



An Analysis of Consumers' Internal Perception of Soup and Sauce using ZMET

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Abstract

There is a growing global interest in food choices that could affect health. Consumer food choices are dictated by numerous factors such as attitudes, beliefs, desires and preferences stemming from psychological and physiological attributes. The present study aimed to understand consumers' internal perceptions about cream soup, cream sauce, and tomato sauce using ZMET (Zaltman's Metaphor Elicitation Technique). The 9 step ZMET interview process was conducted for a sample of 36 consumers (12 consumers for each sauce). A content analysis of the survey results was carried out. From this, 56 concepts of cream soup were derived, and 15 constructs that met with the agreement of more than one-third of the total sample consumers were extracted. These 15 constructs included 'Soft', 'Recollection', 'Familiar', 'Warm', 'Comfortable', etc. Similarly, for cream sauce, 67 concepts and 20 constructs 'Silky', 'Warm', 'Restaurant', 'Family', 'Memory', etc. were deduced. A total of 66 concepts and 20 constructs for tomato sauce 'Sourness', 'Sauce Bottle', 'Pleasant', 'Ingredient', 'Cooking', etc. were derived. The analysis of consumers' consensus maps through this study provides a deep and useful understanding of consumers and their latent needs. Also, the results of this study indicate that exploring consumers' internal perceptions is critical to understanding their healthy food choices. This can be used as basic data for formulating marketing strategies.

Key Words : Perception, eating behavior, food choice, qualitative research, zaltman's metaphor elicitation technique

1. Introduction

Interest in food choice, which could have negative impacts on health, is widespread in developed countries. Regulating food choice is an effective modification of dietary patterns (Steptoe et al. 1995). Motivations of food choice are not solely determined by sensory characteristics (internal stimuli of food), but also by numerous factors such as healthiness, convenience, price, mood, cultural factor, familiarity, weight control, and ethical concern (Steptoe et al. 1995; Milošević et al. 2012). The sensory characteristics of food themselves could be important factor of high fat foods, since fats contribute greatly to the taste, aroma, and texture of many foods (Ledikwe et al. 2007). However, healthy diet may be consumed for various reasons such as individual's concern of appearance, health consciousness, and education level (Cockerham et al. 1988; Mai & Hoffmann 2012; Bargiota et al. 2013).

It has been determined that psychological factors influence consumers' choice through impact on intentions, beliefs and attitudes, which are related to each factors of food choice and

other external influences (Köster 2009). Recent studies have shown growing interest in investigating relation between beliefs and attitudes associated with healthy food choice. For instance, Huang et al. (2020) described the effects of social-psychological factors influencing food consumption, including items related to behavior beliefs, normative beliefs, control beliefs, perceived need and habit towards consuming meat, eggs, dairy, and fruit.

Emotions also affect people's eating behavior, which includes food choice, eating motivation, and amount of food intake. The stress and negative emotions may influence food selection and consumption (Gutjar et al. 2015b). Cho & Song (2007) reported that stress is correlated with meals, food choices, and health conditions, according to the result showing that the amount of food consumed by stressed female university students and their intake of sweet, spicy, and sour flavors increased, similarly intake of spicy, sweet and greasy flavors increased by stressed male university students.

Due to economic development, social change, and high industrialization, the consumers' standard of living has been raised, as well as food consumption patterns are rapidly

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changing to convenience and time-saving (Hong 2017; Hong & Lee 2017). These changes lead to an increase in consumption of sauces that can be easily purchased, and to brisk manufacturing and development of sauces in domestic food companies (Ahn et al. 2015). Therefore, our research team decided to investigate consumers' psychological factors of cream soup, cream sauce, and tomato sauce in-depth using ZMET, a qualitative method.

ZMET is a qualitative method that utilizes visible and sensory images to derive the metaphors, constructs, and mental models that reflect deep analysis of consumers thought, behavior, attitude, potential needs, and unconscious motivations. Zaltman & Coulter (1995) presented ZMET as a research tool designed to disclose the mental model that induces consumer thought and behavior, and characterize the derived model in an applicable way. Choi & Ko (2018) analyzed the inner psychology of Korean wine, analyzed the attributes and value of Korean wine, and presented marketing strategies to secure competitive advantage. Kim & Ko (2017) used soft laddering and ZMET for the purpose of developing Korean Finedining restaurant's foodservice and accomplished categorization by content analysis based on deduced foodservice value. Yang et al. (2014) investigated Malaysian Chinese's food consensus behavior through ZMET and presented the social-psychological stand point in F&B industry.

The influence of attitudes, beliefs and other factors on food choice is of particular importance in the acceptance or rejection of foods (Cho & Song 2007). Therefore, understanding consumers' motivations in the food choice situation are necessary in order to guide the nutritional status of population into a healthier direction (Zaltman & Zaltman 2008). Present study aims to examine the consumers' internal perception of cream soup, cream sauce, and tomato sauce with ZMET to investigate consumers' food choice factors qualitatively. The result of this study gives information of consumers' motive of consuming cream soup, cream sauce, and tomato sauce.

II. Materials and Methods

1. Data collection

The participants were comprised of consumer age 20-64 who had eaten cream soup, cream sauce or tomato sauce within a month before the survey. Data were collected on Sep. 25, Oct. 11, and Oct. 16, 2019. During sample recruiting, we applied the quota sampling method so the

sample population would reflect the demographic ratio of consumer who consume cream soup, cream sauce, tomato sauce living in Republic of Korea. In total, 36 respondents (12 respondents for each sample: cream soup, cream sauce, tomato sauce) were invited to the survey owing to the preceding study of ZMET which stated 8 to 16 responses are appropriate and the number of key constructions in 12 or more people is no longer increasing (Zaltman 1996). This study was approved by the Institutional Review Board (IRB) of Kookmin University, Seoul, Republic of Korea (KMU-201908-HR-214).

2. Research instrument

Prior to conducting the interview, respondents were fully briefed on the purpose and process of the study and asked to collect five pictures representing each sauce before conducting the interview. Interview related to the images prepared by respondents were conducted and it took about an hour per respondent.

The metaphor extraction technique is a step-by-step process that uses image data to identify potential perception of respondents. ZMET consists mainly of 7-10 steps and the configuration procedure may vary somewhat depending on the subject of each study (Zaltman & Zaltman 2008). Therefore, the interview phase in this study was conducted in a total of nine steps based on Zaltman's 10 steps and prior research. All the contents of the interview were recorded with respondents' consent for further data analysis and interview process is shown in <Table 1>.

3. Data analysis

According to a prior study, there are some precautions to be taken in the analysis process. While analyzing the contents of the ZMET's step-by-step interviews, it is necessary to keep in mind what context the thoughts, feelings, and actions of the surveyed people occur, as different meanings may be given to the same terms depending on the social environment of the person being investigated (Zaltman 1996). In addition, each phase of ZMET requires a construct process (Park & Moon 2017) that is correctly interpreted by researchers to understand the behavior of respondents that is important but difficult to consider. Therefore, this study followed the caution and conducted an analysis on whether the coding accurately reflected the respondents' opinions and could be interpreted differently (Yang & Khoo-Lattimore 2015).

During the ZMET interview, the images prepared by the respondents were encouraged to derive comprehensive value

<Table 1> ZMET interview process

Procedure	Content
1. Storytelling	Participants freely talk about the images that they chose.
2. Missed Issues and Images	If no image was found to indicate one's own thoughts, the missing image was identified.
3. Sorting Task	Participants group the images into groups according to the semantic criteria that they thought.
4. Construct Elicitation	Participants select three images at random as a stage for the concept of composition and then explain the classification criteria and meaning by separating two similar and one other.
5. Most Representative Image	Participants select the image that most represents their feeling or thought.
6. Opposite Image	Finding the opposite image of participants' thoughts. This step is necessary to understand their thinking by understanding what does not represent their thoughts.
7. Sensory Image	A sensory image verification step that induced the image to be described using visual, auditory, olfactory, tactile, and palate to deepen participants' emotions and find new meanings.
8. Mental Map	Participants reviews the derived constructs and draw up a mental map to explain connections among the constructs.
9. The Consensus Map	Researcher summarize the most important constructs and creates a map under participants' consent.

hidden in visual metaphors, not just to express concepts. As the interview progressed at each step, the concept of composition was added or removed. Based on the data collected, the individual profiles of the respondents were created to analyze, classify, reduce and categorize the interview contents. In addition, questions or uncertainties arising from the analysis process were confirmed once again to ensure reliability and validity.

When deriving the concept of composition of ZMET, it is an appropriate cut-off criterion to be derived by more than one-third of the total participants and a construct pair mentioned by at least one-quarter of the participants are permitted (Zaltman & Coulter 1995). Thus the derived concepts in present study reflects 4 or more participants' concepts, and construct pair of consensus map was consented by 3 or more participants.

III. Results and Discussion

1. Perception of cream soup

The demographic characteristics of participants interviewed of cream soup is shown in <Table 2>. Based on the collected data, an inductive analysis of the interview resulted in a total of 56 concepts (Soft, Recollection, Familiar, Warm, Comfortable, Light, School Meal, Mother, Salty, Experience, Childhood, Italy, Memory, Pork cutlet, Cozy, Button Mushroom, Calm, Nature, Meat Broth, Monotonous, Pepper, Ecstatic, Weaning Food, Stomach Medicine, Ingredient, Cotton, Satisfied, Melt, Greasy, Neat, Army Days, Earthy, Health, Winter, Western Cuisine, Grain, Cloud, Farm, Cafeteria, Tree, *Bbopgi* (밥기), Thin Rice Gruel, Rice, Child, Armchair, *Ondolbang* (온돌방), Blanket, Junk Food, Pasture,

Campfire, Classical Music, Grass, Sky, Korean Food, *Hanok* (한옥)) with a frequency of at least one to 12 times per item <Table 3>.

A total of 15 construct pairs of cream soup were derived from present study, and were stated by 4 or more people which account for one-third of the total participants. The deducted constructs of cream soup are 'Soft', 'Recollection', 'Familiar', 'Warm', 'Comfortable', 'Light', 'School Meal', 'Mother', 'Salty', 'Experience', 'Childhood', 'Italy', 'Memory', 'Pork cutlet', 'Cozy'. These derived constructs were linked to shared concepts under the consent of 3 or more participants which account for one-quarter of the total participants.

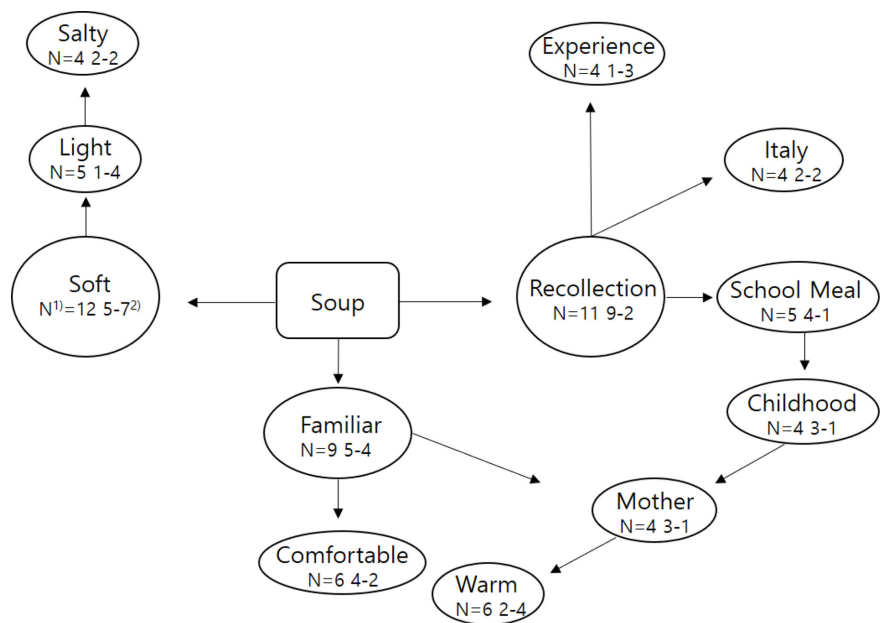
In <Figure 1>, the core compositions are 'Soft', 'Familiar' and 'Recollection'. The most frequent 'Soft' was considered the ideal texture of soup, leading to the 'Light' and 'Salty' representing the appearance and taste of the ideal soup. Also, 'Familiar' was derived from the feeling of familiarity when

<Table 2> Respondents' Profile of Cream Soup

Respondent	Gender	Age Group	Occupation
1	Female	40	Housewife
2	Female	20	Student
3	Female	50	Housewife
4	Male	40	Office Worker
5	Female	30	Office Worker
6	Male	50	Owner-operator
7	Male	20	Student
8	Male	20	Student
9	Female	40	Housewife
10	Male	30	Job seeker
11	Female	30	Housewife
12	Female	50	Teacher

<Table 3> Composition Items of Cream Soup

No.	Frq	Elements respondents mentioned
1	12	Soft
2	11	Recollection
3	9	Familiar
4	6	Warm, Comfortable
5	5	Light, School Meal
6	4	Mother, Salty, Experience, Childhood, Italy, Memory, Pork cutlet, Cozy
7	3	Button Mushroom, Calm, Nature, Meat Broth
8	2	Monotonous, Pepper, Ecstatic, Weaning Food, Stomach Medicine, Ingredient, Cotton, Satisfied, Melt, Greasy, Neat, Army Days, Earthy
9	1	Health, Winter, Western Cuisine, Grain, Cloud, Farm, Cafeteria, Tree, <i>Bbopgi</i> (밥그릇), Thin Rice Gruel, Rice, Child, Armchair, <i>Ondolbang</i> (온돌방), Blanket, Junk Food, Pasture, Campfire, Calssical Music, Grass, Sky, Korean Food, <i>Hanok</i> (한옥)



<Figure 1> Consensus map of Cream Soup

¹⁾N=Number of respondents agree on a particular construct

²⁾x-y=x: Frequency of this construct being an origination point in a relationship with another construct. y: Frequency of this construct being a destination point in a relationship with another construct.

the participants think of soup, and connected to ‘Comfortable’ which is similar to familiarity, and ‘Mother’ which is the object that usually makes them feel friendly. ‘Recollection’ is a concept that refers to various memories when eating soup, which is connected to ‘Experience’ and brought back memories of eating soup. Recalling the experience, the participants came up with an impressive destination, which resulted in ‘Italy’. It also showed that cream soup reminded consumer of school meals, reminded of childhood and mother, and made them feel warm.

2. Perception of cream sauce

<Table 4> shows the demographic characteristics of participants interviewed of cream sauce. An inductive analysis of the interview resulted in a total of 67 constructs (Silky, Warm, Restaurant, Family, Memory, Travel, Pleasure, Recollection, Cheese, Salty, Sons and Daughters, Exotic, Silent, Melt, Pasta, Greasy, Mushroom, Friend, Pleasant, Children, Positive, Army, Conversation, Bread, Childhood, Relaxed, Italy, Accustomed, Place, Sunset, Familiar, Tomato Sauce, Abundant, Fruit, Clean, Husband, Unfamiliar, Sweet,

<Table 4> Respondents' Profile of Cream Sauce

Respondent	Gender	Age Group	Occupation
1	Male	20	Student
2	Male	40	Office Worker
3	Female	40	Housewife
4	Female	50	Housewife
5	Female	50	Housewife
6	Male	30	Housewife
7	Male	20	Student
8	Female	40	Housewife
9	Female	50	Freelancer
10	Female	30	Housewife
11	Male	30	Master's Student
12	Female	20	Housewife

Adventurous, Smooth, Atmosphere, Ingredient, Novelty, Happiness, Thirst, Unhealthy, Winter, Luxurious, Savory, Tempting, Oily, Tree, Garlic, Water, Polished, Music, Neighbor, Nature, Attachment, Camp, Cracker, Pastel, Junk Food, Cozy, Pizza, Rest, Healing) with a frequency of at least one to 12 times per constructs <Table 5>.

A total of 20 construct pairs of cream sauce were derived from present study, and remarked by 4 or more participants. The derived constructs were 'Silky', 'Warm', 'Restaurant', 'Family', 'Memory', 'Travel', 'Pleasure', 'Recollection', 'Cheese', 'Salty', 'Sons and Daughters', 'Exotic', 'Silent', 'Melt', 'Pasta', 'Greasy', 'Mushroom', 'Friend', 'Pleasant', 'Children'.

The key constructs of cream sauce were 'Silky', 'Warm' and 'Restaurant'. 'Silky' is a sensory term derived from the texture of cream sauce, connected to other concept of texture, 'Greasy' and 'Silent'. 'Warm' is derived when think of an ideal type of cream sauce, and connected to 'Family' and

'Daughter' that people intake the sauce together, and connected to 'Pleasant', the emotion that came to mind in those situation. 'Restaurant' was also a place to bring back memories of consumers, which was linked to 'Recollection'. 'Recollection' was reminiscent of 'Travel' and 'Memory', and 'Travel' was linked to 'Exotic' as an element of novelty.

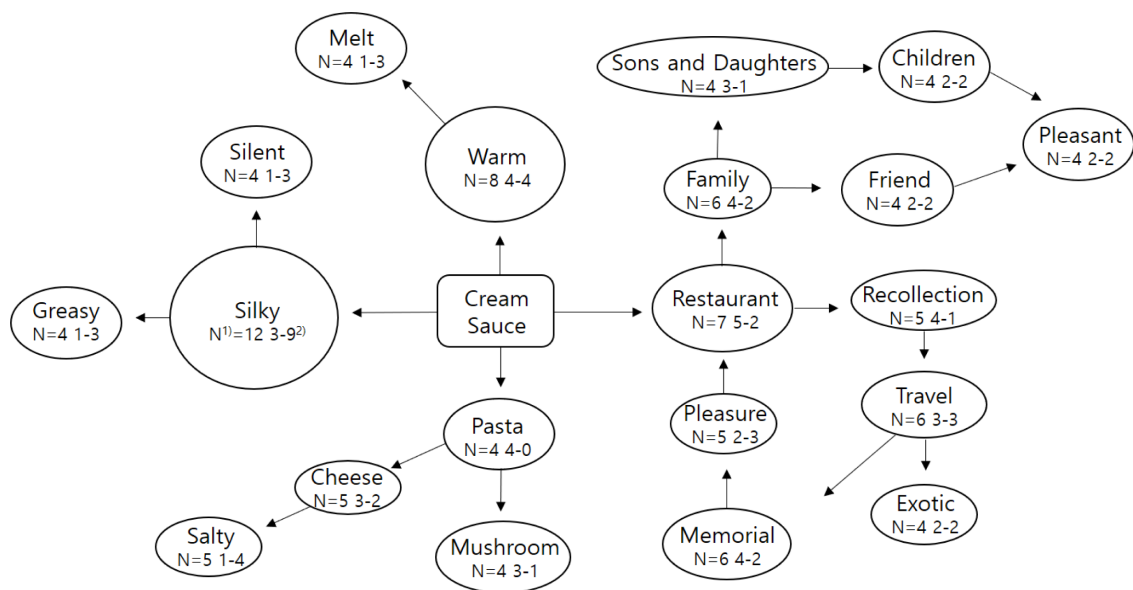
3. Perception of tomato sauce

The demographic characteristics of participants interviewed of tomato sauce is shown in <Table 6>. A total of 66 constructs (Sourness, Sauce Bottle, Pleasant, Ingredient, Cooking, Home, Pasta, Familiar, Family, Farm, Bright, Soft, Energetic, School Meal, Restaurant, Children, Festival, Pizza, Strong, Spice, Slippery, Nature, Recollection, Friend, Healthy, Freshness, Refreshing, School, Water, Crunchy Texture, Cuisine, Saltiness, Home-made Pasta, Umami, Thick, Positive, Pleasant, Memory, Warm, *Tteokbokki* (떡볶이), Chunk, Accustomed, Processed Food, Formality, Fruit, Juice, Ladle, Boiling Sound, Sweetness, Lunch box, Garlic, Fireworks, Social Fellowship, Lively, Spain, Travel, Omelet, Warmth, Olive Oil, Artificial, Combat Ration, Genial, Sunlight, Beach, Rest) are deducted with a frequency of at least one to 9 times per item <Table 7>.

A total of 20 construct pairs that were stated by 4 or more participants are deducted. The construct pairs of tomato sauce are 'Sourness', 'Sauce Bottle', 'Pleasant', 'Ingredient', 'Cooking', 'Home', 'Pasta', 'Familiar', 'Family', 'Farm', 'Bright', 'Soft', 'Energetic', 'School Meal', 'Restaurant', 'Children', 'Festival', 'Pizza', 'Strong', 'Spice'. In the consensus map <Figure 3>, 'Sourness', 'Sauce Bottle', 'Pleasant' and 'Ingredient' were the main concepts of composition of tomato sauce. 'Sourness' was derived based on the flavor of tomato sauce that comes to mind, and

<Table 5> Composition Items of Cream Sauce

No.	Frq	Elements respondents mentioned
1	12	Silky
2	8	Warm
3	7	Restaurant
4	6	Family, Memory, Travel
5	5	Pleasure, Recollection, Cheese, Salty, Sons and Daughters
6	4	Exotic, Silent, Melt, Pasta, Greasy, Mushroom, Friend, Pleasant, Children
7	3	Positive, Army, Conversation, Bread
8	2	Childhood, Relaxed, Italy, Accustomed, Place, Sunset, Familiar, Tomato Sauce, Abundant, Fruit, Clean, Husband, Unfamiliar, Sweet, Adventurous, Smooth, Atmosphere, Ingredient, Novelty, Happiness
9	1	Thirst, Unhealthy, Winter, Luxurious, Savory, Tempting, Oily, Tree, Garlic, Water, Polished, Music, Neighbor, Nature, Attachment, Camp, Cracker, Pastel, Junk Food, Cozy, Pizza, Rest, Healing



<Figure 2> Consensus map of Cream Sauce

¹⁾N=Number of respondents agree on a particular construct
²⁾x-y=x: Frequency of this construct being an origination point in a relationship with another construct. y: Frequency of this construct being a destination point in a relationship with another construct.

<Table 6> Respondents' Profile of Tomato Sauce

Respondent	Gender	Age Group	Occupation
1	Male	30	Student
2	Male	40	Office Worker
3	Male	30	Office Worker
4	Male	30	Office Worker
5	Female	40	Housewife
6	Female	30	Housewife
7	Female	20	Student
8	Male	50	Freelancer
9	Female	50	Housewife
10	Female	40	Housewife
11	Male	20	Student
12	Female	20	Master's Student

‘Spice’ was thought to enhance this flavor. In addition, these spices generally came to mind ‘Strong’ meaning that they taste intense. ‘Sauce Bottle’, a commercial product, showed that when consumers think of tomato sauce, they think of cooking at home. It was connected to ‘Ingredient’ since they put various ingredients while cooking with tomato sauce, and connected to ‘Cooking’. When thinking of ingredients, consumers stated they were reminded of ‘Farm’ and ‘Soft’ which implies the atmosphere of farm. Also, ‘Family’ was derived as people who eat ‘Pasta’ with, and ‘Home’ was emerged as the place where they eat pasta.

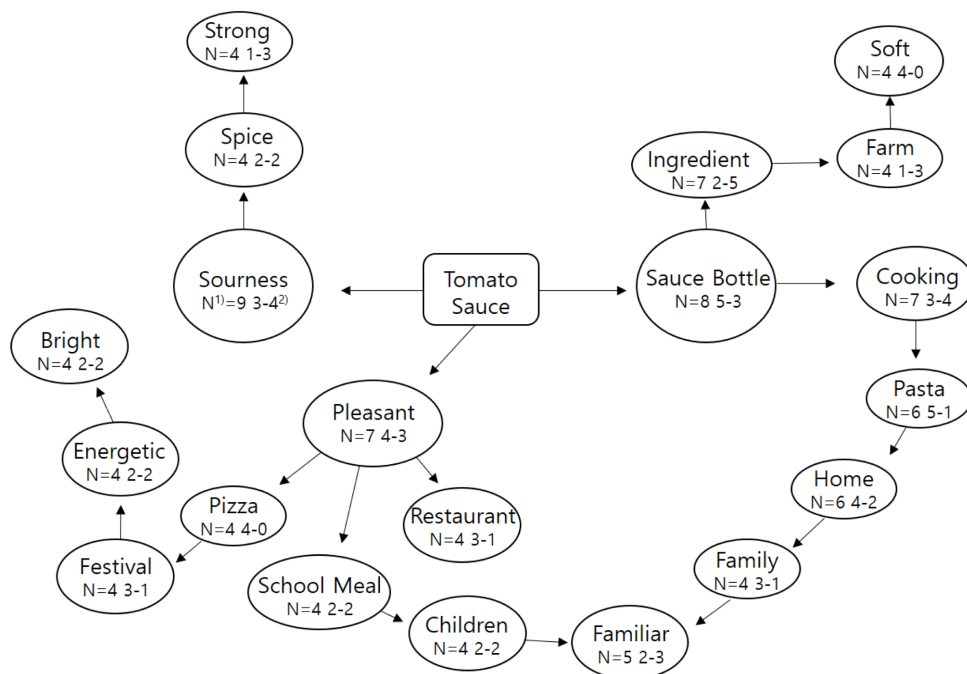
IV. Summary and Conclusion

It is important to understand the factors associated with food choice since it can have an important effect on health. There are numerous factors of food choice such as taste, healthiness, desires, preference, attitude and belief originated by psychological and physiological attributes. Herein, present study examined consumers’ internal perception of cream soup, cream sauce and tomato sauce which have a great impact on food choice and health.

The major findings of the study are as follows. First, a total of 56 concepts of cream soup were derived, and one-third of the total samples were derived as criteria, 15 constructs including ‘Soft’, ‘Recollection’, ‘Familiar’, ‘Warm’, ‘Comfortable’, ‘Light’, ‘School Meal’, ‘Mother’, ‘Salty’, ‘Experience’, ‘Childhood’, ‘Italy’, ‘Memory’, ‘Pork cutlet’, ‘Cozy’. Second, 67 constitutions for cream sauce and 20 constructs ‘Silky’, ‘Warm’, ‘Restaurant’, ‘Family’, ‘Memory’, ‘Travel’, ‘Pleasure’, ‘Recollection’, ‘Cheese’, ‘Salty’, ‘Sons and Daughters’, ‘Exotic’, ‘Silent’, ‘Melt’, ‘Pasta’, ‘Greasy’, ‘Mushroom’, ‘Friend’, ‘Pleasant’, ‘Children’ are deducted. Third, a total of 66 concepts of tomato sauce have been derived, and 20 constructs ‘Sourness’, ‘Sauce Bottle’, ‘Pleasant, Ingredient’, ‘Cooking’, ‘Home’, ‘Pasta’, ‘Familiar’, ‘Family’, ‘Farm’, ‘Bright’, ‘Soft’, ‘Energetic’, ‘School Meal’, ‘Restaurant’, ‘Children’, ‘Festival’, ‘Pizza’, ‘Strong’,

<Table 7> Composition Items of Tomato Sauce

No.	Frq	Elements respondents mentioned
1	9	Sourness
2	8	Sauce Bottle
3	7	Pleasant, Ingredient, Cooking
4	6	Home, Pasta
5	5	Familiar
6	4	Family, Farm, Bright, Soft, Energetic, School Meal, Restaurant, Children, Festival, Pizza, Strong, Spice
7	3	Slippery, Nature, Recollection, Friend, Healthy, Freshness, Refreshing, School
8	2	Water, Crunchy Texture, Cuisine, Saltiness, Home-made Pasta, Umami, Thick, Positive, Pleasant, Memory, Warm, <i>Tteokbokki</i> (떡볶이), Chunk, Accustomed
9	1	Processed Food, Formality, Fruit, Juice, Ladle, Boiling Sound, Sweetness, Lunch box, Garlic, Fireworks, Social Fellowship, Lively, Spain, Travel, Omelet, Warmth, Olive Oil, Artificial, Combat Ration, Genial, Sunlight, Beach, Rest



<Figure 3> Consensus map of Tomato Sauce

¹⁾N=Number of respondents agree on a particular construct

²⁾x-y=x: Frequency of this construct being an origination point in a relationship with another construct. y: Frequency of this construct being a destination point in a relationship with another construct.

‘Spice’ are derived. These findings also show that consumers’ internal perceptions are influenced by life style, family, friend, emotion, experience, environment etc.

This result is consistent with the result of previous studies that testified impact of internal factors on food choice. Dowd & Burke (2013) have shown that the ethical values and food choice motivations affect purchase sustainably sourced foods. Gutjar et al. (2015a) emphasized that perception of sensory attribution, psychological factors, price availability, brand, social and cultural factors influence attitudes which as

an impact on food choice. Tarkiainen & Sundqvist (2005) investigated the impact of health consciousness, subject norms, importance of price and perception of availability on buying intentions of organic food.

Since this study may be the first to examine consumers’ internal perception of cream soup, cream sauce, and tomato sauce, it still holds some limitations. First, the respondents of this research were limited to those who reside in Seoul, they do not represent the results of all consumers in Republic of Korea. Second, since the survey was conducted in Republic

of Korea, it does not reflect the perceptions of overseas consumers. Therefore, in future research, participants from various regions and countries should be recruited and investigated.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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