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Changes in the frequency of family meals from 1999-2010 in the homes of adolescents: Trends by sociodemographic characteristics

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Abstract

Objective—To examine secular trends from 1999 to 2010 in family meal frequency in a population-based sample of adolescents across sociodemographic characteristics.

Methods—A repeated cross-sectional design was used. Participants were from Minneapolis/St. Paul middle schools and high schools and included 3,072 adolescents in 1999 (mean age=14.6±1.8) and 2,793 adolescents in 2010 (mean age=14.4±2.0) from diverse ethnic/racial and socioeconomic backgrounds. Trends in family meal frequency were examined using inverse probability weighting to control for changes in sociodemographic characteristics over time.

Results—Family meal frequency remained fairly constant from 1999 to 2010 in the overall sample, but decreases were found in population subgroups including girls, middle school students (grade 6-8), Asians, and youth from low socioeconomic backgrounds. Among youth from the lowest socioeconomic backgrounds, the mean number of family meals in the past week decreased from 4.0 in 1999 to 3.6 in 2010 ($p=.003$). Furthermore, the percentage of youth from low socioeconomic backgrounds eating five or more meals in the past week decreased from 46.9% in 1999 to 38.8% in 2010 ($p<.001$). In contrast, family meal frequency tended to increase over time among youth from higher socioeconomic backgrounds.

Conclusions—The widening gap in family meal frequency between youth from low and high socioeconomic backgrounds is concerning, particularly given the greater risk for poor health

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IMPLICATIONS AND CONTRIBUTION

Little is known about how family meal frequency has changed over time. The current study examines secular trends in family meals from 1999 to 2010 among a diverse population of adolescents. This study further identifies subgroups of the population in greatest need of interventions to increase family meal frequency.

outcomes among low-income youth. Given findings from other studies suggesting multiple benefits of family meals, interventions to increase family meal frequency are needed that target adolescents and their families from the most vulnerable segments of the population.

Research shows that more frequent family meals are associated with several positive outcomes in adolescents, including better dietary intake (1-10), fewer disordered eating behaviors (11-16), higher levels of psychological well-being (14, 17, 18), less substance use (16, 17, 19, 20), and better academic success (17). Much of this research has been published in the past decade or so. The growing interest and scientific attention to family meals research is evident in that approximately 25 scientific papers were published in the peer-reviewed literature prior to 1999, whereas over 125 papers were published between 1999 and 2011. Activities aimed at promoting family meals also appear to have increased over the past decade; for example, based on their research regarding the importance of family meals for preventing substance use, in 2001, the National Center on Addiction and Substance Abuse at Columbia University (CASA) launched a national campaign promoting family meals in which one day a year is called Family Day – A Day to Eat Dinner with Your Children (21).

To advance the state of the science, it is now important to assess whether there have been trends in the frequency of family meals over time and to examine these trends across sociodemographic characteristics of adolescents. Although it is commonly stated that family meals have declined over time (22), we were unable to find any empirical data showing such a trend for families of adolescents. Nicklas and colleagues found a decrease in the percentage of 10-year old children eating a home dinner from 1973 to 1994 (89.2% to 75.9%), but did not report on family meals (23). The only study identified, which studied trends in family meal frequency over time, was conducted by CASA (20). In this study, the percentage of adolescents reporting five or more family meals per week remained fairly consistent in annual assessments conducted from 1999 to 2011, with slightly higher levels in 2011 (58%) than in 1999 (51%). However, trends were not reported for different subgroups of the adolescent population which may be important for efforts targeting change. Cross-sectional research has indicated that the frequency of family meals differs across sociodemographic characteristics (1, 24). For example, in Project EAT-I, conducted in 1999, our research team found that family meal frequency differed across gender (higher in boys than in girls), school level (higher in middle schools students than high school students), ethnicity/race (highest in Asian Americans), and socio-economic status (most frequent in youth from highest socio-economic backgrounds) (1). Exploring whether these differences have become smaller or larger over time may have important implications for interventions.

The current study addresses an important gap in the literature on family meals, in that it examines *secular trends* in family meal frequency within a large and diverse adolescent population. Trends are examined from 1999 to 2010, thus capturing a period in which there was an increase in the dissemination of information on family meals in both the scientific and popular media. Furthermore, the diverse nature of the sample allows for an examination of trends in family meal frequency by adolescents' sociodemographic characteristics, including gender, school level, ethnicity/race, and socioeconomic status, all of which could be important to inform future interventions.

METHODS

Study Design and Population

A repeated cross-sectional study design was used to compare family meal patterns between 1999 and 2010 among adolescent participants in Project EAT (Eating and Activity in Teens). Data from 1999 are from Project EAT-I, the first wave of a longitudinal study

following adolescents into young adulthood (25-27). Data from 2010 are from EAT 2010, a multi-level study in adolescents. Both studies were designed to assess variables of relevance to eating behaviors, physical activity patterns, and weight-related outcomes in participants. Study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and by the research boards of the participating school districts. At each wave, approximately 90% of adolescents who were at school on the days of survey administration had parental consent and chose to participate.

In Project EAT-I, participants included ethnically/racially and socioeconomically diverse students from 31 public schools in the Minneapolis/St. Paul metropolitan area of Minnesota (25, 26). For EAT 2010, a new cohort of students from 20 public schools in the same metropolitan area participated in the study. To facilitate the examination of secular trends, the earlier study sample was restricted to 27 schools from the two urban school districts that participated at both time points. At both time points, middle schools and high schools were included. Mean ages and standard deviations (SD) of middle school youth were 12.8 (SD=0.82) and 12.6 (SD=0.83) in 1999 and 2010, respectively. Mean ages of high school participants were 16.0 (SD=0.90) and 16.0 (SD=1.29) in 1999 and 2010. The study sample includes 3,072 adolescents from 1999 and 2,793 adolescents from 2010.

Measures

Adolescents completed surveys in school classrooms for both study waves; all survey questions utilized in the current analysis were identical in 1999 and in 2010. We examined the test-retest reliability of survey questions in 161 diverse adolescents in 1999 and found good agreement (11). In 2010, we again examined test-retest reliability of survey questions in 129 diverse adolescents; psychometric properties from 2010 are reported in this paper.

To assess the frequency of family meals, adolescents were asked the question: "During the past seven days, how many times did all, or most, of your family living in your house eat a meal together?" Response categories were: never, 1-2 times, 3-4 times, 5-6 times, 7 times, or more than 7 times (test-retest $r = 0.63$). Three variables were developed from this question for the current analysis and included *family meal frequency* (mean number of family meals in the past week), *infrequent family meals* (2 or fewer family meals in the past week) and *frequent family meals* (5 or more family meals in the past week) (test-retest agreement for both infrequent and frequent family meals = 82%).

Sociodemographic variables were reported by adolescents and included *gender*, *age*, *ethnicity/race*, and *socioeconomic status*. *Ethnicity/race* was assessed with the question: "Do you think of yourself as...? 1) White, 2) Black or African American, 3) Hispanic or Latino, 4) Asian American, 5) Native Hawaiian or Pacific Islander, 6) American Indian or Native American, or 7) Other" (Test-retest agreement = 98-100%). Since very few adolescents reported "Hawaiian or Pacific Islander" they were coded as "mixed/other" at both time points. A follow-up question asked about background (e.g., Hmong, Cambodian, Somali, Ethiopian) (Test-retest agreement = 92%); of note, the majority of the Asian American adolescents reported that they were Hmong (weighted percents: 76% in 1999 and 82% in 2010). *Socioeconomic status (SES)* was determined primarily using the higher education level of either parent, based on adolescent report (range: 1-5, test-retest $r=0.90$). To prevent the misclassification of participants as high SES based on education if their family had economic stress, an algorithm was developed that also took into account family eligibility for public assistance, eligibility for free or reduced-cost school meals, and parental employment status (26, 28).

Statistical analysis

Tests for secular trends in frequency of family meals measured both as continuous and dichotomized variables were conducted using two sample t-tests and chi-square tests, respectively. These tests comparing 1999 to 2010 were conducted stratified by gender, school level (middle school or high school), ethnicity/race, and SES and used inverse probability weights (29) applied to the 1999 sample. Effect sizes were calculated for differences in mean family meal frequency; specifically differences in mean family meal frequency between 1999 and 2010 were divided by the pooled standard deviation of family meal frequency which was 2.57. An effect size between 0.10 and 0.30 is usually considered small, although even small differences in trends at a population-based level can have important implications. A test for differential secular trends across SES categories was additionally conducted using linear binomial regression (30) with a SES by year interaction. Inverse probability weights were included for the 1999 sample in all analyses in order to control for demographic shifts in the study population and were calculated from a logistic regression of the year indicator on gender, school level, ethnicity/race, SES, and two-way interactions (29). By weighting the 1999 sample, the secular trend tests are consequently controlled for demographic shifts that may have occurred over time. For example, in our comparison of the mean frequency of family meals in girls from 1999 and girls from 2010, the weighted distribution of school level, ethnicity/race, and SES in the 1999 sample of girls will match the distribution of those demographics in the 2010 sample so that differences can be attributed to secular changes rather than shifts in the demographics. Proper control of the demographic shift using this weighting method was achieved as evidenced by the non-significant differences in the weighted 1999 sample compared to the 2010 sample (See Table 1) and fuller description in a previous publication (31). All analyses were performed in SAS 9.2.

RESULTS

Findings suggest that in the overall sample of adolescents, the mean number of family meals remained fairly constant from 1999-2010 (p -value=.054; effect size=-0.05) with trends differing across sociodemographic characteristics (Table 2). Statistically significant decreases were found in adolescent girls, middle school students, Asian adolescents, and youth from low socioeconomic backgrounds. For example, the percentage of middle school students reporting infrequent family meals (i.e., 2 or fewer meals in the past week) increased from 24.2% in 1999 to 30.3% in 2010 (p <.001). Among the Asian adolescents (primarily Hmong in the study population), the percentage of youth reporting infrequent family meals increased from 24.2% to 30.3% (p <.001).

Findings further suggest that disparities in family meal practices across SES are widening. Among youth from the lowest socioeconomic backgrounds, the mean number of family meals in the previous week decreased from 4.0 in 1999 to 3.6 in 2010 (p =.003; effect size=-0.14), and the percentage of youth from low socioeconomic backgrounds eating infrequent family meals increased from 31.8% in 1999 to 38.8% in 2010 (p =.003). In contrast, family meal frequency tended to increase among youth from higher socioeconomic backgrounds. Specifically, among youth from the high-middle SES group, the mean number of family meals in the past week increased from 4.2 in 1999 to 4.5 in 2010 (p =.039; effect size=0.14), and the percentage of youth from high-middle SES group eating infrequent family meals decreased from 29.5% in 1999 to 23.7% in 2010 (p =.032).

Figure 1 visually shows the growing disparity in the prevalence of frequent family meals (5 or more/past week) across the five levels of SES. In both 1999 and 2010, fewer families from the lowest SES level ate frequent family meals than families from the highest SES level; however, the disparity between these groups grew from 8.9% in 1999 to 22.5% in

2010. This growing disparity was primarily due to a large decline in the percentage of low SES families having frequent family meals (46.9% in 1999 to 38.8% in 2010; $p < .001$). The non-significant trends toward an increase in frequent family meals among the higher SES families also contributed to the growing disparity across SES. For example, among the highest SES families frequent family meals were reported by 55.8% of the adolescents in 1999 and 61.3% in 2010 ($p = 0.200$).

DISCUSSION

The aim of the current study was to examine secular trends in family meal frequency from 1999 to 2010. Findings indicate that the frequency of family meals tended to remain constant or decrease during this period. It is concerning that at both time points, many adolescents report infrequent family meals; a third of adolescents (31.9% in 1999 and 34.5% in 2010) had two or fewer family meals in the past week. Of further concern, decreases often occurred in the sectors of the population most vulnerable to poor nutrition and other developmental risk factors, particularly youth from low SES families. Given the consensus of research findings that strongly suggest the importance of family meals for the well-being of adolescents (20, 32-34), it is important to ensure that more adolescents eat meals with their families and that interventions to increase family meals reach out to and are designed to meet the needs of all sectors of the population.

The different patterns for trends in family meals across sociodemographic characteristics of adolescents are disturbing in that decreases in family meal frequency were often found in the most vulnerable groups, for whom family meals may be most important. There was a small decrease in family meal frequency among girls, which is of concern given past research showing that family meals have particular benefits for girls. For example, in previous longitudinal studies using data from Projects EAT-I and II, more frequent family meals in adolescence predicted lower levels of substance use (19) and disordered eating behaviors (12) five years later in girls, but not in boys. The decline in family meals among younger adolescents is similarly of concern given the importance of healthy nutrition during this period of rapid growth (29, 35). Furthermore, the developmental challenges facing middle school youth make family support particularly important; while families have opportunities outside of the family meal to provide support for their children, the family meal provides a structured framework for regular contact and communication (36). The present study findings showing a decrease in family meal frequency among Asian youth parallels a large secular increase in the prevalence of obesity among Asian boys in this sample shown in a previous publication (31). In this prior analysis of trends in weight-related outcomes, the prevalence of obesity increased from 21.2% in 1999 to 33.5% in 2010 among Asian boys. In contrast, the prevalence of obesity among white boys stayed constant during this time period (18.1% in 1999 and 18.3% in 2010). Of note, the Asian population in the EAT population is primarily Hmong, and a high percentage of the Hmong adolescents come from low socioeconomic backgrounds. While a causal contribution to this trend in obesity cannot be discerned from these analyses, a meta-analysis found that family meals were associated with better dietary quality across studies and protective against obesity in some studies (34).

Of particular concern were the growing disparities in family meal frequency across socioeconomic status. The decline in family meal frequency among adolescents from low SES families suggests that these families are facing difficulties in making family meals happen on a regular basis. While it is beyond the scope of this study to determine what these difficulties are and how they have changed over time, we speculate that obstacles to family meals include factors related to economic stresses such as increased unemployment and underemployment, a need to work multiple part-time jobs to make ends meet, decreased food security, smaller living spaces that are not conducive to shared eating, changes in

workplace demands that allow for less flexibility in time schedules as well as related time stressors (37, 38). The growing disparity in family meal frequency is also due to the trends toward increasing family meals in youth from higher SES families. This increase was statistically significant in the high-middle SES families, suggesting that messages regarding the importance of family meals and strategies for overcoming obstacles to family meals, may be reaching these families.

The current study contributes to the extant literature on family meals in its examination of secular trends in family meals in the homes of adolescents from diverse backgrounds. The unique repeated cross-sectional study design allowed for the study of secular trends from 1999 to 2010, a period during which much attention was directed toward family meals and their associations with a number of positive outcomes in adolescents. The large and diverse study population allowed for comparisons of trends in family meal frequency in different subgroups of the population. We were only able to identify one other study that examined secular trends in family meal frequency in the homes of adolescents, and trends were not examined within subgroups of youth (20). Given that the majority of the Asian adolescents in the EAT population in both 1999 and 2010 were Hmong, this study allowed for a unique opportunity to examine trends in this sub-group of the population. Nevertheless, extrapolations should not be made to other Asian populations. Furthermore, since data were collected in one urban area, generalizations to youth from other areas should be made cautiously. Finally, although data were collected in the same school districts in both 1999 and 2010, there were demographic shifts in the population. Given these shifts, all analyses utilized inverse probability weighting so that the 1999 sample was matched demographically to the 2010 sample. This matching was done to ensure that identified trends were not merely a function of the demographic changes in the population.

Future research should examine whether similar trends in family meals have occurred in different populations across the United States and other countries. The decreasing frequency of family meals found in the Asian adolescents, who are primarily Hmong, is likely due to acculturation into U.S. society (51% of the Hmong youth in the 1999 EAT sample were born in the U.S. as compared to 82% of the Hmong youth in the 2010 sample), suggesting a need for examining family meal trends in other immigrant population groups. Research is also needed to explore the reasons for the trends identified in the current study, particularly what factors led to decreases in the low SES families and what factors led to increases in some of the higher SES families. It is also of interest to examine how family meals have changed over time in terms of the types of foods being served, who is eating together, and what the family meal looks like (e.g., eating at the table or elsewhere, conversations, length of meals). Of most urgency is a need to determine how best to reach the most vulnerable sectors of the population with interventions most likely to meet their needs and increase the frequency of family meals.

This study showed that in spite of the increased attention that has been given to family meals in the scientific literature and popular media, the frequency of family meals either remained constant or decreased in the homes of adolescents from 1999-2010. More work is needed to ensure the adequate dissemination of these findings to families and their translation into effective interventions. Given the decreases in family meals among low SES families, it is crucial to identify and utilize dissemination outlets that reach low SES populations. Realistic interventions that meet the needs of families facing numerous stresses on their time and budgets are also needed. Public health interventionists and policy makers should continue to focus messages and interventions around family meals to the more vulnerable sectors of the population (39). Such interventions may include community-based programs for families (40), the resurrection of home economics classes within schools that provide adolescents with the skills to contribute to the preparation of family meals, and workplace and sport

team policies that allow families to spend time together at mealtimes. Dietitians discussing family meals within clinic or public settings are encouraged to provide ideas about how to make simple, affordable and healthful family meals. Other health care providers working with adolescents and their families are also encouraged to inquire about family meal frequency, discuss the importance of family meals, explore obstacles to family meals, and elicit strategies for overcoming these barriers.

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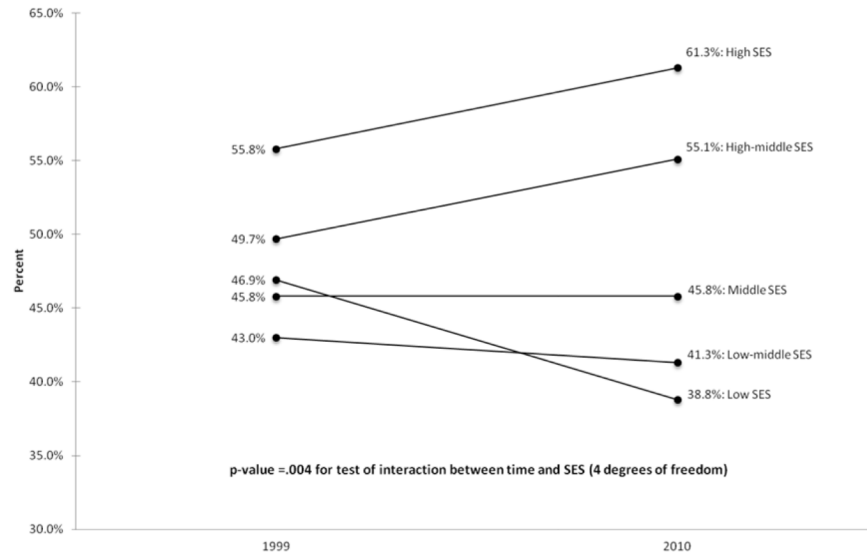


Figure 1. Percent of families eating a family meal 5 times/past week in 1999 and 2010 by socio-economic status (SES)

Table 1

Comparisons of socio-demographic characteristics in actual 1999, weighted 1999 and actual 2010 samples from Minneapolis/St. Paul used to examine secular trends in family meals^a

	1999 sample		Weighted 1999 sample		2010 sample		p-value ^b
	n	%	N	%	n	%	
Gender							0.968
Male	1499	48.8	1436	46.7	1307	46.8	
Female	1573	51.2	1636	53.3	1486	53.2	
Ethnicity/race							0.999
White	1029	33.5	587	19.1	525	18.8	
Black	723	23.6	885	28.8	808	28.9	
Asian	753	24.5	615	20.0	555	19.9	
Hispanic	243	7.9	513	16.7	472	16.9	
Native American	133	4.3	110	3.6	102	3.7	
Mixed/Other	191	6.2	362	11.8	331	11.8	
Socio-economic status							0.999
Low	683	22.2	1168	38.0	1072	38.4	
Low-middle	601	19.5	655	21.3	595	21.3	
Middle	755	24.6	521	16.9	471	16.9	
High-middle	513	16.7	388	12.7	347	12.4	
High	358	11.7	224	7.3	203	7.3	
Not reported	162	5.3	116	3.8	105	3.7	
Age in years: Mean (SD)	3072	14.6 (1.8)	3072	14.5 (1.8)	2793	14.4 (2.0)	0.255

^a The weighted 1999 sample used inverse probability weighting (32) based on the odds of being in the 2010 sample given demographics. Weighting was done to allow for an examination of secular trends in weight-related outcomes independent of demographic shifts in the population (see text in statistical analysis section). Both the unweighted and weighted 1999 demographics are provided for ease of comparison.

^b p-values are presented for differences between the weighted 1999 and 2010 samples, based on chi-square tests for gender, ethnicity/race and socio-economic status and t-tests for age

Ten-year secular trends in family meal frequency from (1999-2010) in a population-based sample of adolescents by sociodemographic characteristics

Table 2

	1999 N ^a	2010 N	Number of family meals: past week (mean)			ES ^b	p-value	Infrequent family meals (2 times/past week) (%)		p-value	Infrequent family meals (5 times/past week) (%)		p-value
			1999 ^a	2010	ES ^b			p-value	1999		2010	1999	
Total sample	3072	2793	4.03	3.90	-0.05	.054	.041	31.9	34.5	.041	47.2	44.4	.035
Gender													
Boys	1436	1307	4.08	4.04	-0.02	.618	.397	30.2	31.7	.397	48.1	46.6	.425
Girls	1636	1486	3.98	3.78	-0.08	.032	.047	33.4	36.9	.047	46.4	42.5	.033
School level													
Middle school	1431	1287	4.59	4.21	-0.15	<.001	<.001	24.2	30.3	<.001	56.9	50.4	<.001
High school	1641	1506	3.54	3.63	0.04	.331	.714	38.7	38.0	.714	38.7	39.3	.735
Ethnicity/race													
White	587	525	4.02	4.24	0.09	.092	.180	31.4	28.1	.180	47.0	51.1	.120
Black	885	808	3.59	3.67	0.03	.567	.485	40.5	38.7	.485	41.8	40.7	.668
Hispanic	513	472	3.92	4.04	0.05	.546	.289	30.2	34.1	.289	43.6	46.1	.539
Asian	615	555	4.69	3.95	-0.29	<.001	<.001	22.8	31.9	<.001	57.8	43.3	<.001
Native American	110	102	4.34	3.73	-0.24	.083	.106	29.4	39.6	.106	55.6	43.6	.069
Mixed/other	362	331	4.00	3.65	-0.14	.137	.149	31.4	37.8	.149	44.5	42.2	.608
Socioeconomic status (SES)													
Low	1168	1072	3.99	3.62	-0.14	.003	.003	31.8	38.8	.003	46.9	38.8	<.001
Low-middle	655	595	3.82	3.72	-0.04	.513	.399	35.7	38.1	.399	43.0	41.3	.559
Middle	521	471	3.96	3.92	-0.02	.786	.923	34.1	33.8	.923	45.8	45.8	.998
High-middle	388	347	4.17	4.53	0.14	.039	.032	29.5	22.9	.032	49.7	55.1	.125
High	224	203	4.48	4.71	0.09	.268	.986	23.8	23.7	.986	55.8	61.3	.200

^aThe 1999 sample was weighted to allow for an examination of secular trends in weight-related outcomes independent of demographic shifts in the population. For example, the test comparing family meals within the low SES group between 1999 to 2010 is mutually controlled so that gender, school level, ethnicity/race, and SES makeup are the same in the low SES group in the 1999 sample as in the 2010 sample.

^bES = effect size is calculated as the difference in mean family meal frequency between 1999 and 2010 divided by the pooled standard deviation of fami meal frequency which is 2.57.