Development of the DESK (Disinhibited Eating Score for Koreans) Questionnaire: Examining the relationship between eating cues and food intake in the corporate-working population of Seoul, Korea

Young Mee Kwon

A thesis
submitted in partial fulfillment of the
requirements for the degree of

Master of Public Health

University of Washington
2013

Committee:
Marian L. Neuhouser
Adam Drewnowski

Program Authorized to Offer Degree:
Public Health – Epidemiology

University of Washington

What triggers us to start or stop eating, and also decide what and how much we eat? There are many established questionnaires that have been developed to assess one's motivation to eat. Among the most widely used is the Three Factor Eating Questionnaire (TFEQ) that was developed in 1985. Among the three factors in the TFEQ, "disinhibition" refers to the lack of control and tendency to overeat or eat opportunistically in response to certain cues and circumstances. TFEQ has been widely used in many different countries both in its original form or modified versions to suit the study population's specific cultural and societal characteristics. However, there has not been an assessment tool tailored for South Korea and especially its capital Seoul, a city with the highest population density even among other megacities of developed countries, resulting in a highly intensified food environment with many potential implications on eating behavior. Also, both the corporate and social culture revolving highly around eating and drinking may create numerous opportunities that impact food choice and consumption in the corporate-working population. Therefore, the overall goal of this study is to expand the domain of "disinhibition" from the TFEQ and develop a *Disinhibited Eating Score for Koreans (DESK) Questionnaire*. This study has two components: 1) the development and administration of a scored scale questionnaire that measures an individual's degree of control in response to various factors of "disinhibited eating", and 2) a focused recall assessing self-reported intake of undesirable foods (categorized as high fat, high sodium, sweets, and alcohol) to examine the correlation between DESK score and food choice/intake in this population.

Development of the DESK (Disinhibited Eating Score for Koreans) Questionnaire: Examining the relationship between eating cues and food intake in the corporate-working population of Seoul, Korea

Young Mee Kwon

Chair of the Supervisory Committee:
Marian L. Neuhouser, Affiliate Professor
Nutritional Sciences

Table of Contents

I. BACKGROUND

What triggers people to start and stop eating, or to decide what and how much to eat? The most intuitive—as well as physiologically correct—answer would be hunger. However, this is certainly not the only answer in the modern "obesigenic environment," a term first coined by Swinburn in the late 1990s that embraces the entire range of social, cultural and environmental conditions that impact an individual's ability to follow a healthy lifestyle (1). Over the past thirty years, studies have attempted to reveal the motivations of human eating behavior and the concept of "restrained eating"—the tendency to restrict food intake in order to control body weight—by Herman was a pioneering concept in the mid-1970s (2). Largely building upon the Restraint Scale developed by Herman, in 1980s Stunkard and Messick identified one additional dimension of human eating behavior in their development of the Three Factor Eating Questionnaire (TFEQ) that included one other important factor in addition to hunger and cognitive restraint: disinhibition (3). If cognitive restraint can be explained in terms of all conscious efforts and strategies to prevent overeating and gaining weight, disinhibition is the opposite concept describing the lack of control and tendency towards over-eating and eating opportunistically in response to a variety of cues and circumstances.

In a systematic review, Bryant expanded on the concept of disinhibition as an important eating behavior trait associated not only with a higher BMI and obesity, but also with mediating variables such as less healthy food choices and inhibited consumption monitoring that ultimately can contribute to overweight/obesity and poorer health (4)(5). Studies have shown that out of the three factors—hunger, disinhibition and cognitive restraint—disinhibition is the strongest predictor of food consumption (6, 7, 8), most highly associated with making less healthful food choices, and a good indicator of a person's responsiveness to eating cues. Cross-sectional studies have also highlighted how individuals with high disinhibition scores were more likely to choose high-fat foods (9) (10),

high-salt foods, processed meat, carbonated drinks (11), sweets (6, 7, 12) and alcohol (13, 14). All of these studies have documented how disinhibition can lead to less healthy food choice, contributing to overweight and obesity, which could possibly lead to poorer general health. Therefore, disinhibition has important implications for understanding a person's relationship with today's obesigenic environment and to what extent it affects his or her eating behavior.

Clearly, disinhibition is a powerful eating behavior trait very relevant to the issues regarding less healthy food choices and consumption in today's modern environment. However, it could very well be manifested differently according to different cultural and societal characteristics. Therefore, following the most renowned TFEQ and other established questionnaires such as the Dutch Eating Behavior Questionnaire (15) that were developed to assess many aspects of disinhibition and other behavioral eating traits, further studies (5, 6, 7, 8, 9, 11, 12, 13, 14) have tested these tools either in the original form or modified versions suitable to a particular study population's cultural and societal characteristics.

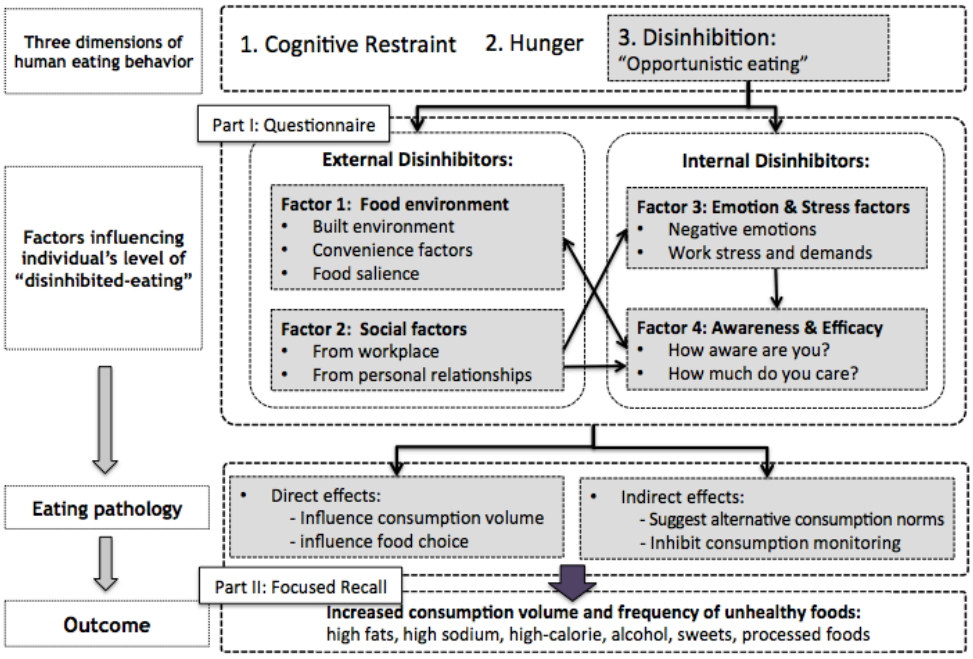
However, there has not been an assessment tool developed specific to South Korea, a country with a unique eating environment of prevalent eateries and a social culture in which not only personal but professional relationships revolve highly around eating and drinking. This applies especially to its capital Seoul, a megacity with a bursting population of over 10 million that manifests a highly intensified food environment with eateries all across the city. In addition, the unique corporate and social culture creates numerous opportunities that may also have tremendous impact on food choices and eating behaviors in professionals. Such characteristics create a setting in which various external and internal cues may impact one's food choices and control over eating, therefore increasing a person's susceptibility to disinhibited eating.

Therefore, the primary aim of this study was to expand the domain of disinhibition from the TFEQ and develop a scaled scoring system—in name of the DESK (Disinhibited Eating Score for Koreans) Questionnaire—to identify factors and their degree of control over

food choice and consumption in the corporate working population of Seoul, Korea. A unique aspect of this study in comparison to previous studies of disinhibition from other countries is the focus on the particular corporate culture of Korea that was suspected to have great impact on this population in regards to their diet and eating behaviors. Such a tool would provide insight into which disinhibition factors this population is most susceptible to and also help individuals identify but not respond to inappropriate eating cues in order to facilitate achieving a healthier diet.

II. METHODS

Figure 1: Study design logic of the development of the DESK Questionnaire



Part I instrument Development: The DESK Questionnaire

The two domains and four sub-factors of the DESK Questionnaire were developed based on the original TFEQ and upon review of other established literature (which will be explained in each section of the DESK sub-factors) regarding many aspects of disinhibition and other behavioral eating traits. The root of the concept was grounded on the TFEQ of

which the study researchers state their question item pools also derived from Herman and Polivy's Revised Restraint Scale and Pudel's Latent Obesity Questionnaire (3). However, as the TFEQ did not distinguish between different types of disinhibitors, Bond's study(16), which further broke down TFEQ's domain of disinhibition by identifying three sub-scales in disinhibition became an important basis for identifying the two domains and four sub-factors in the DESK Questionnaire. Those three sub-scales Bond identified were "habitual susceptibility," "emotional susceptibility," and "situational susceptibility." (16)

With the previously established studies taken into consideration and author's own perceptions of the study population and culture, two large domains of disinhibited eating were categorized as "external disinhibitors" and "internal disinhibitors," each of which includes two relevant sub-factors (refer to Figure 1). The Food Environment factor and Social factor fit into external disinhibitors since the trigger for disinhibition comes from external sources. On the other hand, Emotional factor and Self-efficacy factor fit into internal disinhibitors, as the trigger is within oneself. Item pools of the original TFEQ questionnaire was screened to identify items applicable to this study's target population and were placed into the relevant DESK sub-factor category. Some of these TFEQ questions were modified to better fit the target population and some were included in their original form. In addition, newly developed items specific to the cultural and societal characteristics of the study population were added.

1. *External Disinhibitors*

    1) Food Environment Factor: Items Q1-Q3 were adapted from the TFEQ. Added items in this category took into consideration the unique "food salience" present in Seoul's food environment. Wansink explained that "salient food promotes salient hunger" both cognitively and physiologically as food being everywhere can serve as a continually tempting consumption reminder (18). He also explained "eating effort," as an environmental factor in that increased effort decreases consumption. Both of the salience and convenience component of food is

abundant in Seoul, Korea. For instance, late-night food delivery service is a competitive business that is very prevalent. The café and dessert culture has more than boomed in the past decade that on certain streets you may easily find five different brands of coffee shops lined up on the same block. Therefore, questions referring to the impact of such food environments were added to this section. In addition, with the evidence from established literature on the impact of visual cues and portion sizes on eating behaviors (17), relevant question items were also added to gauge the study population's response to such cues.

2) Social Factor: It is now almost a common knowledge that social factors play a huge role in not only what is eaten, but also how much is eaten. De Castro even showed that meals eaten with other people were 33% larger than those eaten alone (19). Often, this is explained in that meals eaten with familiar people can help make a meal more enjoyable and long, and also that it can reduce a person's ability or motivation to monitor their own consumption (18). Items Q10-Q11 were adapted from the TFEQ on this subject, but this sub-factor category had the most number of newly written items added in order to reflect the unique corporate culture surrounding food and alcohol consumption in Seoul, Korea. For instance, some practices that are common across the majority of the corporate culture include: going out to eating lunch together as a team where the person higher in corporate hierarchy often decides the menu; company dinners and drinking sessions that occur after work-hours; over-consumption of alcohol at these occasions. There is also a unique aspect about the Korean culture in general in terms of alcohol consumption. Unlike the typical American bar-scene where people would have a drink and eat moderate amounts of foods, in Korea, it is very normal that large dishes—both calorically dense and massive in portion size—usually accompany alcohol, therefore there is a very likely tendency to overeat in this context. All of these factors were taken into consideration for this

part of the questionnaire and tailored specifically to the corporate population in Korea.

2. Internal Disinhibitors

3) Emotional Factor: The concept of emotional eating has long-been substantiated (24, 25) and incorporated in items Q19-Q21 from the TFEQ, as these questions deal with emotional eating and alcohol consumption in response to negative emotions. However, stress is also an emotional factor (in addition to physiological) and many studies have explored the relationship between stress and eating behavior. Torres explained that although exposure to acute stress creates a "flight or flight" response and results in suppression of appetite, exposure to chronic stress such as job pressures was actually associated with greater preference for energy-dense foods, mainly those high in sugar and fat (20). Furthermore, stress manipulation studies have shown that disinhibition is an important predictor of eating in response to stress (21). Therefore, since one of the main interests of this study was in the corporate culture's influence on the study population in which job stress is inevitably a part of, questions on the impact of stress on food and alcohol consumption were newly written into this category.

4) Self-Efficacy Factor: Q25-Q27 were adapted from the TFEQ. However, the Self-efficacy sub-factor was newly constructed by combining two existing concepts, which were an individual's level of awareness and how much an individual actually cares about their health in terms of food and nutrition. For instance, distractions such as watching TV while eating have shown to increase consumption by obscuring a person's ability to monitor consumption and also extend the duration of a meal, a prominent disinhibiting effect (18). Therefore, additional question items were written to fit this sub-factor.

In total, the DESK Questionnaire comprises 32 questions ranging from six to ten questions per category. The answer choices provided on a 4-point scale ranging from "very often," "often," "sometimes," and "almost never."

Part II instrument Development: The "Unhealthy Food Score" Focused Food Recall

The purpose of this focused food recall was to serve as a measure of validating the DESK questionnaire by assessing perceptional food choice and intake of unhealthy foods and correlate that with the level of disinhibition as assessed by the DESK Questionnaire. As mentioned earlier, there have been many cross-sectional studies highlighting how individuals with high disinhibition scores were more likely to choose high-fat foods, high-salt foods, processed meat, carbonated drinks, as well as higher intake of sweets and higher rates of alcohol consumption in several study populations. Such food items are generally regarded as "unhealthy food" categories in most cultures in terms of the negative implications on health. Therefore, the categories for the "Unhealthy Food Score" were to be: high-fat foods, high-sodium foods, high-calorie foods, sweets, alcohol and processed foods. Upon consultation with a Korean dietitian, the format of the "Unhealthy Food Score" was constructed in a format of a focused food recall, tracking meals over the time of the day in order to capture every eating opportunity. Additionally, this was also to avoid categorizing the food items under labels of "high-fats," "high-sodium," etc., which could potentially discourage the respondents from answering without bias or guilt. Therefore, the recall was broken in sections related to eating opportunities throughout the time of the day: breakfast, lunch, snacks and sweets, dinner, alcohol and late-night foods. The food items under each time of the day were classified upon type of cuisine, considering the most commonly consumed foods in this population.

The specific items that fall under each of these "unhealthy food" categories were based upon several resources. First, an informal survey was conducted via Facebook to gather input on what kind of "unhealthy" food items (in their own perception) Koreans in

their 20s-30s consumed regularly. Also, in consultation with a Korean dietitian, a list of foods were drawn up that are commonly recognized as foods that fit into each categories and often included in food recall questionnaires used in Korea. These items were cross-checked with the Korean Ministry of Drug, Food and Safety's Food & Nutrition Guide, their on-line Food and Nutrition Data System and their recently published Nutrition Information Data for Most Commonly Eaten-out Foods. The response range for frequency was: <2 times monthly, 1-2times/week, 3-4times/week, or >4times/week. The response options for portions were S, M, L in comparison to the reference portion "M," which were given for each item.

The developed Questionnaire with both Part I and Part II instruments included were presented to Korean native speakers to confirm that the language and instructions were clear and unambiguous. The finalized questionnaire was then transformed into the online survey-platform *Survey Monkey* to be administered. The finalized English version of the full questionnaire is included in Appendix 1.

Study Population

Data was collected via *Survey Monkey* from July 29 to September 1, 2013. The target population was individuals of both genders and across all age groups, working full-time in the corporate environment across all industries in Seoul, Korea. In addition to the two-part questionnaire, a section was added at the end of the survey to collect self-reported demographic data on sex, age, weight, height, industry, physical activity levels and average work hours per week. Link to the on-line survey was sent out by contacting previous HR of the author's previous work places, ex-coworkers and friends who are working full-time in Seoul, and by individually explaining to each the nature of the study in order to facilitate voluntary participation. Those primary contacts used similar dissemination processes to their personal contacts that would fit the target population. All activities were approved by

the Institutional Review Board of the University of Washington. Implied informed consent was given by completion of the anonymized survey.

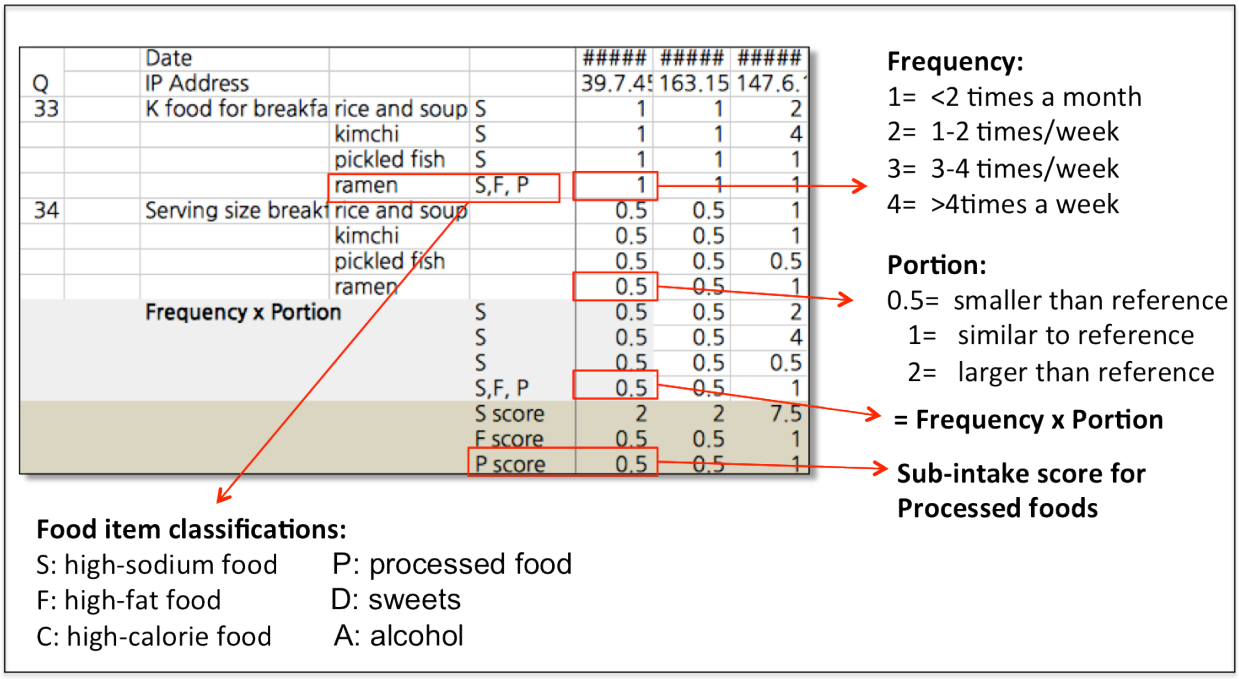
Data Analysis

A total of 177 participants participated in the questionnaire. 44 of them were excluded for not completing it to the end and two were excluded as they were "graduate students" and did not fit the criteria of working full-time. Additionally, eight were excluded for having too many missing answers, which was determined by having more than two missing answers per sub-factor of the DESK Questionnaire. Therefore, the final data analysis included the results from 123 respondents.

Scoring Total DESK score of each participant was calculated by sum of the four sub-factor scores. Each Sub-factor score was calculated as the mean score of each category. Since each question item was scored on a one (for "almost never") to four (for "very often") point-scale, the maximum sub-factor score one could reach would be four, which makes the maximum possible Total DESK score a 16. It should be noted that four questions (Q 26, 28, 29, 30) in the Self-efficacy factor had an opposite scoring scale (i.e. 1-point for "very often" and 4-points for "almost never") because higher disinhibition was represented in the opposite order due to the wording in these question items. For the six different categories of the "Unhealthy Food Scores," a more complicated algorithm was applied to calculate the individual scores (Figure 2). First, each and very food item was marked for the food categories the item would fall under. Depending on the item, it could fall anywhere between one to three categories out of the possible six (high-fat, high-sodium, high-calorie, alcohol, sweets and processed foods). For instance, a ramen would be marked for high-fat, high-sodium and processed. Also, each food item was calculated for [frequency x portion] depending on the respondent's answer. Then, each of the six unhealthy food scores were calculated by adding all of the [frequency x portion] results for each of the categories the food item fell under. That score was then converted into a percentage of the maximum

possible points of that particular category in order to make comparisons possible among each unhealthy food categories.

Figure 2. Unhealthy Food Score scoring algorithm



Data Analysis Descriptive analyses were performed for both Part I and Part II of the questionnaire to examine overall mean DESK scores, sub-factor scores, Unhealthy Food Score results. Significant differences within different demographics were also examined. In addition, since the degree of impact of the corporate culture of Seoul was one of the main points of interest, a few specific questions in the Social Factor of DESK pertaining to the Korean corporate culture was examined specifically between genders, younger and older age, and average work hours per week. Measures of reliability analysis were conducted to test the internal consistency reliability of the DESK questionnaire and establish construct validity. Bivariate correlations and linear regression models were used to examine the relationship between DESK scores and the six categories of the Unhealthy Food Scores. All tests were two-sided and statistical significance was set at $p<0.05$. All analyses were performed with *SPSS Statistics Version 21*.

III. RESULTS

Table 1: Participant characteristics of the DESK Questionnaire

Characteristics	n	%
Total	**123**	**100.0**
Gender		
Male	53	43.1
Female	70	56.9
Age		
<25	3	2.4
26-30	39	31.7
31-35	59	48.0
36-40	10	8.1
41-45	7	5.7
>45	5	4.1
Marital Status		
Single	83	67.5
Married	39	31.7
BMI (change to >25?)		
Underweight (<18.5)	10	8.1
Normal (18.5-25)	86	69.9
Overweight (25-30)	23	18.7
Obese (>30)	3	2.4
Physical activity hrs		
<60min/wk	48	39.0
1-3hr/wk	47	38.2
4-6hr/wk	20	16.3
>7hr/wk	7	5.7
Number of daily supplements taken		
0	64	52.0
1	44	35.8
2	10	8.1
>3	5	4.1
Avg weekly work hrs		
<40hrs	14	11.4
40-50 hrs	70	56.9
50-60 hrs	26	21.1
>60hrs	12	9.8
Industry		
Advertising/Media	22	17.9
IT/Telecom	30	24.4
Education	18	14.6
Medical/Healthcare	12	9.8
Manufacturing	6	4.9
Finance/Banking	5	4.1
Other		

Participant Characteristics

Table 1. provides the overall characteristics of participants in the study. Overall, there was a good balance in gender, although there were slightly more female (56.9%) than male (43.1%) participants. Age range spanned from under 25 to over 45, but heavily centered around the age group of 26 to 35 (80% of all participants), which would still be considered as the relatively early years of professional life in Korea, considering that mean college graduation ages are becoming older due to common leave of absences and compulsory military duty in males. The majority (67.5%) of participants were single and nearly 40% of them reported average physical activity of less than 60 minutes per week. 78% of all participants reported working between 41 and 60 hours a week, but 9.8% reported working more than 60 hour-long weeks on average.

DESK Questionnaire Psychometric Properties

Table 2 displays the psychometric properties of the DESK Questionnaire. Tests for internal consistency reliability as measured by Cronbach's α ranged from .56 to .79. The reliability of the summary score, which is the mean of the four sub-factor scores, was high at .76, with correlations between sub-factors and the total score ranging from .69 to .81. Also, in examining correlation matrixes of the question items in each sub-factor towards each other, all but only one fell under 0.70 indicating low correlations to each other. The only question pair with high correlation was Q21 and Q23 at .825 in the Social Factor.

Table 2: Items and sub-factors of the DESK Questionnaire. Shown with internal consistency reliability and item-total correlations

Factor and Items	Cronbach's α	Item-total correlation
I. Food Environment Factors:	**.76**	**.81**
1) I eat out of urges when I see certain bakeries or coffee shops even when I am not hungry		.52
2) I eat out of urges when I walk by convenient stores or snack stands on the street even when I am not hungry		.49
3) I have trouble not eating snacks when they are around at home or at work		.77
4) I use late-night delivery service of foods from sticker ads and flyers		.46
5) I tend to order dessert if I see them even if I didn't initially intend to		.60
6) I will buy processed snack items(i.e. chips, ice cream, instant noodles) when grocery shopping just because they're there		.73
7) Even when I feel full, I tend to finish my plate rather than making little amounts of left-overs		.58
8) There are times I find myself eating something mindlessly		.75
II. Social Factors:	**.77**	**.76**
9) I tend to purposely find someone to eat with rather than eat alone		.36
10) I tend to eat more when I eat with others in a social setting away from home		.53
11) When I am with someone who is overeating, I usually tend to		.62

overeat too		
12) I feel pressured to eat lunch with my "team" or superiors at work		.48
13) My weekends are usually filled with social gatherings involving food and/or alcohol		.51
14) I am obligated to go to company dinners and drinking sessions.		.56
15) I am pressured to drink (alcohol) beyond my will at company outings.		.61
16) I tend to eat more than intended when I go to company dinners or drinking sessions		.74
17) I tend to eat more when I am drinking alcohol		.66
18) I think my eating behaviors are impacted by my work life		.66
III. Emotional Factors:	**.79**	**.78**
19) When I feel anxious, I find myself eating something		.57
20) When I feel blue, I often overeat (eating makes me feel better)		.77
21) When I feel blue, I tend to drink more alcohol		.59
22) Stress from work increases my food consumption		.79
23) Stress from work increases my alcohol consumption		.63
24) I believe that my emotional state and level of stress has a lot to do with my eating patterns		.82
IV. Self Efficacy:	**.56**	**.69**
25) Sometimes things just taste so good that I can't stop eating even when I am no longer hungry		.38
26) I consciously eat less when I notice changes in my weight or body shape		.59
27) I often eat foods while doing other activities such as watching TV or working on the computer		.34
28) I am conscious about what and how much food I eat		.60
29) I purposefully try to avoid foods I believe are not good for my health		.66
30) I purposefully try not to skip meals		.32
31) There are times I eat snacks in place of meals		.48
32) I think it is very difficult to change eating habits even when I have the motivation to do so		.59

DESK Score results

The mean of the total DESK Score among all participants was 9.12±1.60 on a possible score range from 0 to 16. When mean scores were compared within different demographics, the differences were not statistically significant for sex, age and marital status. However, there were some statistically significant differences in weekly average

work hours and BMI. Total DESK scores were significantly lower in those who worked 40 hours or less (7.99±1.24) compared to all others who worked longer (9.27±1.59), p=0.01. With BMI, higher total DESK scores were observed in participants with a BMI higher than 25(i.e. overweight or obese) at 9.83±1.74 compared to those with BMI lower than 25 at 8.93±1.52, p=.02. When further examined, the differences were significantly higher in the Social Factor category and Self-efficacy Factor category. Social Factor score was 2.52±.51 in BMI<25, but 2.77±.51 in BMI>25, p=.04. Self-efficacy Factor score was 2.37±.42 in BMI<25, but 2.60±.44 in BMI>25, p=.02.

Table3: Means, standard deviations, ranges from Part I DESK Questionnaire

DESK categories	Mean ±SD	Min	Max
Total DESK	9.12±1.60	5.75	13.62
Food Environment Factor	1.91±.50	1.13	3.63
Social Factor	2.57±.53	1.00	3.67
Emotional Factor	2.22±.65	1.00	3.67
Self-efficacy Factor	2.42±.43	1.38	3.38

The highest sub-factor score across sex, age and marital status was the Social Factor category at 2.57±.53 and the lowest sub-factor score was in Food Environment Factor at 1.91±.50. Other demographical characteristics also did not show any significant difference in sub-factor scores. However, a statistically significant higher Social Factor score was observed in males (2.71± .518) when compared to females (2.47± .511), p=.02.

In terms of individual question items, the question items that showed higher mean scores than the average sub-factor scores are listed in the following Table 4.

Table 4: Question items with highest responses from the DESK Questionnaire

Factor 1. Food Environment Factors	**Mean: 1.91**	**Answered "Often" "Very Often"**
Q3. I have trouble not eating snacks when they are around at home or at work	2.07	28.5%
Q6. I will buy processed snack items(i.e. chips, ice cream, ramen) when grocery shopping just because they're there.	2.10	28.5%
Q7. Even when I feel full, I tend to finish my plate rather than making little amounts of left-overs.	2.43	50.4%

Factor 2. Social Factors	**Mean: 2.57**	
Q12. I feel pressured to eat lunch with my team or superiors at work	2.84	64.2%
Q14. I feel obligated to attend my company dinners and drinking sessions	2.80	61.0%
Q16. I tend to eat more than intended when I go to company dinners or drinking sessions	2.90	68.9%
Q17. I tend to eat more when I am drinking alcohol	2.99	72.8%
Q18. I think my eating behaviors are impacted by my work life	3.08	76.2%
Factor 3. Emotional Factor	**Mean: 2.22**	
Q20. When I feel blue, I often overeat because eating makes me feel better	2.34	43.9%
Q22. Stress from work increases my food consumption	2.28	39.8%
Factor 4. Self Efficacy Factor	**Mean: 2.42**	
Q27. I often eat foods while doing other activities such as watching TV or being on the computer	2.58	52.0%
Q29. I purposefully try to avoid foods I believe are not good for my health	2.62	*58.5%
Q32. I think it is very difficult to change eating habits even when I have the motivation to do so	2.64	57.7%

*Percentage accounted for responses in "sometimes" or "almost"

Moreover, as one of this study's focus was to gauge the influence of the corporate culture on the food choice and consumption pattern in this study population, the individual question items pertaining to Korea's corporate culture were examined more in-depth through cross tabulations of responses for sex, age and mean weekly work hours. The results were as follows.

Table 5: Cross-tab results on questions specific to Korea's corporate culture

#12 "I feel pressured to eat lunch with my team or superiors at work"					
					p-value
			Almost never/sometimes	Often/Very often	
SEX	Female	Count	21	49	NS
		%	30.0%	70.0%	
	Male	Count	23	30	
		%	43.4%	56.6%	
AGE	<35	Count	34	67	NS
		%	33.7%	66.3%	
	>35	Count	10	12	
		%	45.5%	54.5%	
Mean Weekly Work hrs	<50hrs	Count	26	58	NS
		%	31.0%	69.0%	
	>50hrs	Count	18	20	
		%	47.4%	52.6%	

#14 "I am obligated to go to company dinners and drinking sessions"					
					p-value
			Almost never/sometimes	Often/Very often	
SEX	Female	Count	29	39	NS
		%	42.6%	57.4%	
	Male	Count	17	36	
		%	32.1%	67.9%	
AGE	<35	Count	36	63	NS
		%	36.4%	63.6%	
	>35	Count	10	12	
		%	45.5%	54.5%	
Mean Weekly Work hrs	<50hrs	Count	30	52	NS
		%	36.6%	63.4%	
	>50hrs	Count	16	22	
		%	42.1%	57.9%	

#15: "I am pressured to drink alcohol beyond my will at company outings"					
					p-value
			Almost never/sometimes	Often/Very often	
SEX	Female	Count	50	18	.003
		%	73.5%	26.5%	
	Male	Count	25	28	
		%	47.2%	52.8%	
AGE	<35	Count	58	42	.049
		%	58.0%	42.0%	
	>35	Count	17	4	
		%	81.0%	19.0%	
Mean Weekly Work hrs	<50hrs	Count	52	30	NS
		%	63.4%	36.6%	
	>50hrs	Count	22	16	
		%	57.9%	42.1%	

#16: "I tend to eat more than intended when I go to company dinners or drinking sessions"					
					p-value
			Almost never/sometimes	Often/Very often	
SEX	Female	Count	27	43	.040
		%	38.6%	61.4%	
	Male	Count	11	41	
		%	21.2%	78.8%	
AGE	<35	Count	33	67	NS
		%	33.0%	67.0%	
	>35	Count	5	17	
		%	22.7%	77.3%	
Mean Weekly Work hrs	<50hrs	Count	24	59	NS
		%	28.9%	71.1%	
	>50hrs	Count	13	25	
		%	34.2%	65.8%	

#18: "I think my eating behaviors are impacted by my work life"					
					p-value
			Almost never/sometimes	Often/Very often	
SEX	Female	Count	21	48	.048
		%	30.4%	69.6%	
	Male	Count	8	45	
		%	15.1%	84.9%	
AGE	<35	Count	20	80	.037
		%	20.0%	80.0%	
	>35	Count	9	13	
		%	40.9%	59.1%	
Mean Weekly Work hrs	<50hrs	Count	22	61	NS
		%	26.5%	73.5%	
	>50hrs	Count	7	31	
		%	18.4%	81.6%	

"Unhealthy Food Score" results

The Unhealthy Food Scores are quantified in percentages out of the possible maximum "opportunities" of choosing the specific food item and the largest portion size given in the focused food recall. Therefore it is by no means a measure of the actual intake of fat, sodium, etc. Since the number or frequency of food items pertaining to each of the Unhealthy Food Score categories were not all equal, results were converted to percentages in order to make the scores comparable to each other.

Table 6: Means, standard deviations, ranges from the Part II Unhealthy Food Scores

Unhealthy Food Score categories	Mean±SD	Min	Max
Fat score	17.2±7.59	7.3	43.1
Calorie score	17.3±7.71	7.1	41.3
Sodium score	18.6±7.07	8.0	53.9
Sweets score	18.2±8.14	5.2	48.4
Alcohol score	20.0±11.2	6.3	45.8
Processed foods score	22.0±10.8	7.1	75.0

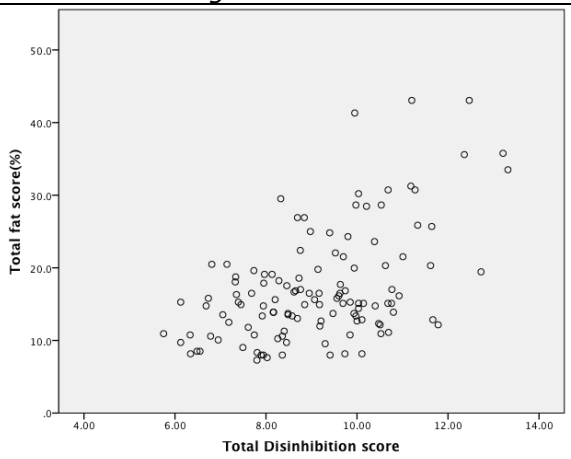
Overall, out of the six categories, Processed foods score had the highest mean of 22.0±10.8, followed by the Alcohol score at 20.0±11.2 and Sodium score at 18.6±7.07. Some notable gender differences were observed. Scores were higher in males across all six categories, but the order of the highest scores is different in males and females. In males the score is highest in Alcohol (23.8±12.2), followed by Processed foods (23.3±10.4) and then Sodium scores (20.5±6.14). In females, Processed foods score (21.0±11.1) was the highest followed by a three-way tie between Sweets (17.2±6.86), Alcohol (17.2±9.53) and Sodium (17.2±7.42). The higher mean scores in males were statistically significant for the fat, calorie, sodium and sweets category but not for processed foods and alcohol.

In terms of other demographics, Unhealthy Food Scores were not significantly different for age and marital status. However, similar to the findings from the DESK Questionnaire, higher BMI (>25) was associated with significantly higher scores in fat (22.5±8.77 vs. 15.6±6.53, p=.001), calorie (22.2±8.80 vs. 15.8±6.74, p=.002) and processed foods(25.5±8.80 vs. 21.0±11.2, p=.03) category. A full comparison of the means of Unhealthy Food Scores across different demographics can be found in appendix. *(FULL demographic chart to be included in Appendix)*

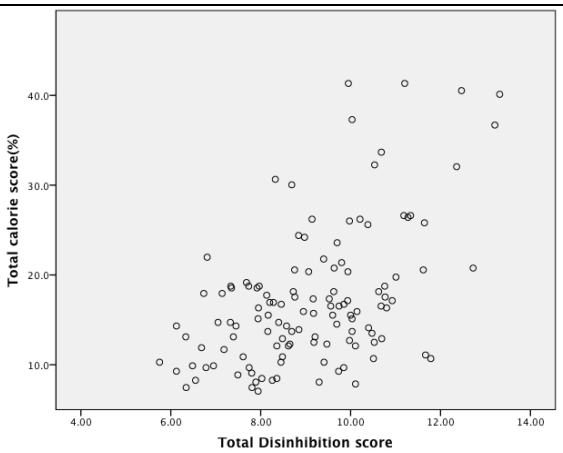
Correlations and linear regression models between DESK & Unhealthy Food Scores

Bivariate correlations and linear regression models examined the relationship between DESK scores and Unhealthy Food scores. Pearson correlations between Total DESK scores and each of the Unhealthy Food Score categories are provided in Figure 3. As demonstrated in the figure, the Pearson correlations show stronger positive correlations between DESK scores and Fat (r=.511), Calorie (r=.521) and Sodium (r=.449) scores.

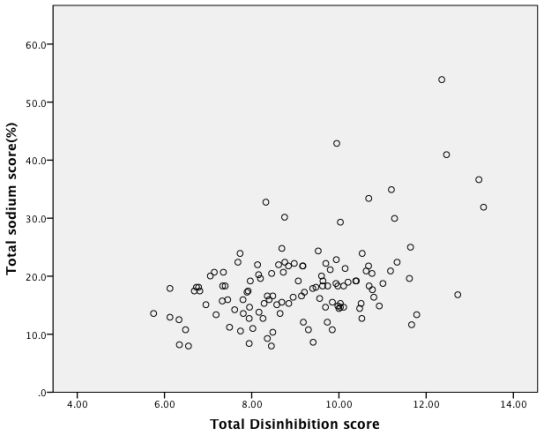
Figure 3: Scatter box plots and Pearson correlations between total DESK and Unhealthy Food Score categories



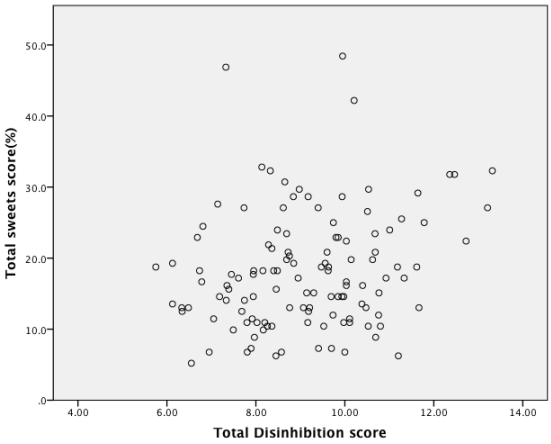
Total DESK & Fat score
r=.511



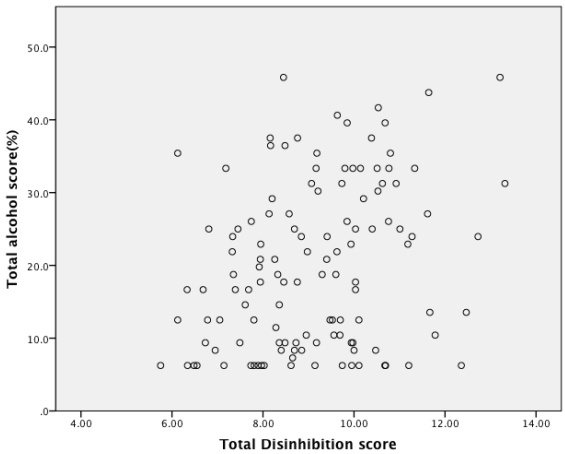
Total DESK and Calorie score
r=.521



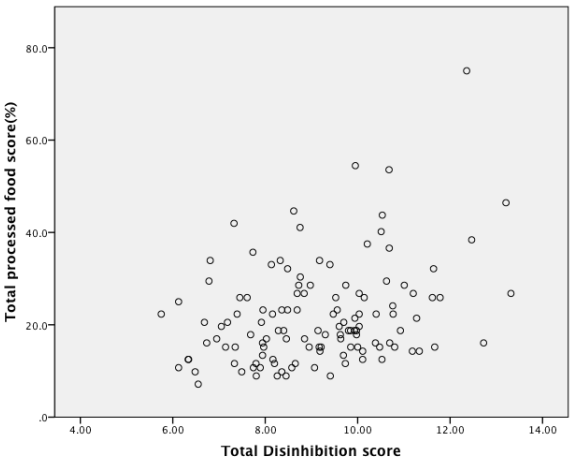
Total DESK & Sodium score
r=.449



Total DESK & Sweets score
r=.225



Total DESK and Alcohol score
r=.283



Total DESK and Processed foods score
r=.316

Results of bivariate correlations between the Sub-factor DESK scores and the Unhealthy food scores are provided in Table 7. Compared to the Pearson Correlations results between Total DESK and the Unhealthy Foods Scores, the correlations with sub-factors became weaker with the Fat score, Calorie Score and Sodium Score. However, the correlations became stronger with certain sub-factors in relations to the Sweets, Alcohol and Processed Foods score. For instance, sweets showed a stronger correlation with the Food Environment Factor (r=.345) than the Total DESK score (r=.235), alcohol showed a stronger correlations with the Social Factor (r=.322) and Emotional Factor (r=.324) than with Total DESK (r=.283), and processed foods showed a stronger correlation with Food Environment Factor (r=.382) and Self-efficacy Factor (r=.402) than with Total DESK(r=.326).

Table 7: Correlations between DESK Sub-factors and Unhealthy Food Scores

Pearson Correlations (r)	Fat score	Calorie score	Sodium score	Sweets score	Alcohol score	Processed foods score
Total DESK Score	.511	.521	.459	.235	.283	.326
Food Environment Factor	.460	.471	.441	**.345**	.112	**.382**
Social Factor	.444	.443	.340	.081	**.322**	.164
Emotional Factor	.244	.271	.204	.061	**.324**	.135
Self-efficacy Factor	.477	.463	.442	.256	.061	**.402**

However, since the bivariate correlations do not control for possible confounders, multiple regression analyses models were performed with adjustments for certain demographic characteristics in examining associations of Total DESK score with categories of the Unhealthy Food Scores. Higher DESK score was associated with higher Unhealthy Food Scores in all categories. Even when controlled for age and sex, then additionally for BMI, although the β coefficients decreased by small increments, they remained strong and still statistically significant.

Table 8: Regression coefficients for models examining associations of Total DESK Scores with the Unhealthy Food Scores

	High-Fat Score			High-Calorie Foods Score			High-Sodium Score		
DESK Score Model	β	95% CI	*p*-value	β	95% CI	*p*-value	β	95% CI	*p*-value
Model 1	2.42	[1.70, 3.16]	.000	2.51	[1.79, 3.23]	.000	1.98	[1.28, 2.68]	.000
Model 2	2.37	[1.64, 3.10]	.000	2.42	[1.72, 3.12]	.000	1.92	[1.22, 2.62]	.000
Model 3	2.23	[1.51, 2.95]	.000	2.33	[1.61, 3.05]	.000	1.89	[1.16, 2.63]	.000

	Sweets Score			Alcohol Score			Processed-foods Score		
DESK Score Model	β	95% CI	*p*-value	β	95% CI	*p*-value	β	95% CI	*p*-value
Model 1	1.15	[0.27, 2.03]	.000	1.98	[0.78, 2.40]	.000	2.14	[1.28, 2.68]	.000
Model 2	1.24	[0.34, 2.14]	.000	1.91	[0.74, 3.08]	.000	2.21	[1.04, 3.38]	.000
Model 3	.99	[.06, 1.92]	.040	2.02	[0.78, 3.26]	.002	2.12	[0.88, 3.36]	.001

Model 1: Unadjusted
Model 2: Adjusted for age and sex
Model 3: Adjusted for age, sex and BMI

IV. Discussion

Construct validity of the DESK Questionnaire

This study was successful in identifying and testing factors of disinhibition relevant to the corporate working population of Seoul, Korea. The DESK Questionnaire overall showed good psychometric properties. The sub-factors had overall good internal consistency reliability ranging from .56 to .79. Although the Self-Efficacy factor was somewhat low at .56, it can be improved by omitting the three individual question items with low item-to-total correlations (Q25, 27, 30). When recalculated without these three question items, the Cronbach's α would improve to .74, which could be a point to consider in future steps of improving the DESK questionnaire. Also, the correlation matrixes of the question items in each sub-factor towards each other showed that overall, most of the individual question items were significant as they demonstrated low correlation against each other except the only question pair with high correlation in Q21 and Q23 in the Social Factor. These question items indeed were similarly phrased in dealing with "feeling blue" or stress and its influence

on alcohol consumption. Therefore, in future steps of improving the questionnaire, one of these two items may be excluded, but otherwise, the clustering of the items or most of the individual questions had good construct validity.

What does the DESK Score results say about the population

Although the four factors of the DESK Questionnaire were constructed based on established literature and attempted to predict different types of eating cues that may promote opportunistic eating in this study population, it was speculated that the unique characteristics of the corporate culture would to some extent magnify the disinhibiting effect. This was found true as the Social Factor score had the highest mean (2.57±.53) followed by the Self-efficacy Factor (2.42±.43) regardless of sex, age and marital status. However, one interesting fact to note was that the Social Factor score was significantly higher in males (2.71± .518) compared to females (2.47± .511). There can be several implications to these findings.

First of all, given that five out of the total ten Social Factor question items are related to the Korean corporate life, it can be said that the corporate culture has great disinhibiting effects regarding food choice and consumption in the Korean corporate population. This was further confirmed by the higher mean scores of the questions regarding work life (Q12, 14, 16, 17, 18) in comparison to the overall mean Social Factor score (Table 4). In general, 76.2% answered "often" or "very often" that they think their eating behaviors are impacted by their work life, including the pressure to eat lunch with the team or superiors (64.2%), feeling obligated to go to company dinners and outings (61.0%), eating more than intended at company outings and drinking sessions (68.9%), and tending to eat more when drinking alcohol (72.8%). These high response rates reflect the prevalent Korean corporate culture that revolves heavily around eating and drinking, often beyond one's own intention and willingness.

Second, although there was not any other significant difference across different demographics, the significantly higher Social Factor score in males may provide insight into Korea's social structure and traditional views on gender roles. It seems that despite the elevated socio-economic status and increased participation in the work force by females, certain social pressures of the Korean corporate culture may still very well lie more heavily on males. For instance, as shown in Table 5, males showed significantly higher rates of responses ("often" or "very often") compared to females in that they feel pressured to drink alcohol beyond their will at company outings (52.8% vs. 26.5%, p=003) and more males felt their eating behaviors are impacted by their work life (84.9% vs. 69.6%, p=.048). Interestingly, for these two questions, younger age of less than 35 also showed significantly higher responses, therefore confirming that the work-culture pressure on males are even greater in younger males than older ones as they are still going through a period of establishing themselves in their professional environment.

Implications of corporate life on disinhibition in this population are points that differentiate the DESK from previous studies. Whereas the "Social Factor" of disinhibition would usually imply social gatherings and eating with others in a casual environment as in the TFEQ (3) or the Dutch Behavior Eating Questionnaire (15), since Korean corporate life is such a significant part of social life and involves many opportunities for eating and drinking, the influence it has on personal food choice and consumption may be a predominant factor impeding individual control.

Following the Social Factor, the Self-efficacy factor had the second-highest sub-factor, indicating low self-efficacy regarding food and eating in the study population. Although many believe changing eating habits are difficult (Q32 in Table 4.), not many seem to be making conscious efforts to actually alter their eating habits (Q29). This could indicate that educational efforts and perhaps tactics such as "mindful eating" may benefit this population from bridging the gaps between intention and behavioral change. With the Emotional Factor, findings were quite consistent with other studies regarding emotional

eating. Eating from stress and negative moods showed to impact eating more than drinking, and females were significantly more susceptible to "overeating when I feel blue" in their responses to Q20 (51.4% vs. 34.0%, p=.05).

One of the less expected findings was the relatively weaker influence of the Food Environment Factor, which showed the lowest mean (1.91±.50) out of the four sub-factors. Since one of the unique aspects of Seoul was its food salience due to saturated amounts of eateries in such a densely populated land, the expectation was that such an environment would trigger opportunistic eating in this population, but that was not so much the case as seen in low responses in relevant questions related to Seoul's eating environment (Q1, 2, 4). However, some of the question items here that displayed higher mean scores than the Food Environment sub-factor mean score are more about impulsive buying of processed foods (Q6) and about the visual cues of portion sizes (Q7). The influence of portion sizes promoting over-eating has been tested in many experiments(17, 18) and seems that it is also affecting the Korean population even though portion sizes in general are not quite as big as they are in the US.

DESK Score as a predictor of food choice and consumption of unhealthy foods

Since disinhibition has been identified as the strongest predictor of unhealthy food choices in many previous studies of various populations, the primary question to investigate in this study was if disinhibition—as measured by the DESK score—would be positively associated with increased frequency and intake of unhealthy foods in the Korean corporate population as well. The correlations displayed (Figure 3) that overall, without any control for demographical characteristics, higher total DESK scores were more positively associated with Fat scores (r=.511), Calorie score (r=.521) and with Sodium score (r=.449) out of the six Unhealthy Food Score categories. This is in line with previous studies where findings showed higher disinhibition scores being linked with overall higher energy intake regardless of BMI status (9) and higher intake of fats such as butter and margarine (12).

However, the more interesting result was the change in correlations observed between DESK sub-factor scores and the Unhealthy Food Scores (Table 7). Although Fat, Calorie and Sodium score's correlation with sub-factor DESK scores all decreased compared to their correlation to the total DESK score, certain sub-factor correlations with Sweets, Alcohol and Processed foods actually increased. Although these numbers are merely correlations without any adjustment and thus should be interpreted carefully, they are suggestive of: environmental links to sweets; social/emotional links to alcohol; and self-efficacy to processed foods. It may also mean that choosing and consuming foods high in fat, calorie and sodium is more of a totality effect of disinhibition on multiple levels, therefore not linked to a specific sub-factor, unlike sweets, alcohol and processed foods which do have primary drivers among the sub-factors.

The most significant finding of the study was in establishing DESK scores as an overall good predictor of food choice and consumption in all of the Unhealthy Food Score categories with multiple regression models (Table 8). DESK score significantly predicted Unhealthy Food Scores in all six categories although to varying degrees. DESK score was especially a stronger predictor for the Fat score, Calorie score and Sodium Score even after control for age, sex and BMI. The association was less robust for the Sweet score, Alcohol score and Processed foods score as the confidence intervals dropped down to the null value, yet the associations remain significant. Even though there may be limitations on using self-reported food recall data, considering that such food recalls usually tend to be under-reported, but the fact that results still demonstrated positive associations with the DESK score in all categories in itself lends validation to the DESK Questionnaire's ability to capture a certain degree of disinhibition in the study population.

Aside from the main hypothesis, an additional finding worthy of note was the significant relationship between DESK scores, Unhealthy Food Scores and BMI. Although studies have repeatedly found that overweight and obese individuals have higher disinhibition scores compared to normal weight individuals (22, 23), this was not part of the

a priori hypothesis because universal BMI measures often are stated as less relevant health indicators in the Asian population. However, the study found significant associations of higher BMI (>25) with both the DESK score and Unhealthy Food Scores. People with higher BMI showed to have significantly higher Total DESK scores attributable to higher Social Factor and Self-efficacy Factor scores (Table 9). They also showed significantly higher scores in fat, calories and processed foods of the Unhealthy Food Scores. Therefore, concerns regarding high BMI and its association with higher disinhibition and implications on less healthy food choices were also confirmed in the corporate working Korean population as it did in previously established studies on different cultures.

Table 9. Significant differences in DESK and Unhealthy Food Scores in BMI<25 vs. BMI>25

	Sub-factor/category	BMI<25	BMI>25	*p*-value
DESK Score	Social Factor score	2.52±.51	2.77±.51	.04
	Self-efficacy factor score	2.37±.42	2.60 ±.44	.02
Unhealthy Food Score	Fat score	22.5±8.7	15.6±6.5	.001
	Calories score	22.2±8.8	15.8±6.7	.002
	Processed foods score	25.5±8.8	21.0±11.2	.033

Limitations

There are several limitations to this study. First of all, the study sample consisted of a convenience sample and may not be representative of the broader age and wider range of industries that characterizes the corporate working population in Seoul, Korea. Second, there are limitations to the Unhealthy Food Score focused food recall as it relies on self-reported retrospective recall of data by participants. Also, although the Unhealthy Food Scores attempted to assess the frequency of choosing the provided items in the focused food recall and how much one eats in one sitting, which are relevant to the concept of "disinhibition," it does not accurately measure the actual intake amounts of the unhealthy food categories since the all food items were not weighted equally in terms of the "unhealthy" component in each food item. Finally, test-retest reliability of the DESK

Questionnaire was not measured, which would be a step needed in further establishing the validity of the DESK Questionnaire before it could be used in applied settings.

V. CONCLUSIONS

The aim of this study was to develop and validate a questionnaire regarding the degree of disinhibited eating in the corporate working population of Seoul, Korea by expanding the domain of "disinhibition" from the original Three Factor Eating Questionnaire. Different types of disinhibitors relevant to this particular study population were identified with focus on the implications of the Korean corporate culture on the study population's eating behaviors.

DESK Questionnaire displayed good construct validity and results revealed the Social Factor as the sub-factor with the most disinhibiting effect. Further examination confirmed that even within the Social Factor, food choices and eating behaviors are dictated more strongly by Korea's corporate social culture than personal social circumstances. Findings on the Emotional Factor from this population were consistent with established studies in that negative emotions and stress does have a disinhibiting effect, but more on food than on alcohol consumption. The presence of the densely packed food environment as a characteristic of a mega-city did not have as much effect as expected, as the Food Environment factor displayed the lowest mean out of the four DESK sub-factors. The study population did overall display low self-efficacy, which could mean it is a population that could potentially benefit from education and mindful-eating concepts in order to enhance awareness and self-efficacy on improving diet and eating behaviors.

The DESK Questionnaire established further validity as a good predictor of higher food choice frequency and intake of unhealthy food categories such as high-fats, high-sodium, high-calories, sweets, alcohol and processed foods. Higher DESK score was

especially a stronger predictor for higher Fat, Calories and Sodium score of the Unhealthy Food Score even after control for age, sex and BMI. However, bivariate correlations between sub-factor DESK scores and some of the Unhealthy Food Scores suggested the possibility of primary drivers among the four sub-factors: Food choice and consumption of sweets may be impacted mainly by the Food Environment Factor, alcohol by the Social and Emotional Factors and processed foods by the Self Efficacy Factor, while for fat, calorie and sodium, it may be more of a total disinhibiting effect rather than one dominating sub-factor.

Despite the limitations, the DESK Questionnaire provides an important first step in identifying disinhibitors, or barriers, to achieving healthier eating habits for the Korean corporate working population. In practice, it could help individuals identify but not respond to certain eating cues they are most impacted by. At the larger level, this study provides evidence on how the Korean work culture imposes certain constraints on food choice and consumption, which could be implications at the public health level in considering policies and programs regarding diet and health in the future.

REFERENCES:

1. Swinburn, B. Edgar, G. et al. Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. Prev Med. 1999 Dec;29(6 Pt 1):563-70.
2. Herman CP, Mack D. Restrained and unrestrained eating. J Pers 1975; 43: 647–660
3. Stunkard AJ, Messick S. The Three-Factor Eating Questionnaire to measure dietary restraint, disinihibition and hunger. J Psychosom Res. 1985;29:71-83.
4. Bryant E.J. et al. Disinhibition: its effects on appetite and weight regulation. Obesity reviews (2007) 9, 409–419
5. Dykes J, Brunner EJ, Martikainen PT,Wardle J. Socioeconomic gradient in body size and obesity among women: the role of dietary restraint, disinhibition and hunger in the Whitehall II study. Int J Obes Relat Metab Disord 2004; 28: 262–268.
6. Westenhoefer J, Broeckmann P, Munch A, Pudel V. Cognitive Control of eating behavior and the disinhibition effect. Appetite 1994; 23: 27–41.
7. van Strien T, Cleven A, Schippers G. Restraint, tendency toward overeating and ice cream consumption. Int J Eat Disord 2000; 28: 333–338.
8. Ouwens MA, van Strien T, van der Staak CP. Absence of a disinhibition effect of alcohol on food consumption. Eat Behav 2003; 4: 323–332.
9. Lindroos AK, Lissner L, Mathiassen ME, Karlsson J, Sullivan M, Bengtsson C, Sjostrom L. Dietary intake in relation to restrained eating, disinhibition, and hunger in obese and nonobese Swedish women. Obes Res 1997; 5: 175–182.
10. Bryant E, Finlayson G, King N, Blundell J. The influence of acute exercise on liking and preference for food on high trait Disinhibition women. Obes Rev 2006; 7: 343.
11. Contento IR, Zybert P, Williams SS. Relationship of cognitive restraint of eating and disinhibition to the quality of food choices of Latina women and their young children. Prev Med 2005; 40: 336.
12. Lahteenmaki L, Tuorila H. Three-factor eating questionnaire and the use and liking of sweet and fat among dieters. Physiol Behav 1995; 57: 81–88.
13. Higgs S, Eskenazi T. Dietary restraint and disinhibition are associated with increased alcohol use behaviours and thoughts in young women social drinkers. Eat Behav 2007; 8: 236–243.
14. Borg P, Fogelholm M, Kukkonen-Harjula K. Food selection and eating behaviour during weight maintenance intervention and 2-y follow-up in obese men 48. Int J Obes Relat Metab Disord 2004; 28: 1548–1554.
15. van Strien T, Frijters J, Bergers G, Defares P. The Dutch Eating Behavior Questionnaire (DEBQ) for assesment of restrained, emotional, and external eating behavior. Int J Eat Disord. 1986;5:295-315
16. Bond MJ, McDowell AJ, Wilkinson JY. The measurement of dietary restraint, disinhibition and hunger: an examination of the factor structure of the Three Factor Eating Questionnaire (TFEQ). Int J Obes Relat Metab Disord 2001; 25: 900–906

17. Wansink B, Painter JE, North J. Bottomless bowls: why visual cues of portion size may influence intake. Obes Res. 2005 Jan;13(1):93-100.

18. Wansink Brian. Environmental Factors that increase the Food Intake and Consumption Volume of Unknowing Consumers. Annu. Rev. Nutr. 2004. 24:455–79

19. de Castro JM. 2000. Eating behavior: lessons from the real world of humans. Ingestive Behav. Obes. 16:800–13

20. Torres, Susan. Nowson, Caryl. Relationship between stress, eating behavior, and obesity. Nutrition 23 (2007) 887–894

21. Haynes C, Lee MD, Yeomans MR. Interactive effects of stress, dietary restraint, and disinhibition on appetite. Eat Behav 2003; 4:369–383.

22. Provencher V, Drapeau V, Tremblay A, Despres JP, Lemieux S. Eating behaviors and indexes of body composition in men and women from the Quebec family study. Obes Res 2003; 11: 783–792.

23. Boschi V, Iorio D, Margiotta N, D'Orsi P, Falconi C. The three-factor eating questionnaire in the evaluation of eating behavior in subjects seeking participation in a dietotherapy programme. Ann Nutr Metab 2001; 45: 72–77.

24. Ganley, R. M. (1988). Emotional eating and how it relates to dietary restraint, disinhibition, and perceived hunger. International Journal of Eating Disorders, 7, 635-647

25. Hudson, A., & Williams, S. G. (1981). Eating behavior, emotions and overweight. Psychological Reports, 48, 669-670.

Appendix 1: Full DESK Questionnaire English version

The "Disinhibited-Eating Score for Koreans (DESK)"

Mya Kwon, Master of Public Health candidate
Graduate Coordinated Program in Dietetics/
Interdisciplinary Program in Nutritional Sciences
School of Public Health, University of Washington
myakwon@uw.edu

Dear Participant,

I am conducting a thesis research study as a graduate student of the School of Public Health at the University of Washington. The purpose of the study is to learn about the degree of influence from environmental/social/emotional/self-control related factors in one's food choice and consumption.

I am asking you to complete the two following questionnaires. The "Disinhibited-Eating Score for Koreans (DESK)" Questionnaire asks about various situations and external/internal cues that might influence your eating behaviors. The second food frequency questionnaire asks about your usual eating patterns. It will take about 15-20 minutes to complete these forms.

I also ask some basic information, such as age, occupation, height/weight, physical activity levels in which you may choose to answer or not for any reason.

If you have any questions or wish to receive more information about my study please do not hesitate to reach me at myakwon@uw.edu

Sincerely,

Mya Kwon
Graduate Coordinated Program in Dietetics/
Interdisciplinary Program in Nutritional Sciences
School of Public Health, University of Washington

PART I "Disinhibited-Eating Score for Koreans (DESK)" Questionnaire

Please read the following items related to factors influencing food choice and intake and check where it most applies to you.

1. Food Environment Factors:

	Very Often	Often	Sometimes	Almost Never
33) I eat out of urges when I see certain bakeries or coffee shops even when I am not hungry				
34) I eat out of urges when I walk by convenient stores or snack stands on the street even when I am not hungry				
35) I have trouble not eating snacks when they are around at home or at work				
36) I use late-night delivery service of foods from sticker ads and flyers				
37) I tend to order dessert if I see them even if I didn't initially intend to				
38) I will buy processed snack items(i.e. chips, ice cream, instant noodles) when grocery shopping just because they're there				
39) Even when I feel full, I tend to finish my plate rather than making little amounts of left-overs				
40) There are times I find myself eating something mindlessly				

2. Social Factors:

	Very Often	Often	Sometimes	Almost Never
41) I tend to purposely find someone to eat with rather than eat alone				

42) I tend to eat more when I eat with others in a social setting away from home - Includes lunch/dinner outings with friends, social gatherings, drinking sessions				
43) When I am with someone who is overeating, I usually tend to overeat too				
44) I feel pressured to eat lunch with my "team" or superiors at work				
45) My weekends are usually filled with social gatherings involving food and/or alcohol				
46) I am obligated to go to company dinners and drinking sessions.				
47) I am pressured to drink (alcohol) beyond my will at company outings.				
48) I tend to eat more than intended when I go to company dinners or drinking sessions				
49) I tend to eat more when I am drinking alcohol				
50) I think my eating behaviors are impacted by my work life				

3. Emotional Factors (Influence of Mood & Stress)

	Very Often	Often	Sometimes	Almost Never
51) When I feel anxious, I find myself eating something				
52) When I feel blue, I often overeat (eating makes me feel better)				
53) When I feel blue, I tend to drink more alcohol				
54) Stress from work increases my food consumption				

55) Stress from work increases my alcohol consumption				
56) I believe that my emotional state and level of stress has a lot to do with my eating patterns				

4. Self Efficacy

	Very Often	Often	Sometimes	Almost Never
57) Sometimes things just taste so good that I can't stop eating even when I am no longer hungry				
58) I consciously eat less when I notice changes in my weight or body shape				
59) I often eat foods while doing other activities such as watching TV or working on the computer				
60) I am conscious about what and how much food I eat				
61) I purposefully try to avoid foods I believe are not good for my health				
62) I purposefully try not to skip meals				
63) There are times I eat snacks in place of meals				
64) I think it is very difficult to change eating habits even when I have the motivation to do so				

PART II Focused Recall Food Frequency Questionnaire

These questions are about your usual frequency of intake of specific foods following through a course of a day. Please answer thinking about your usual consumption of the food item for the specific meal (or snack) time indicated.
Then, mark the adequate column to show the usual amount you eat for the specific food item.
"Medium serving size" indicates a reference portion of the food item.
Mark your usual serving size as small, medium or large compared to the "medium serving size" indicated.

BREAKFAST

33. How often do you eat the following Korean foods for breakfast? (K food for Breakfast)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Rice and soup/stews (rice and soup)				
Kimchi				
Pickled fish				
Ramen				

34. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (Serving size breakfast: Korean food)

Food Items	Medium serving size	S	M	L
Rice and soup/stews	1 bowl			
Kimchi	1 palm-size			
Pickled fish	1 palm-size			
Ramen	1 pkg			

35. How often do you eat the following Western foods for breakfast? (W food for breakfast)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Toast w/ meat, cheese (Ex: "street toast", breakfast sandwich)				
Sweet breads (ex: donut, muffin, cream puffs)				
Bagel & cream cheese				

36. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (Serving size breakfast: Western food)

Food Items	Medium serving size	S	M	L
Toast w/ meat, cheese (Ex: “street toast”, breakfast sandwich)	1 toast/sandwich			
Sweet breads (ex: donut, muffin, cream puffs)	1 piece			
Bagel & cream cheese	1bagel			

37. Please mark how often you skip breakfast. (skip breakfast)

<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly

38. Please list any other food items you often eat for breakfast. (breakfast other)
Food items (Other): _____
Consumption frequency (Frequency): _____

LUNCH

39. How often do you eat the following Korean foods for lunch? (K food for lunch)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Rice and soup/stews (ex: Kimchi stew, beanpaste stew, beef rib soup, beef broth soup)				
Kimchi				
Pickled fish				
Grilled meats (ex: pork-belly, *kalbi*-- marinated beef, steaks)				
Other meat dishes (ex: hot stone bulgogi, marinated pork stir-fry “Je-yook bokkeum”etc)				
Meat intestines (ex: *gobchang*, organ meat soup)				
Noodles (ex: ramen, Korean seafood noodle, starch noodle soup, buckwheat, *udon*, seasoned noodle, etc)				

40. Using the specified “medium serving size” as the reference portion, please mark your usual serving size as “S”, “M”, or “L” compared to the indicated medium serving size. (Serving size lunch: Korean food)

Food Items	Medium serving size	S	M	L
Rice and soup/stews (ex: Kimchi stew, beanpaste	1 bowl			

stew, beef rib soup, beef broth soup)				
Kimchi	1 palm-size			
Pickled fish	1 palm-size			
Grilled meats (ex: pork-belly, *kalbi*--marinated beef, steaks)	1 serving			
Other meat dishes (ex: hot stone bulgogi, marinated pork stir-fry "Je-yook bokkeum"etc)	1 serving			
Meat intestines (ex: *gobchang*, organ meat soup)	1 bowl			
Noodles (ex: ramen, Korean seafood noodle, starch noodle soup, buckwheat, *udon*, seasoned noodle, etc)	1 bowl			

41. How often do you eat the following Western foods for lunch? (W food for lunch)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Fried foods (ex: *donkatsu* (fried pork), fired chicken)				
Pasta				
Pizza				
Hamburger				
French fries				

42. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (Serving size lunch: Western food)

Food Items	Medium serving size	S	M	L
Fried foods (ex: *donkatsu* (fried pork), fired chicken)	1 serving			
Pasta	1 serving			
Pizza	2 pieces			
Hamburger	1 piece			
French fries	M size			

43. How often do you eat the following other Asian foods for lunch? (Asian food for lunch)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Noodles (ex: blackbean noodles, hot soup noddles)				
Rice dishes (ex: fried rice, noodle-rice, seafood rice)				
Fried dishes (ex: fried pork and sweet sauce, etc)				

Stir-fry dishes (ex: “go-chu japche”)				

44. Using the specified “medium serving size” as the reference portion, please mark your usual serving size as “S”, “M”, or “L” compared to the indicated medium serving size. (Serving size lunch: Asian food)

Food Items	Medium serving size	S	M	L
Noodles (ex: blackbean noodles, hot soup noddles)	1 bowl			
Rice dishes (ex: fried rice, noodle-rice, seafood rice)	1 bowl			
Fried dishes (ex: fried pork and sweet sauce, etc)	1/3 dish			
Stir-fry dishes	1/3 dish			

45. How often do you eat the following Korean style snack-items (or *“bun-sik”)* for lunch? (Korean snack foods for lunch)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Ramen noodles				
Korean style fried rice				
Kimbop, ddukbokki, or soon dae				
Fried snacks (“tweegim”)				

46. Using the specified “medium serving size” as the reference portion, please mark your usual serving size as “S”, “M”, or “L” compared to the indicated medium serving size. (Serving size lunch: Korean snack food)

Food Items	Medium serving size	S	M	L
Ramen noodles	1 bowl			
Korean style fried rice	1 serving			
Kimbop, ddukbokki, or soon dae	1 serving			
Fried snacks (“tweegim”)	3 pieces			

47. Please mark how often you skip lunch. (skip lunch)

<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly

48. Please list any other food items you often eat for lunch. (lunch other)
Food items: _____
Consumption frequency: _____

SNACKS

Please answer the following questions considering how often you eat the following items as snacks (meaning eaten between meals but not in substitution of meals.)
(** coffee beverages and other beverages are included in this category for convenience)

49. How often do you eat the following as snacks? (snack: ice creams)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Shaved iced bowls ("bing-soo")				
Popsicles				
Ice cream/ frozen yogurts				

50. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (serving size: ice creams)

Food Items	Medium serving size	S	M	L
Shaved iced bowls ("bing-soo")	½ bowl			
Popsicles	1 piece			
Ice cream/ frozen yogurts	1 scoop			

51. How often do you eat the following as snacks? (snack: cakes)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Cakes/pies				
Other snack breads (cream puffs, pastries)				

52. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (serving size: cakes)

Food Items	Medium serving size	S	M	L
Cakes/pies	1 slice			
Other snack breads (cream puffs, pastries)	1 piece			

53. How often do you eat the following as snacks? (snack: chips)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly

Chips				
Cookie				
“choco pie”/ “Oh-yes” pie				

54. Using the specified “medium serving size” as the reference portion, please mark your usual serving size as “S”, “M”, or “L” compared to the indicated medium serving size. (serving size: chips)

Food Items	Medium serving size	S	M	L
Chips	1 serving size			
Cookie	2 palm-size cookies			
“choco pie”/ “Oh-yes” pie	1 piece			

55. How often do you eat the following as snacks? (snack: bun-sik)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Toppokki/gim-bap-soondae				
Fried snacks				
Ramen				

56. Using the specified “medium serving size” as the reference portion, please mark your usual serving size as “S”, “M”, or “L” compared to the indicated medium serving size. (serving size: bun-sik)

Food Items	Medium serving size	S	M	L
Toppokki/gim-bap/soondae	1 serving size			
Fried snacks	3 pieces			
Ramen	1 bowl			

57. Please list any other food items you often eat as snacks that were not mentioned above. (snack other)
Food items: _____
Consumption frequency: _____

58. How often do you drink the following coffee beverages? (coffee beverages)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Take-out coffee (excluding Americano)				
Instant mixed coffees				

59. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (serving size: coffee beverages)

Food Items	Medium serving size	S	M	L
Take-out coffee (excluding Americano)				
Instant mixed coffees				

60. How often do you drink the following beverages? (soda and juice)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
sodas				
juices				

61. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (serving size: soda and juice)

Food Items	Medium serving size	S	M	L
sodas				
juices				

DINNER

62. How often do you eat the following Korean foods for dinner? (K food for dinner)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Rice and soup/stews (ex: Kimchi stew, beanpaste stew, beef rib soup, beef broth soup)				
Kimchi				
Pickled fish				
Grilled meats (ex: pork-belly, *kalbi*-- marinated beef, steaks)				
Other meat dishes (ex: hot stone bulgogi, marinated pork stir-fry "Je-yook bokkeum"etc)				
Meat intestines (ex: *gobchang*, organ meat soup)				
Noodles (ex: ramen, Korean seafood noodle, starch noodle soup, buckwheat, *udon*, seasoned noodle, etc)				

63. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (Serving size dinner: Korean food)

Food Items	Medium serving size	S	M	L
Rice and soup/stews (ex: Kimchi stew, beanpaste stew, beef rib soup, beef broth soup)	1 bowl			
Kimchi	1 palm-size			
Pickled fish	1 palm-size			
Grilled meats (ex: pork-belly, *kalbi*--marinated beef, steaks)	1 serving			
Other meat dishes (ex: hot stone bulgogi, marinated pork stir-fry "Je-yook bokkeum"etc)	1 serving			
Meat intestines (ex: *gobchang*, organ meat soup)	1 bowl			
Noodles (ex: ramen, Korean seafood noodle, starch noodle soup, buckwheat, *udon*, seasoned noodle, etc)	1 bowl			

64. How often do you eat the following Western foods for dinner? (Western food for dinner)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Fried foods (ex: *donkatsu* (fried pork), fired chicken)				
Pasta				
Pizza				
Hamburger				
French fries				

65. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (Serving size dinner: Western food)

Food Items	Medium serving size	S	M	L
Fried foods (ex: *donkatsu* (fried pork), fired chicken)	1 serving			
Pasta	1 serving			
Pizza	2 pieces			
Hamburger	1 piece			
French fries	M size			

66. How often do you eat the following other Asian foods for dinner? (Asian food for dinner)

	<2 times	1-2 times/	3-4 times/	>4 times

	monthly	week	week	weekly
Noodles (ex: blackbean noodles, hot soup noddles)				
Rice dishes (ex: fried rice, noodle-rice, seafood rice)				
Fried dishes (ex: fried pork and sweet sauce, etc)				
Stir-fry dishes (ex: “go-chu japche”)				

67. Using the specified “medium serving size” as the reference portion, please mark your usual serving size as “S”, “M”, or “L” compared to the indicated medium serving size. (serving size dinner: Asian food)

Food Items	Medium serving size	S	M	L
Noodles (ex: blackbean noodles, hot soup noddles)	1 bowl			
Rice dishes (ex: fried rice, noodle-rice, seafood rice)	1 bowl			
Fried dishes (ex: fried pork and sweet sauce, etc)	1/3 dish			
Stir-fry dishes	1/3 dish			

68. How often do you eat the following Korean style snack-items (or *“bun-sik”)* for dinner? (Korean snack foods for dinner)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Ramen noodles				
Korean style fried rice				
Kimbop, ddukbokki, or soon dae				
Fried snacks (“tweegim”)				

69. Using the specified “medium serving size” as the reference portion, please mark your usual serving size as “S”, “M”, or “L” compared to the indicated medium serving size. (Serving size dinner: Korean snack foods)

Food Items	Medium serving size	S	M	L
Ramen noodles	1 bowl			
Korean style fried rice	1 serving			
Kimbop, ddukbokki, or soon dae	1 serving			
Fried snacks (“tweegim”)	3 pieces			

70. Please mark how often you skip dinner.

<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly

71. Please list any other food items you often eat for dinner. (Dinner Other)
Food items: _____
Consumption frequency: _____

DRINKS AND "BAR FOODS"

72. How often do you drink the following alcohol? (alcohol frequency)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Wine				
Hard liquors				
Beer				
Cocktails				
Mag-keulli				
Soju				

73. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size. (Serving size: alcohol)

Food Items	Medium serving size	S	M	L
Wine	1 glass			
Hard liquors	1 shot			
Beer	1 glass			
Cocktails	1 glass			
Mag-keulli	1 cup			
Soju	1 shot			

74. How often do you eat the following foods with alcohol? (Please do not include the times you eat the following foods as meals) (Foods with alcohol)

	<2 times monthly	1-2 times/ week	3-4 times/ week	>4 times weekly
Grilled meats (ex: pork-belly, *kalbi*--marinated beef, steaks)				
Meat intestines (ex: *gobchang*, organ meat soup)				
Kimchi pancake, scallion pancakes, etc				
Seasoned fried chicken				
French fries, fried shrimp, etc				

Various Korean-style stews with heavy seasoning				

75. Using the specified "medium serving size" as the reference portion, please mark your usual serving size as "S", "M", or "L" compared to the indicated medium serving size.

Food Items	Medium serving size	S	M	L
Grilled meats (ex: pork-belly, *kalbi*--marinated beef, steaks)	1 serving			
Meat intestines (ex: *gobchang*, organ meat soup)	1 serving			
Kimchi pancake, scallion pancakes, etc	1/3 pan			
Seasoned fried chicken	½ chicken			
French fries, fried shrimp, etc	½ serving			
Various Korean-style stews with heavy seasoning	1 bowl			

76. Please list any other food items you often eat with alcohol. (Alcohol food Other)
Food items: _____
Consumption frequency: _____

PART III Demographic Information

Please provide your demographical information below by checking the category applies to you or write in information where asked.

77. Gender:
    - Male □
    - Female □

78. Age group
    - Less than 25 □
    - 26-30 □
    - 31-35 □
    - 36-40 □
    - 41-45 □
    - Older than 45 □

79. Marital Status
    - Single □
    - Married □

80. Body measurements
    Height
    (cm)
    Weight
    (kg)

81. Please indicate if you had any drastic weight changes(+/- 5kg) in the past 6 months.
    Yes ( ). If yes, please specify how much? _____
    No ( )

82. Physical activity level <u>per week</u>
    - Less than 60min □
    - 1-3 hrs □
    - 4-6 hrs □
    - More than 7hrs □

83. Please indicate if you take any of the following supplements regularly.
    - None □
    - Multivitamins □
    - Omega-3 □
    - Protein supplements □

    Other _____

84. Occupational field

1 PR/Advertising	□
2 Media	□
3 IT/Telecom	□
4 Finance/banking	
5 Construction/heavy industries	□
6 Education	□
7 Medical	□
8 Manufacturing industry	□
9 Fashion	□
10 Public sector, government	□
11 Other (Please write in)	_____

85. Average work hours per week

<40hrs	□
40-50 hrs	□
50-60 hrs	□
> 60hrs	□

Thank you very much for completing this questionnaire.