

Parent-reported Eating and Leisure-time Activity Selection Patterns Related to Energy Balance in Preschool- and School-aged Children

Continuing Education Questionnaire available at www.sne.org/ Meets Learning Need Codes for RDs and DTRs 4000, 4010, 4060, and 4150.

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ABSTRACT

Objective: Compare parent-reported preschool- and school-aged children's eating and leisure-time activity patterns that are proposed to influence energy balance.

Design: Cross-sectional investigation of children, 2 to 12 years, attending a well visit.

Setting: Pediatric private practice/ambulatory pediatric clinic.

Participants: One hundred seventy-four children: 49% preschool-aged, 54% female, 28% Hispanic, and 34% overweight or at risk for overweight.

Variables Measured: Parent-reported eating/leisure-time behaviors. Height/weight from medical records.

Analysis: Analyses of covariance/chi-square tests; significance at $P \leq .05$.

Results: By parents' report, preschool-aged children consumed more servings/day of low-fat dairy (2.1 ± 1.6 vs 1.7 ± 1.5 ; $P < .01$), fewer servings/day of sweetened drinks (1.4 ± 1.9 vs 2.2 ± 2.6 ; $P < .01$) and watched fewer hours/day of weekend TV (2.3 ± 1.3 vs 2.7 ± 1.3 ; $P < .05$) than school-aged children. Fewer preschool-aged children consumed salty (14.0% vs 26.1%; $P < .05$) and sweet (16.3% vs. 29.5%; $P < .05$) snack food daily, and a greater percentage regularly consumed dinner with a parent (93.0% vs 80.7%; $P < .05$), as assessed by parent report.

Conclusions and Implications: Parent-reported children's eating/leisure-time patterns that may influence energy balance were less healthful in the school-aged children. However, most children did not meet recommendations, irrespective of age or weight. Interventions for meeting recommendations should start with families with preschool-aged children. Future research should focus on identifying factors that might be contributing to increased reporting of problematic food and leisure-time activity patterns in school-aged children.

Key Words: children, preschool, diet, leisure time, obesity (*J Nutr Educ Behav.* 2009;41:19-26.)

INTRODUCTION

The United States is in the midst of an obesity epidemic, affecting children as young as 2 years of age.¹ Overweight (body mass index [BMI] $\geq 95^{\text{th}}$ per-

centile) is now one of the most commonly identified nutrition problems among children in the United States.²

In school-aged children and adolescents, several problematic food selection patterns, which predomi-

nantly appear to increase overall energy intake, have been associated with weight status. One of the most consistent food selection patterns associated with weight is sweetened drink intake, with a greater intake of sweetened drinks related to overweight status in school-aged children and adolescents.³ Additionally, research indicates that greater fast-food consumption,^{4,5} more energy-dense snack food intake,⁶ less frequent breakfast consumption,^{7,8} fewer meals eaten as a family,^{9,10} and a lower intake of dairy servings^{11,12} are also related to increased weight status in school-aged children and adolescents.

As the prevalence of obesity has increased in younger children, it has become imperative to identify food selection patterns associated

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with weight status in preschool-aged children. Although there have been fewer studies examining dietary intake and weight status in this age group, those investigations examining the relationship between sweetened drink intake and weight status have yielded mixed outcomes,¹³⁻¹⁶ whereas breakfast skipping¹⁷ and consuming fewer daily servings of dairy food^{18,19} have been related to increased body weight or body fat.

Several leisure-time behaviors, such as physical activity and TV watching, have also been associated with energy balance problems (ie, weight gain in excess of growth in height) during early, middle, and late childhood. Being less physically active has been related to increased weight owing to decreased energy expenditure in both preschool- and school-aged children and adolescents.²⁰⁻²³ Watching TV has been proposed to influence weight status through increasing energy intake (ie, TV watching acting as a cue to prompt eating²⁴) and/or decreasing energy expenditure by competing with time for physical activity. More hours of TV watching have been associated with being overweight or overfat in early childhood,^{10,23} and middle-childhood and/or adolescence.^{22,25,26}

Thus, several eating and leisure-time activity selection patterns have been identified as being related to overweight during childhood. However, no studies have compared the occurrence of these eating and leisure-time patterns that are proposed to affect energy balance in both preschool-aged and school-aged children. As children transition from preschool-age to school-age, identifying eating and leisure-time patterns that are not meeting current recommendations and/or are related to weight status may provide insight into areas to target for interventions at appropriate ages. Therefore, the purpose of this cross-sectional investigation was to examine parent-reported eating and leisure-time patterns hypothesized to influence energy balance in children aged 2 to 5 years (preschool-aged) and 6 to 12 years (school-aged) who were either at a healthy weight (BMI \geq 5th percentile and $<$ 85th percentile) or at risk for overweight and overweight (BMI \geq 85th percentile).

METHODS

Participants

Participants were parents of 185 children, aged 2 to 12 years, with a child attending a well visit at a private practice or at an ambulatory pediatric clinic in a northeastern teaching hospital between August 2004 to August 2005. The state in which the study occurred has a provision whereby all children are insured and have access to health care, and the clinic at the hospital provides health care to state-insured children. While they waited, parents were invited to complete a questionnaire about their child's eating/leisure-time activity habits. Participants provided written consent. The protocol was approved by Rhode Island Hospital (Providence, RI).

Procedures

After checking into the clinic, all parents of children aged 2 to 12 years were approached by a research assistant about their interest in participating in the study. Those parents who agreed to participate provided informed consent, and prior to the well visit appointment, parents completed an eating and leisure-time activity questionnaire for the child who was attending the appointment that day. Parents who did not agree to participate often indicated that they did not feel that they had the time prior to the appointment to participate.

Measures

Demographics and anthropometrics. The child's birth date, gender, race, and ethnicity and parent's age, height, and weight were obtained by self-report (all questionnaires were completed by the child's mother). The child's height and weight were measured on the same day in which the eating and leisure-time activity questionnaire was completed and obtained from the child's medical record. Body mass index, which is weight in kilograms/height in meters squared, was calculated for parent and child. Children's zBMI was calculated by standardizing the BMI value in relation to the population mean and standard deviation for children's age and gender.²⁷ Children's BMI was

also compared to the Centers for Disease Control BMI percentile charts.²⁷ Those children who had BMI \geq 85th percentile for their age and gender were classified as at risk for overweight or overweight. In childhood, a BMI in the 85th percentile corresponds to an adiposity status of a BMI of 25 in adulthood (overweight), whereas a BMI at the 95th percentile corresponds to an adiposity status of a BMI of 30 in adulthood.²⁸ Those children \geq 5th percentile and $<$ 85th percentile were classified as at a healthful weight. Anthropometric indexes falling below the 5th percentile are classified as nutritional status indicators of inadequate growth.²⁷ Eleven children had a BMI that was $<$ 5th percentile BMI and thus were not included in the analyses, leaving a sample of 174 families.

Eating and leisure-time activity questionnaire. Parents responded to several questions regarding their child's eating and leisure-time activity habits. Questions were obtained from related research and compiled into one instrument for this investigation.^{5,26,29-37} Based on a typical day, parents reported the child's intake by number of servings (0 to 5 or more) of fruit (not including fruit juice); vegetables (not including potatoes or french fries); low-fat yogurt, low-fat milk (skim or 1%), or low-fat cottage cheese; regular soda (nondiet), Kool-aid, fruit punch, non-100% fruit juice, or sweetened ice tea; and 100% fruit juice.^{15,30,31} Parents reported how often in a typical week, including weekdays and weekend days, their child ate salty snack food (eg, tortilla chips, potato chips) and sweet snack food (eg, candy, cookies) (response choices: more than once a day, daily, 5-6 days/week, 3-4 days/week, 1-2 days/week, $<$ 1 day/week, never), and fast food and breakfast (response choices: never, 1-2, 3-4, 5 or more).^{15,32-34} Parents were also asked how often a parent ate dinner with the child (response choices: always, frequently, sometimes, almost never, never).³⁵ Weekly behaviors were categorized and compared as follows: salty and sweet snack food, \geq once/day versus $<$ once/day; breakfast, \geq 5 days/week, 1 to 4 days/week, or never; fast food, never versus \geq once/week; and parent and child eating dinner together, always/frequently versus all other responses.^{38,39}

For activity habits, parents identified how many times in a typical week, including weekday and weekend days, their child played hard or exercised enough to sweat and breathe hard (response choices: more than once a day, daily, 5-6 days/week, 3-4 days/week, 1-2 days/week, < 1 day/week, never), and how active their child was compared to other children their age (response choices: much less active, a little less active, just as active, a little more active).^{29,36} For analytic purposes, activity that produced sweating/breathing hard was coded as occurring ≥ 5 days/week versus < 5 days/week (meeting current recommendations or not), and activity levels in comparison to other children was coded as much less/a little less active versus just as/a little more active.

For sedentary habits, parents reported on a typical weekday and weekend day how many hours their child watched TV, video, DVD, or used the computer for other than school use,³⁶ how often their child dined when using them (response choices: never, almost never, sometimes, frequently, always; coded for analyses as never, almost never/sometimes, or frequently/always), and if

their child had a TV in his/her bedroom.²⁶ Activity preference was measured by the parent responding to the truthfulness of the statement, "My child would rather watch TV or play in the house rather than play outside," with possible responses of 1 (completely true) to 4 (completely false).³⁷

Statistical Analyses

Two-factor analyses of variance (ANOVA), with the between-subject factors of age (preschool versus school-age) and weight status (BMI < 85th percentile vs $\geq 85^{\text{th}}$ percentile BMI), and chi-square tests investigated differences in demographic characteristics (SPSS, version 15.0, SPSS Inc., Chicago, IL, 2006). Significantly different demographic variables were covariates in subsequent analyses. For questions that produced ratio data (eg, servings per day consumed), 2-factor analyses of covariance (ANCOVA), with age and weight status as the between-subject factors, were conducted. For questions that produced nominal/ordinal data (eg, ≥ 5 times per week, < 5 times per week), chi-square tests were conducted. Statistical significance was set at $P = .05$.

RESULTS

Participant characteristics are shown in Table 1. Of the 174 children, 49% were preschool-aged, 54% were female, 28% were Hispanic, 18% African American, and 34% had a BMI $\geq 85^{\text{th}}$ percentile. The percentage of children who had a BMI $\geq 85^{\text{th}}$ percentile was significantly greater for school-aged as compared to preschool-aged children (46.6% vs 22.1 %; $P = .001$), as was the percentage of children who had a BMI $\geq 95^{\text{th}}$ percentile (28.4% vs 8.1%, $P < .001$). School-aged children also had significantly older mothers than preschool-aged children (37.4 ± 6.3 vs 32.1 ± 6.2 ; $P < .001$), and mothers of children with a BMI $\geq 85^{\text{th}}$ percentile had a significantly greater BMI than mothers of children with a BMI < 85th percentile (28.3 ± 6.3 vs 26.3 ± 5.2 ; $P = .05$). Maternal age and BMI were covariates in subsequent analyses. Group differences in ethnicity or race were not significant.

Eating Selection Patterns

Parent recall of child eating patterns is shown in Table 2. Parent-reported intake of fruit, vegetable, and fruit juice did not differ by age or weight status.

Table 1. Participant Characteristics

	Preschool-aged (2 to 5.9 y)		School-aged (6 to 12.9 y)	
	BMI < 85 th percentile (n = 67)	BMI $\geq 85^{\text{th}}$ percentile (n = 19)	BMI < 85 th percentile (n = 47)	BMI $\geq 85^{\text{th}}$ percentile (n = 41)
Age (y) (mean \pm SD)*	4.0 \pm 1.1	4.4 \pm 1.0	9.1 \pm 2.2	8.8 \pm 2.0
M/F	29/38	9/10	24/23	18/23
Hispanic (%)	23.9	15.8	27.7	39.0
Race (%)				
American Indian	9.1	0.0	4.3	9.8
Asian	6.1	10.5	8.5	2.4
African American	21.2	26.3	10.6	17.1
Pacific Islander	0.0	0.0	2.1	0.0
White	63.6	63.2	74.5	70.7
BMI (kg/m ²) (mean \pm SD)* [†]	15.7 \pm 1.0	19.8 \pm 4.7	16.8 \pm 1.9	23.1 \pm 5.6
zBMI (mean \pm SD) [†]	0.05 \pm 0.75	1.97 \pm 1.26	0.05 \pm 0.73	1.79 \pm 0.46
BMI percentile (mean \pm SD) [†]	52.0 \pm 24.6	92.4 \pm 3.5	52.0 \pm 24.2	94.2 \pm 3.5
Mother's age (y) (mean \pm SD)*	31.8 \pm 6.3	32.9 \pm 5.8	37.7 \pm 5.5	36.9 \pm 7.2
Mother's BMI (kg/m ²) (mean \pm SD) [†]	26.4 \pm 4.9	26.6 \pm 6.1	26.1 \pm 5.7	29.1 \pm 6.3

BMI indicates body mass index; M, males; F, females; zBMI, standardized body mass index; SD, standard deviation.

*significant ($P < .05$) difference by age from 2-way analysis of variance (ANOVA).

[†]significant ($P \leq .05$) difference by weight status from 2-way ANOVA.

Table 2. Parent-reported Eating Patterns of Healthful-weight and At Risk for Overweight/Overweight Preschool- and School-aged Children

	Preschool-aged (2-5.9 y)		School-aged (6-12.9 y)		Recommendations ^a
	BMI < 85 th percentile (n = 67)	BMI ≥ 85 th percentile (n = 19)	BMI < 85 th percentile (n = 47)	BMI ≥ 85 th percentile (n = 41)	
Fruit/day (servings) (mean ± SD)	2.0 ± 1.1	2.1 ± 1.0	1.8 ± 1.0	1.8 ± 1.4	1 to 1.5 cups/day
Vegetable/day (servings) (mean ± SD)	1.6 ± 0.9	1.4 ± 0.8	1.4 ± 0.8	1.4 ± 0.8	1 to 2.5 cups/day
Fruit juice/day (servings) (mean ± SD)	2.2 ± 1.3	1.8 ± 1.5	1.9 ± 1.1	1.7 ± 1.4	N/A
Low-fat dairy/day (servings) (mean ± SD)*	2.0 ± 1.7	2.3 ± 1.5	1.9 ± 1.6	1.5 ± 1.3	2 to 3 cups/day
Sweetened drinks/day (servings) (mean ± SD)*	1.4 ± 2.0	1.4 ± 1.8	2.0 ± 2.4	2.5 ± 2.8	Limit
Salty snack foods consumed daily (%)*	14.9	10.5	29.8	22.0	Limit
Sweet snack foods consumed daily (%)*	14.9	21.1	27.7	31.7	Limit
Breakfast consumed ≥ 5 days/week (%)	89.6	84.2	85.1	73.2	N/A
Parent/child always/frequently eat dinner (%)*	92.5	94.7	87.2	73.2	N/A
Fast food eaten ≥ once/week (%) [†]	70.1	73.7	68.1	87.8	Limit

BMI indicates body mass index; N/A, not applicable.
^aRecommendations are from MyPyramid.com⁵⁰ and the Dietary Guidelines for Americans.³⁹
*significant ($P < .05$) difference by age from 2-way analysis of covariance (ANCOVA) or chi-square test.
[†]significant ($P < .05$) difference by weight status from 2-way ANCOVA or chi-square test.

Parent-reported fruit intake met recommendations (1.9 ± 1.1 servings/day), parent-reported vegetable intake was below recommendations (1.5 ± 0.9 servings/day), and parent-reported fruit juice intake was fairly high, with 2.0 ± 1.3 servings/day consumed. According to parent recall, preschool-aged children consumed significantly more servings of low-fat dairy/day than school-aged children (2.1 ± 1.6 vs 1.7 ± 1.5 ; $P < .01$). As assessed by parent's self-report, preschool-aged children also drank significantly fewer servings/day of sweetened drinks (eg, soda, fruit punch) than school-aged children (1.4 ± 1.9 vs 2.2 ± 2.6 ; $P < .01$).

Parent-reported frequency of salty and sweet snack food intake did not differ according to weight status. However, compared to the percentage of parents with school-aged children, parents of preschoolers reported that their children consumed significantly fewer salty (14.0% vs 26.1%; $P < .05$) and sweet (16.3% vs 29.5%; $P < .05$) snack food items on a daily basis.

Frequency of parent-reported breakfast intake did not differ by age or weight status, with 83.9% of the parents reporting that their children ate breakfast at least 5 days/week. As compared to parents of school-aged children, a greater percentage of parents of preschool-aged children reported that their children regularly consumed dinner with a parent (93.0% vs 80.7%; $P < .05$). Regardless of child age, a significantly greater percentage of parents with children with a BMI ≥ 85th percentile stated that their children consumed fast food at least once/week (83.3% vs 69.3%; $P < .05$).

Leisure-time Activity Selection Patterns

Parent report of the leisure-time activity patterns of the participants are shown in Table 3. Only 51.1% of children played and exercised enough to sweat and breathe hard at least 5 days/week, with no differences by child age or weight status. When par-

ents described how active their child was in comparison to other children of the same age, there was a significant ($P < .001$) difference by age and weight status, with a smaller percentage of the school-aged children just as or a little more active than the preschool-aged children (77.3% vs 98.8%), and a smaller percentage of the children with a BMI ≥ 85th percentile just as or a little more active than children < 85th percentile BMI (73.3% vs 95.6%).

For TV watching, parents reported 2.3 ± 1.3 hours of TV watched on a typical weekday, with no difference by age or weight status. For a typical weekend day, parents reported that the preschool-aged children watched significantly fewer hours than the school-aged children (2.3 ± 1.3 vs 2.7 ± 1.3 ; $P < .05$). There was no difference by age and weight status in the percentage of parents who reported that their children frequently or always ate while watching TV/DVD/video or playing a computer game (18.4%) or for percentage of parents

Table 3. Parent-reported Leisure-time Patterns of Healthful-weight and At Risk for Overweight/Overweight Preschool- and School-aged Children

	Preschool-aged (2-5.9 y)		School-aged (6-12.9 y)		Recommendations ^a
	BMI < 85 th percentile (n = 67)	BMI ≥ 85 th percentile (n = 19)	BMI < 85 th percentile (n = 47)	BMI ≥ 85 th percentile (n = 41)	
Play/exercise to sweat ≥ 5 d/wk (%)	52.2	52.6	55.3	43.9	60 min/d
Child just as/a little more active as compared to peers (%)* [†]	100.0	94.7	89.4	63.4	N/A
Hours of TV on weekday (mean ± SD)	2.2 ± 1.1	2.4 ± 1.4	2.1 ± 1.1	2.6 ± 1.7	< 2 h/d
Hours of TV on weekend day (mean ± SD)*	2.2 ± 1.2	2.7 ± 1.8	2.5 ± 1.1	3.0 ± 1.5	< 2 h/d
Frequently/always eats with TV (%)	22.4	10.5	19.1	14.6	N/A
TV in bedroom (%)	40.3	42.1	46.8	48.8	N/A
Child prefers to watch TV than go outside (mean ± SD) ^{b,†}	3.4 ± 0.9	3.1 ± 1.1	3.2 ± 1.0	2.8 ± 1.3	N/A

BMI indicates body mass index; N/A, not applicable.
^aRecommendations are from MyPyramid.com,⁵⁰ Dietary Guidelines for Americans,³⁹ and the American Academy of Pediatrics.⁵³
^bscaling for question was 1 to 4, with 1 = completely true and 4 = completely false.
*significant ($P < .05$) difference by age for chi-square test.
[†]significant ($P < .05$) difference by weight status for 2-way analysis of covariance (ANCOVA) or chi-square test.

who reported that their child had a TV in his/her bedroom (49.4%). Finally, there was a difference by weight status for how true parents rated the statement, "My child would rather watch TV or play in the house rather than play outside," with children with a BMI < 85th percentile being rated higher than those children with a BMI ≥ 85th percentile (3.3 ± 1.0 vs. 2.9 ± 1.2 ; $P = .05$) (1 represented completely true and 4 represented completely false), and 57.9% of parents of children at a healthful weight and only 41.7% of parents of children at risk for overweight and overweight rated their child a 4 on this question.

DISCUSSION

This cross-sectional investigation examined parent-reported eating/leisure-time activity selection patterns that may influence energy balance occurring in children aged 2 to 5 years (preschool-aged) and 6 to 12 years (school-aged) who were either at a healthful weight (BMI ≥ 5th percentile to < 85th percentile) or at risk for overweight or overweight (BMI ≥ 85th percentile). Interestingly, this investigation found that parent-

reported preschool-aged children's eating and leisure-time activity patterns more closely met current recommendations than parent-reported school-aged children's eating and leisure-time activity patterns, indicating that parents of older children perceive that their diets and leisure-time activities are less healthful. Additionally, the results of this study show that most parents report that their child's eating and leisure-time patterns that may impact energy balance did not meet recommendations, irrespective of age and weight status.

In this investigation the authors found that parents of preschool-aged children report that their children consumed more daily servings of low-fat dairy and fewer daily servings of sweetened drinks than parents of school-aged children. Previous research examining intake of soft drinks in children of different age groups has found that a greater percentage of school-aged children consume soft drinks on a given day than preschoolers, and of those children who consume greater amounts of soft drinks on a given day, milk intake is reduced, suggesting that soft drinks displace milk.⁴⁰ Although the current

study assessed a broader range of sweetened drinks and low-fat dairy intake, the findings from this study show that parents of older children report greater sweetened drink intake with lower low-fat dairy intake, suggesting that increased sweetened drink intake might come at the expense of consumption of a more nutrient-dense low-fat dairy food.

For salty and sweet snacks, a smaller percentage of parents of preschool-aged children reported that their children consumed these food items daily as compared to parents of school-aged children. School-aged children and adolescents have been found to consume diets high in added sugars,⁴¹ with data from the National Health and Nutrition Examination Survey indicating that school-aged children and adolescents consume about 23% of their daily energy intake from sweeteners and desserts.⁴²

Parents of preschool-aged children also reported that dinner was consumed more frequently with a parent as compared to parents of school-aged children. As it has been found that children who eat meals together with other family members, particularly parents, consume more healthful

food and have a more nutrient-dense diet,^{43,44} the poorer quality of diet reportedly consumed by the school-aged children may be a partial consequence of fewer dinners consumed with parents.

Additionally, this study found that a greater percentage of parents with younger children rated their child as just as or a little more active than their peers as compared to the percentage of parents with older children. This perception that younger children are just as or more active than their peers concurs with research indicating that physical activity tends to decrease as children get older.^{45,46} Additionally, in this investigation, parents reported that the older children watched significantly more hours of TV on weekend days than the younger children.

Taken together, these findings suggest that parent reporting of behaviors commonly believed to promote childhood obesity increases with older children. This change in parent-reported patterns of behavior that are potentially related to energy balance with older children may be a consequence of actual change in children's eating and leisure-time behaviors or to a greater parental awareness and consequential reporting of these behaviors.

This investigation found that parents of preschool-aged children reported that their children engaged in more healthful eating and leisure-time activity patterns than parents of school-aged children, but that problematic eating and leisure-time activity patterns may already be occurring in young children. For preschool-aged children, parent-reported vegetable intake was below recommendations, and parent-reported fruit juice and sweetened drink intake were very high, which is consistent with previous research.^{47,48} Additionally, 20% of the parents stated that their children were consuming some type of snack food daily, and although regular breakfast consumption was fairly prevalent in this sample, concurring with previous findings,^{8,17} almost 1 out of 6 parents reported that their child in this study skipped breakfast.

Previous research has also reported that adolescents commonly eat fast food (75% report fast-food consumption in the previous week),³⁴ but that

preschool-aged children do not (22% report fast food consumption in the previous week).⁴⁹ Contrary to this finding, this study found that parents reported that both preschool- and school-aged children commonly consumed fast food, with the majority of children (73.5%) consuming fast food at least once per week. This outcome may be from the greater ethnic/racial diversity of this sample than of previous samples or to a heightened awareness to problems associated with fast food.

For physical activity, parents reported that only about 51% of the children engaged in activity that was vigorous enough to cause sweating ≥ 5 days/week, indicating that almost half of the children were not meeting the current recommendation for participating in moderate intensity physical activity most days of the week.⁵⁰ Other investigators have also reported a significant percentage of school-aged children not meeting physical activity recommendations.^{51,52}

Parents' report of time spent watching TV on both weekdays and weekend days for all children was higher than the recommendations of < 2 hours/day.⁵³ Studies examining preschool- and school-aged children separately have also reported amount of TV watching above recommendations.^{26,54,55} Finally, almost half of the parents reported that their child had a TV in the bedroom, which is similar to previous reports.^{26,52,54}

These findings show that only a few eating and leisure-time activity patterns potentially related to energy balance in preschool- and school-aged children meet current recommendations.^{39,50} Only parent-reported daily fruit and low-fat dairy intake in preschool-aged children met recommendations. Thus, interventions aimed at helping children meet current recommendations for diet and leisure-time activities, which are designed to promote appropriate growth in children, may need to begin with families with young children.

This study did find a few behaviors that were specifically related to weight status in children. The percentage of parents with children with a BMI $\geq 85^{\text{th}}$ percentile regularly consuming fast food was significantly higher (4 out of every 5 parents of children at risk for overweight and overweight

reported that their child consumed fast food at least once per week) than the percentage of parents with children with a BMI $< 85^{\text{th}}$ percentile, concurring with other research.^{4,5} As fast-food intake is associated with greater energy and fat intake and poorer nutrient quality⁵⁶ and was more frequently reported with increased weight status in this study, this may be an eating behavior to target to improve weight status in all ages. For leisure-time behaviors, a smaller percentage of parents with children who had a BMI $\geq 85^{\text{th}}$ percentile perceived their children as just as or a little more active than their peers, and parents of the heavier children were more likely to agree with the statement that their child would prefer to watch TV or play in the house than play outside as compared to parents with children in a healthful weight range. This finding suggests that these parents perceive their children as being more sedentary and preferring sedentary behaviors as compared to other children, which may be an accurate perception.

A limitation of this study is the observational, cross-sectional design. As with any observational study, additional unmeasured variables might explain relationships found in this study (eg, household income, education level of the mother), thus causality cannot be inferred. For example, families studied were attending well visits, demonstrating access to health care. Thus, these findings might not be reproducible in families without access to health care. Additionally, all measures were parent-reported and retrospective, not based on direct observations of the children's eating and leisure-time behaviors, and cover a recall time period of a day to a week; thus, measures may be biased in terms of recall, and unrepresentative for longer time periods. Moreover, since the measures were based on parents' recollections, parents of younger children may have a better idea of what their child is consuming and doing for leisure-time activities than parents of older children. As a parent's eating and leisure-time activity patterns may influence their child's eating and leisure-time activity patterns, and as parents of younger children may more directly control their child's eating and leisure-time

activity patterns, future studies that collect information on parents' diet, physical activity, and TV watching habits may provide important additional information in aiding the understanding of children's eating and leisure-time habits. Finally, to help identify factors that might be contributing to this potential change in children's behaviors over time, prospective studies could help identify problematic eating and leisure-time activity patterns at the specific age they begin to occur. For example, changes in the food environment and feeding practices that impact eating behaviors or change in the structure of the day that might influence leisure-time behaviors may be impacting on children's behaviors as they transition from preschool-age to school-age.

IMPLICATIONS FOR RESEARCH AND PRACTICE

In conclusion, this study found that preschool-aged children engaged in more healthful parent-reported eating and leisure-time activity patterns that are believed to impact energy balance than school-aged children. As assessed via parent report, preschool-aged children consumed more low-fat dairy and fewer sweetened drinks, ate salty and sweet snacks less frequently, more often consumed dinner with a parent, and watched fewer hours of TV on weekend days than school-aged children. Research examining these behaviors longitudinally as children transition from preschool-age to school-age is required to determine if school-aged children need additional support in meeting guidelines.

Although preschool-aged children engaged in more healthful behaviors according to parent recall, the preschool-aged children did only meet 2 dietary recommendations, fruit and low-fat dairy intake. All other parent-reported eating and leisure-time activity patterns did not meet current recommendations. Surprisingly, other than fast-food consumption, this study found few parent-reported eating and leisure-time behaviors related to weight status, which may be a consequence of the overall poor diet quality and relative inactivity reported in

this diverse sample. Thus, interventions designed to help children meet dietary and leisure-time activity recommendations should begin by assisting parents with preschool-aged children develop skills to provide the structure and the environment necessary for their young children to develop a healthful lifestyle.

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