Structural relations of convenience food satisfaction and quality of life according to dietary style
-Focusing on singles in metropolitan area of Korea-

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BACKGROUND/OBJECTIVES: Although the issues of singles' dietary style and quality of life are becoming important due to the increasing number of singles with economic power, little research has been conducted to date on singles' use of convenience food and quality of life in relation to their dietary style. Thus, the present study intends to provide basic data to improve the quality of life by determining the current status of the use of convenience food and explicating its relationship with quality of life through analyzing the dietary lifestyles of the singles.
SUBJECTS/METHODS: The targets of this study were singles, identified as adults between the ages of 25 and 54, living alone, either legally or in actuality having no partner. A statistical analysis of 208 surveys from Seoul, respectively, was conducted using SPSS12.0 for Windows and SEM using AMOS 5.0 statistics package.
RESULTS: The convenience-oriented was shown to have a significant positive effect on convenience food satisfaction. HMR satisfaction was found to have a significant effect on positive psychological satisfaction and the convenience-oriented was found to have a significant negative effect on all aspects of quality of life satisfaction.
CONCLUSIONS: There must be persistent development of food industries considering the distinctive characteristics of the lives of singles in order to satisfy their needs and improve the quality of their lives.

INTRODUCTION

Single-person households are on the rise recently in Korea due to various sociocultural changes. According to Statistics Korea, single-person households increased from 6.3% in 1980 to 15.5% in 2000, to 19.9% in 2005, and to 23.9% in 2010, exceeding, for the first time, the proportion of the traditional four-person households which was 22.5% [1]. The definition of a single varies across researchers, but Conley & Collins [2] defined a single as 'an individual who are not involved in any relationships, regardless of the past marital status', and Schwartz & Barbara [3] defined it as 'someone without legal spouse and who is currently not married including the divorced, widowed, or separated'. However, according to Park [4], singles are defined as 'those who maintains individualistic lifestyle, i.e., enjoying the benefits of being single or choosing to be single rather than everyone who lives as a single, and those who value the merits of living single and can afford the expense' aside from the status of living alone or not.

However, singles experience difficulties in everyday life, and increasingly spend less time for preparing meals at home. In addition, it is believed to be unavoidable and often for them to use convenience food, considering the report that they are increasingly having instant meals or insufficient meals with a limited number of dishes as they seek time-saving and convenience [5,6], which suggests a large impact of such diet on their quality of life.

Thus, the present study intends to provide basic data to improve the quality of life by determining the current status of the use of convenience food and explicating its relationship with quality of life through analyzing the dietary lifestyles of the singles living in Seoul.

SUBJECTS AND METHODS

Subjects

In the present study, singles are defined based on the previous study [7] as 'the households currently without a legal or a putative spouse among the adults between 25 and 54 at the Korean age who live alone in a single separate household with economic capacity or working for a job'. Survey questionnaires were directly distributed to the singles living in Seoul

metropolitan area, and the survey period was between April and August, 2012. Out of 250 surveys in total that had been distributed, 208 surveys excluding incomplete surveys were used for statistical analysis.

Survey protocols, instruments, and the process for obtaining informed consent for this study were approved by the institutional review committees of Sookmyung Women's University (SM-IRB-13-0924-008). All participants gave their written informed consent.

Questionnaires

The questionnaire for singles' dietary style was constructed with reference to relevant previous studies [8-12] and consisted of 18 items on eating habits, and the questionnaire for singles' convenience food satisfaction was constructed with reference to relevant previous studies [13-17] and consisted of 38 items on HMR(Home Meal Replacement: food prepared in a market, department store or home shopping, and consumed which require little or no preparation on the part of the consumer), processed food, delivery food, fast food satisfaction. The questionnaire for singles' quality of life was constructed with reference to relevant previous studies [18-20] and consisted of 17 items on health, economy, human relationship, psychological satisfaction. Each item was rated on a 5-point Likert scale from "not important at all" to "very important". In order to test unidimensionality of multiple items that consist of each factor, exploratory factor analysis and reliability test were performed. Cronbach's alpha coefficient which measures reliability of variables were both greater than 0.6, the scale validation is reliable for the purpose of this study.

Research Model and Hypotheses

Structural equation model was used to examine the effect of Korean singles' dietary style on convenience food satisfaction and quality of life. The research model and research hypothesis are shown in Fig. 1.

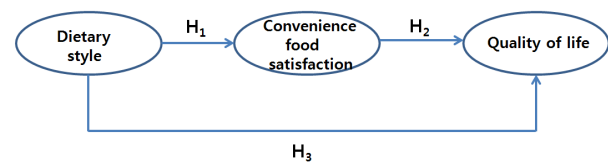Hypothesis 1. Dietary style significantly positive influence the

Fig. 1. The research model and research hypothesis

convenience food satisfaction.

Hypothesis 2. Convenience food satisfaction significantly positive influence the quality of life.

Hypothesis 3. Dietary style significantly positive influence the quality of life.

Statistical analysis

All of the collected data were analyzed with SPSS 12.0 for Windows and AMOS (Analysis of Moment Structure) 5.0 Statistical programs. In order to test unidimensionality of multiple items that consist of each factor, exploratory factor analysis and reliability test were performed. After evaluating the validity of measured items by performing the confirmatory factor analysis for each factor, Equation Modeling (SEM) was used to determine path coefficients of the research model.

RESULTS

Exploratory factor analysis on measurement models
Dietary Style

According to the results of exploratory factor analysis (EFA) on dietary style items, 6 factors were extracted, but secondary factor analysis was conducted after four items with low Cronbach's alpha coefficients. The secondary analysis extracted four factors and the results of the exploratory factor analysis and factor loading on the measurement model are shown in Table 1. The explanatory power was 62.54%, and the Cronbach's alpha coefficients showed the reliability of 0.755, 0.821, 0.670,

Table 1. Explorative factor analysis of dietary style

Question	Factor 1	Factor 2	Factor 3	Factor 4	Cronbach's alpha
Often purchase processed food	0.857				
When busy, take a simple meal like bread or milk	0.697				
Often purchase the ready-to-eat food	0.745				0.755
Eat delivery food often	0.652				
Do not eat instant food for health		0.757			
Care about diet for weight control		0.859			0.821
Consider about nutrition when eating		0.817			
Always check the price when buying groceries			0.709		
Firstly consider discount or event products when buying groceries			0.632		0.670
Draw up a list before buying groceries			0.680		
Buy cheaper product when quality is similar			0.768		
Purchase if it looks tasty				0.851	
Not fear new flavors				0.811	0.650
Like to search for famous restaurants				0.591	
Explained variance	2.586	2.2947	2.074	1.801	
Explained rate(%)	18.471	16.383	14.811	12.872	
Cumulative percentage	18.471	34.853	49.665	62.537	

and 0.650. Factor 1 was named 'Convenience-oriented', factor 2 'Health-oriented', factor 3 'Economy-oriented', and factor 4 'Gourmet-oriented'.

Convenience food satisfaction

According to the results of exploratory factor analysis (EFA) on convenience food satisfaction items, 9 factors were extracted, but secondary factor analysis was conducted after three items with low Cronbach's alpha coefficients. The secondary analysis extracted five factors and the results of the exploratory factor analysis and factor loading on the measurement model are shown in Table 2. The explanatory power was 65.88%, and the Cronbach's alpha coefficients showed the reliability of 0.848, 0.762, 0.761, 0.779 and 0.881. Factor 1 was named 'HMR

Table 2. Explorative factor analysis of convenience food satisfaction

Question	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Cronbach's alpha
Quality of HMR	0.895					
Taste of HMR	0.812					
Nutrition of HMR	0.808					0,848
Hygiene of HMR	0.759					
Quality of processed food		0.824				
Taste of processed food		0.762				
Hygiene of processed food		0.650				0.762
Nutrition of processed food		0.619				
Quality of delivery food			0.805			
Hygiene of delivery food			0.792			
Nutrition of delivery food			0.786			0.761
Taste of delivery food			0.519			
Hygiene of fastfood				0.783		
Quality of fastfood				0.771		0.779
Nutrition of fastfood				0.723		
Convenient to use HMR					0.870	
Convenient to use delivery food					0.870	
Convenient to use processed food					0.792	
Packing of processed food					0.783	
Packing of HMR					0.783	0.881
Convenient to use fastfood					0.729	
Packing of delivery food					0.582	
Packing of fastfood					0.582	
Explained variance	4.770	2.819	2.643	2.542	2.380	
Explained rate(%)	20.740	12.255	11.491	11.051	10.346	
Cumulative percentage	20.740	32.994	44.485	55.536	65.882	

Table 3. Explorative factor analysis of quality of life

Question	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Cronbach's alpha
I trust other people	0.738					
I am satisfied with the relationship between friends	0.865					
I am satisfied with the relationship in the organization	0.694					0.805
I am satisfied with family relationship	0.636					
I have enough energy to routine activities		0.898				
I am satisfied with my physical abilities for activities		0.851				0.886
I am satisfied with my health for work		0.893				
I feel depressed			0.850			
I am easily frustrated			0.840			0.869
I feel anxiety			0.865			
I am an optimist in all situation				0.627		
I am satisfied with myself				0.668		
I take a good night's sleep				0.656		0.725
I am satisfied with my sex life				0.557		
I have enough money to meet my needs					0.885	
I am satisfied with my level of consumption					0.877	0.822
I am satisfied with my standard of living					0.780	
Explained variance	2.814	2.584	2.559	2.261	2.125	
Explained rate(%)	16.553	15.202	15.056	13.300	12.502	
Cumulative percentage	16.553	31.754	46.810	60.110	72.612	

satisfaction, factor 2 'processed food satisfaction', factor 3 'delivery food satisfaction', factor 4 'fast food satisfaction' and factor 5 'convenient to use convenience food'.

Quality of life

According to the results of exploratory factor analysis (EFA) on quality of life items, 5 factors were extracted. The results of the exploratory factor analysis and factor loading on the measurement model are shown in Table 3. The explanatory power was 65.88%, and the Cronbach's alpha coefficients showed the reliability of 0.805, 0.886, 0.869, 0.725, and 0.822. Factor 1 was named 'human relationship satisfaction, factor 2 'Health satisfaction', factor 3 'negative psychological satisfaction', factor 4 'Economy satisfaction' and factor 5 'positive psychological satisfaction' (Table 3).

Confirmatory factor analysis on the measurement model

The results of the confirmatory factor analysis on the

measurement model are shown in Table 4 and Fig. 2. The results of Goodness-of-fit index for the model are shown in Table 1 with accompanying recommended level for each index.

χ^2 value was 3072.655 GFI 0.947, CFI 0.911, IFI 0.918, NFI 0.997, AGFI 0.892, RMR 0.051, RMSEA 0.072 with the values except χ^2, AGFI and RMSEA value satisfied the recommended levels, verifying that the model was adequate.

Model fit test of the measurement model

Structural equation model was used as the theoretical model to analyze convenience food satisfaction and quality of life in accordance with the dietary styles of singles in Seoul (Table 5).

χ^2 value was 3170.447 GFI 0.939 CFI 0.899 IFI 0.905 NFI 0.958 AGFI 0.919 RMR 0.051 RMSEA 0.072 with the values except χ^2, CFI value satisfied the recommended levels of the goodness of fit index and thus, the overall research model was proved to be appropriate [21].

Table 4. Goodness of fit in confirmatory factor analysis

Model	χ^2[1] (P-value)	χ^2/df[2]	GFI[3]	AGFI[4]	IFI[5]	NFI[6]	CFI[7]	RMR[8]	RMSEA[9]
Optimum model	(.05)	2-3	.90-1	.90-1	.90-1	.90-1	.90-1	.05	.06-.07
Hypothetical model	3,072.655 (.000)	2.39	0.947	0.892	0.918	0.997	0.911	0.051	0.072

[1] χ^2: Chi-square
[3] GFI : Goodness of fit index
[5] IFI: Incremenal fit index
[7] CFI: Comparative fit index
[9] RMSEA: Root mean squared error of approximation

[2] χ^2/df: Chi-square divided by degree of freedom
[4] AGFI: Adjusted goodness of fit index
[6] NFI:Normed fit index
[8] RMR: Root mean residual

Table 5. Hypothetical model fit index

Model	χ^2[1] (P-value)	χ^2/df[2]	GFI[3]	AGFI[4]	IFI[5]	NFI[6]	CFI[7]	RMR[8]	RMSEA[9] (90% critical value)
Goodness of fit criteria	(.05)	2-3	.90-1	.90-1	.90-1	.90-1	.90-1	.05	.06-.07
Hypothetical model	3,170.447 (.000)	2.43	0.939	0.919	0.905	0.958	0.899	0.051	0.072
Result	unfit	fit	fit	fit	fit	fit	fit	acceptable	acceptable

[1] χ^2: Chi-square
[3] GFI : Goodness of fit index
[5] IFI: Incremenal fit index
[7] CFI: Comparative fit index
[9] RMSEA: Root mean squared error of approximation

[2] χ^2/df: Chi-square divided by degree of freedom
[4] AGFI: Adjusted goodness of fit index
[6] NFI:Normed fit index
[8] RMR: Root mean residual
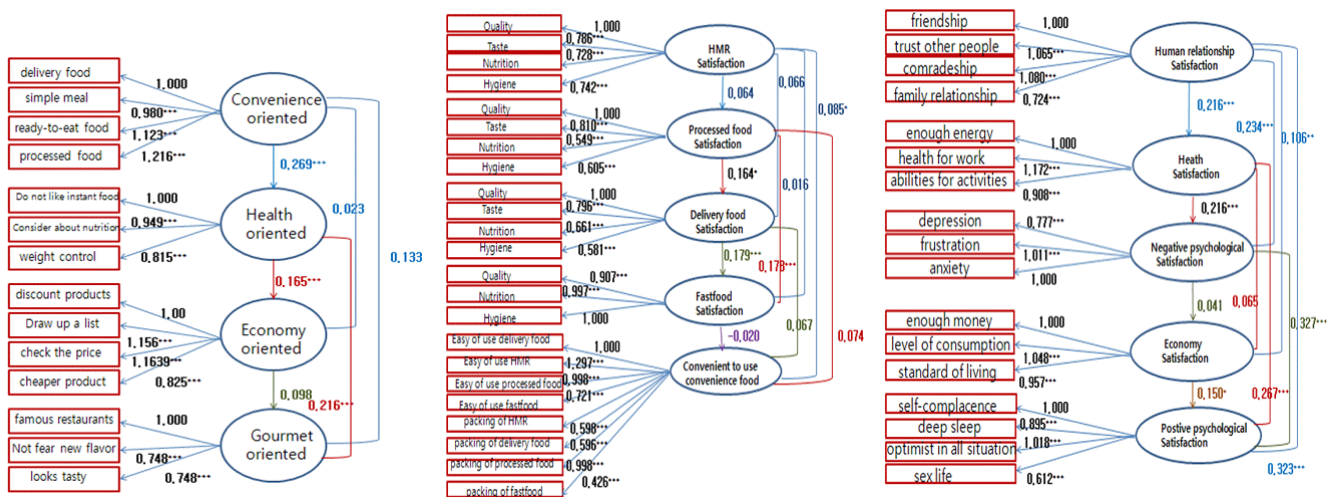
Fig. 2. Confirmatory factor analysis model
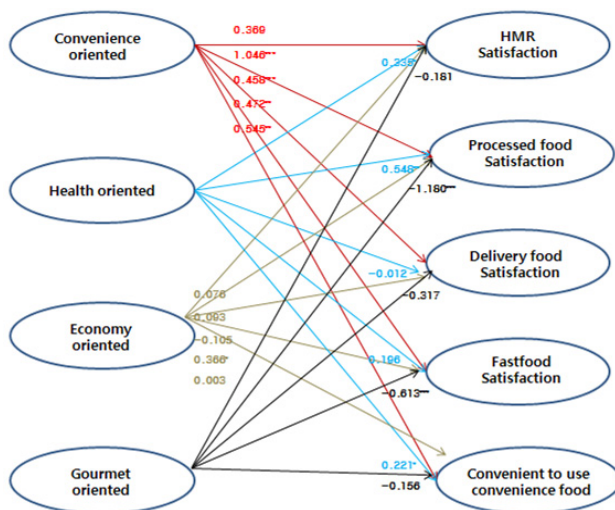
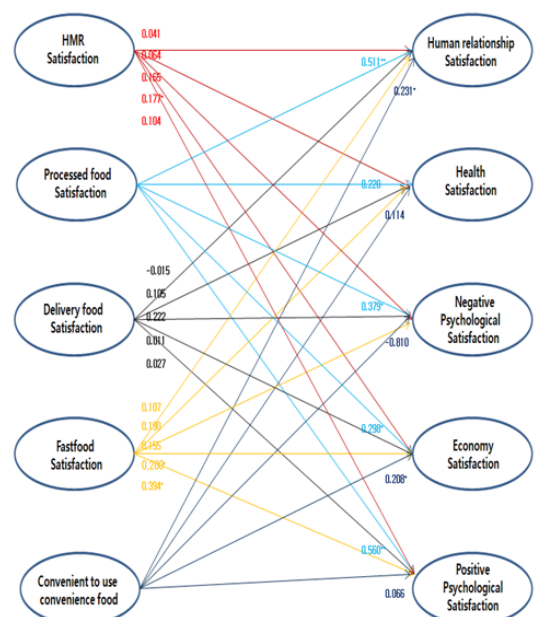**Fig. 3.** Structural equation model of dietary style and convenience food satisfaction

Fig. 4. Structural equation model of convenience food satisfaction and quality of life

Fig. 5. Structural equation model of dietary style and quality of life

Test of Hypothesis
Test of Hypothesis 1: Dietary style significantly positive influence the convenience food satisfaction.

The results of structural equation modeling are shown in Fig. 3.

The convenience-oriented was shown to have a significant positive effect on HMR satisfaction (0.369, $P < 0.05$), processed food satisfaction (1.046, $P < 0.001$), delivered food satisfaction (0.472, $P < 0.01$), and fast food satisfaction (0.545, $P < 0.001$). It is clear that those with convenience-oriented diet style have high satisfaction in overall. The health-oriented was found to have a significant positive effect on HMR satisfaction (0.335, $P < 0.05$), processed food satisfaction (0.548, $P < 0.01$), convenient to use convenience food (0.221, $P < 0.05$). No significant effects were found for delivered food satisfaction and fast food satisfaction, but delivered food satisfaction showed the negative association, suggesting that the singles who are conscious of health have low satisfaction with the taste, nutrition, sanitization, and quality of delivered food. The economy-oriented had a significant negative effect on fast food satisfaction (-0.366, $P < 0.05$), but had no significant effect on convenient to use convenience food satisfaction. The gourmet-oriented had a significant negative effect on processed food satisfaction (-1.180, $P < 0.001$), fast food satisfaction (-0.613, $P < 0.001$), and showed tendency of negative association with all of HMR satisfaction, delivered food satisfaction, and convenient to use convenience food, but showed no significant effects.

Test of Hypothesis 2: Convenience food satisfaction significantly positive influence the quality of life.

The results of structural equation modeling are shown in Fig. 4.

HMR satisfaction was found to have a significant effect on positive psychological satisfaction (0.177, $P < 0.05$), but no significant effect on human relationship satisfaction, health satisfaction, negative psychological satisfaction, and economic satisfaction. In terms of HMR satisfaction, the singles with high positive psychological satisfaction, which includes having sound sleep and being optimistic and satisfied with themselves and
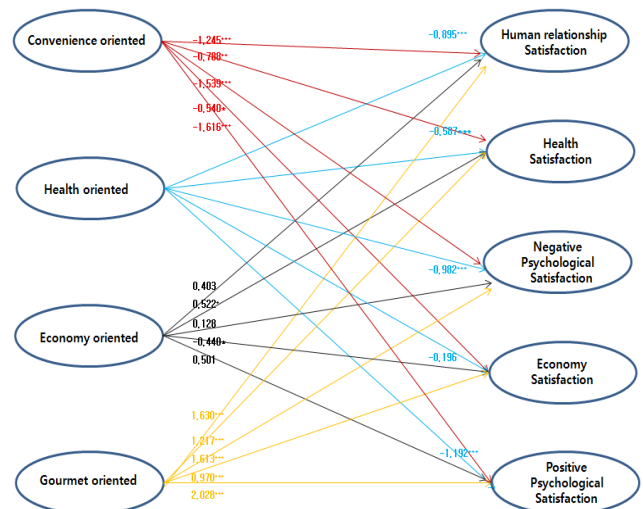
sex life, tended to have higher HMR. Processed food satisfaction was found to have a significant positive effect on human relationship satisfaction (0.511, $P < 0.01$), negative psychological satisfaction (0.379, $P < 0.05$), positive psychological satisfaction (0.560, $P < 0.01$), and economic satisfaction (0.298, $P < 0.05$), except health satisfaction. Delivered food satisfaction did not have a significant effect on any of human relationship satisfaction, health satisfaction, negative psychological satisfaction, positive psychological satisfaction, and economic satisfaction. Fast food satisfaction showed the trend of positive association with all aspects of quality of life, and was found to have a significant positive effect on positive psychological satisfaction (0.394, $P < 0.05$) and economic satisfaction (0.280, $P < 0.05$) in

oriented was found to have a significant positive effect on all aspects of satisfaction. Lee [19] found that emotional stability related to food and pleasure of eating meals have a significant effect on the quality of life of the elderly staying home, and similarly, greater enjoyment of meals among gourmet-oriented singles in the present study is associated with overall satisfaction with quality of life.

There must be persistent development of food industries considering the distinctive characteristics of the lives of singles in order to satisfy their needs and improve the quality of their lives.

REFERENCES

1. Statistics Korea. Population and Housing Census 2010. Daejeon: Statistics Korea; 2011.
2. Conley TD, Collins BE. Gender, relationship status, and stereotyping about sexual risk. Pers Soc Psychol Bull 2002;28:1483-94.
3. Schwartz MA, Scott BM. Marriages and Families: Changes, Choices, and Constraints. 5th ed. Upper Saddle River (NJ): Prentice Hall; 2004.
4. Park MR. A study on the marketing strategy for the development of 'Single Folk' audience [master's thesis]. Seoul: Chung-Ang University; 2010.
5. Lim YS, Park HR, Han GJ. Comparison of preference for convenience and dietary attitude in college students by sex in Seoul and Kyunggi-do area. J Korean Diet Assoc 2005;11:11-20.
6. Kim NH. A study on urban housewive's purchase activity of processed food and perception of nutrition labeling [master's thesis]. Seoul: Sejong University; 2002.
7. Choi SG. A study of singles' dining-out behavior and food consumption behavior by the lifestyle [master's thesis]. Seoul: Sangmyung University; 2011.
8. Choi BR. Influence of food-related lifestyle on Korean food perceptions and commercialization opinions as evaluated in Korean and non-Korean clusters [master's thesis]. Yongin: Dankook University; 2010.
9. Moon YS. A study on the green tea consumption behaviors depending on the food-related lifestyle [master's thesis]. Seoul: Sungkyunkwan University; 2012.
10. Won YE. A study on the specialty coffee shop selection attributes by the food-related lifestyle [master's thesis]. Seoul: Chung-Ang University; 2010.
11. Hong SK. A study on processed food purchasing behavior and satisfaction according to the urban housewives' food-related lifestyle [doctor's thesis]. Seoul: Kyonggi University; 2011.
12. Ryan I, Cowan C, McCarthy M, O'Sullivan C. Segmenting Irish food consumers using the food-related lifestyle instrument. J Int Food Agribus Mark 2004;16:89-114.
13. Ryan I, Cowan C, McCarthy M, O'Sullivan C. 2002. Food-related lifestyle segments in Ireland with a convenience orientation. J Int Food Agribus Mark 2004;14:29-47.
14. Lee SJ. Effect of selection attributes of convenience food users on the value and the after-purchase satisfaction [master's thesis]. Seoul: Kyonggi University; 2011.
15. Kim GA. A study on the classification of home meal replacement [master's thesis]. Seoul: Kyonggi University; 2010.
16. Hur SG. Purchasing behavior for HMR product by life style patterns [master's thesis]. Seoul: Sejong University ; 2007.
17. Park BR. The recognition of housewives with elementary school children for processed food and nutrition labeling. (Focusing on Daegu, Gyungbuk area) [master's thesis]. Gyungsan: Youngnam University; 2011.
18. Yoon MH. Association between oral health and health-related quality of life in adults [master's thesis]. Seoul: Korea University; 2008.
19. Lee SM. The status of meal delivery programs and the study of homebound senior's meal satisfaction related to development of quality of life construct model [doctor's thesis]. Seoul; Sookmyung Women's University; 2011.
20. Ro YJ. An analytical study on the quality of life of the middle-aged in Seoul [doctor's thesis]. Seoul: Yonsei University; 1988.
21. Song JJ. Statistical Methods of SPSS/AMOS for Thesis Writing. Paju: 21C Publishing; 2011.
22. Chung LI. Analysis of consumer inclination to convenience towards home meal replacement in Korea [doctor's thesis]. Seoul: Yonsei University; 2005.
23. Park SN. A comparative study for HMR: what is the theory that especially 20-30 adults South Korea and Japan? [master's thesis]. Seoul: Kyonggi University; 2007.
24. Jang HJ. Evaluation of the menu satisfaction and the customer's menu selection factor in the delivery food service [master's thesis]. Seoul: Chung-Ang University; 2009.
25. Seo KH. A study on delivery food of behaviorism of use and selective attribution according to lifestyle: centering on the consumers in metropolitan area [master's thesis]. Seoul: Kwangwoon University; 2008.
26. Kim MK. A study of relationship between health promoting behavior indices and quality of life indices [master's thesis]. Seoul: Yonsei University; 2001.