경제학 석사 학위논문

An Investigation of Consumers' Ready-meal Purchase Behavior from a Health-related Perspective

2021. 2.

서 울 대 학 교 대 학 원

농경제사회학부 지역정보전공

신 현 숙

Investigation of Consumers' Ready-meal Purchase Behavior from a Health-related Perspective

지도교수 문정훈

이 논문을 경제학 석사 학위논문으로 제출함

2021 년 2 월

서울대학교 대학원
농경제사회학부 지역정보전공
신 현 숙

신현숙의 경제학 석사 학위논문을 인준함
2021 년 2 월

위 원 장   HONG SOK (BRIAN) KIM   (인)

부위원장   문 정 훈   (인)

위   원   이 동 민   (인)

Preface

Ready meals are known to be unhealthy, since they are high in calories, sugar, sodium, and fat (Costa *et al*., 2003). Given this perception, many studies have examined the impact of ready meals on health. Frequent consumption of ready meals can cause weight gain (Van der Horst *et al*., 2011) and chronic disease (Celnik *et al*., 2012; Jabs and Devine, 2006). Despite these findings, the Korean ready meal market is experiencing rapid growth (Park *et al*., 2019). In order to understand how health-related variables affect consumers' ready meal purchases, two essays were written as described below.

Ready meals are likely to trigger feelings of guilt in homemakers (Costa *et al*., 2007; Olsen *et al*., 2010). The first essay aims to see how consumers' health locus of control affects feelings of guilt, which leads to willingness to buy and consume different types of ready meals. The essay was written with the title "The causes of guilt in ready meal users: a focus on cooking instructions and consumers' health locus of control" and was published in the Asia Marketing Journal[1].

Health locus of control is typically used as a predictor of health-related behavior in social learning theory. Compared to previous studies, the first essay has theoretical implications in the sense that feelings of guilt were used as a mediating variable. As the consumption of ready meals is associated with feelings of guilt, it is thus worth exploring such feelings when trying to understand the relationship between health and ready meal consumption. In addition, while many studies examined broad food consumption and the

---

[1] Shin, H., Lee, D., Lim, J., & Moon, J. (2020). The Causes of Guilt in Ready-meal Users: A Focus on Cooking Instructions and Consumers' Health Locus of Control. ASIA MARKETING JOURNAL, 21(4), 25-43.

eating behavior of consumers, the first essay focused exclusively on ready meal consumption.

In order to advance our knowledge, family medical history, another health-related variable, was used to predict ready meal purchases. The second essay examined the relationship between family medical history and the purchase ratio of ready meals to fresh foods. The purpose of the essay was to see the effect a family history of chronic disease has on the purchase ratio of ready meals to fresh foods. In addition, the moderating effect of energy-dense snack and sugar-sweetened beverage purchase expenditure was examined. The essay is titled "The substitution of fresh foods with ready meals: from a perspective of family medical history and hedonic food purchase" and is set to be submitted to the British Food Journal.

Compared to other literature that examines family medical history and processed food consumption, the second essay focuses on the expanding ready meal market in Korea. The purchase ratio of ready meals to fresh foods indicates how often fresh foods are substituted with ready meals. In addition, ready meals were divided into three food item groups according to their main ingredients: grain, meat, and vegetables. The essay uses actual purchase data of panels that make accurate data analysis.

Contents

An Effect of Ready Meals' Cooking Instructions and Consumers' Health Locus of

Control on Feelings of Guilt

Abstract

Although ready meals have recently increased their market share in the Korean food industry,

a literature review found that the use of ready meals triggers feelings of guilt in homemakers.

Such guilt arises as a result of several factors apparently related to consumers' health.

Consequently, levels of guilt might be expected to vary depending on consumers' perceived

health locus. The present study aims to examine (a) how health locus affects guilty feelings

about ready-meal consumption, (b) how the effect varies in relation to the consumption of

different types of ready meal, and (c) the relationship between consumers' guilty feelings and

willingness to buy ready meals. Three dimensions of health locus of control (HLC) -internal

HLC (IHLC), powerful-others HLC (PHLC), and chance HLC (CHLC)- were presumed to

influence consumers' feelings of guilt in association with ready meals. Data were collected

via an online survey, and participants were randomly assigned to either of two groups: one

group was instructed to heat meals in a microwave (ready-to-heat [RTH] group, n=104) and

the other cooked using a pan with additional ingredients (ready-to-cook [RTC] group, n=101).

The study found that guilty feelings about consuming RTH meals increased in line with

increased external HLCs, namely, PHLC and CHLC. For the RTC group, guilt increased in

line with increased PHLC. IHLC had no significant effect on guilty feelings in either group.

Willingness to buy ready meals decreased for both groups as consumers' feelings of guilt

increased. Even RTC meals, which require more time and energy in food preparation, did not

reduce guilty feelings among consumers with higher PHLC. RTC meals are preferable for consumers with higher CHLC, since their sense of greater involvement in the cooking process alleviates their feelings of guilt. Cooking with already prepared and uncooked ingredients brought fun and joy, both for the participants and their significant others. This interpretation may be developed into a strategic plan by ready-meal producers to strengthen their marketing strategy.

An Effect of Ready Meals' Cooking Instructions and Consumers' Health Locus of

Control on Feelings of Guilt[2]

1. Introduction

Consumers are eating more ready meals than ever before. Several socio-economic

factors have contributed to this phenomenon: increased female involvement in the workplace,

the increase in single- and double-income-couple households, and a lack of guidance in

traditional cooking from older generations (Costa, Schoolmeester, Dekker, & Jongen, 2007;

Geeroms, Verbeke, & Kenhove, 2008). When it comes to food choice, consumers prioritize

convenience as much as taste, nutritional value, and price (Candel, 2001; Celnik, Gillespie, &

Lean, 2012; Dave, An, Jeffery, & Ahluwalia, 2009). Convenient ready meals are an attractive

option for women for whom making time to cook seems to be yet another source of pressure.

Even though ready meals make consumers' lives easier, there are some factors that

cause guilty feelings about ready-meal consumption. Convenience, which has been

considered the key advantage of ready meals, may trigger guilt because the use of ready

meals can be perceived as neglecting one's duty to invest time and effort in meal preparation

(Olsen, Sijtsena, & Hall, 2010). In addition, the method of preparing ready-to-heat (RTH)

meals may be a guilt-arousing factor for consumers who are good cooks, since they do not

have the option of adding extra ingredients. The majority of RTH meals are heated using a

microwave, which limits the creation of new dishes. Horning et al. (2017) also noticed that

ready meals lack fruit and vegetables relative to homemade meals.

In addition, the unbalanced nutritional properties of ready meals, which are often high

in sodium and calories, can lead to the perception that ready meals in general are unhealthy (Costa et al., 2003). Many studies have examined the impact of ready meals on health. Frequent consumption of ready meals can cause weight gain (Van der Horst, Brunner, & Siegrist, 2011) and chronic diseases such as cardiovascular disease, diabetes, and cancer (Celnik, Gillespie, & Lean, 2012; Jabs & Devine, 2006) because of the high energy, fat, salt, and sugar levels that ready meals possess (Anderson et al., 2008; Gibson, Armstrong, & McIlveen, 2000; Van der Horst, Brunner, & Siegrist, 2011).

Despite the problems with ready meals, their market share is increasing in the Republic of Korea. According to Korea's Ministry of Agriculture, Food, and Rural Affairs, the domestic ready-meal market has increased from 2.4 trillion dollars in 2014 to 3.5 trillion dollars in 2017 (Lee, Lee, & Jung., 2018) and is expected to have increased by 34.3% by 2035 (Park, Kwon, & Nah, 2019). Given the growing economic importance of the ready-meal market in Korea, a better understanding of it is needed to predict the purchasing factors of ready meals.

According to many studies, health has been identified as a motivator in food choice behavior (e.g., Contento, Michela, & Goldberg, 1988; Roininen et al., 2001; Roininen, Lahteenmaki, & Tuorila, 1999; Schifferstein & Oude Ophuis, 1998). Olsen, Sijtsema, and Hall (2010) have investigated the effect of moral attitudes on ready-meal consumption; Geeroms, Verbeke, and Kenhove (2008) explored the association between health-related motive orientations and ready-meal consumption; and Bennett et al. (1994) used the health locus of control (HLC) to measure individual food consumption and eating patterns.

However, HLC's effects on the willingness to buy ready meals remains underexplored. HLC refers to the belief that one's health quality is a result of one's own behavior or other factors, such as the influence of others or luck (Wallston & Wallston, 1978b). It has been used

to predict health-related behaviors such as adolescent smoking (Eiser et al., 1989), tobacco and drinking consumption in adults (Calnan, 1989; Winefield et al., 1989), the success of people trying to quit smoking (Segall & Wynd, 1990), engagement in physical activity (Calnan, 1989; Carlson & Petti, 1989), and adolescent substance abuse (Dielman et al., 1987). In light of these studies, this paper examines how HLC affects willingness to buy ready meals, which might incur different levels of guilty feelings, focusing on Korean consumers.

The study aims to expand the limited literature on ready meals by introducing health-related variables that are assumed to influence the feelings of guilt experienced by consumers. It compares the feelings of guilt that are triggered by the consumption of different types of ready meal, based on consumers' HLC. Understanding the implications of health perceptions can contribute to the development of the concept for different types of ready meal.

2. Literature review

2.1. Major Constructs

2.1.1. Health locus of control (HLC)

"Locus of control" is a term that has its origins in Rotter's (1966) social learning theory. It has been widely used as a main construct in behavioral research. This construct has been used to predict specific health-related behaviors (Armitage, Norman, & Conner, 2002; Rotter, 1954, 1972; Wallston & Wallston, 1978a). Health behaviors are associated with lifestyle and include exercise, smoking habits, alcohol consumption, and dietary habits (Norman et al., 1998).

The HLC construct holds that a behavior may be derived either from factors within the individual's control (internal) or out of their control (external). Levenson (1974) insisted that external loci of control can be divided into two subscales: control by powerful others

(PHLC), such as family members or doctors, and chance events (CHLC), viewed as arising from fate or luck. People with a higher internal HLC (IHLC) can be expected to have higher levels of self-control. Thus, higher levels of self-control are associated with healthier food choices and lower consumption of high-fat foods (Turner et al., 2010).

Wallston, Wallston, Kaplan, and Maides (1976) developed this construct into a multidimensional health locus of control scale. They argued that the HLC scale measures the extent to which an individual's health is determined by their behavior. The IHLC scale indicates the extent to which people believe themselves to be responsible for their own health. Wallston (1991) observed that health-related behavior is more likely to be exhibited by people who cherish their health more (also called health value). With regard to the subscales of external HLC (EHLC), people with higher PHLC readily follow the advice given to them by medical professionals, whereas those with lower PHLC are indifferent to their health, since their strong belief in medical technology causes them to deprioritize caring for their bodies; those with high CHLC believe that whether they are healthy or unhealthy is beyond their control (Wallston & Wallston, 1978b).

Considering that health is an important factor in consumers' food consumption practices (Contento, Michela, & Goldberg, 1988; Geeroms, Verbeke, & Kenhove, 2008; Roininen et al., 2001; Roininen, Lahteenmaki, & Tuorila, 1999; Schifferstein & Oude Ophuis, 1998), HLC could be a predictor of consumers' willingness to buy ready meals; whether they are happy to use ready meals may be analyzed with HLC. Three aspects of HLC are indicated in Table 2, each of which comprises six survey items. Each HLC is expected to have a different effect on feelings of guilt, depending on the type of ready meal. Figure 1 below describes the research model of this study.

4

2.1.2. Feelings of guilt

Guilt, which causes people to dwell on their actions, leads to confession and compensation. According to Perlman (1958), guilt is a result of conflict between the ego and the superego. In other words, individuals feel guilt when they believe that their behavior or their intention to do something is at odds with their conscience. Thus, guilt has been identified as a moral emotion linked to the comfort and welfare of other people or society (Eisenberg, 2000; Skoe et al., 2002; Steenhaut & Van Kenhove, 2005).

The emotion of guilt has been used in previous consumer behavior research. Dahl et al. (2003) stated that guilt can arise from the use of products that are harmful to one's health, extending to the purchase of foreign products and disposal of recyclable products. Marks and Mayo (1991) noted that people feel guilt when they choose an inappropriate alternative. Strutton et al. (1994) studied the impact of guilt on the probability of engaging in an unethical activity. Steenhaut and Van Kenhove (2005) found that people weigh opportunistic drives and guilty feelings in ethically questionable situations.

Costa et al. (2007) discovered that moral attitudes, including saving time and energy in preparing meals, play a great role in consuming meals. While homemade meals are regarded positively, ready meals are related to negative feelings such as guilt, regret, and neglect of one's duty to cook (Costa et al., 2007). Consequently, consumers are susceptible to morally based criticism when replacing homemade meals with ready meals.

With regard to the guilt associated with HLC, people with a higher IHLC would feel more guilt in consuming RTH meals since they are likely to engage in healthier behavior (Wallston, 1991). By contrast, their guilt may decrease when consuming ready-to-cook (RTC) meals because they can modify the recipe to make it better for their health. People with a higher PHLC would feel more guilt in consuming any type of ready meal since they would

not want to provide significant others with ready meals, given that doctors purportedly do not recommend them. People with a higher CHLC do not care what they eat because of the belief that their health is out of their control, so they would feel less guilt in consuming any type of ready meal.

Benton, Greenfield, and Morgan (1998) used two types of survey item to examine the negative emotions experienced as a result of consuming chocolate. Guilt was measured through a factor analysis using a principal component analysis and varimax rotation. Of the 12 survey items, only 4, whose factors were higher than 0.6, were used in the present survey. Those items were modified for the purpose of measuring feelings of guilt provoked by the consumption of ready meals: (1) After eating ready meals, I often wish I had not; (2) I feel guilty after eating ready meals; (3) I feel depressed and dissatisfied with life after eating ready meals; and (4) I feel unhealthy after I have eaten ready meals.

2.1.3. Willingness to buy

Mai and Hoffmann (2015) measured how consumers' health consciousness and food flavors influence purchase intention. Three measurements were modified to examine consumers' willingness to purchase ready meals: (1) I will buy this product; (2) Next time I am buying a ready meal, I will choose this product; and (3) I prefer this product to other ready meals. A five-point Likert scale was used: 1=totally disagree, 2=partly disagree, 3=indifferent, 4=partly agree, and 5=totally agree. Feelings of guilt are assumed to affect willingness to buy, leading to the following hypotheses:

2.2. Hypotheses

H1a. As consumers' IHLC increases, their feelings of guilt increase when they have

RTH meals.

H1b. As consumers' PHLC increases, their feelings of guilt increase when they have RTH meals.

H1c. As consumers' CHLC increases, their feelings of guilt decrease when they have RTH meals.

H1d. Consumers' willingness to buy RTH meals will decrease as their feelings of guilt at consumption increase.

H2a. As consumers' IHLC increases, their feelings of guilt will decrease when they have RTC meals.

H2b. As consumers' PHLC increases, their feelings of guilt will increase when they have RTC meals.

H2c. As consumers' CHLC increases, their feelings of guilt will decrease when they have RTC meals.

H2d. Consumers' willingness to buy RTC meals will decrease as their feelings of guilt at consumption increase.

3. Method

Ready meals are defined as fully or partially prepared food that requires additional preparation time, cooking skills, and energy in terms of food processing and distribution, along with fast food and ready-to-eat takeaway foods (Celnik, Gillespie, & Lean, 2012). According to Costa, Dekker, Beumer, Rombouts, and Jongen (2001), ready meals are classified into four types: RTH and RTC, as described above, and ready-to-eat (RTE) and ready-to-end-cook (RTEC). Such ready meals are classified according to their degree of cooking preparation. RTE meals are defined as processed foods that can be eaten immediately

without additional preparation, whereas RTH meals, such as frozen pizza, require heating for 15 minutes before consumption. RTEC meals, such as dehydrated pasta dishes, often need longer preparation times than RTH meals do. RTC meals require complete cooking of some or all of their components.

While there are many varieties of ready meal, previous studies distinguishing between these types are scarce. Moreover, the associated feelings of guilt may be expected to differ according to the ready meal's preparation method. Consequently, RTH ready meals, which require little involvement on the part of consumers, and RTC ready meals, which require considerable time and caution to prepare, were used in this study. RTH ready meals were considered to comprise meals that were heated by microwave, while RTC ready meals were cooked using a pan with the addition of extra ingredients.

An online survey was conducted in which 377 respondents participated, and randomly divided into two different groups of 186 and 191 respondents. Table 1 below shows demographic information for the participants. Participants were given a scenario in which they were shopping in a mall and considering the purchase of frozen fried rice for a family supper. Each group was instructed to read different cooking instructions. One group read cooking instructions that described the preparation of ready meals using a microwave and three steps: placing the food in a bowl capable of being microwaved, wrapping the bowl to prevent dehydration, and microwaving for 3 to 4 minutes, depending on the microwave's performance. The other group was instructed to use a pan according to three steps: placing one tablespoon of olive oil in the pan over a low heat; increasing the heat to medium, placing the ready meal in the pan, and frying it for around 3 to 4 minutes; and adding extra ingredients as desired. All participants were Korean married women ranging in age from their 20s to their 60s, and all were asked to fill in a questionnaire anonymously. Also, respondents'

age, residence, number of children, and monthly groceries expenditure were asked for a demographic information. It was mandatory that they answer all questions before submitting the questionnaire.

The data were analyzed through a partial least square (PLS) regression using SmartPLS software for PLS structural equation modeling (Wong, 2013). Since this study is focused on participants who had purchased ready meals within the past month, only 104 and 101 responses from each respective group were used. The respondents' age, number of children, monthly household income, and a monthly groceries expenditure were considered as control variables in the analysis.

Before analyzing the data with the PLS method, the data's validity and reliability were tested. The validity was tested for convergent and discriminant validity, while the reliability was tested for Cronbach's alpha and composite reliability. The rule of thumb for convergent validity is (a) factor loading > 0.7, (b) communality > 0.5, and (c) average variance extracted (AVE) > 0.5 (Latan & Ghozali, 2012; Yana, Rusdhi, & Wibowo, 2015). Survey parameters that exceeded a factor loading of 0.7 remained for these standards, as shown in Appendices A and B.

Table 1

Demographic Characteristics of the Participants

	RTH meals group (n=104)	RTC meals group (n=101)
Age		
20–29	12	8
30–39	18	22
40–49	29	36
50–59	33	28
60–69	12	7

Residence		
Seoul	34	40
Pusan	0	4
Dague	4	3
Incheon	9	5
Gwangju	3	0
Daejeon	3	2
Ulsan	0	3
Gyeonggi-do	32	30
Gangwon-do	3	2
Chungchengbuk-do	1	1
Chungchengnam-do	1	3
Jeollabuk-do	5	2
Jeollanam-do	1	2
Gyeongsangbuk-do	3	2
Gyeongsangnam-do	4	2
Jeju	1	0
Number of children		
0	19	20
1	25	25
2	52	50
3	8	6
Monthly groceries expenditure		
$0–$850	75	72
$851–$1,700	24	22
$1,701–$2,600	3	2
$2,601–$3,400	1	2
$3,401–$4,200	1	1
$4,201 and above	0	2
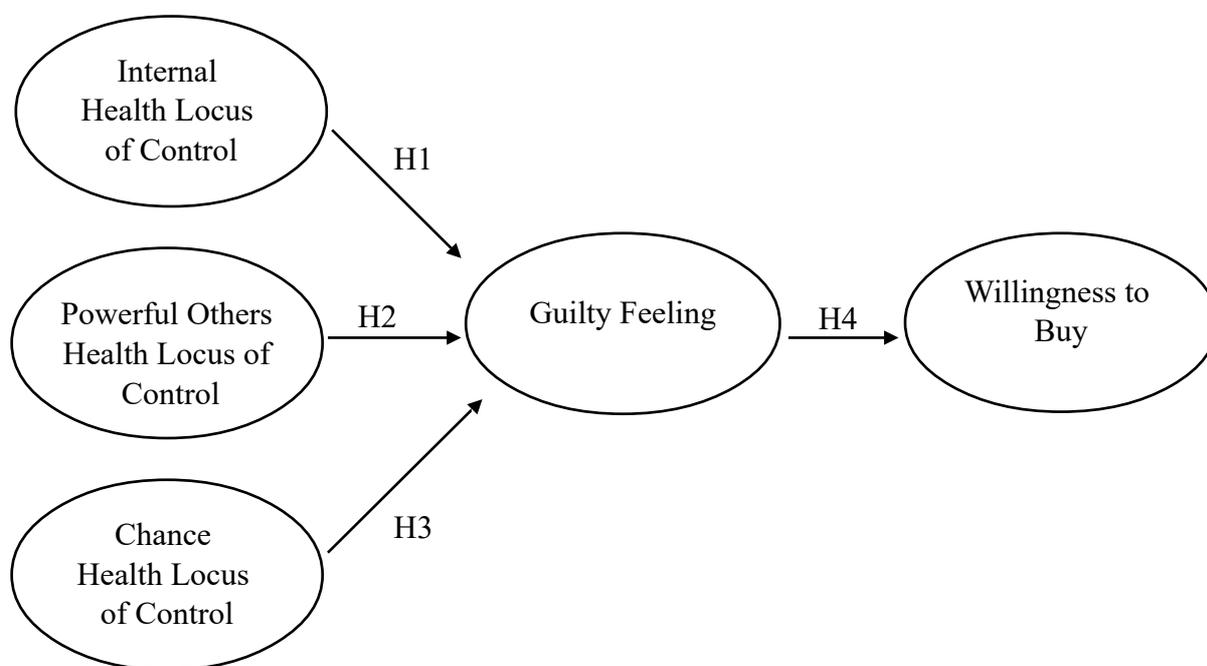
Figure 1. Research model

Table 2

Measurement Instruments

Items	Measures
IHLC1	If I become sick, I have the power to make myself well again.
IHLC2	I am directly responsible for my health.
IHLC3	Whatever goes wrong with my health is my own fault.
IHLC4	My physical well-being depends on how well I take care of myself.
IHLC5	When I fall ill, I know it is because I have not been taking care of myself properly.
IHLC6	I can pretty much stay healthy by taking good care of myself.
PHLC1	If I see an excellent doctor regularly, I am less likely to have health problems.
PHLC2	I can only maintain my health by consulting health professionals.
PHLC3	Other people play a big part in whether I stay healthy or become sick.
PHLC4	Health professionals keep me healthy.
PHLC5	The type of care I receive from other people is responsible for how well I recover from an illness.
PHLC6	Following doctors' orders to the letter is the best way for me to stay healthy.
CHLC1	I often feel that no matter what I do, if I am going to get sick, I will get sick.
CHLC2	It seems that my health is greatly influenced by accidental events.
CHLC3	When I am sick, I just have to let nature take its course.
CHLC4	When I stay healthy, I'm just plain lucky.
CHLC5	Even when I take care of myself, it is easy to get sick.
CHLC6	When I become ill, it is a matter of fate.

GF1	After eating ready meals, I often wish I had not.
GF2	I feel guilty after eating ready meals.
GF3	I feel depressed and dissatisfied with life after eating ready meals.
GF4	I feel unhealthy after I have eaten ready meals.
WTB1	I will buy this product.
WTB2	Next time I am buying a ready meal, I will choose this product.
WTB3	I prefer this product to other types of ready meal.

4. Results

As shown in Table 5, feelings of guilt decreased for the group of RTH meals as respondents IHLC increased. However, the result was not statistically significant (β=-0.134, p=0.072) and Hypothesis 1a is not supported. Because consumers believed themselves to have control over their own health, feelings of guilt over using RTH meals were reduced.

By contrast, feelings of guilt increased as consumers' PHLC increased in relation to the consumption of RTH meals (β=0.199, p=0.005), supporting Hypothesis 1b. Because these consumers rely on medical treatment to remain healthy, their feelings of guilt increased as a result of consuming RTH meals. This means consumers who depend on their physicians or who care about their significant others experience guilt when they consume RTH meals.

Contrary to expectations regarding Hypothesis 1c, the higher consumers' CHLC was, the greater their feelings of guilt in the RTH meals group (β=0.327, p=0.000). Even though consumers believed that being healthy is a matter of fate and thus out of their control, the guilt experienced when using RTH meals increased.

In the RTC meals group, consumers' guilty feelings decreased (β=-0.149, p=0.127) as their IHLC increased. Hypothesis 2a was not supported, however, because their feelings of guilt were not statistically significant. Even though people felt that they were responsible for their own health, their guilty feelings decreased, regardless of the type of ready meal.

In the RTC meals groups, as consumers' PHLC increased, so too did their guilty

feelings, with a statistical significance (β=0.338, p=0.000) supporting Hypothesis 2b. Because people value their family members and are likely to listen to medical information, their feelings of guilt increased when consuming RTC meals.

Hypothesis 2c was not supported. Although consumers' feelings of guilt increased as their level of CHLC increased when consuming RTC meals, the guilt experienced was not significant (β=0.086, p=0.167). Even though people believed that their health was out of their control, their guilty feelings at consuming RTC meals increased. It is difficult to generalize from this result, however, because of the statistical value.

Consumers' willingness to buy ready meals decreased in both the RTH (β=-0.544, p=0.000) and RTC (β=-0.460, p=0.000) meals groups as their guilt at consuming ready meals increased. Given these results, Hypotheses 1d and 2d are supported.

With regard to the control variables, only income had a significant effect on willingness to buy RTH ready meals (β=-0.142, p=0.023). Age, number of dependent children, and monthly groceries expenditure had a positive effect on willingness to buy, but none of these had any significance in either group. As consumers' income increases, their willingness to buy RTH ready meals decreases. Overall, there was no significant difference between the two groups in relation to willingness to buy.

Table 3

Correlation of Latent Variables of the RTH Meals Group

	CHLC	GF	IHLC	PHLC	WTB	Age	Child	Grocery	Income
CHLC	1								
GF	0.407	1							
IHLC	-0.300	-0.257	1						
PHLC	0.202	0.282	-0.126	1					
WTB	-0.138	-0.507	0.209	0.014	1				
Age	-0.133	0.155	-0.013	0.102	-0.013	1			

13

Child	-0.126	-0.068	-0.065	0.047	0.190	0.508	1	
grocery	0.154	0.202	-0.076	0.159	0.034	-0.158	0.083	1
income	-0.113	-0.080	-0.040	-0.018	-0.031	-0.035	0.176	0.243	1

Table 4

Correlation of Latent Variables of the RTC Meals Group

	CHLC	GF	IHLC	PHLC	WTB	Age	Child	Grocery	Income
CHLC	1								
GF	0.246	1							
IHLC	0.123	-0.054	1						
PHLC	0.529	0.345	0.251	1					
WTB	0.140	-0.457	0.079	0.057	1				
Age	0.197	-0.003	0.208	0.199	0.104	1			
Child	0.188	0.076	0.009	0.063	0.109	0.520	1		
Grocery	-0.038	0.099	-0.057	0.089	-0.144	-0.182	0.046	1	
Income	0.015	-0.033	0.070	0.003	-0.060	0.051	0.040	0.056	1

Table 5

Results of Structural Model

	RTH meals group		RTC meals group	
	Path coefficients	P-value	Path coefficients	P-value
IHLC -> GF	-0.134	0.072	-0.149	0.127
PHLC -> GF	0.199	0.005	0.338	0.000
CHLC -> GF	0.327	0.000	0.086	0.167
GF -> WTB	-0.544	0.000	-0.460	0.000
age -> WTB	0.013	0.449	0.013	0.446
child -> WTB	0.158	0.062	0.145	0.072
grocery -> WTB	0.167	0.027	-0.099	0.062
income -> WTB	-0.142	0.023	-0.077	0.208
R²	0.316		0.246	

5. Discussion

Given that health is an important factor affecting consumers' food consumption practices (Contento, Michela, & Goldberg, 1988; Geeroms, Verbeke, & Kenhove, 2008; Roininen et al., 2001; Roininen, Lahteenmaki, & Tuorila, 1999; Schifferstein & Oude Ophuis,

1998), the present research studied how each HLC affects guilty feelings from consuming different types of ready meal, which ultimately affects willingness to buy ready meals.

Before discussing the results, it is crucial to consider the difference in preparation times required for RTH and RTC meals. There have been very few studies regarding preparation times for different types of ready meal, but it is commonly thought that RTC meals require more preparation time than RTH meals do. Consumers who use RTH meals may place the package into a microwave oven or pour the contents into a dish, in accordance with the instructions, in a process that takes under five minutes. By contrast, RTC meals must be prepared from scratch, although all the packaged ingredients are processed. Occasionally, consumers may modify the recipe by adding other ingredients, indicating that RTC ready meals require more care and time to prepare.

The results presented in Table 5 illustrate that CHLC has a positive effect on feelings of guilt only in relation to RTH meals. Consumers with higher CHLC think that being cheerful is an important health-related motivation. These individuals control their health altruistically since they desire "good social contacts" and "harmony with oneself and others" (Geeroms, Verbeke, & Kenhove, 2008). For them, RTH meals cannot satisfy their needs, since there is no scope to invest greater time and effort in the meal when using a microwave. A reduction in cooking time seems undesirable for them, since it may give the impression that they are neglecting their duty toward their significant others. Thus, ready-meal consumption can induce negative feelings like guilt for consumers who have a strong sense of social responsibility (Geeroms, Verbeke, & Kenhove, 2008).

PHLC had a positive effect on guilty feelings in consuming both RTH and RTC meals. Consumers with a higher PHLC consider health to be a social responsibility (Geeroms, Verbeke, & Kenhove, 2008). People with higher EHLC perceive health as an extension of

social activity. However, one of the features of PHLC that distinguishes it from CHLC is that it causes a greater desire to be healthy (Wallston & Wallston, 1978b). Although both segments are classified as EHLC, a higher PHLC is associated with greater concern about one's health than a higher CHLC. Even RTC meals may arouse feelings of guilt, since the meals' preparation is seemingly effortless and offers little opportunity to impress others. Furthermore, these consumers may also believe that ready meals are not good for their health, regardless of the meal type.

It is noteworthy that IHLC had no significant effect for either group. Consumers with higher IHLC regard health as an individualistic responsibility (Geeroms, Verbeke, & Kenhove, 2008). Maintaining their bodies and staying slim are important sources of motivation in their lives. They may place greater emphasis on their private lives than on socializing with other people. Using a microwave to prepare a meal may be less associated with feelings of guilt because these individuals are not obliged to invest time and energy in serving others. Thus, the belief that the maintenance of one's health is an individualistic concern can engender a more positive attitude toward ready meals. The consumption of RTH ready meals does not necessarily mean that those consuming them do not care about their health. Rather, consumers who live hectic lives simply opt for greater efficiency. Rational consumers with limited resources—little time and poor cooking skills—make the optimal choice to minimize opportunity cost.

Food consumption works as a tool to achieve and maintain a healthy life and is imbued with high levels of social and cultural value. (Costa et al., 2003; Roininen, Lahteenmaki, & Tuorila, 1999). Therefore, no food consumption process should be a burden for consumers. The consumption of ready meals may or may not be a rational choice, depending on how consumers perceive their HLC and social relationships.

16

6. Implications

6.1. Theoretical Implications

HLC has been commonly used as a predictor of health-related behavior in social learning theory (Rotter, 1966). Unlike studies in which only health-related behavior variables were used, the present paper includes feelings of guilt to test for variation in relation to HLC. Moreover, because the consumption of ready meals may be associated with feelings of guilt, it is thus worth exploring the relationship between HLC and such feelings when trying to understand the relationship between health and ready-meal consumption. Even though Bennett et al. (1994) examined broad food consumption and the eating behavior of consumers, research focused on ready-meal consumption is rare. Given this fact, the present paper is expected to broaden the body of knowledge in social learning theory.

6.2. Managerial Implications

The findings from this study also provide managerial implications for the Korean ready-meal market. People with a higher IHLC may or may not purchase ready meals since guilty feelings decreased without statistical significance in relation to both ready-meal groups. Thus, there is a risk in developing ready meals for these consumers. Similarly, managers in the food business are unlikely to target consumers who have a higher PHLC, that is, people who are not likely to cook ready meals for their significant others because they care more about their family members and trust medical information more. Further studies could examine whether adding extra vegetables and fruits, which are hardly found in ready meals (Horning et al., 2017), could reduce their guilty feelings. People with a higher CHLC would be appropriate target customers, especially in the RTC meals market. The opportunity to demonstrate their care for others contributes to the creation of strong bonds and increases

their confidence and self-efficacy in cooking. Supporting consumers in the discovery of their interest in and talent for cooking may help to decrease their sense of guilt, leading to their greater willingness to buy. However, identifying which consumers have which type of HLC in various markets needs to be investigated before any practical application is possible.

References

AbuSabha, R., & Achterberg, C. (1997). Review of self-efficacy and locus of control for nutrition-and health-related behavior. Journal of the American Dietetic Association, 97(10), 1122-1132.

Anderson, A., Wrieden, W., Tasker, S. et al. (2008). Ready meals and nutrient standards: challenges and opportunities. Proc Nutr Soc 67, E223.

Armitage, C. J., Norman, P., & Conner, M. (2002). Can the theory of planned behavior mediate the effects of age, gender and multidimensional health locus of control?. British journal of health psychology, 7(3), 299-316.

Bennett, P. Moore, L., Smith, A., Murphy, S., & Smith, C. (1994). Health locus of control and value for health as predictors of dietary behavior. Psychology and Health, 10:1, 41-54.

Benton, D., Greenfield, K., & Morgan, M. (1998). The development of the attitudes to chocolate questionnaire. Personality and Individual Differences, Vol. 24, Issue 4, 513-520.

Beshara, M., Hutchinson, A., & Wilson, C. (2010). Preparing meals under time stress. The experience of working mothers. Appetite, 55, 695-700.

Calnan M. (1989) Control over health and patterns of health related behaviour. Social Science and Medicine, 29, 131-136.

Candel, M. J. (2001). Consumers' convenience orientation towards meal preparation: conceptualization and measurement. Appetite, 36(1), 15-28.

Carlson B. R. and Petti K. (1989) Health Locus of Control and participation in physical activity. American Journal of Health Promotion, 3, 32-37.

Celnik, D., Gillespie, L., & Lean, M. E. J. (2012). Time-scarcity, ready-meals, ill-health and the obesity epidemic. Trends in Food Science & Technology, 27, 4-11.

Cho, Y., Kim, N., Lee, M. M., Lim, J. H., Han, H. & Park, H. Y. (2015). South Korean women leaders' struggles for a work and family balance. Human Resource Development International, 18:5, 521-537.

Contento, I. R., Michela, J. L., & Goldberg, C. J. (1988). Food choice among adolescents: Population segmentation by motivations. Journal of Nutrition Education, 20(6), 289–298.

Costa, A. I. A., Dekker, M., Beumer, R. R., Rombouts, F. M., & Jongen, W. M. F. (2001). A consumer-oriented classification system for home meal replacements. Food Quality and Preference, 12, 229-242.

Costa, A. I. A., Schoolmeester, D., Dekker, M., & Jongen, W.M.F. (2003). Exploring the use of consumer collages in product design. Trends in Food Science & Technology, Vol. 14, 17-31.

Costa, A. I. A., Schoolmeester, D., Dekker, M., & Jongen, W.M.F. (2007). To cook or not to cook: A means-end study of motives for choice meal solutions. Food Quality and Preference, 18, 77-88.

Dahl, D. W., H. Honea and R. V. Manchanda. (2003). The Nature of Self-Reported Guilt in

Consumption Contexts, Marketing Letters, 14(3), 159–171.

Daniels, S., Glorieux, I., Minnen, J., & Tienoven, T. P. (2012). More than preparing a meal? Concerning the meanings of home cooking. Appetite, 58, 1050-1056.

Dave, J. M., An, L. C., Jeffery, R. W., & Ahluwalia, J. S. (2009). Relationship of attitudes toward fast food and frequency of fast‑food intake in adults. Obesity, 17(6), 1164-1170.

Dielman T.E., Campanelli P.C., Shope J.T. and Butchart A.T. (1987) Susceptibility to peer pressure, self- esteem, and health locus of control as correlates of adolescent substance abuse. Health Education Ouarterly. 14, 207-221.

Douthitt, Robin A., Kim, S. (2006). The Effects of Mothers' Market Work Participation and Away-from-Home Food Consumption on Children's Selected Nutrient Intakes. International Journal of Human Ecology: Vol. 7, No.2, December 2006. 63-74.

Eisenberg, N. (2000). Emotion, Regulation, and Moral, Development, Annual Review of Psychology, 51, 665–697.

Eiser J.R., Eiser C., Gammage P. and Morgan M. (1989). Health Locus of Control and Health Beliefs in relation to adolescent smoking. British Journal of Addiction, 84, 1059-1065.

Gaignaire, A., Politzer, N. et al. (2011). "The study of effect evaluation of Classes du Goût on food consumption," a final report «EVALUATION des EFFETS des CLASSES DU GOUT», Ministère de l᾽Agriculture, de l᾽Agroalimentaire et de la Forêt (MAAF).

Geeroms, N., Verbeke, W., & Kenhove, P. V. (2008). Consumers' health-related motive orientations and ready meal consumption behavior. Appetite, 51, 704-712.

Gibson, J, Armstrong, G. & McIlveen, H. (2000). A case for reducing salt in processed foods. Nutr Food Sci 30, 167–173.

Horning, M. L., Fulkerson, J. A., Friend, S. E., & Story, M. (2017). Reasons Parents Buy Prepackaged, Processed Meals: It Is More Complicated Than "I Don't Have Time". Journal of Nutrition Education and Behavior, Vol. 49, 60-66.

Horst, K., Brunner, T. A., & Siegrist, M. (2010). Ready-meal consumption: associations with weight status and cooking skills. Public Health Nutrition, 14(2), 239-245.

Jabs, J., & Devine, C. M. (2006). Time scarcity and food choices: An overview. Appetite, 47, 196-204.

Latan, H. and Ghozali, I. (2012). Partial Least Square Konsep, Teknik dan Aplikasi Menggunakan Program SmartPLS 2.0 M3. Semarang: Badan Penerbit Universitas Diponegoro.

Lee, K., Um, C. C., & Kim, S. (2004). Multiple Roles of Married Korean Women: Effect on Depression. Springer Science + Business Media, Inc, Sex Roles, Vol.51, Nos. 7/8, 469-478.

Lee, S., Lee, K., & Jung, H. (2018). The health directionality and cooking convenience of HMR products and the effect of product quality on customer satisfaction and purchasing behavior. International Journal of Tourism and Hospitality Research, Vol. 32(11), 169-181.

Levenson, H. (1974). Activism and powerful others: distinctions within the concept of

internal-external control. J Pers Assess, 38:377-383.

Mai, R., & Hoffman, S. (2015). How to Combat the Unhealthy = Tasty Intuition: The Influencing Role of Health Consciousness. Journal of Public Policy & Marketing, Vol. 34(1), 63-83.

Marks, L. J. and M. A. Mayo. (1991). An Empirical Test of a Model of Consumer Ethical Dilemmas, Advances in Consumer Research, 18, 720–728.

Norman, P., Bennett, P., Smith, C., & Murphy, S. (1998). Health Locus of Control and Health Behaviour. Journal of Health Psychology, Vol. 3(2), 171-180.

Olsen, N. V., Sijtsema, S. J., & Hall, G. (2010). Predicting consumers' intention to consume ready-to-eat meals. The role of moral attitude. Appetite, 55, 534-539.

Park Min-Hee, Kwon Mahn-Woo, Nah Ken. (2019). Study on Repurchase Intention of RTP HMR Products: Focused on Meal kit. Journal of Korean Conference, Vol.15, No.2, 548-557.

Perlman M. (1958). An Investigation of Anxiety as Related to Guilt and Shame. AMA Arch NeurPsych, Vol. 80(6), 752–759.

Roininen, K., Lahteenmaki, L., & Tuorila, H. (1999). Quantification of consumer attitudes to health and hedonic characteristics of foods. Appetite, 33, 71–88.

Roininen, K., Tuorila, H., Zandstra, E. H., de Graaf, C., Vehkalahti, K., Stubenitsky, K., & Mela, D. J. (2001). Differences in health and taste attitudes and reported behaviour among Finnish, Dutch and British consumers: A cross-national validation of the health and taste attitude scale. Appetite, 37, 33–45.

Rotter, J.B. (1954). Social Learning and Clinical Psychology. Englewood Cliffs, NJ, Prentice-Hall.

Rotter, J. B. (1966). Generalized expectancies for internal and external control of reinforcement. Psychological Monographs: General and Applied, 80 (whole no.609), 1–28.

Rotter, J.B. (1972). Chance J, Phares EJ: Applications of a Social Learning Theory of Personality. New York, Holt, Rinehart & Winston.

Schifferstein, H. N. J., & Oude Ophuis, P. A. M. (1998). Health-related determinants of organic food consumption in the Netherlands. Food Quality and Preference, 9(3), 119–133.

Segall ME. and Wynd C.A. (1990). Health conception, Health Locus of Control, and Power as predictors of smoking behavior change. American Journal of Health Promotion, 4, 338-344.

Skoe, E. E. A., N. Eisenberg and A. Cumberland. (2002). The Role of Reported Emotion in Real-Life and Hypothetical Moral Dilemmas, Personality and Social Psychology Bulletin, 28(2), 962–973.

Steenhaut, S. & Van Kenhove, P. (2005). Relationship Commitment and Ethical Consumer Behavior in a Retail Setting: The Case of Receiving Too Much Change at the Checkout, Journal of Business Ethics, 56, 335–353.

Strutton, D., S. J. Vitell and L. E. Pelton. (1994). How Consumers may Justify Inappropriate Behavior in Market Settings: An Application on the Techniques of Neutralization, Journal of Business Research, 30, 253–260.

Troye, S. V., & Supphellen, M. (2012). Consumer Participation in coproduction: "I Made It Myself" Effects on Consumers' Sensory Perceptions and Evaluations of Outcome and Input Product. Journal of Marketing, Volume 76, 33-46.

Turner, S.A., Luszczynska, A., Warner, L., & Schwarzer, R. (2010). Emotional eating and uncontrolled eating styles and chocolate chip cookie consumption. A controlled trial of the effects of positive mood enhancement. Appetite, 54, 143-149.

Van der Horst, K., Brunner, T. A., & Siegrist, M. (2011). Ready-meal consumption: associations with weight status and cooking skills. Public health nutrition, 14(2), 239-245.

Wallston, B. S., Wallston, K. A., Kaplan, G. D.., & Maides, S. A. (1976). Development and validation of the Health Locus of Control (HLC) Scale. Journal of Consulting and Clinical Psychology, 44(4), 580-585.

Wallston, B. S., & Wallston, K. A. (1978a). Locus of control and health: A review of the literature. Health education monographs, 6(1), 107-117.

Wallston, K. A., & Wallston, B. S. (1978b). Development of the Multidimensional Health Locus of Control (MHLC) Scales. Health Education Monographs, Vol. 6, No.2, 160-170.

Wallston, K. A. (1991). The importance of placing measures of health locus of control beliefs in a theoretical context. Health Education Research, 6(2), 251-252.

Winefield H.R., Winefield A.H., Tiggeman M. and Goldney R.D. (1989). Psychological concomitants of tobacco and alcohol use in young Australian adults. British Journal of Addiction, 84, 1067-1073.

Wong, K. K. K. (2013). Partial Least Squares Structural Equation Modeling (PLS-SEM) Techniques Using SmartPLS. Marketing Bulletin, 24, 1-32.

Yana, A. G. A., Rusdhi, H. A., & Wibowo, M. A. (2015). Analysis of factors affecting design changes in construction project with Partial Least Square (PLS). Procedia Engineering, 125, 40-45.

Appendix

Appendix A

Internal consistency and convergent validity of the RTH meals group

Item	Loading	Mean	SD	CR	AVE
IHLC2	0.7398	4.03	0.81	0.8372	0.723
IHLC6	0.948	3.89	0.78		
PHLC3	0.8545	2.95	0.9	0.8324	0.7129
PHLC5	0.8341	2.72	0.79		
CHLC2	0.722	2.94	0.77	0.7878	0.5534
CHLC4	0.7326	2.41	0.8		
CHLC6	0.776	2.42	0.98		
GF1	0.7783	2.45	0.88	0.8827	0.653
GF2	0.8029	2.11	0.9		
GF3	0.8376	1.85	0.86		
GF4	0.8125	2.92	0.98		
WTB1	0.9041	3.53	0.88	0.9227	0.7992
WTB2	0.8964	3.5	0.85		
WTB3	0.8813	3.08	0.84		

Appendix B

Internal consistency and convergent validity of the RTC meals group

Item	Loading	Mean	SD	CR	AVE
IHLC1	0.7245	3.53	0.94	0.8723	0.5782
IHLC2	0.7792	4.11	0.76		
IHLC4	0.8255	3.91	0.80		
IHLC5	0.702	3.52	0.95		
IHLC6	0.7647	3.89	0.77		
PHLC2	0.828	2.8	0.98	0.8121	0.6837
PHLC5	0.8257	2.83	0.90		
CHLC2	0.8286	3.13	0.89	0.827	0.6152
CHLC3	0.7943	2.78	1.03		
CHLC6	0.7266	2.65	1.05		
GF1	0.848	2.29	0.85	0.903	0.6998
GF2	0.8396	2.3	1.08		
GF3	0.8747	1.92	0.92		
GF4	0.781	2.77	0.99		
WTB1	0.9015	3.66	0.81	0.8869	0.7241
WTB2	0.8759	3.7	0.84		
WTB3	0.7698	3.22	0.82		

Contents

The substitution of fresh foods with ready meals: from a perspective of family medical history and hedonic food purchase[3]

Abstract

A family medical history of chronic disease can affect all aspects of one's lifestyle, including diet, since having a healthy diet helps prevent diseases. Studies that examine whether processed food increases the risk of chronic diseases are prevalent, but the risk to health posed by ready meals is a notable gap in research. Although ready meals, which are some of the most highly processed food items available, are perceived as unhealthy, the Korean ready meal market is on the rise. This greatly concerns the Korean government, as the socio-economic burden of the treatment of chronic diseases is expected to rise in the coming years. Considering that food preference is determined by eating habits and usual food choices, it is expected that consumers' usual food choices would influence their ready meal purchase behavior. Snacks and beverages are known as hedonic foods: foods that grant immediate gratification, despite causing adverse health outcomes. In order to understand the factors that affect consumers' purchase of ready meals, this present study investigated an effect of a family history of chronic disease on the purchase ratio of ready meals to fresh foods. In addition, the moderating effect of energy-dense snack and sugar-sweetened beverage purchase expenditure was examined. Secondary panel data collected by the Rural Development Administration (RDA) of Korea was used in multiple regression analysis. The results showed that there is a positive relationship between a family medical history of

---

hypertension and a purchase ratio of grain-based ready meals to fresh grain under conditions of high snack and beverage purchase expenditure and a negative relationship between a family medical history of hypertension and a purchase ratio of grain-based ready meals to fresh grains under conditions of low snack and beverage purchase expenditure. In addition, having a family medical history of diabetes has a stronger effect on the purchase ratio of vegetable-based ready meals to fresh vegetables when snack and beverage purchase expenditure is lower. The reverse is true when snack and beverage purchase expenditures are higher. In this study, ready meals are assigned to one of three groups based on the primary ingredient—grain (rice), meat, and vegetables—and were examined as a ratio of ready meals to fresh foods calculated based on consumers' expenditures, using secondary panel data.

Keywords: ready meals, hedonic foods, disease status, moderating effect

The substitution of fresh foods with ready meals: from a perspective of family medical history and hedonic food purchase

1. Introduction

Family medical history is a significant factor in many common diseases, including breast cancer, diabetes, and stroke. (Acheson *et al*., 2010). People aware of their family medical history tend to perceive that they are at risk for certain diseases and take preventative actions accordingly (Walter *et al*., 2004; Walter and Emery, 2005). In fact, many studies state that risk perceptions, anxiety, and perceived control motivate consumers to take preventative measures (Becker, 1974; Janz and Becker, 1984). Among the most common diseases, chronic and degenerative diseases have been one of the primary causes of death around the world in the early 2000s, especially in developed countries in North America, Europe, and the Western Pacific (Goulding, 2003).

According to the World Health Organization (2002), chronic diseases include cardiovascular disease, hypertension, stroke, diabetes, cancer, and chronic respiratory disease, among others. Senior citizens are particularly vulnerable to chronic disease (World Health Organization, 2002). These diseases cause permanent and irreparable pathological change through gradual processes and require consistent management (Anderson and Bauwens, 1981). In Korea, the death rate of cardiovascular disease, cerebrovascular disease, and hypertension disease is high among all age categories, and the rate is on the rise (Statistics Korea, 2019). Stroke is a cerebrovascular disease that ranks among the top ten causes of death for Koreans every year (Statistics Korea, 2019). One of the adjustable risk factors for stroke is diabetes. Diabetic patients are twice as likely to suffer a stroke as the general population, and more than 70 percent of diabetic patients die from a stroke (Lyu *et al*., 2019).

1

Accordingly, this paper defines chronic disease as stroke, cardiovascular disease, hypertension, and diabetes.

Chronic diseases are mostly affected by lifestyle (Lalonde, 1974), so having a healthy diet and lifestyle plays a significant role in preventing chronic diseases (Oude Griep *et al.*, 2010). Many studies have shown that consumption of ultra-processed food increases the risk of cardiovascular disease, coronary heart disease, cerebrovascular disease (Srour *et al.*, 2019), and all-cause mortality (Rico-Campà *et al.*, 2019). Accordingly, ready meals are also believed to cause adverse health outcomes, as they are also ultra-processed food products (Monteiro *et al.*, 2011). Whereas other studies that examined processed food consumption addressed all processed foods and beverages (see Marrón-Ponce *et al.*, 2018; see also Rauber *et al.*, 2018), this study focuses on ready meal products that are designed to replace homemade meals (Costa *et al.*, 2001) in order to distinguish them from processed culinary ingredients (e.g., oils, butter, sugar, and salt).

Despite a perception that ready meals are unhealthy (Costa *et al.*, 2003), the Korean ready meal market is on the rise (Park *et al.*, 2019). Therefore, examining factors that affect consumers' ready meal purchases could aid the Korean government in reducing the socio-economic burden of treating chronic diseases, as 33.6% of Korea's population currently suffers from a chronic condition (Ministry of Health and Welfare, 2019). This study aims to demonstrate the association between a family medical history of chronic disease and the purchase ratio of ready meals using secondary panel purchase data.

Whereas most of the previous research has focused on how a family medical history of chronic disease affects diet, this study mainly examines how family medical history influences the purchase ratio of ready meals to their fresh food equivalents. Purchase ratio indicates a substitution rate between ready meals and fresh foods. As the name suggests,

2

ready meals are purchased as substitutes for homemade meals for convenience (Carrigan *et al*., 2006). Thus, a higher purchase ratio of ready meals to fresh foods means that consumers are more likely to substitute fresh foods with ready meals, and vice versa.

Moreover, this present study predicts that a family medical history of chronic disease is not the only rationale for ready meal purchase, since individual food choice and eating behavior are a result of interrelated factors (Janssen *et al*., 2018). Considering that food preference is determined by eating habits and typical food choices (Bobowski *et al*., 2015; Methven *et al*., 2012), we suggest that the purchase ratio of ready meals might vary depending on snack and beverage purchase expenditures. Even though energy-dense snacks and sugar-sweetened beverages can cause excessive weight gain (Mozaffarian *et al*., 2011; Woodward-Lopez *et al*., 2010), they are regarded as hedonic foods (Decock *et al*., 2016; Ullrich *et al*., 2013) that give immediate gratification (Bazerman *et al*., 1998).

Decock *et al.* (2016) found that adolescents who purchased more snacks and beverages were more sensitive to rewards than those who purchased fewer snacks and beverages. Since emotional stimuli influence hedonic food consumption (Hirshman and Holbrook, 1982), it is expected that consumers who purchase more snacks and beverages are more likely to seek excitement in food choice than those who do not. As consumers already anticipate hedonic foods to be less healthy, the fact that ready meals give immediate stimuli with high calories, fat, salt, and sugar (Anderson *et al*., 2008) is likely to please frequent consumers of snacks and beverages.

Given the previous research, this study suggests that snack and beverage purchases have a moderating effect on the relation between a family medical history of major disease and the purchase ratio of ready meals. This study is also the first to examine the moderating role of snack and beverage purchases on the relationship between a family medical history of

chronic diabetes and the purchase ratio of ready meals to fresh foods. Thus, this study provides original contributions to the field of public health and the food industry. Accordingly, the objective of the present study is to demonstrate the moderating effect of snack and beverage purchase expenditure on the link between family medical history of major diseases and purchase ratio of ready meals and fresh foods.

2. Literature Review

2.1. Family medical history of chronic disease

Chronic and degenerative diseases have become the main cause of death in the early 2000s over the world (Goulding *et al*., 2003). Seong *et al.* (2004) demonstrated that this trend is due to an aging population. Although chronic diseases are mostly affected by lifestyle, the effect of genetic factors and environmental factors should not be neglected (Lalonde, 1974). Previous literature has discovered that a family medical history of chronic diseases is one of the predictors for disease-preventing efforts (Hunt *et al.*, 2003). Rodriguez-Moran M *et al.* (2010) found that children with a family medical history of hypertension are two times more likely to have hypertension than those with parents of normal blood pressure. Park (2013) showed that children's blood sugar was higher if one parent had diabetes compared to those who had parents with normal blood pressure. This indicates that people with a family medical history of chronic disease need to adopt healthy lifestyle habits like those used to manage disease in order to prevent developing these diseases later in life. Accordingly, this present study uses a family medical history of stroke, cardiovascular disease, hypertension, and diabetes as a family medical history of chronic diseases.

Many previous studies have examined how the morbidity of chronic diseases could be adjusted by consumers' lifestyle factors. When it comes to stroke, Larsson (2014)

4

investigated the association between a low-risk lifestyle and the risk of stroke. A low-risk lifestyle was defined as a healthy diet, moderate alcohol consumption, no smoking, physical activity, and body mass index below 25kg/m^2. Healthy food items include fruit, vegetables, nuts, low fat dairy foods, whole grain foods, and fish. On the contrary, less healthy food items include red meat, processed meat, white bread, sweets, and so on. The risk of stroke was reduced as the low-risk lifestyle factor increased. Based on the literature, we propose that having a family medical history of stroke would affect consumers with the perception that ready meals are unhealthy (Costa *et al.*, 2003) when purchasing groceries.

As stated before, having a healthy diet is a significant factor in the prevention of chronic disease (Oude Griep *et al.*, 2010). An unhealthy diet, however, can lead directly to adverse health outcomes. For example, high consumption of white rice increases the risk of diabetes (Bhavadharini *et al.*, 2020), since rice is a carbohydrate-supply food that contains a high glycemic index (Brand-Miller *et al.*, 2009). Most grain-based ready meals in Korea use white rice, and even products that use whole grain are mixed with white rice (Park *et al.*, 2020). While whole grain helps to prevent cardiovascular disease and metabolic syndrome (McKeown *et al.*, 2004; Ye *et al.*, 2012), a high dietary glycemic index and glycemic load are associated with risk of coronary heart disease (Liu *et al.*, 2000), diabetes (Meyer *et al.*, 2000), and stroke (Oba *et al.*, 2010).

The effects of meat consumption on coronary heart disease and diabetes varies, depending on the degree of processing (Micha and Mozaffarian, 2010). In another study, processed meat led to a higher risk of diabetes compared to unprocessed meat, and this is attributed to the higher sodium and cholesterol content in processed meat (Micha *et al.*, 2012). Regardless, it is well understood that both processed meat and unprocessed meat are not beneficial for cardio metabolic health. Consuming processed red meat is associated with a

higher risk of metabolic syndrome, including diabetes, hypertension, and cardiovascular disease (Babio *et al*., 2012).

When it comes to vegetables, high consumption of fruit and vegetables is associated with a lower risk of cardiovascular disease (Hung *et al*., 2004). Unlike other food items, however, processed vegetables do not seem to affect the risk of chronic disease. Oude Griep (2010) found that high consumption of fruit and vegetables reduces the risk of coronary heart disease, regardless of whether it was processed or not. Even though fruit juice and cooked vegetables lose intact cell walls and insoluble fiber (Colin-Henrion *et al*., 2009), it is believed that improved bioavailability of bioactive compounds has contributed to the lower risk of coronary heart disease. Based on the literature, the authors expect that a family medical history of chronic disease would positively affect the purchase ratio of vegetable-based ready meals to fresh vegetables. According to the literature, we present the following hypotheses:

H1a. *Family medical history of stroke negatively affects the ratio of grain-based ready meal purchase expenditure to fresh grains.*

H1b. *Family medical history of stroke negatively affects the ratio of meat-based ready meal purchase expenditure to fresh meats.*

H1c. *Family medical history of stroke positively affects the ratio of vegetable-based ready meal purchase expenditure to fresh vegetables.*

Many studies have theorized that Mediterranean food patterns have an effect in preventing cardiovascular disease (e.g., Trichopoulou *et al*., 2003; Knoops *et al*., 2004). The Mediterranean diet could be described as one that features high fiber, high vegetable fat, low trans fatty acids, and a moderate intake of alcohol (Schulze *et al*., 2007). Martínez-González

(2011) assessed the relationship between a Mediterranean diet and the incidence of cardiovascular disease (CVD) and found that a Mediterranean diet was associated with a lower risk of CVD.

H2a. Family medical history of cardiovascular disease negatively affects the ratio of grain-based ready meal purchase expenditure to fresh grains.

H2b. Family medical history of cardiovascular disease negatively affects the ratio of meat-based ready meal purchase expenditure to fresh meats.

H2c. Family medical history of cardiovascular disease positively affects the ratio of vegetable-based ready meal purchase expenditure to fresh vegetables.

Elevated blood pressure increases the risk of cardiovascular disease, stroke, kidney failure, and other diseases. (Chobanian *et al.*, 2003). As an initial treatment for hypertension, dietary change is conducted before drug therapy (Appel *et al.*, 2006). A reduction in blood pressure was demonstrated when people with a high risk of hypertension had a low sodium diet (Hunt *et al.*, 1998) and salt reduction through high fruit, vegetable, and low-fat diets (Svetkey *et al.*, 2001). According to the literature, people with a family medical history of hypertension would be affected by the fact that ready meals contain high sodium (Costa *et al.*, 2003) in grocery shopping.

H3a. Family medical history of hypertension negatively affects the ratio of grain-based ready meal purchase expenditure to fresh grains.

H3b. Family medical history of hypertension negatively affects the ratio of meat-based ready meal purchase expenditure to fresh meats.

H3c. Family medical history of hypertension positively affects the ratio of vegetable-based ready meal purchase expenditure to fresh vegetables.

Changing lifestyle as well as losing weight are effective in preventing diabetes (Bantle *et al*., 2008). The Mediterranean diet is also effective in preventing diabetes (Martínez-González *et al*., 2008). As mentioned before, the Mediterranean diet is identified as a healthy diet containing a high intake of vegetables, fruits, nuts, moderate consumption of wine and alcohol, and a low intake of red and processed meat and whole-fat dairy products (Martínez-Gonza´lez *et al*., 2009). Other observational studies have shown that diets rich in vegetables and low in red meat and whole-fat dairy products are associated with a decreased risk of diabetes, whereas dietary patterns rich in red meats, processed foods, refined grains, and sugar increase diabetes risk (Kastorini and Panagiotakos, 2009). Accordingly, we suggest that people with a family medical history of diabetes would be influenced by the fact that ready meals lack fruit and vegetables compared to homemade meals (Horning *et al*., 2017) when purchasing groceries.

H4a. Family medical history of diabetes negatively affects the ratio of grain-based ready meal purchase expenditure to fresh grains.

H4b. Family medical history of diabetes negatively affects the ratio of meat-based ready meal purchase expenditure to fresh meats.

H4c. Family medical history of diabetes positively affects the ratio of vegetable-based ready meal purchase expenditure to fresh vegetables.

2.2. The moderating role of hedonic food consumption

Studies about the relationship between a family medical history of chronic disease and food choice have been actively researched, but studies examining how the relationship differs according to the moderating variable are rarely found. Decock *et al.* (2016) found that adolescents who have high sensitivity to rewards consumed more energy-dense snacks and sugar-sweetened beverages than those who have low sensitivity to rewards. This indicates that people who consume more snacks and beverages are more likely to seek excitement and new sensations in terms of food choice tendency. Thus, frequent consumers of snacks and beverages would also be attracted to ready meals that give immediate stimuli with high calories, fat, salt, and sugar (Anderson *et al.*, 2008). As snacks and beverages have been regarded as hedonic foods (Decock *et al.*, 2016; Ullrich *et al.*, 2013), it is expected that consumers who spend a lot of money on snacks and beverages would purchase more ready meals than fresh foods. Therefore, this paper predicts that consumers who purchase more snacks and beverages would lead to different results in association with a family medical history of chronic disease and purchase ratio of ready meals to fresh foods than those who purchase fewer snacks and beverages. Hence, we propose that snack and beverage purchase would have a moderating effect on a link between family medical history of chronic disease and purchase ratio of ready meals to fresh foods.

To describe each food item from a hedonic food consumption perspective, white rice was estimated as a pleasant food that had a high score on a hedonic scale in terms of color, odor, taste, and texture (Monge-Rojas *et al.*, 2014). Even though there are grain-based ready meals that use whole grain, they are often mixed with white rice, and most of the products are made of white rice itself (Park *et al.*, 2020). Accordingly, it is believed that grain-based ready meals are also perceived as hedonic food. Therefore, we expect that people who purchase

more snacks and beverages would also purchase more grain-based ready meals than those who purchase fewer snacks and beverages.

Meat and processed meat are widely consumed for their essential nutrients, such as proteins, minerals (iron, zinc, selenium), and vitamins, especially B6 and B12, with high sensory properties (Pérez-Palacios *et al*., 2019). However, processed meat products contain high amounts of fat, saturated fatty acids, cholesterol, salt, and synthetic additives (Paglarini *et al*., 2018). Processed meat contains large amounts of salt since it decreases water activity to inhibit the growth of pathogens and microorganisms, regulates biochemical and enzymatic reactions during maturity, and affects the final flavor (Inguglia *et al*., 2017). High amounts of sodium are related to high consumption of processed meat, which makes a pleasant flavor (Zandstra *et al*., 2016). Consumers do not always compromise taste for potential health benefits (Zandstra *et al*., 2016). The authors suggest that people who purchase more snacks and beverages would also purchase more meat-based ready meals than those who purchase fewer snacks and beverages.

Although a vegetable-rich diet is known to protect against chronic diseases and promote health (Committee, 2010), the bitterness of vegetables deters their consumption (Dinehart *et al*., 2006). Bitter vegetables rated low in hedonic ratings are disliked in general (Sharafi *et al*., 2013). However, the enjoyment of vegetables was increased if vegetables were seasoned with additives to mask bitterness (Sharafi *et al*., 2013). Since Korean vegetable-based ready meals, such as *kimchi,* are cooked with high sodium seasoning (Hong *et al*., 2014), the preference toward products in which bitterness is blocked with salt is expected to increase. Therefore, the authors suggest that consumers who purchase more snacks and beverages would purchase more vegetable-based ready meals than those who purchase fewer snacks and beverages. According to the literature, we present the following hypotheses:

H5a. A relationship between family medical history of (5-1a) stroke, (5-2a) cardiovascular disease, (5-3a) hypertension, and (5-4a) diabetes and grain-based ready meal purchase ratio is positively moderated by snack and beverage purchase expenditure.

H5b. A relationship between family medical history of (5-1b) stroke, (5-2b) cardiovascular disease, (5-3b) hypertension, and (5-4b) diabetes and meat-based ready meal purchase ratio is positively moderated by snack and beverage purchase expenditure.

H5c. A relationship between family medical history of (5-1c) stroke, (5-2c) cardiovascular disease, (5-3c) hypertension, and (5-4c) diabetes and vegetable-based ready meal purchase ratio is positively moderated by snack and beverage purchase expenditure.

Hirshman and Holbrook (1982) state that hedonic food consumption is affected by emotional stimuli such as taste, sound, scents, tactile impressions, and visual images. This implies that taste is more important to hedonic products (Hirschman and Holbrook, 1982). Consumers expect hedonic products to be less healthy and prefer unhealthy products when hedonic goals are the most salient factor they seek (Raghunathan *et al*., 2006). Hedonic foods can be described with the word 'wants' (Dhar and Wertenbroch, 2000), which implies immediate gratification (Bazerman *et al*., 1998). Foods that satisfy this hedonic impulse are often unhealthy foods that contain high fat and sugar (Wertenbroch, 1998).

3. Methods

The present study used panel data, which is secondary data collected by the Rural Development Administration (RDA) of Korea from 2015 to 2018. The actual purchase data contains the name of the product purchased by consumers, purchase frequency, purchase

quantity, and purchase expenditure as well as consumers' demographic characteristics. The RDA randomly selected 896 households and accumulated actual purchase data. This data reflects the purchase record of the person who manages grocery shopping for their household. Since the data had a relatively high number of panel members in their 60s, their data were excluded in order to obtain unbiased purchase records. As a result, the purchase records of 595 households were selected and used for a multiple regression analysis using STATA.

Ready meals were divided into three categories based on their main ingredients: grain (rice), meat, and vegetables. Ready meals were counted for multiple categories if they contained more than two main ingredients. For example, bulgogi (Korean barbecue) cup rice was categorized as both a grain-based and meat-based ready meal. Panel members who had not purchased any ready meals or fresh foods were excluded from the data. As a result, 586, 577, and 577 panel members were left for each category, respectively. The number of panel members varies as STATA proceeds analysis by removing missing values.

Table 1 shows the demographic characteristics of the panel for every category. Most panel members were female, though there were 27 male panel members in every category. The average age of panel members was 47, since panel data is concentrated on middle-aged people, especially those in their 40s and 50s. They had three family members on average, and the number of panel members that had children was much higher than that of the panel members that had no children. Their average monthly income was 5.21 million KRW. More specific information is described in Table 1 below.

Table 1. Demographic characteristics of panel members

		N (mean)	% (SD)
Gender	Male	27	4.54%
	Female	568	95.46%

Age	20-29	10	1.68%
	30-39	69	11.60%
	40-49	276	46.39%
	50-59	240	40.34%
Mean		47.34	7.25
Family number	1	66	11.09%
	2	67	11.26%
	3	162	27.23%
	4	243	40.84%
	5	47	7.90%
	6	8	1.34%
	7	1	0.17%
	8	1	0.17%
Mean		3.29	1.18
Children status	Y	462	77.65%
	N	133	22.35%
monthly income	Less than 2,000,000 KRW	37	6.22%
	2,000,000 ~ 2,990,000 KRW	53	8.91%
	3,000,000 ~ 3,990,000 KRW	92	15.46%
	4,000,000 ~ 4,990,000 KRW	109	18.32%
	5,000,000 ~ 5,990,000 KRW	107	17.98%
	6,000,000 ~ 6,990,000 KRW	83	13.95%
	7,000,000 ~ 7,990,000 KRW	40	6.72%
	more than 8,000,000 KRW	74	12.44%
Mean (unit: 10,000KRW)		521.15	331.27

Food item 1: Grain-based ready meal products

Koreans eat rice as a staple food, and 95% of rice is consumed in the form of boiled rice (Lee and Eun, 2008). Even though rice is processed in diverse ways [e.g., boiled rice, porridge, rice cakes, *Hangwa* (Korean traditional sweets and cookies), noodles, and rice wine] (Lee and Eun, 2008), snacks, noodles, and drinks were excluded from grain-based ready meals since these are not expected to replace homemade meals due to the complicated methods of their preparation.

Grain-based ready meals include ready-to-heat (RTH) products (*haetban* and *cupbab*), ready-to-eat (RTE) products [*kimbab* (laver roll)], and ready-to-cook (RTC) products (frozen fried rice). In 1996, the CJ Cheiljedang food corporation pioneered the instant rice market by introducing aseptic packed rice, or *haetban,* to the market (Kim and Park, 2001). haetban is a type of RTH product that could be microwaved or boiled in water. While *haetban* was initially made with only white rice, brown rice and mixed grain were used to expand the customer base (Kim *et al.*, 2017). Later, haetban with a small, packed side dish was launched under the name *cupbab* (cup rice) in order to relieve consumers' burden of preparing food. The side dish is separately enclosed in *cupbab* and contains various types of ingredients, such as pork, beef, and chicken. Following CJ, other food corporations started to release new instant rice products into the market (Kim *et al.*, 2017). Now there are various types of rice processed products, such as *haetban* (boiled rice), *cupbab* (cup rice), frozen fried rice, and rice porridge (Kim *et al.*, 2017). To compare with grain-based ready meals, uncooked white rice, brown rice, sticky brown rice, black rice, sticky rice, barley, black soybean, oat, millet, and sorghum were used as fresh grains.

Food item 2: Meat-based ready meal products

While grain and vegetables were commonly in the Korean diet before the 1970s, the use of animal products has consistently increased along with economic development (Yoon and Woo, 1999). Though ham and sausage used to be the most frequently consumed processed meat products until the 1980s in Korea, Yoon and Woo (1999) found that processed meat products had developed more varieties, including sausage, bacon, burger patties, canned meat, and ground meat, as the meat processing industry evolved.

We define meat-based ready meals as any ready meal containing processed meat that is

smoked, salted, or added with preservatives. However, meat-based ready meals that require more complicated cooking methods were excluded. For example, cured meats like ham, bacon, and sausage were excluded from this category, and the process of making them from scratch cannot be easily replicated in the typical household. Thus, meat-based ready meals that are used in this category include ready-to-heat (RTH) and ready-to-cook (RTC) products, such as cup rice with meat, pre-cooked vacuum-packed pork cutlet, pork rind, dim sum, meatball, fried chicken, sous vide chicken, nuggets, steaks, hamburger steaks, jokbal (pig's feet), ribs, bulgogi (barbequed beef), smoked duck, omelets, and bibimbap (boiled rice with meats and vegetables). On the contrary, fresh meat is unprocessed meat, including uncooked vacuum-packed pork, beef, chicken, lamb, duck, and egg.

Food item 3: Vegetable-based ready meal products

The Korean diet is well known for its low-fat and high-vegetable content, since it consists of rice, soup, and side dishes made of plant foods (Kim *et al.*, 2000; Lee *et al.*, 2002). Vegetables are used in various Korean dishes, including rice steamed with vegetables, porridge, rice cakes, soup, kimchi, casseroles, steamed vegetable dishes, na-mul (cooked vegetables), sang-chae (raw vegetables), ssam (vegetable wrap), fried vegetables, and hard-boiled foods. In particular, kimchi—a traditional Korean side dish—has been the most consumed processed vegetable by Koreans (Lee *et al*., 2002). As Koreans have enjoyed vegetables for a long period, the type of processed vegetables available is highly diverse. Thus, the demand for simple processed agricultural products has increased as the number of household members decreased and household monthly income increased (Sung *et al.*, 2017).

This paper divided vegetable products into fresh vegetables and vegetable-based ready meals. Fresh vegetables are ready-to-cook (RTC) products that should be heated or seasoned.

For instance, uncooked cucumber, eggplant, bracken, paprika, chili, cabbage, lettuce, sesame leaf, carrot, sweet pumpkin, green pumpkin, tomato, black tomato, cherry tomato, mushroom, ginger, radish, onion, green onion, zucchini, chive, yellow bean sprouts, garlic, spinach, and lotus root are included as fresh vegetables. These fresh vegetables could be used independently to make a Korean side dish or be added to other dishes as an extra ingredient.

Vegetable-based ready meals include ready-to-eat (RTE) vegetables (e.g., salad) and ready-to-end-cook (RTEC) vegetables. Ready-to-eat (RTE) vegetables could be considered a side dish consisting of precooked, seasoned, or fermented vegetables. Examples of vegetable-based ready meals include salad, precooked and seasoned chilled cucumber, eggplant, bracken, chili, sesame leaf, mushroom, radish, chive, yellow bean sprouts, and spinach.

4. Results

Food item 1: Grain-based ready meal products

Table 2 is a correlation matrix of variables that were used in category 1, and Table 3 shows the results of the panel regression analysis. Among demographic variables, age (β=-0.017, p=0.000) and family size (β=-0.212, p=0.053) had a negative effect on the purchasing ratio of grain-based ready meals, whereas gender (male) (β=0.164, p=0.001), monthly income (β=0.032, p=0.127) and an annual grocery shopping expenditure (β=0.040, p=0.735) had a positive effect on the purchasing ratio of grain-based ready meals. In other words, consumers purchased fewer grain-based ready meals as they got older. Male consumers purchase more grain-based ready meals than fresh grains. Consumers purchased fewer grain-based ready meals as the size of their family increased. Consumers who have higher monthly income and spend money on groceries purchased more grain-based ready meals compared to fresh grain. However, monthly income (β=0.032, p=0.127) and annual grocery shopping expenditure

(β=0.040, p=0.735) had no significance.

A family medical history of stroke (β=-0.070, p=0.142), CVD (β=-0.061, p=0.181), diabetes (β=-0.022, p=0.570), and hypertension (β=-0.063, p=0.063) showed a negative impact on the dependent variable. However, only a family medical history of hypertension (β=-0.063, p=0.063) had significance. This means that consumers purchased less grain-based ready meals if they had a family medical history of hypertension, supporting Hypothesis 3a.

For Hypothesis 5a, snack and beverage purchase expenditure × family medical history of stroke (β=0.433, p=0.000), snack and beverage purchase expenditure × CVD (β=0.150, p=0.134), snack and beverage purchase expenditure × diabetes (β=0.245, p=0.023), and snack and beverage purchase expenditure × hypertension (β=0.214, p=0.005) had a positive effect on the purchasing ratio of grain-based ready meals to fresh grains. Consumers purchased more grain-based ready meals as they spent more money on snacks and beverages. Except for the family medical history of CVD, the rest of the snack and beverage purchase expenditure × family medical history of chronic disease had an interaction effect. The authors have found both main effect (β=-0.063, p=0.063) and interaction effect (β=0.214, p=0.005) for family medical history of hypertension. The family medical history of high-pressure × snack and beverage purchase expenditure interaction is graphed in Figure 1. As it shows, there is a positive relationship between family medical history of hypertension and purchase ratio of grain-based ready meals to fresh grain under conditions of high snack and beverage purchase expenditure and a negative relationship between family medical history of hypertension and purchase ratio of grain-based ready meals to fresh grains under conditions of low snack and beverage purchase expenditure, supporting Hypothesis 5-3a.

Table 2. Correlation of Latent Variables of the Grain-based Ready Meals

.	(1) age	(2) monthly income	(3) family number	(4) an annual grocery shopping expenditure	(5) snack and beverage purchase expenditure	(6) purchase ratio of ready meals to fresh grain
(1)	1					
(2)	0.1345***	1				
(3)	-0.0103*	0.3797***	1			
(4)	-0.0925***	-0.0577***	-0.1265***	1		
(5)	0.0602***	-0.0884***	-0.0527**	0.1539***	1	
(6)	-0.337***	-0.0339***	-0.079***	0.0513**	-0.1604***	1

Table 3. Results of multiple regression analysis of the Grain-based Ready Meals

Variable		β	p-value	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
Control Variable	age	-0.017	0.000	-0.016	0.000	-0.015	0.000	-0.015	0.000	-0.016	0.000	-0.016	0.000
	gender(male)	0.164	0.001	0.155	0.003	0.153	0.005	0.154	0.005	0.152	0.005	0.152	0.005
	monthly income	0.032	0.127	0.043	0.041	0.039	0.060	0.036	0.083	0.035	0.087	0.037	0.073
	family number	-0.021	0.053	-0.024	0.030	-0.028	0.009	-0.027	0.012	-0.027	0.011	-0.026	0.014
	an annual grocery shopping expenditure	0.040	0.735	0.054	0.646	0.115	0.332	0.127	0.282	0.113	0.342	0.127	0.284
	year1	-0.023	0.091	-0.023	0.091	-0.023	0.091	-0.023	0.090	-0.023	0.086	-0.023	0.095
	year2	-0.035	0.011	-0.035	0.010	-0.036	0.008	-0.036	0.009	-0.036	0.008	-0.036	0.008
	year3	-0.031	0.012	-0.031	0.011	-0.031	0.013	-0.030	0.015	-0.031	0.012	-0.031	0.013
Independent Variable (family medical history of chronic disease)	stroke (A)			-0.070	0.142	-0.220	0.000	-0.081	0.090	-0.085	0.070	-0.088	0.063
	CVD (B)			-0.061	0.181	-0.075	0.099	-0.129	0.049	-0.058	0.187	-0.051	0.260
	diabetes (C)			-0.022	0.570	-0.032	0.425	-0.027	0.506	-0.108	0.047	-0.020	0.625
	high pressure (D)			-0.063	0.063	-0.075	0.029	-0.065	0.062	-0.063	0.067	-0.150	0.001
Moderating Variable	snack and beverage purchase expenditure (E)					-0.167	0.000	-0.159	0.000	-0.163	0.000	-0.168	0.000
Interaction Terms	A x E					0.433	0.000						
	B x E							0.150	0.134				
	C x E									0.245	0.023		
	D x E											0.214	0.005
Adjusted R-square		0.129		0.133		0.155		0.149		0.151		0.151	

Figure 1. Results- The interaction of family medical history of hypertension and purchase ratio of grain-based ready meals to fresh grain
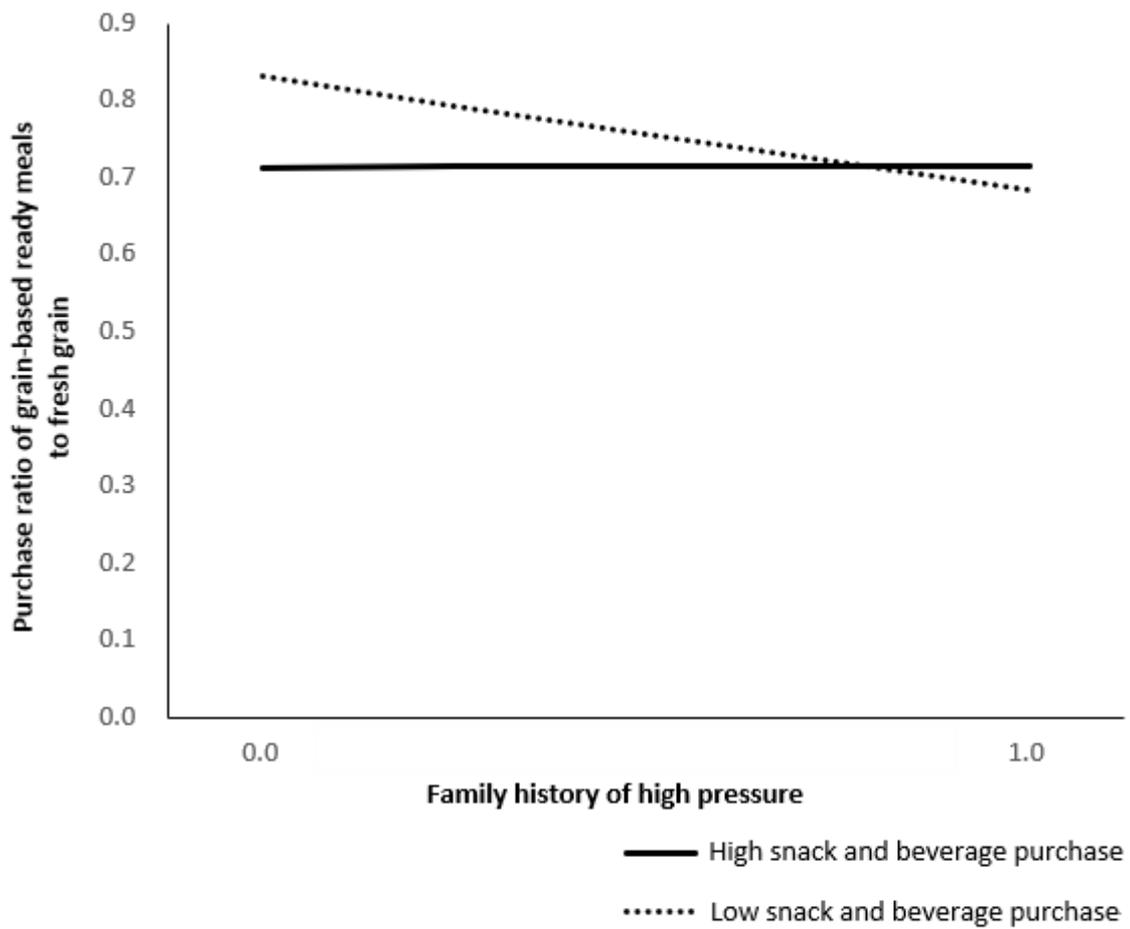
Food item 2: Meat-based ready meal products

Table 4 is a correlation matrix for category 2, and Table 5 shows the results of the panel regression analysis. Among demographic variables, age (β=-0.007, p=0.000), monthly income (β=-0.004, p=0.754), and family size (β=-0.011, p=0.028) had a negative effect on the purchasing ratio of meat-based ready meals, whereas gender (male) (β=0.020, p=0.520) and annual grocery shopping expenditure (β=0.062, p=0.227) had a positive effect on the purchasing ratio of meat-based ready meals. Age (β=-0.007, p=0.000) and family size (β=-0.011, p=0.028) showed statistical significance. In other words, consumers purchased fewer meat-based ready meals than fresh meat as they got older, had higher monthly incomes, and had a bigger family. On the contrary, male consumers and people who spend money on groceries purchase more meat-based ready meals compared to fresh meat.

Family medical history of CVD (β=0.014, p=0.613) and diabetes (β=0.020, p=0.256) had a positive effect on purchasing ratio of meat-based ready meals, whereas family medical history of stroke (β=-0.003, p=0.879) and hypertension (β=-0.026, p=0.085) had a negative effect on purchasing ratio of meat-based ready meals. This implies that consumers who have a family medical history of CVD and diabetes buy more meat-based ready meals compared to fresh meat. On the contrary, consumers who have a family medical history of stroke and hypertension purchase less meat-based ready meals than fresh meat. Only a family medical history of hypertension showed statistical significance, supporting Hypothesis 3b.

For Hypothesis 5b, snack and beverage purchase expenditure × family medical history of stroke (β=0.079, p=0.009), snack and beverage purchase expenditure × CVD (β=0.013, p=0.779), snack and beverage purchase expenditure × diabetes (β=0.072, p=0.023), and snack and beverage purchase expenditure × hypertension (β=0.046, p=0.150), had a positive effect on the purchasing ratio of meat-based ready meals to fresh meat. Consumers

purchased more meat-based ready meals as they spent more money on snacks and beverages. The interaction effect was shown for a family medical history of stroke and diabetes. However, there was no variable that had both the main effect and interaction effect, which led to the rejection of Hypothesis 5b.

Table 4. Correlation of Latent Variables of the Meat-based Ready Meals

	(1) age	(2) monthly income	(3) family number	(4) an annual grocery shopping expenditure	(5) snack and beverage purchase expenditure	(6) purchase ratio of ready meals to fresh meat
(1)	1					
(2)	0.1806***	1				
(3)	0.024*	0.3646***	1			
(4)	-0.0862***	-0.0669***	-0.1419***	1		
(5)	0.0568***	-0.0884***	-0.0734**	0.1723***	1	
(6)	-0.3431***	-0.109***	-0.1122***	0.0771***	-0.0543***	1

Table 5. Results of Multiple Regression Analysis of the Meat-based Ready Meals

Variable		β	p-value	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
Control Variable	age	-0.007	0.000	-0.007	0.000	-0.007	0.000	-0.007	0.000	-0.007	0.000	-0.007	0.000
	gender	0.020	0.520	0.021	0.493	0.022	0.481	0.022	0.475	0.022	0.489	0.022	0.482
	monthly income	-0.004	0.754	-0.004	0.719	-0.003	0.782	-0.004	0.726	-0.004	0.738	-0.003	0.772
	family number	-0.011	0.028	-0.011	0.028	-0.011	0.026	-0.011	0.030	-0.011	0.026	-0.011	0.029
	an annual grocery shopping expenditure	0.062	0.227	0.066	0.200	0.072	0.159	0.075	0.141	0.069	0.177	0.074	0.146
	year1	-0.029	0.000	-0.029	0.000	-0.029	0.000	-0.029	0.000	-0.029	0.000	-0.029	0.000
	year2	-0.047	0.000	-0.047	0.000	-0.047	0.000	-0.047	0.000	-0.047	0.000	-0.047	0.000
	year3	-0.027	0.000	-0.027	0.000	-0.028	0.000	-0.028	0.000	-0.028	0.000	-0.028	0.000
Independent Variable (family medical history of chronic disease)	stroke (A)			-0.003	0.879	-0.027	0.287	-0.001	0.944	-0.005	0.827	-0.004	0.838
	CVD (B)			0.014	0.613	0.015	0.588	0.014	0.720	0.018	0.521	0.020	0.479
	diabetes (C)			0.020	0.256	0.014	0.436	0.015	0.413	-0.008	0.734	0.016	0.371
	high pressure D)			-0.026	0.085	-0.030	0.041	-0.029	0.055	-0.028	0.063	-0.045	0.025
Moderating Variable	snack and beverage purchase expenditure (E)					-0.028	0.019	-0.025	0.036	-0.029	0.016	-0.029	0.018
Interaction Terms	A x E					0.079	0.009						
	B x E							0.013	0.779				
	C x E									0.072	0.023		
	D x E											0.046	0.150
Adjusted R-square		0.124		0.128		0.135		0.134		0.135		0.134	

Food item 3: Vegetable-based ready meal products

Table 6 is a correlation matrix for category 3, and Table 7 shows the results of the panel regression analysis. Among demographic variables, age (β=-0.002, p=0.000), gender (β=-0.028, p=0.070), and family size (β=-0.003, p=0.433) had a negative effect on the purchasing ratio of vegetable-based ready meals, whereas monthly income (β =0.027, p=0.001) and annual grocery shopping expenditure (β=0.038, p=0.278) had a positive effect on the purchasing ratio of vegetable-based ready meals to fresh vegetables. Consumers purchase fewer vegetable-based ready meals than fresh vegetables as they get older, particularly when they are male and have bigger families. On the contrary, consumers who have a higher monthly income and spend money on groceries purchase more vegetable-based ready meals compared to fresh vegetables. Every demographic variable showed statistical significance except for family size (β=-0.003, p=0.433) and annual grocery shopping expenditure (β=0.038, p=0.278).

In the case of the main effect, family medical history of CVD (β=0.029, p=0.206), diabetes (β=0.030, p=0.100), and hypertension (β=0.030, p=0.049) caused a positive effect on the purchasing ratio of vegetable-based ready meals, whereas the family medical history of stroke (β=-0.025, p=0.115) had a negative effect on the purchasing ratio of vegetable-based ready meals. This indicates that consumers purchase more vegetable-based ready meals than fresh vegetables if they have a family medical history of CVD, diabetes, and hypertension, and consumers with a family medical history of stroke buy fewer vegetable-based ready meals than fresh vegetables. The existence of a family medical history of diabetes and hypertension showed statistical significance, supporting Hypotheses 3c and 4c.

For Hypothesis 5c, snack and beverage purchase expenditure × family medical history of stroke (β=-0.077, p=0.001), snack and beverage purchase expenditure × CVD (β=-

0.062, p=0.007), snack and beverage purchase expenditure × diabetes (β=-0.060, p=0.071), and snack and beverage purchase expenditure × hypertension (β=-0.012, p=0.753), had a negative effect on the purchasing ratio of vegetable-based ready meals to fresh vegetables. Consumers purchase fewer vegetable-based ready meals as they spend more money on snacks and beverages. Except for the family medical history of hypertension, the rest of the snack and beverage purchase expenditure × family medical history of chronic disease had an interaction effect. The authors have found both main effect (β=0.030, p=0.100) and interaction effect (β=-0.060, p=0.071) for family medical history of diabetes. Figure 2 illustrates the pattern of family medical history of diabetes × snack and beverage purchase expenditure interaction. Having a family medical history of diabetes has a stronger effect on the purchase ratio of vegetable-based ready meals to fresh vegetables when snack and beverage purchase expenditure is lower, supporting Hypothesis 5-4c. The reverse is also true.

Table 6. Correlation of Latent Variables of the Vegetable-based Ready Meals

	(1) age	(2) monthly income	(3) family number	(4) an annual grocery shopping expenditure	(5) snack and beverage purchase expenditure	(6) purchase ratio of ready meals than fresh meat
(1)	1					
(2)	0.1806***	1				
(3)	0.024*	0.3646***	1			
(4)	-0.0862***	-0.0669***	-0.1419***	1		
(5)	0.0568*	-0.0884***	-0.0734***	0.1723***	1	
(6)	-0.1251***	0.114***	0.0161	0.0331	-0.0465**	1

Table 7. Results of Multiple Regression Analysis of Vegetable-Based Ready Meals

	Variable	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
Control Variable	age	-0.002	0.000	-0.002	0.000	-0.002	0.000	-0.002	0.000	-0.002	0.000	-0.002	0.000
	gender	-0.028	0.070	-0.023	0.132	-0.022	0.159	-0.022	0.162	-0.022	0.165	-0.022	0.158
	monthly income	0.027	0.001	0.023	0.002	0.022	0.004	0.023	0.003	0.023	0.003	0.023	0.003
	family number	-0.003	0.433	-0.003	0.513	-0.002	0.635	-0.002	0.638	-0.002	0.627	-0.002	0.568
	an annual grocery shopping expenditure	0.038	0.278	0.021	0.526	0.024	0.480	0.022	0.505	0.025	0.454	0.020	0.542
	year1	-0.029	0.000	-0.029	0.000	-0.029	0.000	-0.029	0.000	-0.029	0.000	-0.029	0.000
	year2	-0.016	0.000	-0.016	0.000	-0.016	0.000	-0.016	0.000	-0.016	0.000	-0.016	0.000
	year3	-0.009	0.025	-0.009	0.024	-0.009	0.021	-0.009	0.020	-0.009	0.021	-0.009	0.021
Independent Variable (family medical history of chronic disease)	stroke (A)			-0.025	0.115	0.000	0.990	-0.022	0.147	-0.023	0.137	-0.025	0.111
	CVD (B)			0.029	0.206	0.033	0.160	0.055	0.060	0.030	0.191	0.029	0.211
	diabetes (C)			0.030	0.100	0.032	0.077	0.031	0.086	0.050	0.038	0.031	0.090
	high pressure (D)			0.030	0.049	0.032	0.034	0.030	0.049	0.030	0.050	0.035	0.090
Moderating Variable	snack and beverage purchase expenditure (E)					-0.004	0.653	-0.002	0.820	-0.003	0.714	-0.006	0.484
Interaction Terms	A x E					-0.077	0.001						
	B x E							-0.062	0.007				
	C x E									-0.060	0.071		
	D x E											-0.012	0.753
Adjusted R-square		0.042		0.064		0.066		0.066		0.066		0.063	

Figure 2. Results- The interaction of family medical history of diabetes and purchase ratio of vegetable-based ready meals to fresh vegetables
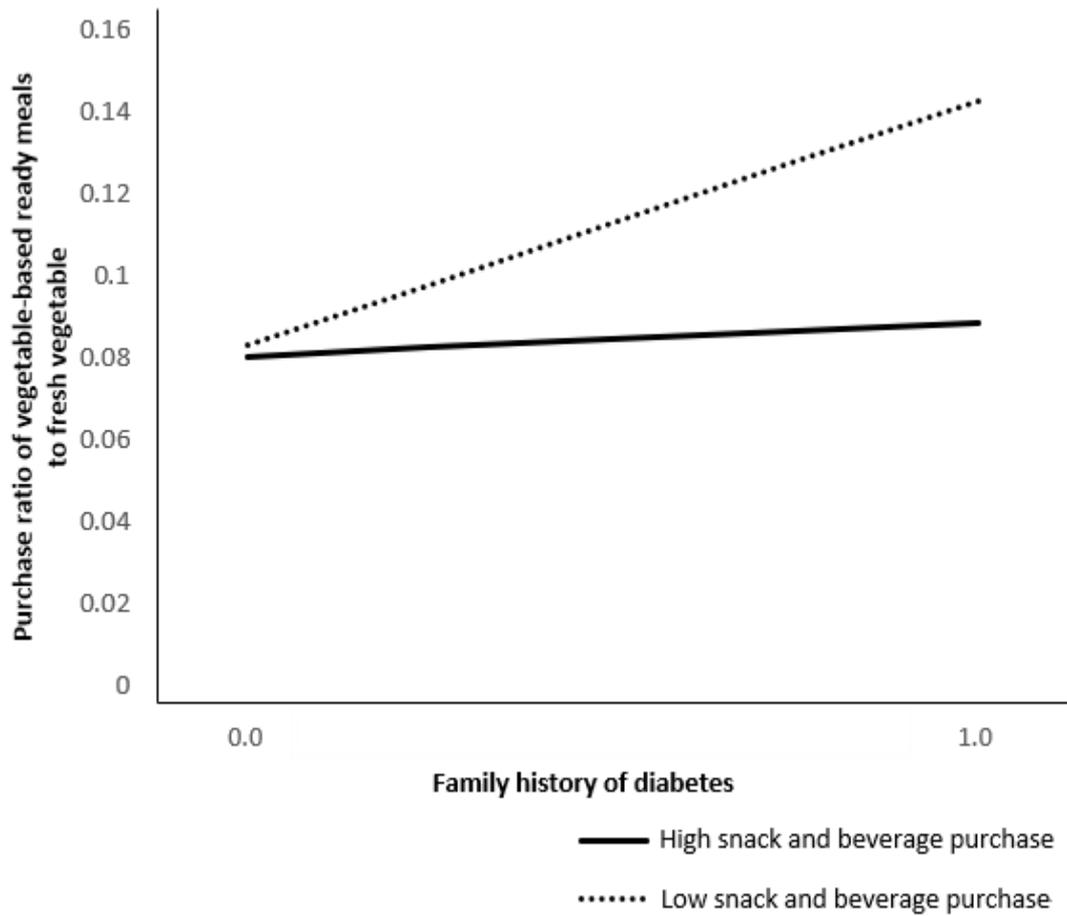
5. Discussion and Conclusion

5.1. Direct effects

The results show how a family medical history of chronic disease affects the purchase ratio of ready meals than fresh foods. Consumers purchased fewer grain-based ready meals and meat-based ready meals if they had a family medical history of hypertension. However, consumers with a family medical history of diabetes and hypertension purchased more vegetable-based ready meals than fresh vegetables. These findings are in line with the literature (Hunt *et al.*, 1998; Larsson 2014; Martínez-González *et al*., 2008; see also Svetkey *et al.*, 2001) which states that the risk of being diagnosed with the disease could be reduced by having a low fat and sodium diet and a high vegetable diet. Also, these results imply that people with a family medical history of hypertension are likely to avoid grain-based ready meals and meat-based ready meals in order to maintain their stable blood pressure. On the contrary, people might think that it is okay to have vegetable-based ready meals even when they have a family medical history of diabetes and hypertension.

To interpret these results from the perspective of distinctive properties of each food item, grain-based ready meals could be divided into *haetban,* which contains only white rice or mixed grains, and others, such as *cupbab* and frozen fried rice, which include extra ingredients. Park (2020) found that the latter grain-based ready meals have high saturated fat and sodium compared to calories, and one third of the ready meals provide more carbohydrates than recommended daily carbohydrate intake. Grain-based ready meals that use mixed rice are found in small portions in haetban and *cupbab,* but the rest of grain-based ready meals use white rice (Park, 2020). Since rice is a carbohydrate-supply food that contains a high glycemic index (Brand-Miller *et al*., 2009), high consumption of white rice is associated with an increased risk of incident diabetes (Bhavadharini *et al*., 2020).

28

Accordingly, the authors predict that these results might affect consumers in purchasing grain-based ready meals.

Increased health concerns make consumers associate their diet with diseases, and health-conscious consumers change their diet to avoid high-fat and high-protein (Resurreccion, 2003). American consumers are mostly concerned about cholesterol when it comes to purchasing meat and meat products, followed by calorie content, artificial ingredients, convenience, and price (Resurreccion, 2003). As Korean eating habits have become westernized (Koo and Park, 2011), health-conscious consumers in Korea have also started to consider the health effects of foods. Consuming processed red meat is associated with a higher risk of metabolic syndrome, including diabetes, hypertension, and cardiovascular disease (Babio *et al.*, 2012). Meat-based ready meal soups are known to contain high cholesterol (Oh *et al.*, 2019). Therefore, it is believed that consumers with a family medical history of hypertension purchased less meat-based ready meals than fresh meat.

The result of the main effect, which was shown in vegetable-based ready meals, corresponds with the literature. Lee *et al.* (1994) found that total amount of dietary fiber that Koreans intake from vegetables remained relatively constant from 1969 to 1990. However, the proportion of fiber obtained from fresh vegetables decreased, while the proportion of fiber taken from processed vegetables increased (Lee *et al.*, 1994). Jin (2000) surveyed Korean housewives about their attitudes and behaviors related to fruit and vegetables, and most respondents answered they prefer vegetables since they are rich in nutrition. In another survey (Kang and Jung, 1995), many respondents answered that vegetables are rich in vitamin, mineral, and fiber, indicating that they have relatively high knowledge of vegetables. In fact, high consumption of fruit and vegetables is known to reduce the risk of CVD

(Bazzano *et al*., 2008). These results imply that consumers might think that vegetable-based ready meals are healthy, as opposed to what the literature has found (Costa *et al*., 2003). When consumers prepare vegetable side dishes in households, the fact that vegetables are not tasty is the main factor that hinders eating vegetables, followed by lack of time and effort (Jin, 2000). This indicates that homemade vegetable side dishes are not tasty enough, and it is necessary to develop vegetable-based ready meals that could satisfy Koreans. In addition, most respondents perceived that a vegetable-based diet is healthier than a meat-based diet (Kang and Jung, 1995). According to these results, it is believed that consumers with a family medical history of diabetes and hypertension purchased more vegetable-based ready meals to fresh vegetables.

In the case of demographic variables, older consumers purchased fewer ready meals than fresh foods in all food items. This finding is consistent with previous studies. Van der Horst *et al.* (2011) found that intake of ready meals was higher in younger age groups compared to older age groups. Men purchased more grain-based ready meals than fresh grains and fewer vegetable-based ready meals than fresh vegetables. Research about men purchasing more ready meals than women is well described in other studies (Smith *et al*., 2009; Vandevijvere *et al*., 2009). To our knowledge, since this study is the first to divide ready meals into three categories and examine the purchase ratio of ready meals to fresh foods, additional interpretation is needed to understand the outcome of these results. Considering the different properties between grain-based ready meals and vegetable-based ready meals, grain-based ready meals can be considered a meal by itself, while vegetable-based ready meals are closer to side dishes and need to be consumed alongside another dish. Men could also prefer grain-based ready meals to vegetable-based ready meals, as they tend to have less developed cooking skills than women (Van der Horst *et al.*, 2011). In the case of monthly income, high-

income households purchased more vegetable-based ready meals than fresh vegetables, which also corresponds with previous research (Crovetto *et al.*, 2014). As family sizes increase, consumers purchase fewer ready meals than fresh foods in the categories of grain and meat. According to Verlegh and Candel (1999), convenience-oriented meals are preferred by a single-person household compared to multi-person households with children. This could be because a single household tends to have weaker cooking skills than multi-person households (Van der Horst *et al*., 2011).

5.2. Moderating effects of snack and beverage purchase expenditure

This study demonstrates that consumers with a family medical history of chronic disease manifest different purchase ratios of ready meals to fresh foods with different levels of snack and beverage purchase expenditure. As the results show, snack and beverage purchase expenditure had a moderating effect in the categories of grain and vegetables. For grain, a family medical history of hypertension has a positive effect on the purchase ratio of grain-based ready meals to fresh grain with a high level of snack and beverage purchase expenditure. A family medical history of hypertension has a negative effect on the purchase ratio of grain-based ready meals to fresh grain with a low level of snack and beverage purchase expenditure. For vegetables, a family medical history of diabetes has a significantly stronger effect on the purchase ratio of vegetable-based ready meals to fresh vegetables with a low level of snack and beverage purchase expenditure.

It is interesting to find that snack and beverage purchases had different moderating effects on the grain-based and vegetable-based ready meal purchase ratios. As consumers are more exposed to palatable snacks and beverages, they buy more grain-based ready meals regardless of their family medical history of hypertension. This indicates that consumers who

31

purchase snacks and beverages are likely to buy grain-based ready meals since both food items are perceived as hedonic. Consumers' hedonic perception of white rice was significantly affected by salt reduction. Antúnez (2019) assessed the effect of salt reduction on consumers' perception of white rice and found that consumers who gave the highest overall liking score to the rice sample with the highest salt content showed a pronounced decrease in their overall liking as the percentage of salt reduction increased. Considering that food preference is determined by eating habits and usual food choice (Bobowski *et al.*, 2015; Methven *et al.*, 2012), this result implies that consumers who gave higher scores to samples with high salt content were exposed to a high sodium diet, which made them less sensitive to salt (Antúnez *et al.*, 2019). Based on the literature, it could be interpreted that consumers who purchase more snacks and beverages are likely to purchase more grain-based ready meals than those who purchase fewer snacks and beverages. Fresh grains might be bland for consumers who are used to having energy-dense foods, which gives them a hedonic feeling.

However, consumers buy fewer vegetable-based ready meals as their snack and beverage purchase expenditures increase. Different from what the authors have expected, seasoned vegetables might not enough to be perceived as a hedonic food to Korean consumers. Even though sodium salts blocked the bitterness of vegetables, preference toward vegetables did not increase significantly (Sharafi *et al.*, 2012). Fondness of seasoned vegetables varies based on consumer preference.   The preference of people who enjoy vegetables did not increase as much as that of those who do not when bitterness was masked with salt (Sharafi *et al.*, 2012). According to a survey that examined the overall Korean preference toward vegetables, all age groups do not dislike vegetables, they did not enjoy them though (Kim and Kim, 2012). Therefore, it is believed that Korean consumers would not appreciate vegetable-based ready meals even if the bitterness of vegetables is covered

with seasoning. Rather, they might want to enjoy the natural taste of vegetables.

6. Implications

6.1. Theoretical Implications

Most studies that have examined processed food consumption have classified all foods and beverages into four NOVA food groups (see Marrón-Ponce *et al*., 2017; see also Rauber *et al*., 2018). However, the present study focused on ready meal products that are designed to replace homemade meals (Costa *et al.*, 2001) in order to distinguish them from processed culinary ingredients (e.g., oils, butter, sugar, and salt). While most studies use purchase expenditure to predict consumers' food consumption, this present study uses the purchase ratio of ready meals to fresh foods as a dependent variable. The purchase ratio of ready meals indicates a substitution rate between ready meals and fresh foods. Consumers with a higher purchase ratio of ready meals to fresh foods replace more fresh foods with ready meals than those with a lower purchase ratio.

In addition, the present study selected three specific food ingredients—grain, meat, and vegetables—that are commonly used in Korean ready meals to divide these meals into three categories. Considering that the Korean diet consists of staple foods and side dishes (Kim *et al*., 2016), each food item has a distinct meaning in the domestic food industry. Grain is consumed as a staple food in Korea and is a main source of carbohydrates (Kim *et al*., 2016). Grain-based ready meals represent the commercial rice industry that has targeted busy consumers with its convenience. Red meat side dishes were difficult to find in the traditional Korean diet since Korea was used to an agricultural society. However, processed meat products have become more diverse as Western dietary practices have been introduced (Yoon and Woo, 1999). Meat-based ready meals were consumed as a side dish that is served with

rice or as a snack to alleviate hunger. Lastly, vegetables were used for various Korean side dishes (Kim *et al*., 2016), and vegetable-based ready meals relieve consumers' burden in preparing a meal.

Compared to the other studies that used a national health and nutrition survey (Marrón-Ponce *et al*., 2017; Monteiro *et al*., 2011), this study used actual purchase panel data, which is secondary data collected by RDA in Korea, that shows precise purchase frequency and quantity of each food item on a daily basis. Since food items are classified in detail by product name and type, we were able to do a data analysis with accuracy.

6.2. Managerial Implication

Based on the results of the moderating effect in the third category (vegetable-based ready meals), it is perceived that vegetable-based ready meals were not hedonic enough to increase the purchase ratio of consumers regardless of snack and beverage purchase expenditure. As discovered in previous literature, a decreased preference toward seasoned vegetables indicates that consumers like the original taste and odor of vegetables (Sharafi *et al*., 2012). Unlike grain and meat, adding sugar and salt to mask the bitterness of vegetables was not efficient in increasing consumers' preferences. Therefore, it would be better to release vegetable-based ready meals that preserve their natural appearance and taste. Considering that the Korean government implements policies to reduce sodium intake and protect national health (Kim and Jung, 2016), releasing a vegetable-based ready meal that contains low sodium would be a better alternative for these consumers.

7. Limitations and further research

Panels in the present study are slightly biased toward older age and lower monthly

34

income. Thus, there is a limitation in generalizing the findings to the overall population. The authors predict that different results could be shown if younger respondents were included in the panel data. Since young singles and young professionals without children are more likely to accept ready meals than older consumers (Geerooms *et al.*, 2008), it is expected that the purchase ratio of ready meals to fresh foods could increase even in grain-based ready meals and vegetable-based ready meals.

Although this present study used actual purchase data that enables quantitative analysis, using a survey that shows consumers' attitudes and beliefs toward ready meals could also contribute to interpreting health-conscious consumers' ready meal consumption, which is affected by physical, mental, and social well-being. In order to examine the relationship from a wider psychosocial perspective, psychological factors could be used as previous literatures investigated (e.g., Buckley *et al.*, 2007; Mahon *et al.*, 2006; Olsen, 2003; Olsen *et al.*, 2007; Scholderer and Grunert, 2005).

References

ACHESON, L. S., WANG, C., ZYZANSKI, S. J., LYNN, A., RUFFIN, M. T., GRAMLING, R., RUBINSTEIN, W. S., O'NEILL, S. M. & NEASE, D. E. 2010. family medical history and perceptions about risk and prevention for chronic diseases in primary care: a report from the Family Healthware™ Impact Trial. Genetics in Medicine, 12, 212-218.

ANDERSON, S. V. & BAUWENS, E. 1981. Chronic health problems: Concepts and application, Mosby.

APPEL, L. J., BRANDS, M. W., DANIELS, S. R., KARANJA, N., ELMER, P. J. & SACKS, F. M. 2006. Dietary approaches to prevent and treat hypertension: a scientific statement from the American Heart Association. Hypertension, 47, 296-308.

BABIO, N., SORLï, M., BULLõ, M., BASORA, J., IBARROLA-JURADO, N., FERNãNDEZ-BALLART, J., MARTïNEZ-GONZãLEZ, M., SERRA-MAJEM, L., GONZãLEZ-PëREZ, R. & SALAS-SALVADõ, J. 2012. Association between red meat consumption and metabolic syndrome in a Mediterranean population at high cardiovascular risk: cross-sectional and 1-year follow-up assessment. Nutrition, Metabolism and Cardiovascular Diseases, 22, 200-207.

BANTLE, J. P., WYLIE-ROSETT, J., ALBRIGHT, A. L., APOVIAN, C. M., CLARK, N. G., FRANZ, M. J., HOOGWERF, B. J., LICHTENSTEIN, A. H., MAYER-DAVIS, E. & MOORADIAN, A. D. 2008. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. Diabetes care, 31, S61-S78.

BAZERMAN, M. H., TENBRUNSEL, A. E. & WADE-BENZONI, K. 1998. Negotiating with yourself and losing: Making decisions with competing internal preferences. Academy of Management Review, 23, 225-241.

BAZZANO, L. A., LI, T. Y., JOSHIPURA, K. J. & HU, F. B. 2008. Intake of fruit,

vegetables, and fruit juices and risk of diabetes in women. Diabetes care, 31, 1311-1317.

BECKER, M. H. 1974. The health belief model and personal health behavior. Health education monographs, 2, 324-473.

BHAVADHARINI, B., MOHAN, V., DEHGHAN, M., RANGARAJAN, S., SWAMINATHAN, S., ROSENGREN, A., WIELGOSZ, A., AVEZUM, A., LOPEZ-JARAMILLO, P. & LANAS, F. 2020. White rice intake and incident diabetes: a study of 132,373 participants in 21 countries. Diabetes care, 43, 2643-2650.

BOBOWSKI, N., RENDAHL, A. & VICKERS, Z. 2015. A longitudinal comparison of two salt reduction strategies: Acceptability of a low sodium food depends on the consumer. Food Quality and Preference, 40, 270-278.

BRAND-MILLER, J., MCMILLAN-PRICE, J., STEINBECK, K. & CATERSON, I. 2009. Dietary glycemic index: health implications. Journal of the American College of Nutrition, 28, 446S-449S.

CARRIGAN, M., SZMIGIN, I. & LEEK, S. 2006. Managing routine food choices in UK families: The role of convenience consumption. Appetite, 47, 372-383.

CHOBANIAN, A. V. 2003. National heart, lung, and blood institute; national high blood pressure education program coordinating committee. seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. Hypertension, 42, 1206-1252.

COLIN-HENRION, M., MEHINAGIC, E., RENARD, C. M., RICHOMME, P. & JOURJON, F. 2009. From apple to applesauce: Processing effects on dietary fibres and cell wall polysaccharides. Food Chemistry, 117, 254-260.

COMMITTEE, U. S. D. G. A. 2010. Dietary guidelines for Americans, 2010, US Department of Health and Human Services, US Department of Agriculture.

COSTA, A. I. D. A., DEKKER, M., BEUMER, R. R., ROMBOUTS, F. M. & JONGEN, W. M. 2001. A consumer-oriented classification system for home meal replacements. Food Quality and Preference, 12, 229-242.

COSTA, A. I. D. A., SCHOOLMEESTER, D., DEKKER, M. & JONGEN, W. M. 2003. Exploring the use of consumer collages in product design. Trends in Food Science & Technology, 14, 17-31.

CROVETTO, M., UAUY, R., MARTINS, A. P., MOUBARAC, J. C. & MONTEIRO, C. 2014. Household availability of ready-to-consume food and drink products in Chile: impact on nutritional quality of the diet. Revista médica de Chile, 142, 850-858.

DE COCK, N., VAN LIPPEVELDE, W., GOOSSENS, L., DE CLERCQ, B., VANGEEL, J., LACHAT, C., BEULLENS, K., HUYBREGTS, L., VERVOORT, L. & EGGERMONT, S. 2016. Sensitivity to reward and adolescents' unhealthy snacking and drinking behavior: The role of hedonic eating styles and availability. International Journal of Behavioral Nutrition and Physical Activity, 13, 17.

DE SOUZA PAGLARINI, C., DE FIGUEIREDO FURTADO, G., BIACHI, J. P., VIDAL, V. A. S., MARTINI, S., FORTE, M. B. S., CUNHA, R. L. & POLLONIO, M. A. R. 2018. Functional emulsion gels with potential application in meat products. Journal of food engineering, 222, 29-37.

DHAR, R. & WERTENBROCH, K. 2000. Consumer choice between hedonic and utilitarian goods. Journal of marketing research, 37, 60-71.

DINEHART, M., HAYES, J. E., BARTOSHUK, L., LANIER, S. & DUFFY, V. 2006. Bitter taste markers explain variability in vegetable sweetness, bitterness, and intake. Physiology & behavior, 87, 304-313.

GOULDING, M. R., ROGERS, M. & SMITH, S. 2003. Public health and aging: Trends

in aging-United States and worldwide. Jama, 289, 1371-1371.

HIRSCHMAN, E. C. & HOLBROOK, M. B. 1982. Hedonic consumption: emerging concepts, methods and propositions. Journal of marketing, 46, 92-101.

HONG, S. M., LEE, J. H., KIM, H.-K., YU, R., SEO, J. H., HUH, E. J., CHO, S. S. & YANG, J. 2014. Study on sodium reduction:'Healthy restaurant for sodium reduction'. Journal of the Korean Dietetic Association, 20, 174-182.

HORNING, M. L., FULKERSON, J. A., FRIEND, S. E. & STORY, M. 2017. Reasons parents buy prepackaged, processed meals: it is more complicated than "I Don't Have Time". Journal of nutrition education and behavior, 49, 60-66. e1.

HUNG, H.-C., JOSHIPURA, K. J., JIANG, R., HU, F. B., HUNTER, D., SMITH-WARNER, S. A., COLDITZ, G. A., ROSNER, B., SPIEGELMAN, D. & WILLETT, W. C. 2004. Fruit and vegetable intake and risk of major chronic disease. Journal of the National Cancer Institute, 96, 1577-1584.

HUNT, S. C., COOK, N. R., OBERMAN, A., CUTLER, J. A., HENNEKENS, C. H., ALLENDER, P. S., WALKER, W. G., WHELTON, P. K. & WILLIAMS, R. R. 1998. Angiotensinogen genotype, sodium reduction, weight loss, and prevention of hypertension: trials of hypertension prevention, phase II. Hypertension, 32, 393-401.

HUNT, S. C., GWINN, M. & ADAMS, T. D. 2003. family medical history assessment: strategies for prevention of cardiovascular disease. American journal of preventive medicine, 24, 136-142.

INGUGLIA, E. S., ZHANG, Z., TIWARI, B. K., KERRY, J. P. & BURGESS, C. M. 2017. Salt reduction strategies in processed meat products–A review. Trends in Food Science & Technology, 59, 70-78.

JANSSEN, H. G., DAVIES, I. G., RICHARDSON, L. D. & STEVENSON, L. 2018.

Determinants of takeaway and fast food consumption: a narrative review. Nutrition research reviews, 31, 16-34.

JANZ, N. K. & BECKER, M. H. 1984. The health belief model: A decade later. Health education quarterly, 11, 1-47.

KASTORINI, C.-M. & PANAGIOTAKOS, D. B. 2009. Dietary patterns and prevention of type 2 diabetes: from research to clinical practice; a systematic review. Current diabetes reviews, 5, 221-227.

KIM, D.H. & PARK. H.S. 2001. Case Note: Strategies for Developing and Launching New Products According to Market Changes; Focused on Jeil Jedang Haetban. Journal of Consumer Studies. 12(3), pp.191-208

KIM, H.-H. & KIM, Y.-N. 2012. A preference analysis of vegetable group foods in primary school students and their mothers. Journal of Korean Home Economics Education Association, 24, 73-88.

KIM, S.H. & JUNG, Y.J. 2016. Domestic and International Trends in Sodium Reduction and Practices. Food Science and Industry, 49(2), pp.25-33.

KIM, S., MOON, S. & POPKIN, B. M. 2000. The nutrition transition in South Korea. The American journal of clinical nutrition, 71, 44-53.

KIM, S. H., KIM, M. S., LEE, M. S., PARK, Y. S., LEE, H. J., KANG, S.-A., LEE, H. S., LEE, K.-E., YANG, H. J. & KIM, M. J. 2016. Korean diet: characteristics and historical background. Journal of Ethnic Foods, 3, 26-31.

KIM, T.G., CHOI, H.D., KIM, Y.B., JEON, K.H., CHOI, Y.S. 2017. Status and technology trends of Home Meal Replacement. Food Industry and Nutrition, 22(1), pp.1-7.

KNOOPS, K. T., DE GROOT, L. C., KROMHOUT, D., PERRIN, A.-E., MOREIRAS-

VARELA, O., MENOTTI, A. & VAN STAVEREN, W. A. 2004. Mediterranean diet, lifestyle

factors, and 10-year mortality in elderly European men and women: the HALE project. Jama,

292, 1433-1439.

KO, Y. & COONS, S. J. 2006. Self-reported chronic conditions and EQ⁻5D index

scores in the US adult population. Current medical research and opinion, 22, 2065-2071.

LALONDE, M. 1974. A new perspective on the health of Canadians: a working

document, Ottawa.

LARSSON, S. C., ÅKESSON, A. & WOLK, A. 2014. Healthy diet and lifestyle and risk

of stroke in a prospective cohort of women. Neurology, 83, 1699-1704.

LEE, B. & EUN, J., 2008. rice processing food industry. Food Industry and Nutrition, 13,

1-8.

LEE, H.S., LEE, Y.J. & SEO, Y.J. 1994. Annual Changes in the Estimated Dietary Fiber

Intake of Korean During 1969~1990. *Korean J Nutrition*, 27(1). pp.59-70.

LEE, M.-J., POPKIN, B. M. & KIM, S. 2002. The unique aspects of the nutrition

transition in South Korea: the retention of healthful elements in their traditional diet. Public

health nutrition, 5, 197-203.

LIU, S., WILLETT, W. C., STAMPFER, M. J., HU, F. B., FRANZ, M., SAMPSON, L.,

HENNEKENS, C. H. & MANSON, J. E. 2000. A prospective study of dietary glycemic load,

carbohydrate intake, and risk of coronary heart disease in US women. The American journal

of clinical nutrition, 71, 1455-1461.

LYU, Y.-S., KIM, J.-H. & KIM, S.-Y. 2019. Pharmacotherapy of Diabetes Focused on

Stroke. Journal of the Korean Neurological Association, 37, 235-250.

MARRõN-PONCE, J. A., SãNCHEZ-PIMIENTA, T. G., DA COSTA LOUZADA, M. L.

& BATIS, C. 2018. Energy contribution of NOVA food groups and sociodemographic determinants of ultra-processed food consumption in the Mexican population. Public health nutrition, 21, 87-93.

MARTINEZ-GONZALEZ, M. A., BES-RASTROLLO, M., SERRA-MAJEM, L., LAIRON, D., ESTRUCH, R. & TRICHOPOULOU, A. 2009. Mediterranean food pattern and the primary prevention of chronic disease: recent developments. Nutrition reviews, 67, S111-S116.

MARTïNEZ-GONZãLEZ, M. Á., DE LA FUENTE-ARRILLAGA, C., NUNEZ-CORDOBA, J., BASTERRA-GORTARI, F., BEUNZA, J. J., VAZQUEZ, Z., BENITO, S., TORTOSA, A. & BES-RASTROLLO, M. 2008. Adherence to Mediterranean diet and risk of developing diabetes: prospective cohort study. Bmj, 336, 1348-1351.

MARTïNEZ-GONZãLEZ, M. A., FERNãNDEZ-JARNE, E., SERRANO-MARTïNEZ, M., MARTI, A., MARTINEZ, J. A. & MARTïN-MORENO, J. M. 2002. Mediterranean diet and reduction in the risk of a first acute myocardial infarction: an operational healthy dietary score. European journal of nutrition, 41, 153-160.

MARTïNEZ-GONZãLEZ, M. A., GARCïA-LõPEZ, M., BES-RASTROLLO, M., TOLEDO, E., MARTïNEZ-LAPISCINA, E. H., DELGADO-RODRIGUEZ, M., VAZQUEZ, Z., BENITO, S. & BEUNZA, J. J. 2011. Mediterranean diet and the incidence of cardiovascular disease: a Spanish cohort. Nutrition, Metabolism and Cardiovascular Diseases, 21, 237-244.

MCKEOWN, N. M., MEIGS, J. B., LIU, S., SALTZMAN, E., WILSON, P. W. & JACQUES, P. F. 2004. Carbohydrate nutrition, insulin resistance, and the prevalence of the metabolic syndrome in the Framingham Offspring Cohort. Diabetes care, 27, 538-546.

METHVEN, L., LANGRENEY, E. & PRESCOTT, J. 2012. Changes in liking for a no

added salt soup as a function of exposure. Food Quality and Preference, 26, 135-140.

MEYER, K. A., KUSHI, L. H., JACOBS JR, D. R., SLAVIN, J., SELLERS, T. A. & FOLSOM, A. R. 2000. Carbohydrates, dietary fiber, and incident type 2 diabetes in older women. The American journal of clinical nutrition, 71, 921-930.

MICHA, R., MICHAS, G. & MOZAFFARIAN, D. 2012. Unprocessed red and processed meats and risk of coronary artery disease and type 2 diabetes–an updated review of the evidence. Current atherosclerosis reports, 14, 515-524.

MICHA, R. & MOZAFFARIAN, D. 2010. Saturated fat and cardiometabolic risk factors, coronary heart disease, stroke, and diabetes: a fresh look at the evidence. Lipids, 45, 893-905.

Ministry of Health and Welfare. 2019. Guidance on pilot projects for chronic disease management in primary care

MONGE-ROJAS, R., MATTEI, J., FUSTER, T., WILLETT, W. & CAMPOS, H. 2014. Influence of sensory and cultural perceptions of white rice, brown rice and beans by Costa Rican adults in their dietary choices. Appetite, 81, 200-208.

MONTEIRO, C. A., LEVY, R. B., CLARO, R. M., DE CASTRO, I. R. & CANNON, G. 2011. Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. Public Health Nutr, 14, 5-13.

MOZAFFARIAN, D., HAO, T., RIMM, E. B., WILLETT, W. C. & HU, F. B. 2011. Changes in diet and lifestyle and long-term weight gain in women and men. New England Journal of Medicine, 364, 2392-2404.

OBA, S., NAGATA, C., NAKAMURA, K., FUJII, K., KAWACHI, T., TAKATSUKA, N. & SHIMIZU, H. 2010. Dietary glycemic index, glycemic load, and intake of carbohydrate and rice in relation to risk of mortality from stroke and its subtypes in Japanese men and women. Metabolism, 59, 1574-1582.

ORGANIZATION, W. H. 1997. Obesity epidemic puts millions at risk from related diseases. WHO Press Release, 46, 12.

ORGANIZATION, W. H. 2002. Active ageing a policy framework. Noncommunicable Disease Prevention and Health Promotion Department.

OUDE GRIEP, L., GELEIJNSE, J., VERSCHUREN, W., OCKE, M. & KROMHOUT, D. Consumption of colored fruit and vegetables and 10-year coronary heart disease incidence in a population-based cohort study in the Netherlands.   European Heart Journal, 2010. OXFORD UNIV PRESS GREAT CLARENDON ST, OXFORD OX2 6DP, ENGLAND, 684-684.

PARK, H.-S., JEONG, J.-G. & YU, J.-H. 2013. The Relationship between Factors of Metabolic Syndrome in Korean Adult Males and the Parents' family medical history of Diabetes. The Journal of the Korea institute of electronic communication sciences, 8, 779-784.

PARK, J.S., HAN, Y.H., and HYUN, T.S. 2020. Evaluation of Nutrition Content by Convenience Store Lunch Box by Type of Diet, Price, and Convenience Store Brand. KOREAN JOURNAL OF COMMIUNITY NUTRITION, 25(4), pp.280-290.

PARK, M.-H., KWON, M.-W. & NAH, K. 2019. Study on Repurchase Intention of RTP HMR Products: Focused on Meal kit. The Journal of the Korea Contents Association, 19, 548-557.

PëREZ-PALACIOS, T., RUIZ-CARRASCAL, J., SOLOMANDO, J. C. & ANTEQUERA, T. 2019. Strategies for enrichment in ω-3 fatty acids aiming for healthier meat products. Food Reviews International, 35, 485-503.

RAGHUNATHAN, R. & CORFMAN, K. 2006. Is happiness shared doubled and sadness shared halved? Social influence on enjoyment of hedonic experiences. Journal of

Marketing Research, 43, 386-394.

RAUBER, F., DA COSTA LOUZADA, M. L., STEELE, E. M., MILLETT, C., MONTEIRO, C. A. & LEVY, R. B. 2018. Ultra-processed food consumption and chronic non-communicable diseases-related dietary nutrient profile in the UK (2008–2014). Nutrients, 10, 587.

RICO-CAMPâ, A., MARTïNEZ-GONZãLEZ, M. A., ALVAREZ-ALVAREZ, I., DE DEUS MENDONéA, R., DE LA FUENTE-ARRILLAGA, C., GõMEZ-DONOSO, C. & BES-RASTROLLO, M. 2019. Association between consumption of ultra-processed foods and all cause mortality: SUN prospective cohort study. bmj, 365.

RODRïGUEZ-MORAN, M., ARADILLAS-GARCïA, C., SIMENTAL-MENDIA, L. E., MONREAL-ESCALANTE, E., DE LA CRUZ MENDOZA, E., DãVILA ESQUEDA, M. E. & GUERRERO-ROMERO, F. 2010. family medical history of hypertension and cardiovascular risk factors in prepubertal children. American journal of hypertension, 23, 299-304.

SCHULZE, M. B., SCHULZ, M., HEIDEMANN, C., SCHIENKIEWITZ, A., HOFFMANN, K. & BOEING, H. 2007. Fiber and magnesium intake and incidence of type 2 diabetes: a prospective study and meta-analysis. Archives of internal medicine, 167, 956-965.

SEONG, S. S., CHOI, C. B., SUNG, Y. K., PARK, Y. W., LEE, H. S., UHM, W. S., KIM, T. W., JUN, J. B., YOO, D. H. & LEE, O. Y. 2004. Health-related quality of life using EQ-5D in Koreans. The Journal of the Korean Rheumatism Association, 11, 254-262.

SHARAFI, M., HAYES, J. E. & DUFFY, V. B. 2013. Masking vegetable bitterness to improve palatability depends on vegetable type and taste phenotype. Chemosensory perception, 6, 8-19.

SMITH, K. J., MCNAUGHTON, S. A., GALL, S. L., BLIZZARD, L., DWYER, T. &

VENN, A. J. 2009. Takeaway food consumption and its associations with diet quality and abdominal obesity: a cross-sectional study of young adults. International Journal of Behavioral Nutrition and Physical Activity, 6, 29.

SROUR, B., FEZEU, L. K., KESSE-GUYOT, E., ALLêS, B., MëJEAN, C., ANDRIANASOLO, R. M., CHAZELAS, E., DESCHASAUX, M., HERCBERG, S. & GALAN, P. 2019. Ultra-processed food intake and risk of cardiovascular disease: prospective cohort study (NutriNet-Santé). bmj, 365.

STATISTICS KOREA, 2019. Annual Report on the Causes of Death Statistics

SUNG, G., HWANG, I., PARK, S. H., PARK, S., KIM, B. J., LEE, J. H. & MIN, S. K. 2017. Study on microbiological safety of simple processed agricultural products. Korean Journal of Food Science and Technology, 49, 599-604.

SVETKEY, L. P., MOORE, T. J., SIMONS-MORTON, D. G., APPEL, L. J., BRAY, G. A., SACKS, F. M., ARD, J. D., MORTENSEN, R. M., MITCHELL, S. R. & CONLIN, P. R. 2001. Angiotensinogen genotype and blood pressure response in the Dietary Approaches to Stop Hypertension (DASH) study. Journal of Hypertension, 19, 1949-1956.

TRICHOPOULOU, A., COSTACOU, T., BAMIA, C. & TRICHOPOULOS, D. 2003. Adherence to a Mediterranean diet and survival in a Greek population. New England Journal of Medicine, 348, 2599-2608.

ULLRICH, J., ERNST, B., WILMS, B., THURNHEER, M. & SCHULTES, B. 2013. Roux-en Y gastric bypass surgery reduces hedonic hunger and improves dietary habits in severely obese subjects. Obesity surgery, 23, 50-55.

VAN DER HORST, K., BRUNNER, T. A. & SIEGRIST, M. 2011. Ready-meal consumption: associations with weight status and cooking skills. Public health nutrition, 14, 239-245.

VANDEVIJVERE, S., LACHAT, C., KOLSTEREN, P. & VAN OYEN, H. 2009. Eating out of home in Belgium: current situation and policy implications. British journal of nutrition, 102, 921-928.

VERLEGH, P. W. & CANDEL, M. J. 1999. The consumption of convenience foods: reference groups and eating situations. Food Quality and Preference, 10, 457-464.

WALTER, F. M. & EMERY, J. 2005. 'Coming down the line'—patients' understanding of their family medical history of common chronic disease. The Annals of Family Medicine, 3, 405-414.

WALTER, F. M., EMERY, J., BRAITHWAITE, D. & MARTEAU, T. M. 2004. Lay understanding of familial risk of common chronic diseases: a systematic review and synthesis of qualitative research. The Annals of Family Medicine, 2, 583-594.

WERTENBROCH, K. 1998. Consumption self-control by rationing purchase quantities of virtue and vice. Marketing science, 17, 317-337.

WOODWARD-LOPEZ, G., KAO, J. & RITCHIE, L. 2011. To what extent have sweetened beverages contributed to the obesity epidemic? Public health nutrition, 14, 499-509.

YE, E. Q., CHACKO, S. A., CHOU, E. L., KUGIZAKI, M. & LIU, S. 2012. Greater whole-grain intake is associated with lower risk of type 2 diabetes, cardiovascular disease, and weight gain. The Journal of nutrition, 142, 1304-1313.

YOON, G. & WOO, J., 1999. Korean Consciousness Structure and Behavior of Meat Food. *Journal of the Korean Society of Food Science and Nutrition*, 28, 246-256.

ZANDSTRA, E. H., LION, R. & NEWSON, R. S. 2016. Salt reduction: Moving from consumer awareness to action. Food Quality and Preference, 48, 376-381.