 50,942 online purchase records, and 645 households with experience in purchasing groceries online were selected. Next, 599 households were selected for the panel, excluding those who did not respond to a 2016 survey on their shopping experience with smartphones.

## 4.2 Operationalization of the Smartphone Group (vs. PC group)

The structure of the panel data indicated that the groceries were purchased online, but it is not clear whether the purchases were made using a PC or a mobile device. Thus, the data were operationally identified according to the smartphone shopping experience questionnaire (Appendix. A). Table 2 shows the household's online shopping frequency per month using a smartphone as follow:

Table 2. Panel's mobile shopping frequency per month

<b>The average number of shopping through mobile per month</b>	<b>Frequency of household</b>
Not Purchased	215
Less than once	80
1~2 times	88
3~4 times	97
5~6 times	54
7~8 times	31
9~10 times	14
More than 11 times	20
Total	599

Because 215 households responded that they did not shop on their smartphones, it can be assumed PCs were used, and the study operationally defined 215 households as the group that made purchases using PCs (GPP). According to the Digital Media Convergence

Company (DMC)'s report (2016), the average number of mobile shopping by Korean consumers is more than five times a month. Therefore, the panel that responded by using smartphones to purchase more than five times a month defined it as a group that purchases using mobile (GPM).

To sum up, a total of 334 households, 215 GPP and 119 GPM, were used for the analysis. In this study, records purchased by GPP were used as proxy data purchased through the PC, and records purchased by GPM were used as proxy data purchased using a mobile device. Table 3 shows the final analysis of households in the present study as follows:

Table 3. The operational definition of group

<b>Group</b>	<b>Definition</b>	<b>N</b>
The group that made purchases using PCs (GPP)	A group of household who used their PCs to shop online	215
The group that made purchases using Mobile (GPM)	A group of household who used their Smartphone to shop online	199



### 4.3 Operationalization of Purchasing Behavior

The following three terms are first explained in order to define the five dependent variables for purchase behavior: (1) item, (2) order, and (3) category.

As mentioned, The list of groceries purchased by the household panel is recorded as data by *item* purchased, which means that the brand name, the exact name of the product, and the quantity are all the same. Therefore, this study counted the number of products purchased in a unit as an *item*. For example, a household that purchased a pack of 300g of pork and two packages of instant rice (200g) purchased a total of two items. On the other hand, a household that purchased a pack of 200g of a fork, a pack of 100g of a fork of a different brand, and a package of instant rice (100g) purchased a total of three items.

Data records indicate when, where, and how much a panel was purchased based on an item. However, due to the characteristics of the data, the date of purchase is recorded, but the time is not recorded, so it is not possible to classify whether the purchased item records were purchased on different *orders*. Therefore, this study operationally defined items purchased at the same online shopping mall on the same date as a single *order*.

All grocery items purchased by the panel are divided into sections, divisions, and groups presented by the Rural Development Administration (RDA). For example, there is an “apple” division within the “fruit” section, and a group of apples is the Fuji apple, the Aori-apple, the Hong-lo, the Hong-ok, and other apples. Therefore, in this study, the term *category* was defined as a group presented by RDA.

Based on the definition of the terms, the purchasing behavior of online shopping malls were identified as: (1) the number of orders (NO), (2) the number of items purchased per order (NIO), (3) the number of purchased food categories (NFC), (4) the purchase amount per order (PAO), and (5) the purchase amount per item (PAI)). Table 4 illustrates the dependent variables.

Table 4. The definition of the dependent variable

Variable	Definition
The number of orders (NO)	The average number of orders placed by household panels per year in online shopping malls between 2015 and 2017
The number of items purchased per order (NIO)	The average number of different groceries purchased by household panels on a single order from an online shopping mall between 2015 and 2017
The number of purchased food categories (NFC)	The average number of different grocery categories purchased by household panels per year in online shopping malls between 2015 and 2017
The purchase amount per order (PAO)	The average amount per order by household panels in online shopping malls between 2015 and 2017
The purchase amount per item (PAI)	The average amount of money that household panels paid for a single food purchase in an online shopping mall between 2015 and 2017

## 5. Data Analysis and Results

### 5.1 Sample Characteristics

The demographic characteristics of the panel are shown in Table 5.

Table 5. Demographic characteristics of panels

		The group that made purchases using PCs (GPP) (n=215)		The group that made purchases using Mobile (GMP) (n=119)		Overall (n=334)	
		N (Mean)	% (SD)	N (Mean)	% (SD)	N (Mean)	% (SD)
Gender	Male	2	0.9%	5	4.2%	7	2.1%
	Female	213	99.1%	114	95.8%	327	97.9%
Age	20-29	-	-	7	5.8%	7	2.1%
	30-39	5	2.3%	37	31.3%	42	12.6%
	40-49	39	18.1%	56	47.0%	95	28.4%
	50-59	75	34.9%	15	12.6%	90	27.0%
	60-69	92	42.8%	4	3.3%	96	28.7%
	70 or higher	4	1.9%	-	-	4	1.2%
	Mean	57.04	8.318	42.27	8.224	51.78	10.890
Housewife	Y	114	53.0%	44	37.0%	158	47.3%
	N	101	47.0%	75	63.0%	176	52.7%

Household Size	1	11	5.1%	13	10.9%	24	7.2%
	2	69	32.1%	21	17.7%	90	26.9%
	3	55	25.6%	21	17.7%	76	22.8%
	4	66	30.7%	52	43.7%	118	35.3%
	5	9	4.2%	11	9.2%	20	6.0%
	6 or higher	5	2.3%	1	0.8%	6	1.8%
	Mean	3.04	1.116	3.25	1.202	3.12	1.150
The number of children	0	76	35.4%	30	25.2%	106	31.7%
	1	62	28.8%	26	21.9%	88	26.4%
	2	67	31.2%	53	44.5%	120	35.9%
	3	8	3.7%	10	8.4%	18	5.4%
	4	2	0.9%	-	-	2	0.6%
	Mean	1.06	0.948	1.36	0.954	1.17	0.960
Income	Less than 2,000,000 KRW	35	16.3%	11	9.2%	46	13.8%
	2,000,000~2,990,000 KRW	17	7.9%	13	10.9%	30	9.0%
	3,000,000~3,990,000 KRW	54	25.1%	17	14.3%	71	21.2%
	4,000,000~4,990,000 KRW	29	13.5%	24	20.2%	53	15.9%
	5,000,000~5,990,000 KRW	31	14.4%	22	18.5%	53	15.9%
	6,000,000~6,990,000 KRW	24	11.2%	11	9.2%	35	10.5%
	7,000,000~7,990,000 KRW	25	11.6%	21	17.7%	46	13.7%
	Mean (unit: 10,000KRW)	433.40	248.185	484.86	249.998	451.73	249.680

## 5.2 Descriptive Statistics of Major Variables

This study investigated the difference in consumers' grocery purchasing behavior according to the device they used. The effects of the device used for online shopping were analyzed using SPSS version 25.0. Table 6 shows the descriptive statistics for the dependent variables.

Table 6. Descriptive statistics for the dependent variables

	<b>The group that made purchases using PCs (GPP) (N=215)</b>		<b>The group that made purchases using Mobile (GPM) (N=119)</b>		<b>Overall (N=334)</b>	
	Mean	SD	Mean	SD	Mean	SD
The number of orders (NO)	6.51	14.61	45.71	52.62	20.48	38.36
The number of items purchased per order (NIO)	1.85	1.85	3.77	3.54	2.54	2.74
The number of purchased food categories (NFC)	7.73	17.14	49.78	52.27	22.71	39.54
The purchase amount per order (PAO)(unit: KRW)	54,754.77	89,366.61	37,700.67	28,305.99	48,678.61	74,048.75
The purchase amount per item (PAI)(unit: KRW)	41,086.03	75,573.34	15,976.34	17,767.04	32,139.77	62,667.68

### 5.3 Correlation Analysis

This study conducted a correlation analysis of the relationship between the primary variables, and the results are displayed in Table 7.

Table 7. Correlation analysis results for the variables

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1)	Gender	1												
(2)	Age	0.08	1											
(3)	Housewife	.139*	.331**	1										
(4)	Household size	0.033	-.165**	0.071	1									
(5)	Income	-0.024	-0.085	-0.097	.268**	1								
(6)	Online expenditure (OE)	-0.004	-.234**	-0.004	0.049	.177**	1							
(7)	Offline categories(OFC)	0.096	.222**	.145**	.356**	.164**	-0.092	1						
(8)	GMP	-.109*	-.650**	-.154**	0.088	0.099	.414**	-.244**	1					
(9)	NO	-0.034	-.274**	0.009	0.041	0.099	.871**	-.184**	.490**	1				
(10)	NIO	-0.03	-.308**	-0.023	.119*	0.002	.548**	-0.048	.336**	.423**	1			
(11)	NFC	-0.031	-.331**	-0.005	0.071	0.087	.868**	-.116*	.510**	.847**	.746**	1		
(12)	PAO	0.011	0.04	-0.023	0.056	.133*	.168**	.169**	-.110*	-0.052	0.034	-0.008	1	
(13)	PAI	0.024	.126*	0.018	0.021	.112*	0.016	.160**	-.192**	-.150**	-.192**	-.177**	.927**	1

\*\* and \* indicate significant at the 1% and 5% levels, respectively

- (1) Gender: gender of panel (male = 1, female = 2)
- (2) Age: age of panels as of 2017
- (3) Housewife: panel housewife status (housewife = 1, not housewife = 0)
- (4) Household size: the number of family members
- (5) Income: household income per month
- (6) Online expenditure(OE): the average amount of online grocery expenditure per year
- (7) Offline categories(OFC): the number of types of purchased food categories (offline)
- (8) GMP: the group that purchases using Mobile
- (9) NO: the number of orders (online)
- (10) NIO: the number of items purchased per order (online)
- (11) NFC: the number of purchased food categories (online)
- (12) PAO: the purchase amount per order (online)
- (13) PAI: the purchase amount per item (online)



## 5.4 Hypothesis Test

This study's goal was to verify the effect of the device used on consumers' grocery purchasing behavior in online shopping malls. To achieve this goal, multiple regression analysis was conducted. Statistical analysis is composed of five regression models: (1) the number of orders (NO), (2) the number of items purchased per order (NIO), (3) the number of purchased food categories (NFC), (4) the purchase amount per order (PAO), and (5) the purchase amount per item (PAI) as follow:

$$(1)Y_{NO} = \beta_0 + \beta_1X_{GMP} + \beta_2X_{Gender} + \beta_3X_{Age} + \beta_4X_{Housewife} + \beta_5X_{HouseholdSize} + \beta_6X_{income} + \beta_7X_{OE} + \epsilon$$

$$(2)Y_{NIO} = \beta_0 + \beta_1X_{GMP} + \beta_2X_{Gender} + \beta_3X_{Age} + \beta_4X_{Housewife} + \beta_5X_{HouseholdSize} + \beta_6X_{income} + \epsilon$$

$$(3)Y_{NFC} = \beta_0 + \beta_1X_{GMP} + \beta_2X_{Gender} + \beta_3X_{Age} + \beta_4X_{Housewife} + \beta_5X_{HouseholdSize} + \beta_6X_{income} + \beta_7X_{OE} + \beta_8X_{OFC} + \epsilon$$

$$(4)Y_{PAO} = \beta_0 + \beta_1X_{GMP} + \beta_2X_{Gender} + \beta_3X_{Age} + \beta_4X_{Housewife} + \beta_5X_{HouseholdSize} + \beta_6X_{income} + \beta_7X_{OE} + \epsilon$$

$$(5)Y_{PAI} = \beta_0 + \beta_1X_{GMP} + \beta_2X_{Gender} + \beta_3X_{Age} + \beta_4X_{Housewife} + \beta_5X_{HouseholdSize} + \beta_6X_{income} + \beta_7X_{OE} + \epsilon$$

Table 8 shows the variables that were used in the regression analysis.

Table 8. Description of the variables

<b>Variable</b>		
Dependent Variable	(1) The number of orders (NO)	Unit: number
	(2) The number of items purchased per order (NIO)	Unit: number
	(3) The number of purchased food categories (NFC)	Unit: number
	(4) The purchase amount per order (PAO)	Unit: KRW
	(5) The purchase amount per item (PAI)	Unit: KRW
Independent Variable	The group that made purchase using Mobile (GPM)	PCs = 0 Mobile = 1
Control Variable	Gender	Male = 1 Female = 2
	Age	Unit: years old
	Housewife	Not a housewife = 0 Housewife = 1
	Household size	Unit: number
	Income	Unit: 10,000 KRW
	Online expenditure(OE)	Unit: 1,000KRW
	Offline categories(OFC)	Unit: number

### 5.4.1 The number of orders (NO)

To examine the effect of the device used on the number of orders, a regression analysis was conducted (one-tailed test) (see Table 9). The effect of mobile device use on the number of orders was significant (H1, one-tailed test,  $p < .001$ ). The group that used mobile devices (GMP) ordered more online than the GPP. In particular, the GMP ordered 4.5 times more per year than GPP. Ultimately, Hypothesis 1 was supported.

Table 9. Regression Analysis Results (y=the number of orders)

	Coefficient				
	B	S. E.	St. B	<i>t</i>	<i>p</i> -value
(Intercept)	10.961	16.034		0.684	0.247
GMP	13.505	2.919	0.169	4.626	0.000***
Gender	-5.032	6.987	-0.019	-0.720	0.236
Age	0.044	0.128	0.013	0.346	0.365
Housewife	2.370	2.155	0.031	1.100	0.136
Household size	0.068	0.915	0.002	0.074	0.470
Income	-0.009	0.004	-0.059	-2.142	0.016**
OE	0.018	0.001	0.815	28.346	0.000***
$R^2=0.784$ , adj $R^2=0.780$					

\*\*\*, \*\*, \* indicate significant at 1%, 5%, 10% levels, respectively

### 5.4.2 The number of items purchased per order (NIO)

To examine the effect the device used on the number of items purchased per order, a regression analysis was conducted (one-tailed test), and the results are shown in Table 10. The effect of mobile device use on the number of items per order was significant (H2, one-tailed test,  $p < .001$ ). The group that used mobile devices (GMP) purchased more items per order than the GPP. Specifically, the GMP purchased 1.3 more items per order than the GPP. Ultimately, Hypothesis 2 was supported.

Table 10. Regression Analysis Results (y=the number of items purchased per order)

	Coefficient				
	B	S. E.	St. B	<i>t</i>	<i>p</i> -value
(Intercept)	3.813	2.280		1.672	0.048
GMP	1.343	0.390	0.235	3.444	0.000***
Gender	-0.050	0.994	-0.003	-0.050	0.480
Age	-0.041	0.018	-0.165	-2.279	0.012**
Housewife	0.312	0.306	0.057	1.020	0.154
Household size	0.192	0.130	0.081	1.472	0.071*
Income	-0.001	0.001	-0.052	-0.957	0.170
$R^2=0.138$ , adj $R^2=0.122$					

\*\*\*, \*\*, \* indicate significant at 1%, 5%, 10% levels, respectively

### 5.4.3 The number of purchased food categories (NFC)

To examine the effect of the difference in the device used on the number of food categories, a regression analysis was conducted (one-tailed test); the results are shown in Table 11. The effect of mobile device use on the number of food categories was significant (H3, one-tailed test,  $p < .001$ ). The group that used mobile devices (GMP) purchased 12.2 more food categories than the GPP. Ultimately, Hypothesis 3 was supported.

Table 11. Regression Analysis Results (y=the number of purchased food categories)

	Coefficient				
	B	S. E.	St. B	<i>t</i>	<i>p</i> -value
(Intercept)	22.525	16.796		1.341	0.090
GMP	12.202	3.005	0.148	4.060	0.000***
Gender	-4.193	7.148	-0.015	-0.587	0.279
Age	-0.218	0.132	-0.060	-1.653	0.050*
Housewife	2.556	2.204	0.032	1.160	0.124
Household size	0.878	1.004	0.026	0.874	0.191
Income	-0.013	0.004	-0.080	-2.947	0.002**
OE	0.018	.001	0.806	28.290	0.000***
OFC	0.008	0.031	0.008	0.269	0.394
$R^2=0.789$ , adj $R^2=0.784$					

\*\*\*, \*\*, \* indicate significant at 1%, 5%, 10% levels, respectively

#### 5.4.4 The purchase amount per order (PAO)

To examine the effect of the device used on the purchase amount per order, a regression analysis was conducted (one-tailed test), and the results can be seen in Table 12. The effect of mobile device use on the purchase amount per order was significant (H4, one-tailed test,  $p < .001$ ). The group that used mobile devices (GMP) had lower purchase amounts per order than the GPP. Specifically, the GMP had an online purchase per order of 40,340 won less than the GPP. Ultimately, Hypothesis 4 was supported.

Table 12. Regression Analysis Results (y=the purchase amount per order)

	Coefficient				
	B	S. E.	St. B	<i>t</i>	<i>p</i> -value
(Intercept)	58973.641	63761.052		0.925	0.178
GMP	-40339.955	11609.408	-0.261	-3.475	0.000***
Gender	-3312.847	27784.046	-0.006	-0.119	0.453
Age	-303.846	507.800	-0.045	-0.598	0.275
Housewife	-5897.014	8570.101	-0.040	-0.688	0.246
Household size	2339.653	3638.388	0.036	0.643	0.260
Income	28.881	16.701	0.097	1.729	0.042**
OE	10.385	2.496	0.246	4.161	0.000***
$R^2=0.084$ , adj $R^2=0.065$					

\*\*\*, \*\*, \* indicate significant at 1%, 5%, 10% levels, respectively

### 5.4.5 The purchase amount per item (PAI)

To examine the effect of the device used on the purchase amount per item, a regression analysis was conducted (one-tailed test), and the results are shown in Table 13. The effect of mobile device use on the purchase amount per item was significant (H5, one-tailed test,  $p < .05$ ). The group that used mobile devices (GMP) purchased items that were less expensive than purchases made by the GPP. In particular, the GMP purchased items that were 31,653 won cheaper per item than the GPP. Ultimately, Hypothesis 5 was supported.

Table 13. Regression Analysis Results (y=the purchase amount per order)

	Coefficient				
	B	S. E.	St. B	<i>t</i>	<i>p</i> -value
(Intercept)	23760.478	54616.533		0.435	0.332
GMP	-31652.944	99944.403	-0.242	-3.183	0.001**
Gender	566.586	23799.298	0.001	0.024	0.491
Age	32.016	434.972	0.006	0.074	0.471
Housewife	-1349.166	7340.989	-0.011	-0.184	0.427
Household size	451.432	3116.575	0.008	0.145	0.442
Income	29.198	14.198	0.116	2.041	0.021**
OE	3.439	2.138	0.096	1.609	0.054*
$R^2=0.062$ , adj $R^2=0.042$					

\*\*\*, \*\*, \* indicate significant at 1%, 5%, 10% levels, respectively

## 6. Discussion

### 6.1 Summary of Findings

The primary purpose of the present study was to examine the effects of mobile device use on consumers' purchasing behavior in online shopping malls. To verify the hypotheses, household panel data was used, and 334 household purchase records were analyzed using multi-regression. Table 14 illustrates a summary of the hypotheses test.

Table 14. The results of the hypotheses test

	<b>Hypothesis</b>	<b>Support</b>
H1	<i>Using a mobile device will increase the number of online orders.</i>	Supported
H2	<i>Using a mobile device will increase the number of items purchased per online order.</i>	Supported
H3	<i>Using a mobile device will increase the number of food categories purchased.</i>	Supported
H4	<i>Using a mobile device will decrease the purchase amount per online order.</i>	Supported
H5	<i>Using a mobile device will decrease the purchase amount per item ordered online.</i>	Supported

According to the results of the multiple regression model for mobile device use for the number of orders (Model 1) and the purchase amount per order (Model 4), consumers who purchased groceries using mobile devices buy less than consumers who purchase using PCs on a single order, but they order more often. As a result, consumers who



purchase online through mobile devices spend more annually. From these results, it can be determined that the mobile device's various benefits, such as convenience and portability, allow the consumer to visit the online shopping mall frequently and to purchase online with frequency.

In addition, the use of mobile devices appears to significantly affect the number of items purchased per order (Model 2), and the number of purchased food categories (Model 3). That is, when people buy groceries using a mobile device rather than a PC, they buy different items and more types of groceries. It can be concluded that shopping with mobile devices leads people to a more diverse range of food-purchasing behaviors as a reason for pleasure factors and the reduction of perceived risks.

The results of regression Model 5 show that people who are using a mobile device pay less for an item on average than those who buy via a PC. It can be assumed that people who purchase through a mobile device buy one item in a relatively short period with a plan to consume it shortly, as if they were purchasing it offline, while people using a PC buy a large quantity of items with long shelf life or relatively homogeneous quality.

## **6.2 Contributions and Limitations**

The main objective of the study was to determine the impact of mobile device use when purchasing groceries online. To achieve the objective, a research model was used that consisted of five variables regarding consumers' purchasing behavior in online shopping malls: (1) the number of orders (NO), (2) the number of items purchased per order (NIO), (3) the number of purchased food categories (NFC), (4) the purchase amount per order (PAO), and (5) the purchase amount per item (PAI).

### **6.2.1 Academic Contribution**

This study contributed to some academic achievements. First, the study analyzed the panel's purchase data in an online shopping mall over a three-year period and found that using mobile devices and using PCs differed clearly in purchasing behavior. To our knowledge, this is the first study to investigate this difference. This study supplemented the limitations of previous research that only conducted a survey or analyzed a single distributor's restricted data. In other words, this study contributed by verifying the contentions of several precedent studies that the purchase behavior of e-commerce is different from that of m-commerce through empirical analysis.

Secondly, this research subdivided purchase behavior based on the number of orders, amount of orders, and type of items purchased and empirically analyzed whether the subdivided purchase behavior was affected by the use of mobile devices in online. Some studies have explored the effect of the difference in the device on purchase intention (Chung, Kramer, & Wong, 2018; Zhu & Meyer, 2017). The results of this study show how online purchasing behavior changes explicitly depending on the device used. Namely, this study further expanded the comparative study of purchasing behavior using mobile devices and purchasing behavior using PCs by investigating various aspects of purchasing behavior.

Third, the results of this thesis suggest a novel approach to online purchasing behavior for groceries that were considered high risk due to heterogeneous characteristics (De Figueiredo, 2000). Put another way, purchasing a wider variety of groceries when using a mobile device suggests that the use of mobile devices can alleviate the perceived risk of online purchases. Therefore, this study suggests the potential for the use of mobile devices as a way to lower the barriers that online shopping malls have compared to offline shopping.

### **6.2.2 Practical Contribution**

This study also makes some practical contributions that provide guidance for companies that operate online grocery shopping malls. First, it suggests that even the same shopping mall should have different marketing strategies for websites that are usually accessed using PCs and applications that are usually accessed using mobile devices. The results indicate that mobile users and desktop users show different buying patterns and different buying behaviors in grocery shopping. Notably, consumers spend more money per order on their PCs, but fewer orders are placed, and consumers spend less per order on mobile devices, but more often. Therefore, consumers who have accessed the shopping mall through a PC stay longer to facilitate a large amount of purchases. On the other hand, consumers who have accessed online malls through mobile devices should be tempted to access malls more frequently and make purchase decisions more quickly.

Second, this study suggests strategies for choosing a sales medium for purchasing new products and products that consumers have never purchased. The results indicate that people who buy using a mobile device buy different products on a single order, and finally, more various items. Consumers may have a friendlier attitude toward new products and products they have not purchased before when using a mobile device.

Therefore, consumers who have accessed the shopping mall through a PC should be offered promotions for products they have purchased before or are familiar with. On the other hand, consumers who have accessed the market through mobile devices should be exposed to new products and products they have never purchased before.

### **6.2.3 Limitation and Future Study**

The study demonstrated some limitations that can provide guidance for future research. Although it provides academic and practical implications for the differences in consumer purchasing behavior depending on the device they use, the internal validity of the experiment needs to be strengthened by follow-up field research. In other words, this research is reflected in reality and has a high external validity because it has collected data regarding purchases by actual consumers. However, it is not possible to track specific factors that differ in consumer purchasing behavior, so further research should analyze the factors of influence through controlled experiments of external factors.

This research is also limited in that the average age of the household panels was 52, which is higher than the distribution of the major age groups using online shopping malls. Also, most of the household panels used in the analysis of this study were women. Therefore, the results may represent older women in Korea rather than the whole population. Therefore, future research on the effect of the device used should be based on a sample that is evenly distributed regarding age and gender..

## **II. Essay 2:**

# **The Effect of Product Image Touch on Consumers' Grocery Purchasing Behavior**

### **1. Introduction**

#### **1.1 Research Background**

Online shopping has become commonplace for consumers; particularly, the number of online shoppers using mobile devices is increasing (Statista, 2019a, 2019b, 2019c). One of the prominent features of mobile devices (e.g., smartphones, tablets) is the touch interface (Siau et al., 2001). There has been a significant change in the environment of consumers online shopping in terms of interfaces. Specifically, there has been a shift made from the “direct touch” of desktops and laptops with mouse or touchpad to the “direct touch” of tablets or smartphones.

When online shopping malls began, consumers perceived higher risks when shopping online because they could not touch the products and check their quality (De Figueiredo, 2000; Garbarino & Strahilevitz, 2004). Also, touching a product in an offline environment affects impulse buying (Vohs & Faber, 2007) and willingness to buy a product (Bushong, King, Camerer, & Rangel, 2010; Wolf, Arkes, & Muhanna, 2008), which is not possible in an online environment. Therefore, many

studies have been conducted regarding how to reduce the perceived risk experienced by consumers in online shopping malls (Park, Lennon, & Stoel, 2005; Pires, Stanton, & Eckford, 2004).

According to Peck (2013), imagining the touch of a product can function as a surrogate for the actual touch effect. For instance, imagine touching a product with eyes closed has a positive effect on psychological ownership and ownership effect, as if actually touching a real product. Furthermore, some recent studies suggest that touching a product through a screen has an effect similar to the “direct-touch effect” (Chung et al., 2018; de Vries et al., 2018; Hattula et al., 2017; San-Martín et al., 2017). However, only a few studies have compared the touch interface with the non-touch interface. This research indicates a need to understand what factors influence purchasing behavior with regard to touch interface.



## 1.2 Research Objectives

Taking embodied cognition theory and thinking style into account, this essay seeks to understand how touching an image through a screen affects the purchasing behavior in online shopping malls. To that end, the author experimented by implementing a virtual online shopping mall to answer the following research questions:

*RQ<sub>2-1</sub>: Does touching a product image on a screen affect the consumers' grocery purchasing behavior?*

*RQ<sub>2-2</sub>: Why does touching a product image on a screen affects the consumers' grocery purchasing behavior?*

## 2. Theoretical background

### 2.1 Thinking Style

#### *Types of thinking style*

The way people think is divided into two distinct styles: (1) affective thinking, and (2) cognitive thinking (Epstein, 1973; Epstein et al., 1996). In particular, when making decisions in a task or situation, one of the two thinking styles is expressed (Novak & Hoffman, 2008; Shiv & Fedorikhin, 1999). In other words, people have dual-processes in processing information and process it differently depending on task and situation. Much of consumer research has extended dual-process theory (Novak & Hoffman, 2008; Pham, 2004; Shiv & Fedorikhin, 1999). Table 15 shows the characteristics of affective thinking and cognitive thinking.

Table 15. The features of thinking style

	<b>Affective Thinking</b>	<b>Cognitive Thinking</b>
Definition	Holistic, experiential	Analytic, logical
Decision-making	Fast, automatic, easy, rapid, immediate gratification	Slow, controlled, effortful, elaborated, delayed gratification
Relation	-Sensory-motor programs -Physiological responses -Action-oriented	-higher-order processing -abstract & knowledge oriented

When a person's affective thinking style is expressed, they can make any task or situation judgments holistically, experientially, and intuitively (Epstein, 2003). That is, their responses are automatic, preconscious, and directly associated with affect. Also, when interpreting sources for judgment, the reality is encoded in metaphors, images, and narratives. On the other hand, when a person's cognitive thinking style is expressed, they make task or situation judgments analytically, logically, and rationally (Epstein, 2003). That is, their responses are deliberate, conscious, and affect-free. Also, when interpreting sources for judgment, the reality is encoded in words, numbers, and symbols.

### *Thinking style and Touch Interface*

Recently, some research has investigated computer interface based on dual process (thinking style) (Peng, Wang, & Teo, 2017; Shen et al., 2016; Zhu & Meyer, 2017). Shen et al. (2016) asserted that the touch interface is intimately connected to sensory-motor programs and thus leads to affective thinking. According to Shen (2016), affective thinking triggered by touch interface enhances the mental simulation of the product and thus leads to a more affective choice. Moreover, Zhu and Meyer (2017) contended that touch screens cause affective thinking

because they are more experiential, emotional, and sensational, while desktops are more instrumental, rational, and functional, resulting in cognitive thinking.

In summary, some research has contended that thinking style is affected by computer interface; the sensational nature of touch interface evokes a more affective thinking style, and the instrumental nature of non-touch interface (e.g., using a PC) evokes a more cognitive thinking style. However, there is not much research on the relationship between computer interfaces and thinking styles. Therefore, to fill the gap, the present study focused on how computer interface affects the thinking style and consumers' purchasing behaviors.

## **2.2 Embodied Cognition Theory**

### *Embodied Cognition Theory*

According to embodied (or grounded) cognition theory, the cognitive process is incomplete without the body's contributions (Wilson, 2002). In other words, cognition is affected by specific sensory perceptions of the physical body. According to Williams and Bargh (2008), for example, participants who held a hot drink in their hand rated a target person as having a warmer personality than did the participants who held a cold drink in their hand.

Based on embodied cognition theory, there are three categories of factors that affect the cognitive process: (1) body states (Ackerman, Nocera, & Bargh, 2010; Beilock & Goldin-Meadow, 2010; Jostmann, Lakens, & Schubert, 2009; Williams & Bargh, 2008), (2) actions (Kaspar, 2013; Lee & Schwarz, 2010; Tom, Ramil, Zapanta, Demir, & Lopez, 2006), and (3) mental simulations (Eelen, Dewitte, & Warlop, 2013; Elder & Krishna, 2012; Papiés, Best, Gelibter, & Barsalou, 2017). Therefore, this research reviewed the literature on embodied cognition theory based on three categories. Table 16 illustrates the literature review in the present study.

Table 16. The literature regarding the embodied cognition theory

<b>Category</b>	<b>Author (year)</b>	<b>Key Finding</b>
Body State	Williams and Bargh (2008)	Participants touching hot objects judge other people to be warmer than participants touching cold objects.
	Ackerman et al. (2010)	Participant touching rough objects judge other people's interactions to be more hostile than participants touching smooth objects.
	Beilock and Goldin-Meadow (2010)	Participants with a straight waist feel more powerful and confident than participants with a bent waist.
	Jostmann et al. (2009)	Participants holding heavy objects have an increased judgment of monetary value than participants holding light objects.
Action	Lee and Schwarz (2010)	Participants washing their hands feel less guilty than who do not.
	Tom et al. (2006)	Participants nodding their heads are more easily persuaded than participants shaking their heads.
	Kaspar (2013)	Participants cleansing physically consider the future more optimistically than those who did not.
Mental Simulation	Elder and Krishna (2012)	Participants value the product higher than otherwise if they see a picture of a fork placed in the same position as their handle.
	Eelen et al. (2013)	Participants evaluate the product more favorably than otherwise if they see a picture of the product placed so that the product can be held in the same direction as their handle.
	Papies et al. (2017)	Participants who are motivated by appetite, such as clues to a particular product, are more likely to simulate to consume and enjoy the product than those who are not.

The body states factors include the aforementioned body temperature (Williams & Bargh, 2008), as well as tactile (Ackerman et al., 2010), gesture (Beilock & Goldin-Meadow, 2010), and weight (Jostmann et al., 2009). According to Ackerman et al. (2010), participants touching smooth objects rated the relationship between the two more positively when reading neutral dialogues between the two than participants touching rough objects. In terms of actions, participants who had washed their hands felt less guilty than those who had not (Lee & Schwarz, 2010). With respect to mental simulation, when looking at food with fork photos, the food was rated higher than it was when the fork's position in the picture matched that of the hand that was primarily used (Elder & Krishna, 2012).

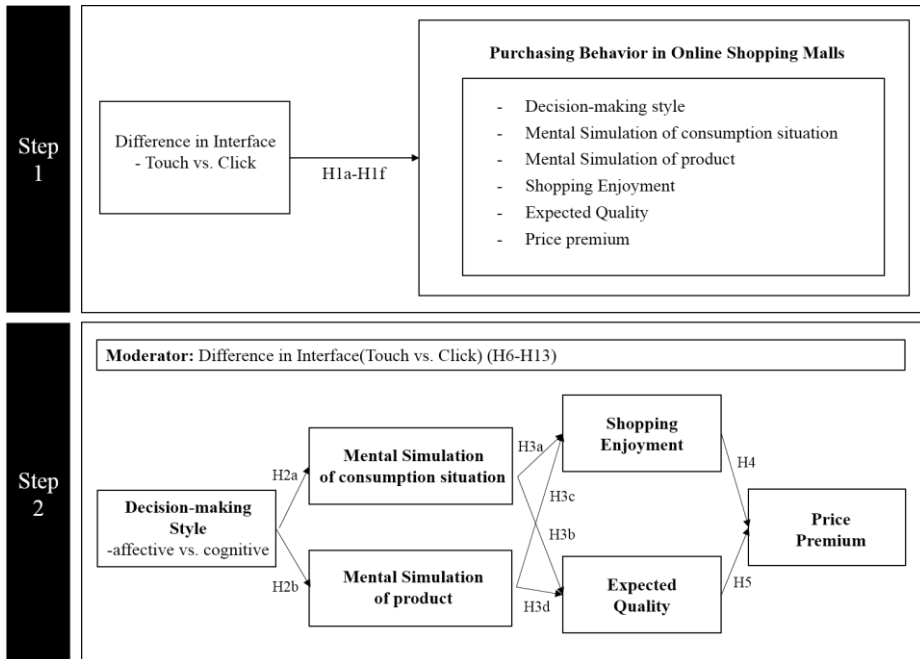
### *Embodied Cognition and Computer-Human Interaction*

More recently, with the increase in the number of mobile device users, many studies are being conducted on embodied cognition in the field of computer-human interaction (Krishna & Schwarz, 2014; Li & Duh, 2013; Yang, 2017). However, most studies focus on what online factors affect mental simulation enhancement. Thus, this study sought to examine the effect of computer interface on mental simulation and the effect of mental simulation on consumers' purchasing behavior.

### 3. Research Model and Hypotheses

After reviewing the extant literature, the present study proposed the following research model and hypotheses (Figure 3). The research model was composed of two steps. Step 1 was to investigate the effect of differences in interfaces on the various variables associated with purchasing behavior in online shopping malls. Step 2 examined how differences in interfaces influenced purchasing behavior in online shopping malls.

Figure 3. A research model and hypotheses





Based on the findings of previous research on thinking style theory (Epstein, 1973; Novak & Hoffman, 2008) and embodied cognition theory (Williams & Bargh, 2008; Wilson, 2002), this study assumed that touch interface evokes affective thinking and results in affective decisions and enhanced mental simulation. Mental simulation can be divided into two types: (1) mental simulation of the consumption situation (Petrova & Cialdini, 2005) and (2) mental simulation of the product (Escalas, 2004). Therefore, we suggest the following hypotheses:

*H1a: Touching a product through a screen will increase affective thinking style.*

*H1b: Touching a product through a screen will increase the mental simulation of the consumption situation.*

*H1c: Touching a product through a screen will increase the mental simulation of the product.*

*H2a: Affective thinking will increase the mental simulation of the consumption situation.*

*H2b: Affective thinking will increase the mental simulation of the product.*

*H6: The effect of affective thinking on the mental simulation of the consumption situation depends on the interface type.*

*H7: The effect of affective thinking on the mental simulation of the product depends on the interface type.*

The effect of mental simulation has been tested in the field of consumer behavior (Escalas, 2004; Schlosser, 2003), and according to Zhao, Hoeffler, and Zauberan (2011), mental simulation enhanced by advertising has a positive effect on product evaluation. Also, mental simulation reduces the uncertainty of new products (Castaño, Suján, Kacker, & Suján, 2008). In the online environment without physical contact, a mental simulation that is the mental image of a product positively affects online shopping enjoyment (Overmars & Poels, 2015). In terms of interface, in mobile devices with a touch interface, consumers are more excited (Hardy & Rukzio, 2008; Xi, Gong, & Wang, 2019). Therefore, we suggest the following hypotheses:

*H1d: Touching a product through a screen will increase shopping enjoyment.*

*H1e: Touching a product through a screen will increase the expected quality of the product.*

*H3a: The mental simulation of the consumption situation will increase shopping enjoyment.*

*H3b: The mental simulation of the consumption situation will increase the expected quality of the product.*

*H3c: The mental simulation of the product will increase shopping enjoyment.*

*H3d: The mental simulation of the product will increase the expected quality of the product.*

*H8: The effect of the mental simulation of the consumption situation on shopping enjoyment depends on the interface type.*

*H9: The effect of the mental simulation of the consumption situation on the expected quality of the product depends on the interface type.*

*H10: The effect of the mental simulation of the product on shopping enjoyment depends on the interface type.*

*H11: The effect of the mental simulation of the product on the expected quality of the product depends on the interface type.*

Shopping enjoyment has been cited as an essential factor affecting consumer behavior and includes purchase intention (Ramayah & Ignatius, 2005), repurchase intention (Wen, Prybutok, & Xu, 2011), and intention to use payment system (Rouibah, Lowry, & Hwang, 2016). In the field of agri-food research, food quality factors have been considered

one of the most important factors influencing consumers' purchase intention because of the low homogeneity of food quality (Acebrón & Dopico, 2000; Papanagiotou, Tzimitra-Kalogianni, & Melfou, 2013). Therefore, we suggest the following hypotheses:

*H1f: Touching a product through a screen will increase the price premium.*

*H4: Shopping enjoyment will increase the price premium.*

*H5: The expected quality of the product will increase the price premium.*

*H12: The effect of shopping enjoyment on the price premium depends on the interface type.*

*H13: The effect of the expected quality of the product on the price premium depends on the interface type.*

## 4. Methodology

### 4.1 Stimulus Material and Measurements Development

#### 4.1.1 Stimulus Material

The purpose of the present study was to examine the effect of product image touch through the screen on consumers' purchasing behavior. Thus, this study conducted a between-subject design (touch interface vs. click interface) experiment.

The difference in the interface was manipulated by instructing subjects to use a multi-interface laptop (screen resolution: 2160×1440, screen size: 12 inches) in the experiment. The multi-interface laptop used in this study was Microsoft's Surface, which features the following: (1) a touch interface on the screen, (2) two versions of the interface—PC and tablet, and (3) a keyboard that can be separated from the screen. Figure 4 shows the “touch interface” and “click interface” used in the experiment.

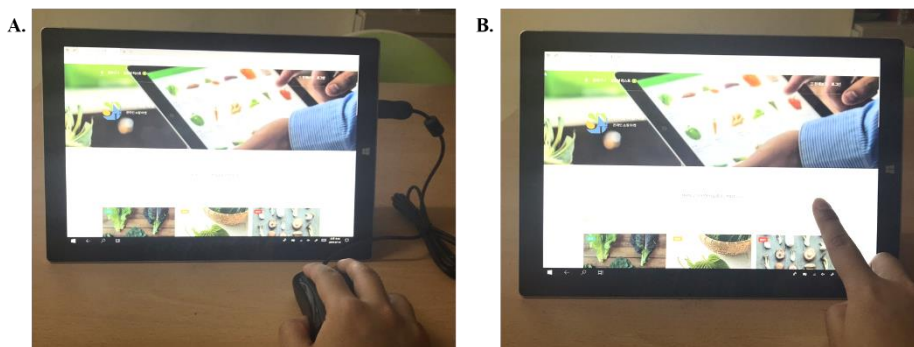


Figure 4. The difference in interface

The food utilized as a stimulus in this study was “samgyeopsal,” one of Korea’s most famous pork belly parts. Three different samgyeopsal were used for the online grocery shopping experiment: (1) samgyeopsal of A farm (4,000 KRW per 200 grams), (2) samgyeopsal of B farm (5,000 KRW per 200 grams), and (3) samgyeopsal of C farm (6,000 KRW per 200 grams). Figure 5 illustrates the three different samgyeopsal.



Figure 5. Three different Samgyeopsal

The three types of samgyeopsal were seen as an option in an online grocery shopping mall where a page was organized to introduce each one. Each page consisted of seven pictures and  $218 \pm 1$  characters (Appendix. B). The price of the samgyeopsal differed by 1,000 KRW, based on the price of the least expensive samgyeopsal at E-Mart (4,000KRW per 200 grams), one of the largest online grocery shopping malls in Korea.

### 4.1.2 Measurement Development

All constructs and indicators used in this study were taken or adapted from the previous research. Variable operationalization is shown in Table 17.

Table 17. Operationalization of variables

<b><i>Decision-Making Style(DMS)</i></b>		
<i>My final decision about which A to choose was driven by ...</i>		
DMS1	my thoughts(1) - my feeling(7)	
DMS2	my willpower(1) - my desire(7)	
DMS3	my prudent self(1) - my impulsive self(7)	Shiv and Fedorikhin (1999)
DMS4	the rational side of me(1) - the emotional side of me(7)	
DMS5	my head(1) vs. my heart(7)	
<b><i>Mental Simulation of Consumption Situation</i></b>		
MSiS1	whether the participants were able to imagine A	
MSiS2	how easy it was for them to imagine A	Petrova and Cialdini (2005)
MSiS3	how long it took them to create the mental image	
MSiS4	vivid and clear versus vague	
MSiS5	alive and dynamic versus not dynamic	
MSiS6	detailed versus not detailed	
<b><i>Mental Simulation of Product</i></b>		
MSiP1	I imagined myself enjoying A	Escalas (2004)
MSiP2	I imagined myself grabbing A	
<b><i>Shopping Enjoyment</i></b>		
SE1	Time spent on this web site was truly enjoyable	
SE2	Shopping on this web site was a very nice time out	
SE3	This web site immersed me in exciting products it offers	Cai and Xu (2006)
SE4	I enjoyed this web site for its own sake, not just for the items I may have purchased	
<b><i>Expected Quality</i></b>		
EQ1	A's meat will be chewy and tender	
EQ2	A's meat juice will be enough	Lee at al (2012)
EQ3	The aroma of A will be abundant	
EQ4	The fat ratio of A would be adequate	
<b><i>Price Premium</i></b>		
PP	The final amount of samgyeopsal purchase according to how much samgyeopsal purchased	

## 4.2 Procedure of Experiment

Participants were recruited using help-wanted advertisements for device operational convenience research subjects on an online website and offline bulletin board. That the present study was concerned with device operational convenience research for the laptop was emphasized to conceal the purpose of the study. In total, 107 participants were spontaneously recruited. Participants were randomly assigned to two conditions (touch interface and click interface) depending on the date and time the participants applied.

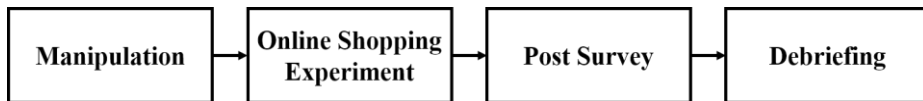


Figure 6. Experiment process

Figure 6 represents the experiment process. While reading the presented scenario (Appendix. C), participants were told to imagine that they were trying to buy samgeopsal from an online shopping mall to serve at a pork belly party with four friends. To manipulate, participants assigned to click conditions were instructed to explore the online shopping mall using only the mouse to select samgyeopsal, while participants assigned to the touch condition were instructed to use the touchscreen to browse the online shopping mall to select samgyeopsal.



After choosing the samgyeopsal, participants answered a series of questions about the mental simulation of product, the mental simulation of the situation, their decision-making style, their attitudes toward the food they chose (i.e., expected quality), and their shopping enjoyment (Appendix. C). Finally, participants were asked to complete a series of demographic questions. After debriefing participants, all were rewarded with a \$3.5 (4,100 KRW) coffee coupon for their participation.

## 5. Data Analysis and Results

### 5.1 Data Collection

Data was collected using an experimental approach. The experiment and related survey were conducted in an on-campus meeting room. Most participants were undergraduate and graduate students. A total of 110 responses were collected, and 107 of these were analyzed. Three responses were excluded because one participant had a manipulation problem, and two participants had serious missing data. The between-subject experimental design and a summary of the number of participants allocated to each group is shown in Table 18.

Table 18. Number of final responses

<b>Group</b>	<b>Touch Group</b>	<b>Click Group</b>	<b>Total</b>
N	54	53	107

### 5.2 Demographic Information

Participants' demographic information is shown in Table 19. The majority of participants were between 21 and 25 years old (50.5%); 42.1% were male, and 57.9% were female.

Table 19. Demographic characteristics of subjects

		Touch Group (n=54)		Click Group (n=53)		Overall (n=107)	
		N (Mean)	% (SD)	N (Mean)	% (SD)	N (Mean)	% (SD)
Gender	Male	25	46.3%	20	37.7%	45	42.1%
	Female	29	53.7%	33	62.3%	62	57.9%
Age	18-20	6	11.1%	3	5.7%	9	8.4%
	21-25	24	44.4%	30	56.6%	54	50.5%
	26-30	21	38.9%	15	28.3%	36	33.6%
	31 or higher	3	5.6%	5	9.4%	8	7.5%
	Mean	24.85	3.230	25.25	4.004	25.05	3.622
Education	Undergraduate	21	38.9%	21	39.6%	42	39.3%
	College graduate	5	9.3%	3	5.7%	8	7.5%
	Graduate student or more	28	51.8%	29	54.7%	57	53.2%
Income	Less than 2,000,000 KRW	15	27.8%	22	41.5%	37	34.6%
	2,000,000~2,990,000 KRW	2	3.7%	6	11.3%	8	7.5%
	3,000,000~3,990,000 KRW	4	7.4%	2	3.8%	6	5.6%
	4,000,000~4,990,000 KRW	4	7.4%	5	9.4%	9	8.4%
	5,000,000~5,990,000 KRW	4	7.4%	4	7.5%	8	7.5%
	6,000,000~6,990,000 KRW	6	11.1%	1	1.9%	7	6.5%
	7,000,000~7,990,000 KRW	5	9.3%	4	7.5%	9	8.4%
More than 8,000,000 KRW	14	25.9%	9	17.0%	23	21.5%	

### 5.3 Descriptive Statistics of Major Variables

This study investigated the difference in consumers' grocery purchasing behavior when using click interface and touch interface. The effects of the interface used for online shopping were analyzed using SPSS version 25.0 and PLS-Graph. Table 20 shows the descriptive statistics for the major variables.

Table 20. Descriptive statistics for the major variables

	<b>Click Group (N=53)</b>		<b>Touch Group (N=54)</b>		<b>Overall (N=107)</b>	
	Mean	SD	Mean	SD	Mean	SD
Decision-Making Style (DMS)	3.41	1.33	3.92	1.49	3.67	1.43
Mental Simulation of Consumption Situation (MSiS)	4.36	1.72	4.32	1.62	4.34	1.66
Mental Simulation of Product (MSiP)	4.54	1.61	5.09	1.52	4.82	1.58
Shopping Enjoyment (SE)	4.78	1.04	5.09	1.06	4.94	1.06
Expected Quality (EQ)	5.13	0.95	5.29	0.93	5.21	0.94
Price Premium (PP)	24,396.23	2,761.96	25,518.52	2,765.97	24,692.62	2,808.09

## 5.4 Assessment of Measurement Model

Before testing the hypotheses, we examined the measurement model using the PLS-Graph (version 3.0) software. For the assessment of measurement, the present study tested its convergent and discriminant validities using the method suggested by Chin (1988) and Fornell and Larcker (1981).

The results of the convergent validity assessment are shown in Table 21. All of the individual items' factor loadings were greater than 0.7, and the AVEs (Average Variance Extracted) of the constructs were greater than 0.5, which showed sufficient reliability.

Table 21. Internal consistency and convergent validity

	Item	Weight	Loading	CR	AVE
Decision-Making Style	DMS1	0.2409	0.7659	0.897	0.636
	DMS2	0.2358	0.7497		
	DMS3	0.2399	0.7625		
	DMS4	0.261	0.8297		
	DMS5	0.2743	0.8721		
Mental Simulation of consumption Situation	MSiS1	0.1767	0.8853	0.968	0.835
	MSiS2	0.186	0.9318		
	MSiS3	0.1861	0.9325		
	MSiS4	0.1841	0.9224		
	MSiS5	0.187	0.9372		
	MSiS6	0.174	0.872		
Mental Simulation of Product	MSiP1	0.5461	0.9157	0.912	0.839
	MSiP2	0.5461	0.9157		

Shopping Enjoyment	SE1	0.3239	0.9114	0.904	0.703
	SE2	0.3128	0.8799		
	SE3	0.2608	0.7338		
	SE4	0.291	0.8186		
Expected Quality	EQ1	0.4005	0.8637	0.884	0.719
	EQ2	0.4206	0.907		
	EQ3	0.3555	0.7666		

The results of discriminant validity are shown in Table 22. The square root of the AVE of each construct was higher than its correlations with the other constructs. Thus, the survey item had a reasonable degree of discriminant validity.

Table 22. Correlation of latent variables

	DMS	MSiS	MSiP	SE	EQ
DMS	(0.797)				
MSiS	0.113	(0.914)			
MSiP	0.196	0.666	(0.916)		
SE	0.171	0.337	0.358	(0.838)	
EQ	0.238	0.386	0.421	0.402	(0.848)

## 5.5 Hypothesis Test

### 5.5.1 The main effect of the difference in interface

To investigate the main effect of the difference in the interface on purchasing behavior (H1a–f), an independent t-test (one-tailed test) was conducted using SPSS version 25.0. Table 22 shows that Hypothesis 1 was partially supported. There was a significant difference between those using the touch interface and those using the click interface in terms of decision-making style (H1a), mental simulation of the product (H1c), shopping enjoyment (H1d), and price premium (H1f).

Table 23. The effect of the difference in interface (Touch vs. Click)

Hypothesis	Type of Interface	N	Average	S.D.	p
H1a Decision-making style	Click	53	-0.19	0.93	0.027**
	Touch	54	0.18	1.05	
H1b Mental Simulation of consumption Situation	Click	53	0.01	1.04	0.447
	Touch	54	-0.01	0.98	
H1c Mental Simulation of Product	Click	53	-0.18	1.02	0.035**
	Touch	54	0.17	0.97	
H1d Shopping Enjoyment	Click	53	-0.16	0.98	0.053*
	Touch	54	0.16	1.01	
H1e Expected Quality	Click	53	-0.07	1	0.239
	Touch	54	0.07	1.02	
H1f Price Premium	Click	53	24396.23	2761.96	0.019**
	Touch	54	25518.52	2765.97	

\*\*\*, \*\*, \* indicate significant at 1%, 5%, 10% levels, respectively

Note: one-tailed test

### 5.5.2 Structural model

To test the hypotheses in the research model (H2–H5), this study estimated the partial least squares (PLS) model using PLS-Graph version 3.0 (Chin, 2001; Wold, Ruhe, Wold, & Dunn, 1984). To test for moderating effects (H6–H13), multi-group analysis (MGA) was conducted with differences in interface subsamples click (n=53) and touch (n=54) (Keil et al., 2000). We calculated the path estimates and t-statistics for the hypothesized relationship using a bootstrapping technique. The results using PLS are shown in Table 24 and Figure 7.

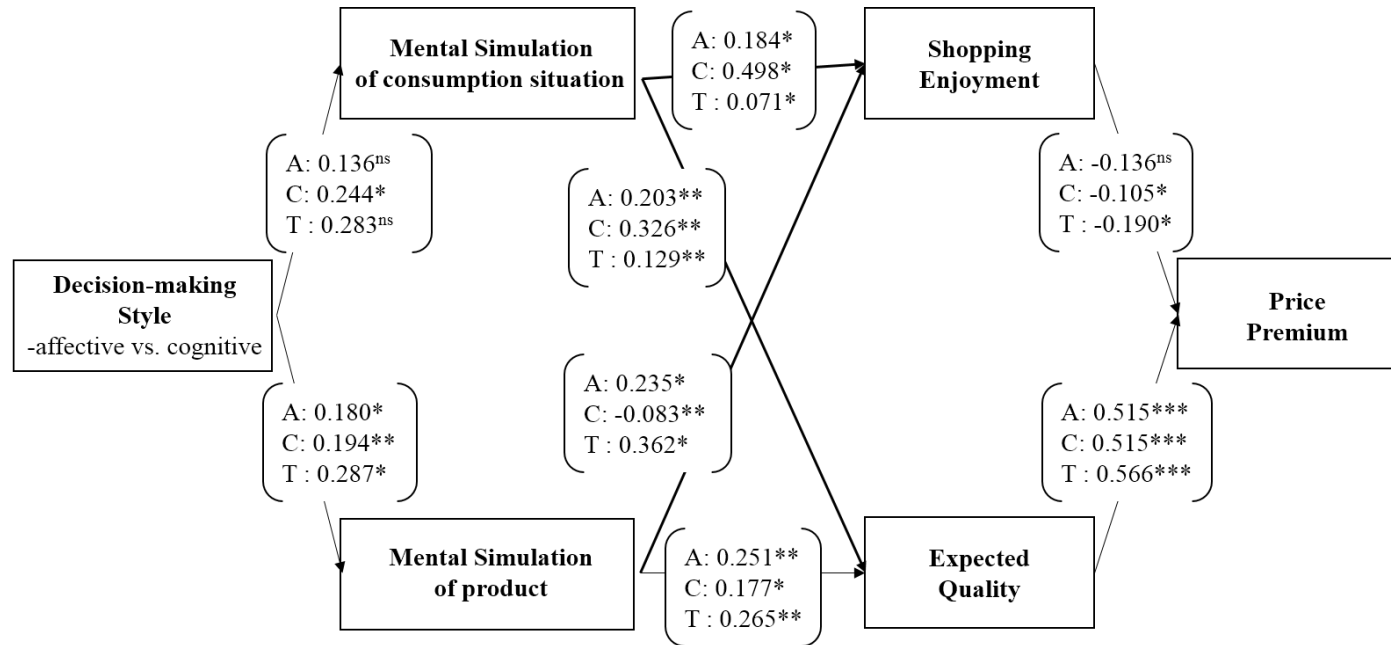
Table 24. Path analysis results

Path	Path coefficients		
	Difference in interface		
	Overall	Click	Touch
DMS → MSiS	0.136	0.244*	0.283
DMS → MSiP	0.180*	0.194**	0.287*
MSiS → SE	0.184*	0.498*	0.071*
MSiS → EQ	0.203**	0.326**	0.129**
MSiP → SE	0.235*	-0.083**	0.362*
MSiP → EQ	0.251**	0.177*	0.265**
SE → PP	-0.136	-0.105*	-0.190*
EQ → PP	0.515***	0.515***	0.566***

\*\*\*, \*\*, \* indicate significant at 0.1%, 1%, 5% levels, respectively



Figure 7. Path analysis and multi-group analysis results



Note: A=Overall sample, C=Click interface group, and T=Touch interface group

\*\*\*, \*\*, \* indicate significant at 0.1%, 1%, 5% levels, respectively

Bold arrow indicate significant for comparison of the path between click group and touch group

The results show that the effect of thinking style on mental simulation (H2a–b) is partially supported; mental simulation of product is significantly affected (H2b; path coefficient = 0.180,  $p < 0.05$ ), but a mental simulation of the consumption situation is not significantly affected (H2a; path coefficient = 0.136,  $p > 0.05$ ). Also, the mental simulation significantly influenced shopping enjoyment (H3a; path coefficient = 0.184,  $p < 0.05$ , H3c; path coefficient = 0.235,  $p < 0.05$ ) and expected quality (H3b; path coefficient = 0.203,  $p < 0.01$ , H3d; path coefficient = 0.251,  $p < 0.01$ ). The impact of shopping enjoyment on price premium was not significant (H4; path coefficient = -0.136,  $p > 0.05$ ), but the impact on expected quality was significant (H5; path coefficient = 0.515,  $p < 0.001$ ).

The results (see Table 25) indicate that there was no significant difference in the effect of thinking style on mental simulation (H6;  $p > 0.1$ , H7;  $p > 0.1$ ) among the click-interface group and touch-interface group. In accordance with H8 and H9, the effect of mental simulation of the consumption situation on shopping enjoyment and expected quality was stronger for the click-interface group than for the touch-interface group. Also, the effect of mental simulation of the product on shopping enjoyment was positively significant in the touch-interface group, while the effect of mental simulation of the product on shopping enjoyment

was negatively significant in the click-interface group (H10). However, the effect of mental simulation of the product on expected quality (H11) as well as the effect of shopping enjoyment (H12) and expected quality (H13) on price premium did not differ statistically significantly between the click-interface group and the touch-interface group.

Table 25. Statistical comparison of paths

Path	Click group		Touch group		statistical comparison of path
	path coefficient	Standard error	path coefficient	Standard error	
DMS → MSiS	0.244	0.061	0.203	0.090	0.380
DMS → MSiP	0.194	0.062	0.287	0.074	0.970
MSiS → SE	0.498	0.081	0.071	0.086	3.664***
MSiS → EQ	0.326	0.074	0.129	0.073	1.916*
MSiP → SE	-0.083	0.084	0.362	0.099	3.450***
MSiP → EQ	0.177	0.100	0.265	0.093	0.652
SE → PP	-0.105	0.068	-0.190	0.067	0.896
EQ → PP	0.515	0.045	0.556	0.044	0.660

\*\*\*, \*\*, \* indicate significant at 1%, 5%, 10% levels, respectively

## 6. Discussion

### 6.1 Summary of Findings

The primary purpose of the present study was to investigate the effects of different interfaces on consumers' purchasing behavior in online shopping malls. To verify the hypotheses, a between-subject experiment was conducted, and 107 participants' responses were analyzed. The data were analyzed using a t-test and multi-group analysis. Table ## illustrates a summary of the hypothesis test.

Table 26. The results of the hypothesis test

	<b>Hypothesis</b>	<b>Support</b>
Main effects		
H1a	<i>Touching a product through a screen will increase the affective thinking style.</i>	Supported
H1b	<i>Touching a product through a screen will increase the mental simulation of the consumption situation.</i>	Not Supported
H1c	<i>Touching a product through a screen will increase the mental simulation of product.</i>	Supported
H1d	<i>Touching a product through a screen will increase shopping enjoyment.</i>	Supported
H1e	<i>Touching a product through a screen will increase the expected quality of the product.</i>	Not Supported
H1f	<i>Touching a product through a screen will increase the price premium.</i>	Supported
Main effects		
H2a	<i>The affective thinking style will increase the mental simulation of the consumption situation.</i>	Not Supported
H2b	<i>The affective thinking style will increase the mental simulation of the product.</i>	Supported

H3a	<i>The mental simulation of the consumption situation will increase shopping enjoyment.</i>	Supported
H3b	<i>The mental simulation of the consumption situation will increase the expected quality of the product.</i>	Supported
H3c	<i>The mental simulation of the product will increase shopping enjoyment.</i>	Supported
H3d	<i>The mental simulation of the product will increase the expected quality of the product.</i>	Supported
H4	<i>Shopping enjoyment will increase the price premium.</i>	Not Supported
H5	<i>The expected quality of the product will increase the price premium.</i>	Supported
<hr/> Moderator hypotheses: difference in interface <hr/>		
H6	<i>The effect of the affective thinking style on the mental simulation of the consumption situation depends on interface types.</i>	Not Supported
H7	<i>The effect of the affective thinking style on the mental simulation of the product depends on interface types.</i>	Not Supported
H8	<i>The effect of the mental simulation of the consumption situation on shopping enjoyment depends on interface types.</i>	Supported
H9	<i>The effect of the mental simulation of the consumption situation on the expected quality of the product depends on interface types.</i>	Supported
H10	<i>The effect of the mental simulation of the product on shopping enjoyment depends on interface types.</i>	Supported
H11	<i>The effect of the mental simulation of the product on the expected quality of the product depends on interface types.</i>	Not Supported
H12	<i>The effect of shopping enjoyment on the price premium depends on interface types.</i>	Not Supported
H13	<i>The effect of the expected quality of the product on the price premium depends on interface types.</i>	Not Supported

## **6.2 Contribution and Limitation**

### **6.2.1 Academic Contribution**

First, this is the first study to apply thinking style theory (e.g., Epstein et al., 1996; Novak & Hoffman, 2008) to investigate the thinking styles (affective vs. cognitive) expressed by consumers using different computer interfaces (touch vs. click) for online shopping. It confirmed that using a touch interface enhances affective thinking, while a click interface enhances cognitive thinking. Therefore, the present study contributes by examining the reasons why consumer behavior varies when using a desktop or a mobile devices by focusing on the touch interface and examining the associated thinking style.

Second, this study extended the embodied cognition theory (e.g., Ackerman et al., 2010; Wilson, 2002) by applying it to the computer interface field. Based on the embodied cognitive theory, we identified the relationship between mental simulation and thinking style; affective thinking strengthens the consumer's mental simulation of products in online shopping. Also, the following two aspects of the mental simulation were examined simultaneously: mental simulation of consumption situation and mental simulation of the product; affective thinking expressed by the interface has more impact on mental simulation of product.

Third, this study is the first to attempt to analyze how differences in computer interfaces (touch vs. click) affect consumer behavior in online shopping malls through partial least squares (PLS) and multi-group analysis. This paper confirmed that the main path to reaching the price of payment for the product varies with the difference of the interface, from the enhanced thinking style. More specifically, the impact of mental simulation of the product on shopping enjoyment was positive with the touch-interface and negative with the click-interface.

### **6.2.2 Practical Contribution**

The results of this study suggest that marketing strategies should be clearly different when the interfaces are different in online shopping malls. Because the interfaces used to change the way consumers think, the information they prefer, the feelings they feel, and the buying behavior changes, online shopping malls should approach consumers in different ways depending on the interface used by the consumer. That is, this research provides some guidance for online shopping malls.

The results of this research suggest that in online shopping malls other than offline shopping, where physical entities can be sensitively determined, mental simulations suggest that different interfaces should be emphasized differently. That is, touch interfaces should focus on the product itself that they want to sell, and click interfaces should focus on the consumption situation of the product they want to sell.



### **6.2.3 Limitation and Future study**

This study has some academic and practical implications regarding the relationship between the computer interface and consumer purchasing behavior, which can guide the future study. This experiment utilized the Microsoft Surface, a device capable of both a click and touch interface, but it also has a specific screen size that is not consistent with the actual size of a smartphone screen, which is used most frequently in online shopping. Therefore, further research is needed.

In this study, although there is significance in focusing on fresh foods that were not focused on in previous interface studies, it is limited because only one product family was used. Also, samgyupsal, the stimulus, has characteristics that are similar to hedonic foods for Koreans. Therefore, in the next study, it will be necessary to conduct a food-related study focusing on a wider range of products with utilitarian product characteristics.

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## Appendix B. Stimulus (Online Shopping mall)


### B.1 Samgyeopsal of A farm

온라인쇼핑마켓 | 홈 장바구니 **삼겹살 리스트** 0 | [전체보기](#) [로그인](#)

[A농장 삼겹살](#) | [B농장 삼겹살](#) | [C농장 삼겹살](#)

#### A농장 삼겹살

 [A농장] 삼겹살  
판매가: 4,000원  
판매단위: 1팩  
중량/수량: 200g



초 신선함과 전통 삼겹살의 맛

**[A농장] 삼겹살**

A농장 생산 삼겹살은 전통 삼겹살의 맛을 극대화 시킨 삼겹살입니다.  
A농장의 최적으로 조합된 돼지고기 품종의 신선한 삼겹살을 맛보세요.

### A농장 삼겹살 정보

- A농장은 전문화된 농가들의 협동 사육방법으로 사육합니다.
- 아름다운 육색과 전통 삼겹살의 육질을 고수하고 있습니다.
- 약간의 향신료를 첨가해 전통 삼겹살의 육향을 즐기세요.



### A농장 삼겹살 상세 사진




## B.2 Samgyeopsal of B farm


온라인 쇼핑 마켓 | 홈 장바구니 **삼겹살 리스트** 1 | 전체보기 로그인

A농장 삼겹살 | **B농장 삼겹살** | C농장 삼겹살

### B농장 삼겹살



[B농장] 삼겹살  
판매가: 5,000원  
판매단위: 1팩  
중량/용량: 200g



푹푹하게 녹는 고소한 감칠맛

**[B농장] 삼겹살**

B농장 생산 삼겹살은 촉촉한 육질과 푹푹한 식감이 조화로운 삼겹살입니다.  
엄격하게 선별된 국내산 돼지고기만을 취급하는 B농장의 삼겹살을 맛보세요.



### B농장 삼겹살 정보

- B농장은 자연을 활용한 특유의 사육방법을 고수합니다.
- 고소한 맛과 향 우수한 식감을 자랑하는 삼겹살입니다.
- 약간의 소금을 곁들여, 최적의 삼겹살구이를 즐기세요.



### B농장 삼겹살 상세 사진




## B.3 Samgyeopsal of C farm


온라인쇼핑마켓 | 홈 장바구니 **삼겹살 리스트** 0 | 전체보기 로그인

A농장 삼겹살 B농장 삼겹살 **C농장 삼겹살**

### C농장 삼겹살



[C농장] 삼겹살  
판매가: 6,000원  
판매단위: 1팩  
중량/중량: 200g



풍부한 육즙의 프리미엄 삼겹살

**[C농장] 삼겹살**

C농장 생산 삼겹살은 풍부한 육즙으로 입을 가득 채우는 삼겹살입니다.  
C농장의 엄격한 시스템으로 관리된 고급품종 돼지고기인 삼겹살을 맛보세요.

### C농장 삼겹살 정보

- C농장은 축적된 노하우로 최상의 사육방법을 고수합니다.
- 풍부한 육즙량으로 최상의 식감을 자랑하는 삼겹살입니다.
- 최적의 삼겹살을 즐기 위해 소량의 소금을 곁들이세요.



### C농장 삼겹살 상세 사진



## Appendix C. Survey of Essay 2

### 설문지 I

본 실험은 <온라인 쇼핑 환경에서의 기기 조작 편의성>을 살펴보기 위한 목적으로 진행되는 것입니다. 설문내용은 조사 목적 이외의 용도로 사용되지 않을 것입니다. 귀하의 성의 있는 답변을 부탁드립니다. 바쁘신 와중에 실험에 참여해주신 것에 대해 깊이 감사드립니다.

연구책임자 : 서울대학교 푸드비즈니스랩 소장 문정훈 교수( )  
 서울대학교 푸드비즈니스랩 임하람 연구원

1. 다음은 귀하의 **현재 상태**에 대한 질문입니다.

	전혀 그렇지 않다			보통			매우 그렇다		
	1	2	3	4	5	6	7		
나는 현재 배가 고프른 상태이다									

2. 다음은 귀하의 **온라인 쇼핑물 이용** 관련 질문입니다.

	전혀 그렇지 않다			보통			매우 그렇다		
	1	2	3	4	5	6	7		
나는 온라인 쇼핑물을 자주 사용한다									
나는 온라인 쇼핑물에서 식품을 자주 구매한다									

- 안 내 문 -

다음의 설명과 지시를 꼼꼼하게 읽고 따라주시길 바랍니다.  
밑줄을 치거나 작게 소리 내며 읽어주시길 바랍니다.



귀하는 친구 4명과 즐거운 삼겹살 파티를 계획하고 있습니다.  
실제 파티를 함께할 친구 4명의 얼굴과 이름을 떠올려 주시길 바랍니다.

귀하는 삼겹살 파티를 위한 식재료를 구매해야 합니다.  
따라서, 온라인 쇼핑물을 통하여 필요한 식재료를 주문하려고 합니다.  
구매할 다른 모든 식재료는 장바구니에 담아 놓은 상태이고,  
삼겹살 1kg을 구매할 예정입니다.

온라인 쇼핑물 상품페이지를 보시고  
어떤 제품을 얼마큼 구매하실지 응답해주시길 바랍니다.

## 설문지 II

Q. 온라인 쇼핑몰에 있는 삼겹살 중 어떤 것을 얼마만큼 구매하시겠습니까?  
 (총 5팩(1kg)이 되도록 응답해주세요.)

A농장 삼겹살 (200g당 4,000원)	B농장 삼겹살 (200g당 5,000원)	C농장 삼겹살 (200g당 6,000원)
_____ 팩	_____ 팩	_____ 팩



**설문지 III** [다음은 쇼핑상황에 대한 설문입니다.]

**[Section A]**

A-1. 다음은 오늘 이용한 온라인 쇼핑에 대한 평가입니다.

	전혀 그렇지 않다		보통			매우 그렇다	
(1) 온라인 쇼핑물에서 보낸 시간은 재미있었다.	1	2	3	4	5	6	7
(2) 온라인 쇼핑을 하는 것은 좋은 시간이었다.	1	2	3	4	5	6	7
(3) 온라인 쇼핑물에서 제공한 상품은 흥미로웠다.	1	2	3	4	5	6	7
(4) 온라인 쇼핑물은 그 자체로 즐거움을 주었다.	1	2	3	4	5	6	7

A-2. 다음은 오늘 이용한 서비스에 대한 사용성 평가입니다.

(1) 편리하지 않은	1	2	3	4	5	6	7	편리한
(2) 사용하기 나쁜	1	2	3	4	5	6	7	사용하기 좋은
(3) 어려운	1	2	3	4	5	6	7	쉬운
(4) 비효율적인	1	2	3	4	5	6	7	효율적인

**[Section B]**

B-1. 귀하가 쇼핑하며 느낀 것에 대한 평가입니다.

	전혀 그렇지 않다		보통			매우 그렇다	
(1) 쇼핑하며, 삼겹살파티를 하는 것을 상상했다.	1	2	3	4	5	6	7
(2) 쇼핑하며, 삼겹살파티 상황을 떠올리기 쉬웠다.	1	2	3	4	5	6	7
(3) 쇼핑하며, 삼겹살파티 상황을 빨리 떠올릴 수 있었다.	1	2	3	4	5	6	7

B-2. 귀하가 쇼핑하는 중에 떠올린 삼겹살파티 상황에 대한 평가입니다.

	전혀 그렇지 않다		보통			매우 그렇다	
(4) 삼겹살파티 상황이 생생하고 선명하게 떠올랐다.	1	2	3	4	5	6	7
(5) 삼겹살파티 상황을 구체적으로 떠올릴 수 있었다.	1	2	3	4	5	6	7
(6) 떠올린 삼겹살파티 상황은 생기있고 역동적이었다.	1	2	3	4	5	6	7

[Section C]

C-1. 귀하의 삼겹살 선택에 영향을 미친 요소는 무엇입니까?

어떤 삼겹살을 선택할지에 대한 최종결정은 _____에 의해 이루어졌다.									
(1)	나의 생각	1	2	3	4	5	6	7	나의 느낌
(2)	나의 의지	1	2	3	4	5	6	7	나의 욕구
(3)	신중한 내 자신	1	2	3	4	5	6	7	충동적인 내 자신
(4)	나의 합리적인 면	1	2	3	4	5	6	7	나의 감정적인 면
(5)	나의 머리	1	2	3	4	5	6	7	나의 마음

C-2. 귀하가 쇼핑하는 중에 떠올린 삼겹살에 대한 평가입니다.

	전혀 그렇지 않다		보통			매우 그렇다	
	1	2	3	4	5	6	7
(1) 삼겹살을 먹는 것을 상상했다.	1	2	3	4	5	6	7
(2) 삼겹살을 굽는 장면이 머릿속에 떠올랐다.	1	2	3	4	5	6	7

C-4. 귀하가 선택한 삼겹살의 기대품질에 대한 평가입니다.

	전혀 그렇지 않다		보통			매우 그렇다	
	1	2	3	4	5	6	7
(1) 삼겹살의 육질은 쫄깃하고 부드러울 것이다.	1	2	3	4	5	6	7
(2) 삼겹살의 육즙은 충분할 것이다.	1	2	3	4	5	6	7
(3) 삼겹살의 향은 풍부할 것이다.	1	2	3	4	5	6	7
(4) 삼겹살의 지방의 비율은 적당할 것이다.	1	2	3	4	5	6	7





## 요약 (국문초록)

### 모바일 기기를 통한 식품 구매 행동

#### Two Essays of Grocery Shopping Behavior through Mobile Device

터치 인터페이스 기반인 모바일 기기를 사용하여 온라인 쇼핑을 하는 사람들이 급속도로 증가하고 있다. 본 연구는 온라인에서 식료품을 구입할 때 PC와 비교하여 모바일 기기의 사용이 미치는 영향에 초점을 맞추었다. 첫번째 연구에서는 온라인 쇼핑물에서 모바일 기기 사용과 PC 사용의 차이가 소비자의 식료품 구매패턴에 미치는 영향을 확인하였다. 연구의 목적을 달성하기 위해 소비자 패널들의 온라인 식료품 구매 지출내역을 분석하였다. 분석결과, 사용하는 기기의 차이에 따라 온라인 쇼핑물에서 소비자의 구매 행동이 달라진다는 것을 보여준다. 두번째 연구에서는 온라인 쇼핑물에서 화면을 통해 제품을 터치하는 것이 마우스를 사용할 때와 비교하여 소비자 구매행동에 미치는 영향을 조사하였다. 본 연구의 목적을 위해 107명의 참가자들을 대상으로 실험을 진행했다. 그 결과, 스크린을 통한 제품의 터치는 사고 방식, 제품에 대한 정신적 시뮬레이션, 쇼핑에 대한 즐거움, 가격 프리미엄에 유의미한 영향을 미쳤다. 또한, 사용하는 인터페이스의 차이(터치 vs. 클릭)에 따라 가격 프리미엄에 영향을 미치는 주요 경로가 다르다는 것을 보여준다.

주요어: 전자상거래 (online shopping), 모바일 쇼핑(mobile shopping), 터치 인터페이스(touch interface), 사고방식(thinking style), 체화된 인지(embodied cognition), 멘탈 시뮬레이션(mental simulation)