Tracking of Dietary Intake Patterns Is Associated with Baseline Characteristics of Urban Low-Income African-American Adolescents1–3

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Abstract

Young peoples’ dietary habits may persist over time. However, few studies have examined the dynamic patterns in urban low-income African-American adolescents’ intakes. This study examined these dynamic patterns and their predictors and explored the association between the patterns and BMI over time. Dietary data were collected from 181 low-income African-American adolescents using a 152-item FFQ at baseline and 1-y follow-up. High intakes and high BMI were defined as the top quartile and high-fat intake as >35% of energy from fat. Multinomial logistic regression models were fit to study the association between study variables. Correlation coefficients (0.4 ≤ r < 0.6; P < 0.05) between participants’ intakes at baseline and at 1-y follow-up suggested tracking, particularly intakes of energy, fat, fiber, calcium, vegetables and fruits, fried food, and snack food. However, the tracking of percentage of energy from fat and sugar-sweetened beverages was weak (0.2 ≤ r < 0.3; P < 0.01). Proportion of agreement (>30%) and k-values (>0.2) also indicated tracking. Adjustment for tracking of energy changed little the observed tracking for other micronutrients and food groups. Factor analysis showed moderate tracking in a Western diet pattern (r = 0.47; P < 0.001) but was weaker in 2 healthier diet patterns (r = 0.31–0.36; P < 0.001). Age, gender, physical activity, and BMI predicted dietary changes (P < 0.05). Adolescents who tracked high intakes of energy, fiber, fried food, and snacks were less likely to track high BMI. Decreased energy and snack intakes were negatively related to tracking of high BMI. Overall, urban low-income African-American adolescents tracked their dietary patterns over time. The tracking was affected by baseline characteristics. J. Nutr. 138: 94–100, 2008.

Introduction

Diet affects the risk for many chronic diseases such as obesity and cardiovascular disease (1). Childhood and adolescence are 2 key periods for the formation of lifelong dietary habits (2,3). Poor dietary habits developed in these years can have many serious adverse health effects (4–6), yet fewer than one-half of U.S. adolescents meet the specific national dietary recommendations (7). Without effective intervention, poor eating habits developed during childhood may “track” into adulthood. “Tracking” refers to the maintenance of a relative position in rank of behavior over time. Several studies have examined tracking in young people’s dietary patterns. For example, the Framingham Children’s Study found that nutrient-specific correlation coefficients ranged from 0.37 (energy) to 0.63 (percentage of energy from carbohydrate) between ages 3–4 y and 5–6 y (8). The Bogalusa Heart Study showed that children’s diet composition remained similar at various ages between adolescence and young adulthood (9).

On the other hand, adolescence is also a period when many physiological and psychological changes are happening in young people’s lives and adolescents are more likely than younger children to be sensitive to the influence of their environment, including peer influence and the food environment outside of home. As a result, considerable changes may occur in their eating patterns during this period. Some studies have suggested a strong association between food choices and socioeconomic status (SES)4 (10,11). A recent Australian study reported that people with lower SES were more likely to purchase unhealthy food (12). Another study that included 6 Latin American cities showed that lower SES adolescents had the least knowledge of the fat and energy contents of foods and beverages (13). Compared with white children, low SES African-American children are less likely to consume healthy foods (14) and are at increased risk of overweight (15).

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To our knowledge, few tracking studies have been conducted among low-income minority adolescents. In addition, although the association between diet and BMI among children has been extensively studied, few studies have examined the association between the dynamic patterns in dietary intake and BMI using longitudinal data. The purposes of this study are: 1) to examine the tracking patterns in urban low SES African-American adolescents’ dietary intake over a 1-y period; 2) to study the predictors of the tracking and dynamic patterns in their dietary intakes; and 3) to explore the associations between the dynamic patterns in their dietary intake and BMI. A better understanding of these questions will provide useful information for the development of interventions to promote more healthy eating behaviors at younger ages.

Methods and Materials

Overview of study design and data collection

This study was based on the data collected in the 2 control schools enrolled in the Healthy Eating and Active Lifestyles from school to Home for Kids (HEALTH-KIDS) Study, a randomized intervention trial to test a school-based obesity prevention program in urban low-SES African-American adolescents. At baseline, over 400 students from grades 4 to 7 in 4 Chicago public schools were enrolled in the study. Trained research staff collected data following standardized protocols at baseline and thereafter approximately every 6 mo during the 1.5 y of follow-up. Study protocols were approved by the Institutional Review Board at the University of Illinois at Chicago and Johns Hopkins University Bloomberg School of Public Health. More details about the HEALTH-KIDS Study are provided elsewhere (16).

Subjects

Only students from the 2 control schools with complete data on sociodemographic characteristics, dietary intake (see below), and measured height and weight at baseline (fall 2003) and 1-y follow-up (fall 2004) were included (n = 181 adolescents aged 10–14 y at baseline; 57% were girls).

Assessment of dietary intake

In the fall of 2003 (n = 236) and fall of 2004 (n = 216), participants completed the Youth Adolescent Questionnaire (YAQ), a 152-item self-administered semiquantitative FFQ developed by Harvard University (17,18). Reproducibility and validity of the YAQ has been previously described in detail (17,18). The 152-item instrument asks participants how often they usually consume each of 131 food items, along with questions regarding meal intake and the usual types and methods of food consumption. The YAQ also asked questions about the frequency of fried food consumption and the number of snacks consumed per day on school and nonschool days. Individuals with extreme energy intakes ([<2093.4 kJ (<500 kcal) or >29317.6 kJ (>7000 kcal)] or missing >70 items in the FFQ were excluded, yielding a final sample of 181 students.

Energy and nutrient intakes and food groups. Energy and nutrient intakes were calculated by Harvard University using a nutrient database specifically designed for use with the YAQ. They were presented as mean daily intake per child. This article focused only on total energy intake, fat intake, percentage of energy from fat, and fiber and calcium intakes. We aggregated the 152 items on the YAQ into 13 broad food groups such as meat, main dishes, baked goods/cereals, fruits, vegetables, dairy, snacks, and beverages, as adapted for use with the YAQ by Xie et al. (19). These food groups were used in our factor analysis to identify and study the tracking of dietary patterns. In addition, some of these groups were combined into larger categories. This study focused on the consumption of vegetables and fruits, fried food, sugar-sweetened beverages, and snack foods.

Key outcome variables

Definition of tracking of dietary intake patterns. We used gender-age-specific quartiles to define the tracking of diets. If an individual remained in the same quartile at both the baseline and 1-y follow-up surveys, this was defined as tracking. Dietary patterns were assessed based on the nutrients and food groups specified above and based on our factor analysis.

The dynamics of dietary patterns. To investigate the predictors of the dynamics of dietary intakes and the association between the dynamic patterns and BMI, we defined 4 patterns for each dietary variable of interest based on gender-age-specific medians due to our relatively small sample size: tracking high, tracking low, decrease, and increase. This also allowed us to examine factors that might predict desirable and undesirable changes. Based on their association with obesity and other chronic disease, we focused on 6 types of diet tracking patterns: tracking of high energy intake, high fiber intake, high fruit and vegetable consumption, high snack intake, a high Western diet pattern, and high fat intake (>35% of energy from fat based on the 2005 Dietary Guidelines for Americans [20]).

Main independent variables

Anthropometric measures. Height, weight, and waist circumference were measured at baseline and 1-y follow-up. BMI was calculated for each individual based on their weight and height. The participants’ body weight status was classified using the age-gender-specific percentiles from the 2000 CDC Growth Charts: 1) overweight, BMI ≥ 95th percentile; 2) at risk of overweight, 85th percentile ≤ BMI < 95th; and 3) the others (normal weight), BMI < 85th percentile (21).

Physical activity. Information on study participants’ physical activity (PA) was collected using the HEALTH-KIDS activity questionnaire (AQ). The AQ was adapted from the Girls Health Enrichment Multi-Site Studies questionnaire, which was validated among African-American girls (aged 8–10 y). The HEALTH-KIDS AQ consisted of a checklist of 30 activities that were typically performed by African-American students, along with drawn pictures of the activities. A metabolic equivalents (MET) value was assigned for each PA item based on the compendium of physical activities provided by Ainsworth et al. (22). The tertiles of the total PA-MET score were used to evaluate the PA level of adolescents in our study.

Statistical analysis

First, we calculated both Pearson and Spearman rank-order correlation coefficients but reported only the Spearman coefficients to examine the correlation between dietary intake measures at baseline and at the 1-y follow-up. Correlation coefficients are typically used to study associations and tracking (23). Spearman is a better choice than the Pearson correlation for this purpose, because it helps minimize underlying problems of outliers and data distribution (24). We chose 0.2 as the cutoff point for suggesting the existence of tracking.

Further, dietary patterns were identified and studied by principle component analysis (25) at baseline and follow-up. Stevens’ method was used to specify an acceptable level of significance (26). We derived uncorrelated factors using orthogonal rotation. The scree plots and factors were observed to judge the meaningful solutions. In both cases, a 3-factor solution was selected for further analysis. Patterns were named according to those foods that had the highest factor loadings and the general nutritional content of foods that loaded highly on the pattern. Spearman correlations between the factor scores calculated for each individual at baseline and follow-up were calculated.

Next, the proportion of subjects who remained in the same quartile over time was assessed. Note that only 25% of subjects would remain in the same quartile over time if one assumes that they could move randomly into any of the quartiles at follow-up. Then we calculated k to test the agreement between each individual’s relative quartile positions in both waves. Note that k = 0 when the observed agreement equals that expected by chance and k = 1 when the tracking is perfect (27). We chose a value of k > 0.2 as an indicator of the existence of tracking, ≥0.4 for moderate tracking, and ≥0.8 for strong tracking.

Finally, we fit ordinary and multinomial logistic regression models to study the predictors of the dietary tracking patterns and to test the association between the dynamic patterns of dietary intake and BMI. OR and the 95% CI were presented and adjusted for potential confounders.
Data management and analysis were carried out using SAS (version 9.2) and STATA (version 9.0). \( P < 0.05 \) was considered significant. Between-group differences by gender, body weight status, and PA levels as well as the changes of participants were compared using \( t \) test, ANOVA, and Dunnett’s T3 post hoc tests \( (P < 0.05) \). Proportions were compared by their 95% CI.

## Results

### Baseline characteristics

The participants’ mean age was 11.8 years (Table 1). Girls had a higher fat intake than boys \( (P = 0.014) \). Compared with normal-weight adolescents, overweight adolescents consumed less energy, fat, fried food, and snack food \( (P < 0.05) \). Adolescents in the upper PA-MET score tertile were more likely to consume more energy and fiber than adolescents at the bottom tertile \( (P < 0.05) \).

### Tracking patterns of dietary intakes over a 1-y period

**Correlation coefficients.** Pearson (not presented) and Spearman correlation coefficients showed similar tracking patterns. An overall tracking pattern was suggested, particularly for intakes of energy, fat, fiber, calcium, vegetables and fruits, fried food, snack food, and Western diet pattern (Table 2; \( 0.4 < r < 0.6; \) all \( P < 0.05 \)). The tracking of percentage of energy from fat and sugar-sweetened beverages was weak \( (0.2 \leq r \leq 0.3; \) \( P = 0.009 \) and \( P < 0.001 \), respectively). In general, gender or PA did not differ in the tracking. Overweight adolescents were not

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**Table 1** Low-income urban African-American adolescents’ dietary intake at baseline and 1-y follow-up by gender, BMI, and PA

<table>
<thead>
<tr>
<th>Gender</th>
<th>BMI category</th>
<th>Physical activity status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Boys</td>
</tr>
<tr>
<td></td>
<td>BMI &lt; 85th percentile</td>
<td>85th ≤ BMI &lt; 95th percentile</td>
</tr>
<tr>
<td></td>
<td>Nutrient intake, unit/df</td>
<td>Nutrient intake, unit/df</td>
</tr>
<tr>
<td>Energy, kJ</td>
<td>Total fat, g</td>
<td>Energy from fat, %</td>
</tr>
<tr>
<td>Baseline</td>
<td>12,248.5 ± 6541.5</td>
<td>99.4 ± 54.4</td>
</tr>
<tr>
<td>Follow-up</td>
<td>11,000.4 ± 5771.1</td>
<td>93.2 ± 46.7</td>
</tr>
<tr>
<td>Change, %</td>
<td>−10.2</td>
<td>−4.7</td>
</tr>
</tbody>
</table>

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1. Values are means ± SD. *Gender difference was significant, \( P < 0.05 \). **At risk of overweight and overweight were significantly different from normal-weight students, \( P < 0.05 \). ***Differences between PA groups were significant, \( P < 0.05 \).
2. BMI categories were defined using the age-sex-specific percentiles in the 2000 CDC Growth Charts (21).
3. Physical activity category were classified using tertiles of PA-MET score.
4. Fruits and vegetables include food items such as raisins, grapes, bananas, melons, apples, pears, oranges, strawberries, peaches, juice, tomatoes, tofu, beans, broccoli, beets, corn, peas, mixed vegetables, squash, corn, peas, mixed vegetables, spinach, kale, peppers, beans, squash, carrots, celery, lettuce, coleslaw, and potato.
5. Fried foods include items such as French fries, chicken nuggets, pastries, egg rolls, potato chips, corn chips, and nachos.
6. Sugar-sweetened beverages include items such as coke, punch, and iced tea.
7. Snack foods include items such as potato chips, corn chips, nachos, popcorn, pretzel, nuts, graham crackers, crackers, pop tarts, cake, Twinkies, sweet rolls, donuts, cookies, brownies, pies, chocolate bars, candy, candy bars, Jello, puddings, frozen yogurt, ice cream, milkshake, and popsicles.

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significantly less likely to track intakes of fat (as percentage of energy) and sugar-sweetened beverages than normal-weight adolescents.

Our factor analysis identified 3 dietary patterns at baseline and the follow-up: Western, Eastern, and Dairy (Supplemental Table 1). The correlations in the factor scores of both surveys suggested a moderate tracking for Western diet pattern but weaker tracking in Eastern and Dairy diet patterns.

In addition, we tested how energy adjustment might affect the tracking using 2 approaches. After adjusting for tracking in the observed tracking of the nutrients and foods were toward the 95th percentile, changes in energy intake, which was defined based on quartiles, were relatively small except for fat intake (0.1–0.2 for the majority of intake variables).

Proportion of tracking and changing quartile rank positions. In general, the tracking patterns were consistent (Table 3), with >30% of students maintaining their quartile positions 1 y later. For the bottom and top quartiles, the percentage of tracking was higher (≥40%). k of all the diet patterns examined also indicated tracking (k > 0.2), but percentage of energy from fat and sugar-sweetened beverages had lower k-values than others. We also calculated overall proportion of desirable and undesirable changes over the 1-y period. These adolescents were less likely to increase than to maintain their intakes of total fat (P < 0.05) and snack food (P < 0.05).

Predictors of the tracking and dynamics of dietary intakes. Our multinomial logistic models show that baseline age, gender, BMI category, and PA level were not significant predictors of tracking for high-fat or high-vegetable and fruit diet, but they were significant predictors of tracking for high-energy, high-fiber, high-snack intakes, and high-Western diet pattern (Table 4). These factors (baseline age, gender, BMI category, and PA) were significant predictors of the dynamic patterns (i.e. changes) of some of these dietary patterns (not shown in Table 4). Overweight adolescents were more likely to reduce their intakes of energy (OR = 0.32; 95% CI = 0.13, 0.77), fiber (OR = 0.35; 95% CI = 0.14, 0.87), and snack foods (OR = 0.16; 95% CI = 0.06, 0.40) than normal-weight adolescents. Physically active adolescents (in the upper tertile of PA-MET score) were more likely to consume more energy (OR = 2.76; 95% CI = 1.11, 6.82) and fiber (OR = 2.70; 95% CI = 1.06, 6.87) and seemed to be less likely to decrease energy intake than physically inactive adolescents (the bottom PA-MET score tertile), although it was not significant [OR = 0.26; 95% CI = (0.06, 1.08)]. Older adolescents (>13 y old) were more likely to decrease their energy intake from fat (OR = 12.33; 95% CI = 2.00, 76.02). Overweight adolescents were less likely to increase snack food intake than normal-weight adolescents (OR = 0.23; 95% CI = 0.07, 0.76) and girls were more likely to increase snack food intake than boys (OR = 2.86; 95% CI = 1.07, 7.71).

The association between the dynamic patterns of diet and BMI over 1-y follow-up. Our multinomial logistic models (Supplemental Table 2) show a significant negative association between tracking of high BMI

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### TABLE 2

<table>
<thead>
<tr>
<th>Nutrient intake, g</th>
<th>Energy, kJ</th>
<th>Total fat, %</th>
<th>Energy from fat, %</th>
<th>Fiber, g</th>
<th>Calcium, mg</th>
<th>Food groups, snacks, sugars/d</th>
<th>Fruits and vegetables</th>
<th>Fried food</th>
<th>Sugar-sweetened beverages</th>
<th>Snack</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>181</td>
<td>78</td>
<td>103</td>
<td>98</td>
<td>35</td>
<td>48</td>
<td>61</td>
<td>59</td>
<td>61</td>
<td>59</td>
</tr>
<tr>
<td>Boys</td>
<td>181</td>
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<td>59</td>
<td>61</td>
<td>59</td>
</tr>
</tbody>
</table>

1 Spearman rank correlation coefficient is a nonparametric measure and was calculated between the ranks of individual’s repeated dietary intakes. Pearson correlation coefficient is calculated by using individuals’ dietary intakes as continuous variable. Pearson correlation coefficient showed consistent tracking patterns with Spearman rank correlation coefficient (results were not presented). *Not significant under null hypothesis of ρ = 0; P > 0.05. All other correlation coefficients were statistically significant.

2 BMI categories were defined using the age-sex-specific percentiles in the 2000 CDC Growth Charts (21).

3 Physical activity categories were classified using tertiles of PA-MET score.

4 Western diet pattern comprised of baked food, snack food, fried food, fruits, sugar-sweetened beverages, juice, and punch.

5 Eastern diet pattern comprised of fish, soy, vegetables, and main dishes.

6 Dairy diet pattern comprised of milk and dairy products.

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**Tracking of diets in urban African-American adolescents**

Our multinomial logistic models show that baseline age, gender, BMI category, and PA level were not significant predictors of tracking for high-fat or high-vegetable and fruit diet, but they were significant predictors of tracking for high-energy, high-fiber, high-snack intakes, and high-Western diet pattern (Table 4). These factors (baseline age, gender, BMI category, and PA) were significant predictors of the dynamic patterns (i.e. changes) of some of these dietary patterns (not shown in Table 4). Overweight adolescents were more likely to reduce their intakes of energy (OR = 0.32; 95% CI = 0.13, 0.77), fiber (OR = 0.35; 95% CI = 0.14, 0.87), and snack foods (OR = 0.16; 95% CI = 0.06, 0.40) than normal-weight adolescents. Physically active adolescents (in the upper tertile of PA-MET score) were more likely to consume more energy (OR = 2.76; 95% CI = 1.11, 6.82) and fiber (OR = 2.70; 95% CI = 1.06, 6.87) and seemed to be less likely to decrease energy intake than physically inactive adolescents (the bottom PA-MET score tertile), although it was not significant [OR = 0.26; 95% CI = (0.06, 1.08)]. Older adolescents (>13 y old) were more likely to decrease their energy intake from fat (OR = 12.33; 95% CI = 2.00, 76.02). Overweight adolescents were less likely to increase snack food intake than normal-weight adolescents (OR = 0.23; 95% CI = 0.07, 0.76) and girls were more likely to increase snack food intake than boys (OR = 2.86; 95% CI = 1.07, 7.71).

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**Predictors of the tracking and dynamics of dietary intakes**

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and tracking of high intakes of energy \( [OR = 0.40 (0.18, 0.89)] \), fiber \( [OR = 0.42 (0.19, 0.94)] \), fried food \( [OR = 0.21 (0.09, 0.52)] \), and snack food \( [OR = 0.32 (0.14, 0.72)] \) compared with those who tracked low-intake levels. The findings were similar for tracking of high-waist circumference, e.g., tracking high intakes of fried food \( [OR = 0.23 (0.10, 0.56)] \) and snack food \( [OR = 0.39 (0.18, 0.87)] \).

Both decreases in energy intake and in snack food consumption were negatively related to tracking high BMI; the OR were 0.31 (0.11, 0.89) and 0.36 (0.13, 0.98), respectively. In addition, girls were more likely to track high BMI than boys \( [OR = 2.03 (1.04, 3.96)] \) and the OR for older adolescents aged >13 y was 1.96 (0.98, 3.91) compared with their younger counterparts.

### Discussion

This study focused on an underserved homogeneous group of urban low-income African-American adolescents and provided evidence of moderate dietary pattern tracking over a 1-y period during puberty. We used several approaches to assess the tracking and dynamic patterns. The correlation coefficients showed moderate tracking \( (r = 0.5; P < 0.001) \) in the Western diet pattern and intakes of energy, fat, fiber, calcium, fried food, and snack food. The tracking in the 2 healthier diet patterns was weaker \( (r = 0.31–0.36; P < 0.001) \). Tracking of vegetables and fruits was strong \( (r = 0.43–0.49; P < 0.001) \), whereas tracking of percentage of energy from fat and sugar-sweetened beverages was weak \( (r = 0.2; P < 0.001) \). More than 30% of these students remained in the same quartile for all the dietary variables we examined. \( k \)-Values also indicated tracking (all \( k > 0.2) \), although percentage of energy from fat and sugar-sweetened beverages had lower \( k \)-values.

To our knowledge, no studies have examined the predictors of the dynamic patterns of low-income minority young people’s diet intakes using comprehensive dietary data that could reflect their usual diet. Our study attempted to fill this gap in the literature. We found that baseline age, PA, and body weight status were all likely to influence the tracking and dynamic patterns in intakes. Overweight adolescents were more likely to decrease their energy, fiber, and snack food intakes and less likely to increase snack food intake and track Western diet pattern.

### TABLE 4 Predictors of dietary intake tracking patterns among low-income urban African-American adolescents

<table>
<thead>
<tr>
<th>Predictors (baseline characteristics)</th>
<th>Tracking high energy</th>
<th>Tracking high fat</th>
<th>Tracking high fiber</th>
<th>Tracking high fruit and vegetable</th>
<th>Tracking high snack intake</th>
<th>Tracking high western diet pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older age (12–14 y vs. &lt; 12 y)</td>
<td>1.56 (0.73, 3.33)</td>
<td>4.23 (0.97, 18.48)</td>
<td>1.76 (0.81, 3.82)</td>
<td>1.13 (0.54, 2.35)</td>
<td>2.02 (0.93, 4.41)</td>
<td>1.47 (0.68, 3.20)</td>
</tr>
<tr>
<td>Gender (girls vs. boys)</td>
<td>0.87 (0.41, 1.85)</td>
<td>5.57 (1.10, 28.32)</td>
<td>0.86 (0.40, 1.83)</td>
<td>1.31 (0.63, 2.71)</td>
<td>1.41 (0.65, 3.07)</td>
<td>1.17 (0.54, 2.54)</td>
</tr>
<tr>
<td>At risk of overweight (vs. BMI &lt; 85th percentile)</td>
<td>0.54 (0.21, 1.40)</td>
<td>1.90 (0.46, 7.93)</td>
<td>0.50 (0.19, 1.31)</td>
<td>0.97 (0.38, 2.50)</td>
<td>0.45 (0.17, 1.20)</td>
<td>0.40 (0.15, 1.06)</td>
</tr>
<tr>
<td>Overweight (vs. BMI &lt; 85th percentile)</td>
<td>0.32 (0.13, 0.77)</td>
<td>0.22 (0.03, 2.13)</td>
<td>0.35 (0.14, 0.87)</td>
<td>0.87 (0.38, 2.53)</td>
<td>0.16 (0.06, 0.40)</td>
<td>0.37 (0.15, 0.92)</td>
</tr>
<tr>
<td>PA-MET medium (vs. low)</td>
<td>2.52 [1.03, 6.15]</td>
<td>0.38 (0.07, 2.28)</td>
<td>2.63 [1.04, 6.64]</td>
<td>1.55 (0.63, 3.82)</td>
<td>2.43 (0.95, 6.20)</td>
<td>2.18 (0.85, 5.66)</td>
</tr>
<tr>
<td>PA-MET high (vs. low)</td>
<td>2.76 [1.11, 6.82]</td>
<td>1.11 (0.25, 4.97)</td>
<td>2.70 [1.06, 6.87]</td>
<td>1.44 (0.62, 3.35)</td>
<td>1.16 (0.47, 2.88)</td>
<td>1.27 [0.51, 3.12]</td>
</tr>
</tbody>
</table>

\( n = 181 \), Separate models were fit for each outcome dietary tracking pattern. Tracking low was treated as the outcome reference group. *OR with 95% CI that did not cover 1.0, \( P < 0.05 \).
ically active adolescents were more likely to consume more energy and fiber and less likely to decrease energy intake. Older adolescents were more likely to decrease their percentage of energy from fat. Girls were more likely to increase snack food intake compared with boys.

In addition, our analysis indicates that the energy-adjusted tracking (correlations) became weaker, which is similar to what has been observed previously in young adults (28). However, the influence of energy adjustment on tracking of dietary intakes is small. We suggest more attention should be focused on the non-energy-adjusted measures, because related national dietary guidelines for a number of nutrients and food groups are provided as absolute amount of intakes. However, adjusting for energy intake might introduce some methodological and interpretation concerns, e.g., reducing the variation in the intakes of some nutrients and food groups (e.g., high-fat and energy-dense foods).

We also studied the association between the tracking/dynamics of diets and the tracking/dynamics of BMI. To our knowledge, this is the first such study among U.S. minority adolescents. We expected that tracking of high intakes of energy, fried food, and snack foods would be associated with tracking of high BMI. However, our findings do not support this hypothesis, likely due to possible changes in overweight adolescents’ eating behaviors. In addition, we found that decreased intakes of energy and snack foods were negatively associated with tracking of high BMI. Girls and older adolescents were more likely to track high BMI than their counterparts.

Some of our results seem to be inconsistent with those of previous studies. For example, the 6-y follow-up study we conducted in China showed that the group of children who tracked overweight had higher fat intake at baseline than the non-tracking group (29). Some studies have also shown that high intakes of energy and fried food were associated with overweight in children (30,31). The differences between these earlier studies and the present one are likely due to differences in study samples, dietary assessment, and study aims (e.g. to test the effect of baseline diet or changes in diet on BMI vs. study the association between the dynamics in diet and BMI, which were assessed at the same time). Our present analysis could not clarify the causality between the dietary intake and BMI dynamics. Body weight status (e.g. overweight) might have affected some adolescents’ food choices. Also, previous studies including ours conducted in China showed that the group of children who tracked high BMI than their counterparts.

Influence of energy adjustment on tracking of dietary intakes is small. We suggest more attention should be focused on the non-energy-adjusted measures, because related national dietary guidelines for a number of nutrients and food groups are provided as absolute amount of intakes. However, adjusting for energy intake might introduce some methodological and interpretation concerns, e.g., reducing the variation in the intakes of some nutrients and food groups (e.g., high-fat and energy-dense foods).

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Literature Cited


