

Effects of students' satisfaction with school meal programs on school happiness in South Korea

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BACKGROUND/OBJECTIVES: School meals are not just meals consumed at school, they are part of the culture, education, and life experience at school. Nevertheless, few studies have revealed the influence of school meals on students' school lives. The purpose of this study was to investigate the effect of satisfaction with the school meal program on students' school happiness.

SUBJECTS/METHODS: A survey conducted in December 2015 asked 2,336 students (1,062 elementary school students, 880 middle school students, and 394 high school students) about their satisfaction with the school meal program and their school happiness. Multiple regression analyses were used to examine the relation between the students' school meal satisfaction and their happiness level.

RESULTS: The average level of satisfaction with school meals of elementary school students was 4.1 out of 5 points, comparatively higher than that of middle and high school students, with a significant difference between school levels ($P < 0.001$). In addition, school happiness, as well as overall happiness, of elementary school students was higher than that of middle and high school students ($P < 0.001$). The school meal operation factor (0.232, $P < 0.001$) had the most influence on students' school happiness, followed by the school meal environment factor (0.219, $P < 0.001$) and school meal quality factor (0.136, $P < 0.001$). Overall satisfaction (0.097, $P = 0.001$) and school meal hygiene factor (0.095, $P = 0.001$) also had significant influences on students' school happiness.

CONCLUSIONS: Students' satisfaction with the school meal program was related to their school happiness. Therefore, plans to enhance students' satisfaction with a school meal program needs to be implemented, with emphasis on placing a priority on school meal operation and school environment factors, in order to improve students' level of happiness.

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INTRODUCTION

School meal programs provide nutritionally balanced meals and influence the development of healthy eating habits in students. The Korean school meal program began in 1953 with the aid of UNICEF [1] and has contributed to the physical and mental development of students and has improved citizens' dietary lives [2]. Since 1981, when the School Meals Act was enacted, the program has improved both quantitatively and qualitatively. In 2015, all 11,698 elementary, middle, high, and special education schools nationwide conducted school meal programs, and 99.9% of students, equivalent to 6.14 million people, consumed more than one school meal per day in South Korea [3].

With the establishment of the Comprehensive Plan to Improve School Meals in 2003, the Korean government began to change its school meal program policy from a quantity-

focused expansion policy to a quality-focused stability policy. As such, various campaigns were implemented to provide healthier and higher-quality meals to enhance students' satisfaction, such as by providing dietary consultation and an education program on table etiquette. These initiatives can contribute to improving students' capabilities to select a proper diet [4]. Nowadays in South Korea, school meals are not just meals consumed at school, but are part of the culture, education, and life experience at school, as all students experience school meals every day. Nevertheless, few studies have revealed the effect of school meals on students' school lives.

The school meal program is reported to be related to student life satisfaction and student happiness [5-7]. Studies in other countries have shown that school meal programs affect students' school lives and happiness level, as well as their health [7,8] and growth [5,6]. A survey of 100 college students in Southeast Asia indicated a correlation between the quality of

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college school meals and students' overall satisfaction with the colleges [5]. In a survey of Chinese college students, 66% of participants indicated that their overall satisfaction with their college life was directly influenced by their satisfaction with the school meals [6]. Another study on Chinese college students also showed that students' satisfaction with school meals influenced their level of personal happiness [7].

Previous surveys on Korean students' level of happiness indicated that they tend to be unhappy. The Program for International Student Assessment conducted by the OECD in 2012 showed that Korea ranked last out of 65 assessed countries, with only 61% of Korean students indicating that they felt happy at school, while the average among the assessed countries was 80% [9]. Furthermore, the Korean Child and Youth Happiness Index Research 2015, which surveyed 7,536 students in elementary, middle, and high schools countrywide, showed that the subjective level of happiness among Korean children and teenagers ranked only 19th among 23 OECD countries. In addition, the average quantified response for a question asking about students' satisfaction with their school lives was only 45.0 out of 100 [10].

The school meal program, a part of every student's daily experience in Korea, could have an important influence on the formation of students' satisfaction with their school lives. Regarding the relationship between satisfaction with a school meal program and students' happiness, some studies have been conducted on college students in China and other foreign countries [7,8]; however, there have been no reports of research targeting elementary, middle, and high school students. Accordingly, this study aimed to investigate the effect of satisfaction with the school meal program on children's school happiness.

SUBJECTS AND METHODS

Subjects

The participants in this study were selected from 112 elementary, middle, and high schools, equivalent to 5% of all schools in Gyeonggi province, South Korea, by using a stratified and convenience sampling method that considered the number of schools in different regions. In total, 2,800 students—approximately 25 from each school (fifth grade in elementary school, second grades in middle and high school)—were selected as participants in the survey. The study protocol was reviewed and approved by the Institutional Review Board of Honam University (1041223-201603-HR-005).

Measures

A school meal satisfaction survey tool was developed based on previous studies [11-14] and on professional advice, after which the credibility and validity of the survey instrument were confirmed. Six questions were used to assess overall satisfaction with school meals, including "I am generally satisfied with the school meal". We used 22 items concerning the quality of the school meal [13,14], items that affect satisfaction with the school meal program and conducted a factor analysis of the responses. After confirming the commonness of the measurement items, two factors with factor loadings below 0.4 were eliminated.

Overall happiness of participants was measured with one

item: "I am generally happy". The measurement items to assess students' school happiness were obtained from a school happiness index developed by the Gyeonggi Provincial Office of Education [15]. That school happiness index comprises 7 categories and 20 indices. Seven of the categories are: relationship with teacher, self-efficacy, psychological stability, education satisfaction, feeling of security, relationship with friends, and learning environment. Participants provided answers based on a 5-point Likert-type scale.

After a preliminary survey in November 2015, which targeted six elementary, middle, and high school students, and assessed the time required for answering survey questions, etc., we developed the final version of the survey questionnaire. An internal consistency assessment of the six items related to the overall level of school meal satisfaction provided a Cronbach's α of 0.888, indicating high internal consistency. Furthermore, the internal consistency assessments of the 20 items related to school happiness revealed a Cronbach's α of 0.924, indicating high inter-item consistency.

Self-administered questionnaires were distributed to each school by mail, and students filled them out under instructions from the schools' nutrition teachers (or dietitians) and class teachers. The survey was conducted in December 2015, and the completed questionnaires were returned by mail. Ultimately, 2,513 students from 91 schools responded to the survey. After excluding incomplete responses, the questionnaire responses of 2,336 students (1,062 elementary, 880 middle, and 394 high school students; analysis rate of 83.4%) were utilized in the final data analysis.

Statistical analysis

All data were analyzed by using SPSS/WIN 21.0 software. To assess the internal consistency of survey tools, reliability was measured by calculating Cronbach's α . For construct validation, we conducted confirmatory factor analysis and established the final measurement items. Comparison between groups (elementary, middle, and high school students) was conducted through post-verification by using Duncan's multiple comparisons test after conducting a one-way ANOVA. The relationship between the level of school meal satisfaction and students' level of happiness was analyzed by using multiple regression analyses.

RESULTS

General characteristics

Table 1 summarizes the general characteristics of the study participants. The number of participants was 2,336: 1,062 elementary (45.5%), 880 middle (37.7%), and 394 high school students (16.9%). Among the participants, there were slightly more male students (50.3%) than female students (49.7%). However, there were more female students (52.7%) than male students (47.3%) in middle school, with significant differences among the three school levels ($P = 0.004$). Regarding the location at which food was distributed, food was more often distributed in classrooms (51.7%) than in cafeterias (48.3%), and there were significant differences depending among the three school levels ($P < 0.001$).

Table 1. General characteristics of the study participants and site of food distribution

Characteristics	Elementary school (n = 1,062)	Middle school (n = 880)	High school (n = 394)	Total (n = 2,336)	P-value ²⁾
Gender					
Male	533 (50.2) ¹⁾	416 (47.3)	226 (57.4)	1,175 (50.3)	0.004
Female	529 (49.8)	464 (52.7)	168 (42.6)	1,161 (49.7)	
Food distribution place					
Cafeteria	344 (32.4)	423 (48.1)	361 (91.6)	1,128 (48.3)	< 0.001
Classroom	718 (67.6)	457 (51.9)	33 (8.4)	1,208 (51.7)	

¹⁾ n (%)²⁾ P-value derived by χ^2 -test**Table 2.** Results of factor analysis of quality factors on overall satisfaction with school meal programs

Factor	Item ¹⁾	Factor loading ²⁾	Eigen value	Percent of variance (%)	Cumulative percent of variance (%)	Cronbach's α
School meal quality	Texture of food is diverse.	0.788	6.158	30.791	30.791	0.950
	Food is diverse.	0.776				
	Food looks appetizing.	0.761				
	Food is nutritious.	0.753				
	Temperature of food is appropriate.	0.737				
	Foods taste good.	0.736				
	Ingredients are high quality.	0.730				
	Seasonal menus are provided.	0.714				
	Serving amount is reasonable.	0.657				
School meal environment	Interior design of the dining place is satisfactory.	0.797	2.909	14.547	45.338	0.877
	Dining place is comfortable.	0.740				
	Air-conditioning system of dining place works well.	0.734				
School meal operation	There are communication channels open to students	0.807	3.266	16.332	61.670	0.862
	Students' opinions are reflected in school meals program.	0.771				
	Staff are kind.	0.532				
	Services are quick and smooth.	0.498				
School meal hygiene	Staff uniforms are clean.	0.750	2.621	13.104	74.774	0.901
	Utensils (tray, spoon, chopsticks and dish etc.) are clean.	0.726				
	Foodservice is sanitary.	0.717				
	Dining place is clean.	0.661				

Kaiser-Meyer-Olkin (KMO) = 0.972, $\chi^2 = 37,937.711$ (degree of freedom = 210), $P < 0.001$ ¹⁾ Each measurement item is measured using 5-point Likert scale where 1 is "strongly disagree" and 5 is "strongly agree".²⁾ Factor loadings were calculated by factor analysis (principal component with Varimax rotation).

School meal satisfaction level

Table 2 presents the results of a factor analysis of quality factors on overall satisfaction with the school meal programs. We categorized the survey's 20 main items into four main factors: meal quality (texture diversity, food diversity, food appearance, nutritional balance, serving temperature, taste, ingredient quality, seasonal menu, and serving amount); environment (interior design, comfort of venue, and air-conditioning system); operation (communication channels, acceptance of opinions, kindness, and service); and hygiene (cleanliness of staffs' uniforms, utensils, dining place, and food service).

The total variance explanatory power was 74.8% and the explanatory power of the four main factors was 30.8%, 14.6%, 16.3%, and 13.1%, respectively. The results of the reliability analysis indicated that the reliability coefficients were 0.950 for the quality factor (9 items), 0.877 for the environment factor (3 items), 0.862 for the operation factor (4 items), and 0.901

for the hygiene factor (4 items), indicating high inter-item consistency. According to the confirmatory factor analysis, the KMO was 0.972 and $P < 0.001$, which indicate an appropriate level of adequacy of the factor analysis.

Fig. 1 provides the results of the comparison of the levels of satisfaction with school meals for the different school levels. The average satisfaction score for all students was 3.9 points out of a possible 5. The overall satisfaction level of elementary school students (4.1 points) was higher than that of middle (3.7 points) and high school students (3.6 points), and there were significant differences among the three school levels ($P < 0.001$). The average levels of satisfaction for the quality, environment, operation, and hygiene factors were 3.9, 3.6, 3.7, and 3.8 out of 5, respectively; all of which were below the 4-point level corresponding to "satisfactory." For all four main factors, the satisfaction levels of elementary school students were higher than that of middle and high school students ($P < 0.001$).

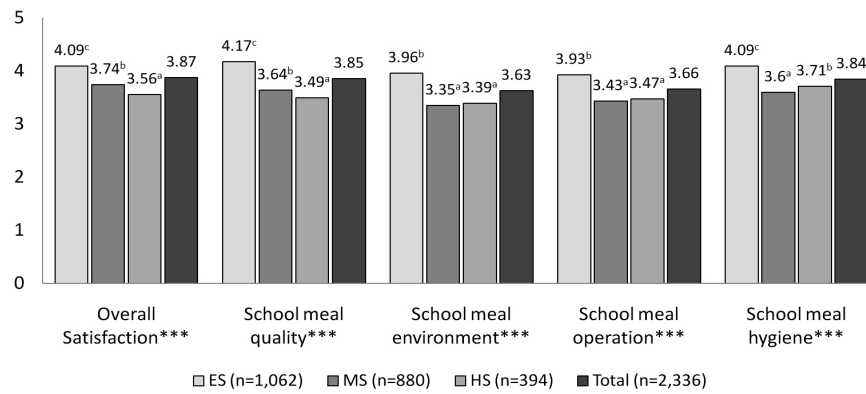


Fig. 1. School meal satisfaction levels by school class level¹⁾. ES, Elementary school; MS, Middle school; HS, High school. ¹⁾ Each item was measured by 5-point scales ranging from 1 (strongly disagree) to 5 (strongly agree), *** significantly different at $P < 0,001$ using ANOVA. ^{a,b,c} significantly different at $P < 0,05$ using ANOVA and Duncan's multiple range test

Table 3. Happiness levels according to general characteristics

Characteristics	n (%)	Overall happiness	School happiness
Gender			
Male	1,175 (50.3)	4.09 ± 0.87 ¹⁾	3.87 ± 0.65
Female	1,161 (49.7)	4.01 ± 0.85	3.81 ± 0.64
<i>P</i> -value ²⁾		0.032	0.039
School level			
Elementary school	1,062 (45.5)	4.24 ± 0.81 ^b	4.08 ± 0.63 ^b
Middle school	880 (37.7)	3.92 ± 0.84 ^a	3.64 ± 0.59 ^a
High school	394 (16.9)	3.83 ± 0.93 ^a	3.67 ± 0.62 ^a
<i>P</i> -value ²⁾		< 0.001	< 0.001
Total		4.05 ± 0.86	3.84 ± 0.65

¹⁾ Mean ± SD; each item was measured by 5-point scales ranging from 1 (strongly disagree) to 5 (strongly agree).

²⁾ *P*-value from Student's *t*-test or ANOVA

^{a,b,c} significantly different at $P < 0,05$ using ANOVA and Duncan's multiple range test

Students' happiness level

Table 3 presents the level of happiness results based on two general characteristics-gender and school level. The average score for overall happiness was 4.1 out of 5, and there were significant differences between genders ($P = 0.032$) and among school levels ($P < 0.001$). The overall happiness score for male students (4.1) was higher than that for female students (4.0). Furthermore, the overall happiness score for elementary school students (4.2) was higher than that for middle (3.9) and high school (3.8) students. Similar results were obtained for the school happiness level assessment. The average score for school happiness was 3.8 out of 5, with significant differences depending on gender ($P = 0.039$) and school level ($P < 0.001$). The score for elementary school students (4.1) was higher than that for middle (3.6) and high school (3.7) students.

Relationship between school meal satisfaction and students' happiness

Table 4 provides the results of the multiple regression analysis

Table 4. Effect of students' school meal satisfaction on their overall happiness level

Quality attribute	Unstandardized		Standardized	<i>t</i> -value	<i>P</i> -value
	β	Standard error	β		
(Constant)	2.798	0.087		32.236	< 0.001
Overall satisfaction	0.059	0.037	0.059	1.596	0.111
School meal quality	0.043	0.042	0.043	1.034	0.301
School meal environment	0.117	0.029	0.131	4.095	< 0.001
School meal operation	0.079	0.033	0.081	2.351	0.019
School meal hygiene	0.037	0.035	0.038	1.063	0.288

Adjusted $R^2 = 0,096$, $F = 47,307$ ($P < 0,001$)

Table 5. Effect of students' school meal satisfaction on their school happiness level

Quality attribute	Unstandardized		Standardized	<i>t</i> -value	<i>P</i> -value
	β	Standard error	β		
(Constant)	1.731	0.051		33.906	< 0.001
Overall satisfaction	0.074	0.022	0.097	3.378	0.001
School meal quality	0.103	0.025	0.136	4.155	< 0.001
School meal environment	0.148	0.017	0.219	8.811	< 0.001
School meal operation	0.169	0.020	0.232	8.579	< 0.001
School meal hygiene	0.070	0.020	0.095	3.420	0.001

Adjusted $R^2 = 0,472$, $F = 383,974$ ($P < 0,001$)

used to determine how the level of school meal satisfaction affects the level of overall happiness of students. The meal environment factor had the most influence (0.131, $P < 0.001$) on the overall happiness level, followed by the meal operation factor (0.081, $P = 0.019$). However, overall meal satisfaction, meal quality factor, and meal hygiene factor did not have any significant influence on the overall happiness level.

Table 5 presents the results of the multiple regression analysis of the influence of school meal satisfaction on students' school happiness. The meal operation factor (0.232, $P < 0.001$) had the most influence, followed by the meal environment factor (0.219, $P < 0.001$), and meal quality factor (0.136, $P < 0.001$). In addition, overall satisfaction (0.097, $P = 0.001$) and meal hygiene factor (0.102, $P = 0.001$) also had significant influences on students' school happiness.

DISCUSSION

This study aimed to describe the relationship between the level of satisfaction with students' school meals and their level of school happiness. The level of school meal satisfaction differed according to school level: the level of satisfaction of elementary school students was higher than that of middle and high school students. In addition, the survey responses of elementary school students indicated they had a higher level of satisfaction with quality factors, including the quality of food, environment, operation, and hygiene, than that of middle and high school students. A Korean survey conducted on the level of school meal satisfaction of elementary, middle, and high school students nationwide showed that elementary school students in Gyeonggi province had a comparatively high level of school meal satisfaction than that of middle and high school students [15]. Furthermore, their level of satisfaction with the quality of food, environment, and operation was higher than that of middle and high school students, which is consistent with the results of the present study.

It has been reported that not only the quality of food, operation, and environment factors, but also additional factors such as the presence of nutrition teachers in schools, can influence students' level of satisfaction with school meals [13]. Examining the distribution of nutrition teachers in schools in 2015, that of elementary schools (60.5%) was notably higher than that of middle (18.7%) and high schools (27.2%) [3], indicating that the presence of nutrition teachers in schools may be considered one of the factors affecting the level of school meal satisfaction.

Analysis of students' happiness revealed that middle and high school students' overall happiness and school happiness fell short of the desired 4 out of 5 points and were lower than the scores for elementary school students. According to the Program for International Student Assessment in 2012, only 61% of Korean students responded that they felt happy in schools [9]. This indicates that many Korean students are unhappy in schools and have a lower level of satisfaction with schools than that of students in other countries. As such, Korea remains in the lower ranks among the countries surveyed. According to the Korean Child and Youth Happiness Index Research, the average score for a question about students' level of satisfaction

with their school lives was 43.73 out of 100; the lowest of all of the questions in the survey [10]. The level of happiness of students in Jeju-island was 4.2 out of 5 for elementary, 3.9 for middle, and 3.7 for high school students, indicating that students' happiness gradually decreases as they move up into the higher-level school years [17]. This is consistent with the results of this study. Korean teenagers have been reported to have a low level of happiness, because of negative influences such as overwhelming academic stress, school violence, and lack of a healthy leisure culture [18-20]. Those results suggest that Korean government organizations and schools should seek ways to enhance students' low level of happiness.

In the results of our study, the level of students' school meal satisfaction was positively correlated with their school happiness as well as with their overall happiness. According to some previous studies, although those studies were conducted with college students, students with a higher level of satisfaction with school meals were more satisfied with their colleges [4]. Moreover, it has been reported that the level of school meal satisfaction has a direct relationship with students' happiness [6] and school life [5]. Our study has revealed that elementary, middle, and high school students' happiness also can be enhanced by promoting their satisfaction with the school meal program. Moreover, students who report feeling happy have better friendships and are more effective in dealing with academic assignments [21]. Therefore, policies that could enhance students' satisfaction with school meals need to be implemented, as students' happiness could be influenced positively by increasing their satisfaction with school meals.

The current study showed that all four of the quality attribute factors of the school meal program (meal quality, environment, operation, and hygiene) had significant influences on students' school happiness. Furthermore, students' overall happiness was significantly related to the environment and operation factors of the school meal program with the operation and environment factors having a relatively high influence on students' happiness level. According to previous research [13], attributes affecting students' level of school meal satisfaction are quality factors, including food taste, diversity of menus, environment factors, and operation factors. To enhance the level of school meal satisfaction, there is a need to improve the quality, environment, operation, and hygiene factors of school meals. Above all, plans to enhance students' satisfaction with the operation and environment factors in school meal programs should be made a priority in order to improve the happiness of school students.

The shortcomings of this study are as follows. First, it is difficult to generalize the results of this study to apply to the entire nation because the survey was limited to students in Gyeonggi province. However, the sample population in this study is relevant because about 19.5% of Korean schools and 26.7% of Korean students are located in Gyeonggi province [22]. Second, this study did not consider exogenous variables such as family relations and economic conditions that can affect the relationship between school meal satisfaction and students' happiness. Third, the level of school meal satisfaction can be influenced by various factors such as the size of the school and the form of the school meal; thus, it is worth investigating these

factors in later studies. Also, a more in-depth nationwide study is required to explain more specifically the influence of school meal program on the school lives of students.

Despite these limitations, this study contributes results that are relevant to the establishment of a school meal policy that can enhance students' happiness as the results show the influence of school meals on the level of students' overall and school happiness. The results of this study can possibly be utilized as a preliminary source of information useful in establishing a policy aimed at enhancing the level of students' school happiness in Korea.

CONFLICT OF INTEREST

The authors declare no potential conflicts of interests.

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