# Dietary Frequencies of Korean American Adolescents in California: Correlation of Acculturation and Parental Dietary Consumption\*

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The purpose of this study was to examine dietary frequencies among Korean American adolescents in California, including the correlation of acculturation and parental dietary consumption. This study was drawn from cross-sectional telephone surveys based on data from a larger study of Korean Americans in California using random sampling of residential phone listings. A total of 494 Korean American adolescents, ages 12 through 17, in California were collected with dietary frequencies and acculturation and one parents' demographic and dietary consumption information. Three-quarters of adolescents were classified as 'more acculturated group' into the U.S. society with a lower preference to Korean foods, frequent snacking, and lower consumptions of rice and kimchi. Other quarter of adolescents was classified as 'less acculturated group'. However, the most frequent food items by both groups were rice and kimchi. Fruit and vegetable consumption was associated between adolescents and parents in both groups, but rice and kimchi were associated only among the more-acculturated group. In conclusion, dietary frequencies of Korean American adolescents were influenced by acculturation and parental dietary consumption. These findings should inform future epidemiological researches as well as efforts to enhance the diet of Koreans and other immigrants.

Key words: Korean American, Adolescent, Acculturation, Parental dietary consumption Received February 2, 2005; Revised March 29, 2005; Accepted April 3, 2005

## INTRODUCTION

Many studies have found that the level of acculturation is associated with dietary patterns. 1-5) Dietary acculturation has been defined as the process whereby an ethnic minority group adopts eating patterns of the host county.<sup>6)</sup> Dietary changes with acculturation differ slightly by ethnic groups, with Chinese Americans reporting higher consumption of fat and fruits/vegetables, 1,7) Hispanic Americans reporting a higher consumption of simple sugars and fat, 2,5) and Japanese Americans reporting a higher consumption of fat<sup>4)</sup> on acculturation.

Several studies<sup>3,8)</sup> were conducted among Korean

Americans, a rapidly growing, recent immigrant group. Acculturated people were less likely to consume typical Korean foods and more likely to consume typical American foods. Acculturated men were more likely to have higher body weights and better self-reported health while acculturated women were more likely to report higher prevalence of smoking and drinking.8-10) For Korean Americans as well as other immigrants, the acculturation to the U.S. may increase risky health and dietary behaviors.

Few studies regarding acculturation and dietary behaviors among adolescents have been reported. Generally, adolescent immigrants or children of immigrant parents have experienced acculturation more quickly than their parents, and this rapid acculturation brings about rapid adoption of western values and lifestyles and socialization into the mainstream society.9,11)

Asian American youth were reported to have lower rate of tobacco, alcohol, and illicit drug use than other

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racial-ethnic groups. 12-14) However, the acculturation was positively associated with higher smoking rates and earlier smoking initiation among Asian American youth. 12) Asian adolescents showed lower intakes of energy, total fat, saturated fat, and calcium when compared to other groups. 15) Yet higher percentages of energy from fat were reported among Korean American adolescents than among Korean adolescents in Korea, and lower percentages of energy from fat than among American adolescents, presumably reflecting the transition of dietary intake among Korean Americans. 16) To better understand the role of acculturation on dietary behaviors among Korean American adolescents in California, we examined these relationships among respondents to the California telephone survey. We also examined the influence of parental dietary consumption on those of their adolescents.

#### **METHODS**

## 1. Sampling

Data were drawn from a larger study of tobacco use and health risks among California residents of Korean descent. Telephone interviews were conducted with Korean descendants. The sampling frame was drawn from a random sample of persons with Korean surnames and listed telephone numbers in California directories. Potential respondents were filtered to insure Korean ethnicity. Specific details of sampling and interviewing have been previously described. [10]

Using Korean or English language depending on the respondents' preference, interviewers made as many as seven attempts to complete each interview. We attained a completion rate of over 90 percent among adolescents, aged 12-17 years, and 494 pairs of adolescents and parents completed the survey. The study protocol was approved by the Institutional Review Board at San Diego State University.

## 2. Acculturation

Acculturation was measured based on items adapted for telephone administration from Suinn and colleagues' work.<sup>17)</sup> Items included aspects of language skill, self-and parental identification, social linkages to friends and neighbors, belief in western values, and music preference. Modifications added birthplace and language chosen at the interview.

Adolescent respondents were divided into two groups using cluster analysis with acculturation items. Based on

item contents, the groups were labeled as "more-acculturated" and "less-acculturated." All acculturation items were significantly different between the two groups (p<.01). The more-acculturated group (77.5%) reported that they preferred to use English, endorsed western values, no longer considered themselves to be primarily Korean, and preferred non-Korean music. The less-acculturated group used English and Korean equally, followed both western and Korean values, and one-third of them still considered themselves Korean and liked both Korean and American music.

## 3. Demographics

Adolescents and parents reported age, gender, and birthplace. Adolescents reported their grades in school, and parents reported years of residency and education in Korea and in the U.S, and household income.

## 4. Dietary Frequencies

Dietary habits and consumption of major foods were measured by self-report. Dietary habits included food preference, fondness for restaurants, frequency of visiting fast food restaurants, number of skipped meals, number of snacks per day, and type of milk consumed.

Dietary consumption of major foods for adolescents and one parent was measured by food frequency using a list of foods: 1) high fat foods such as fried foods, oil-based dressing, butter/margarine; 2) typical American foods such as beef, chicken, egg, milk, bread; 3) green and yellow/white vegetables; 4) typical Korean foods such as rice and kimchi; and 5) beverages such as soda and coffee. Frequency was measured in terms of "twice a day", "once a day", "4-6 times a week", "1-3 times a week", "1-2 times a month", or "less often". Responses were converted to weekly rates for each item.

#### 5. Statistical Analysis

Data were analyzed using the Statistical Analysis System for Windows (SAS, version 6.12). Korean adolescents were divided into two groups by cluster analysis (PROC FASTCLUS) after the standardization of all variables. All acculturation items were compared using the chi-square test. For demographic variables, continuous variables were analyzed using t-test, and categorical variables were analyzed using the chi-square test. Mean values of food frequencies were compared by generalized linear model adjusted for age and gender. Pearson correlation coefficients were used to analyze the

relation of consumption frequencies between adolescents and parents.

## **RESULTS**

## 1. Demographics

Table 1 shows demographic characteristics such as respondents' age, gender, education, and income.

Among males, the more-acculturated group was found to be significantly younger and in the lower grade group in school compared to the less-acculturated group (p<0.001). The more-acculturated group had no significant difference in gender. The average age of parents of both groups was 45 years, and almost all parents were born in Korea with an average of 15 years of education approximating college level. Parents of the more-acculturated group had lived in the U.S. longer than those of the less-acculturated group (p<0.001). They were also

**Table 1.** Demographic characteristics of Korean American adolescents and one parent in California

	Less-	accultu	ırated	More-acculturated			
	(n=111)			(n=383)			
	Mean	SD	Range	Mean	SD	Range	
Adolescents							
Age(yr)***	15.1	1.6	12-17	14.5	1.7	12-17	
Male***	15.5	1.5		14.3	1.7		
Female	14.7	1.5		14.8	1.7		
Gender							
Male(%)	46.9			57.0			
Birth Place							
U.S.(%)	32.1			81.2			
Grade*	9.7	1.7	3-12	9.2	1.7	4-12	
Parents							
Age(yrs)	44.7	4.5	35-67	45.4	4.5	33-60	
Years lived in U.S.***	11.9	6.8	2-34	18.8	6.8	0-43	
Gender(%)							
Male	38.7			38.6			
Birth Place(%)							
Korea	100			99.5			
Education(yrs)	15.5	2.3	9-25	15.3	2.4	6-24	
in U.S.**	0.6	1.7	0-10	1.3	2.3	0-16	
Household Income(%)							
<\$20,000	5.0			1.6			
\$20,000-40,000	23.3			15.1			
\$40,000-60,000	30.0			26.3			
\$60,000-80,000	25.0			25.9			
>\$80,000	16.7			31.1			

Mean values by groups were significantly different by t-test(\*p<0.05, \*\*p<0.01, \*\*\*p<0.001).

educated for more years in the U.S., and this difference was significant (p<0.01). There was no significant difference in income.

#### 2. Dietary Behaviors

## Dietary Habit

Dietary habits of Korean American adolescents for acculturation group are presented in Table 2.

The less-acculturated adolescents were more likely to consume Korean foods and almost half of the more-acculturated group consumed both foods equally (p=0.001). Restaurant preference was also varied by acculturation (p<0.05), with a higher proportion of the

**Table 2.** Dietary habits of Korean American adolescents in California by acculturation level

	Less- acculturated (n=111)	More- acculturated (n=383)	p		
Food Preference (%)			0.001		
Korean Exclusively	2.7	1.6			
Mostly Korean	65.8	47.1			
Both Equal	29.7	45.3			
Mostly American	1.8	5.8			
American Exclusively	0.0	0.3			
Types of Restaurants preferred (%)			0.035		
Korean Exclusively	1.8	0.8			
Mostly Korean	28.8	19.5			
Both Equally	49.6	53.2			
Mostly American	19.8	24.7			
American Exclusively	0.0	1.8			
Going to Fast Food Restaurant (%)			0.817		
None	13.5	9.9			
1 time/wk	42.3	40.5			
2 times/wk	24.3	23.2			
3 or more/wk	19.8	26.4	•		
Average Number of Skipped Meals per Week (%)					
0	37.8	38.5			
1-3	35.1	39.8			
4-7	18.9	12.6			
>7	8.1	9.2			
Average Number of Snacks per Day	(%)		0.001		
0	21.6	7.1			
1	57.7	47.9			
2	11.7	27.2			
>3	9.0	17.8			
Types of Milk Taken (%)			0.031		
Skim Milk	11.8	13.1			
1% Milk	4.7	9.8			
2% Milk	24.7	36.2			
Whole Milk	58.8	41.0			

Distributions of subject by groups were analyzed by chi-square test.

more acculturated group preferring mostly American restaurants. The more-acculturated group was more likely to eat snacks during the day (p=0.001) and less likely to drink whole milk (p<0.05).

#### Dietary Consumption

The dietary consumption of major foods for Korean American adolescents by acculturation level and one

**Table 3.** Dietary consumption of Korean adolescents acculturation group and their parents

(Frequency/week)

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Mean   SD   Mean   SD     Adolescents   Beef*   2.03   1.64   2.28   2.02     Eggs*   2.31   1.53   2.51   2.03     Noodles   1.93   1.68   2.13   1.50     Bread   4.92   2.66   5.48   2.93     Milk***   4.24   3.36   4.80   3.04     Cheese or yogurt   2.95   2.34   3.30   2.41
Adolescents   2.03   1.64   2.28   2.02     Eggs*   2.31   1.53   2.51   2.03     Noodles   1.93   1.68   2.13   1.50     Bread   4.92   2.66   5.48   2.93     Milk***   4.24   3.36   4.80   3.04     Cheese or yogurt   2.95   2.34   3.30   2.41
Beef*   2.03   1.64   2.28   2.02     Eggs*   2.31   1.53   2.51   2.03     Noodles   1.93   1.68   2.13   1.50     Bread   4.92   2.66   5.48   2.93     Milk***   4.24   3.36   4.80   3.04     Cheese or yogurt   2.95   2.34   3.30   2.41
Eggs* 2.31 1.53 2.51 2.03   Noodles 1.93 1.68 2.13 1.50   Bread 4.92 2.66 5.48 2.93   Milk*** 4.24 3.36 4.80 3.04   Cheese or yogurt 2.95 2.34 3.30 2.41
Noodles 1.93 1.68 2.13 1.50   Bread 4.92 2.66 5.48 2.93   Milk*** 4.24 3.36 4.80 3.04   Cheese or yogurt 2.95 2.34 3.30 2.41
Bread 4.92 2.66 5.48 2.93   Milk*** 4.24 3.36 4.80 3.04   Cheese or yogurt 2.95 2.34 3.30 2.41
Milk***   4.24   3.36   4.80   3.04     Cheese or yogurt   2.95   2.34   3.30   2.41
Cheese or yogurt 2.95 2.34 3.30 2.41
Fried food 2.16 1.94 2.51 2.05
Oil based dressing 1.45 1.14 1.76 1.70
Fruits 5.85 2.33 5.94 2.54
Butter or margarine 1.54 2.12 1.94 2.09
Soda*** 3.54 2.96 3.59 2.91
Pork** 1.45 1.49 1.14 1.21
Fish 2.03 1.89 1.83 1.54
Rice*** 9.08 3.49 7.58 2.94
Kimchi* 6.48 3.59 5.44 3.20
Green vegetables 6.25 2.31 5.98 2.35
Yellow/white vegetables 4.89 2.79 4.49 2.63
Coffee*** 0.66 1.22 0.48 1.34
Parents
Beef 1.41 1.39 1.39 1.72
Eggs. 2.05 1.29 2.15 1.50
Noodles 2.00 1.53 1.97 1.46
Bread 3.93 3.07 4.02 2.84
Milk*** 2.94 3.63 2.78 3.28
Cheese/yogurt** 3.32 2.91 2.57 2.13
Fried foods 1.10 1.34 1.03 1.16
Oil based dressing 1.48 1.68 1.33 1.48
Fruits 6.32 2.55 6.36 2.55
Butter/margarine 1.47 2.11 1.24 1.82
Soda 1.90 2.57 1.87 2.71
Pork* 1.38 0.99 1.00 1.22
Fish 2.67 1.67 2.54 1.62
Rice 9.51 3.76 8.90 3.69
Kimchi*** 9.26 3.61 7.57 3.75
Green vegetables 6.40 2.31 6.66 2.47
Yellow/white vegetables 4.83 2.53 5.08 2.68
Coffee 6.29 4.36 6.05 4.21
Alcohol 0.80 1.59 0.74 1.63

Mean values by groups were significantly different by General Linear Model adjusting for age and gender(\*p<0.05, \*\*\*p<0.001).

parent is presented in Table 3.

The more-acculturated adolescents were more likely to consume beef, eggs, milk, and sodas that are mostly American foods. The less-acculturated group was more likely to consume rice and kimchi (typical Korean foods), and pork and coffee. The more-acculturated adolescents consumed beef, egg, milk, and soda more and the less-acculturated adolescents consumed rice, kimchi, and pork more.

Even though the more-acculturated group consumed Korean food such as rice and kimchi less often than the less-acculturated group, the most frequent food items for both groups were rice and kimchi, and rice was eaten more than once a day. The staple food for both groups was Korean food.

Regarding the parental dietary consumption of the acculturation group, parents of the more-acculturated group were more likely to consume chicken, fruit, bread, and vegetables (in Table 3). Parents of the less-acculturated group had significantly higher consumption of pork, kimchi, cheese/yogurt, and milk. The relationships of dietary consumption between adolescents and one parent are presented in Table 4.

Vegetable and bread consumptions were linked between adolescents and their parents in both groups. Among the less-acculturated adolescents, fruit consumption was strongly correlated between adolescents and parents, but rice and kimchi were not correlated.

Among the more-acculturated group, the rice and kimchi consumptions of adolescents were strongly related to those of their parents. A larger number of food items were correlated between the more-acculturated adolescents and their parents than between the less-acculturated adolescents and their parents.

#### DISCUSSION

This study investigated the dietary behaviors and consumption by acculturation among 494 Korean American adolescents in California and the correlation of parental dietary consumption. Frequent snacking, lower preference for Korean foods and restaurants, and lower frequencies of rice and kimchi characterized the more-acculturated group. However, rice was still a staple food for both groups of Korean American adolescents and more food items including rice and kimchi were correlated to parental dietary consumption among the more-acculturated group.

In this study, three quarters of Korean adolescents

Table 4. Correlation of dietary consumption of major foods between Korean American adolescents and one parent by acculturation level of adolescents

Parents	Adolescents							
Less-acculturated Group								
	Rice	Kimchi	Green Veg	Y/W Veg	Fruit	Bread	Fried foods	Butter/M
Rice		•						
Kimchi								
Green Veg								
Y/W Veg			0.2853**	0.4794***				
Fruit					0.31120***			
Bread						0.2496**		
Fried foods								
Butter/M								
More-acculturated Group								
	Rice	Kimchi	Green Veg	Y/W Veg	Fruit	Bread	Fried foods	Butter/M
Rice	0.1890***							
Kimchi	0.3004***	0.1362**						
Green Vet			0.2124**	0.1709***				
Y/W Vet			0.1038*	0.3074***				
Fruit								
Bread						0.1587**		
Fried foods							0.1299*	
Butter/M								0.1602**

Pearson correlation coefficients; \*p<0.05, \*\*\*p<0.01, \*\*\*p<0.001 Green Vet (Green vegetable); Y/W Veg (Yellow/white vegetable); Butter/M (Butter/Margarine)

were described as the more-acculturated group. Compared to other studies<sup>3,8)</sup> conducted with Korean American adults in the U.S., about 10 percent of respondents were described as the acculturated group. Lee *et al.*.<sup>3)</sup> reported that 15 percent of respondents among 348 Korean American adults from the U.S. national samples (mean age 40) were described as the acculturated group with cluster analysis of acculturation items. Our previous study<sup>8)</sup> showed that 2,830 Korean Americans in California (mean age 47) were divided into traditional (79%), bicultural (15%), and acculturated group (6%) with a similar way of cluster analysis of acculturation items. These results support that the acculturation between migrant children and their parents are processed at different speeds.<sup>11,18)</sup>

To better understand the acculturation status of adolescents, we also examined that of their parents with the same acculturation items (data not shown). The parents in this study had similar characteristics on acculturation with the traditional group from our previous study for Korean American adults.8) However, parents were not as acculturated as children.

We found that frequent snacking was one of major characteristics among the more-acculturated Korean American adolescents. About 93% of the more-acculturated adolescents ate snacks more than once a day as compared to about 78% of the less-acculturated group. This parallels the findings<sup>8)</sup> we have previously reported for adults, where more acculturated Korean American adults were more likely to eat snacks during the day when compared to less acculturated adults. This effect might be due to Korean Americans' preference for American breakfasts, lunches and snacks as they are exposed to the American culture.<sup>3)</sup>

Adolescent respondents reported rice to be a staple food, as did other studies of Korean American adults. 3,19,20) Even though the more-acculturated adolescents were more likely to eat American foods such as beef, eggs, and bread, the average frequencies of those items were only 2 to 4 times per week while rice was consumed more than 7 times per week. Our previous study where Korean American adults were classified as traditional, bicultural, and acculturated groups by acculturation items, found that rice consumption showed differences from 9.6 to 6.8 and 6.3 times per week according to acculturated adolescents (7.6 times per week) was lower than that of the traditional group but still high-

er than that of the bicultural group. The kimchi consumption of Korean American adults also showed decreased tendency from 8.1 to 5.3 and 3.7 times per week according to acculturation level, while adolescents showed a slight decreased tendency from 6.5 to 5.4 times per week with more acculturation group.

It was noteworthy that rice and kimchi consumptions of the more-acculturated adolescents were higher than those of acculturated adults even though three quarters of adolescents were assigned as the more-acculturated group. Even though adolescents have been acculturated quickly, they still often reside with parents who are not as acculturated as their children. Since these parents retain Korean foods in their households, the consumption of rice and kimchi are still high even among the more-acculturated Korean American adolescents. This suggests that dietary acculturation for adolescents are slower if they live with less-acculturated parents.

A significant correlation was observed with fruit and vegetable consumption between adolescents of both groups and their parents. These findings were consistent with other studies<sup>21,22)</sup> that family meals or parental presence were positively associated with adolescents' consumption of fruits and vegetables.

The relationship of rice and kimchi consumption between adolescents and parents was found only among the more-acculturated group. Even though the more-acculturated adolescents consumed rice and kimchi less, their consumptions of rice and kimchi were strongly related to those of their parents. It suggests that the less-acculturated adolescents consumed Korean foods regardless of parental dietary consumption but more-acculturated adolescents were more likely to consume Korean foods when their parents consumed Korean foods. The parental dietary consumption plays an important role in connecting their children to traditional Korean foods especially for more-acculturated adolescents. Park et al.<sup>23)</sup> reported for Korean Americans that the mothers' acculturation stage influenced the family's eating habits. Therefore, parents who have more-acculturated adolescents should pay attention to their children' dietary behaviors more in order to maintain the healthful aspects of Korean traditional foods.

Gender of the parent interviewed should not be a confounding factor. Adolescents in this study may not be old enough to go out alone and, according to our previous study, <sup>8)</sup> the mean frequency of eating out for Korean Americans was only twice per week. It implies that the family unit generally eats together. Therefore, examining only one of the parents' dietary consumption

should be sufficient to represent both parents regardless of gender.

In summary, dietary habit and frequencies of Korean American adolescents were different by acculturation, and parental dietary consumption affected adolescents' dietary consumption. Therefore, when dealing with migrant adolescents for improving their health, the acculturation and parental influences should be considered. Future research also should be directed to the acculturation processes to better understand how immigrant children in the U.S. can be incorporated into American culture without increasing health risks.

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