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Screening Measure for Assessing Dietary Fat Intake among Adolescents[1]

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Background. Clinical preventive guidelines recommend that health care providers counsel adolescents on nutrition. Brief, accurate, and reproducible dietary assessments are needed. The purpose of the current pair of studies was to develop a dietary fat screening measure for use with adolescents.

Methods. Two measures were developed—a 21-item and a 4-category measure. The measures differed in the level at which fat consumption was assessed (food item vs food group). Study 1 ($N = 231$, age $M = 15$ years, 57% female, 41% Euro-American) evaluated reliability. Study 2 ($N = 59$, age $M = 14$ years, 63% female, 37% Euro-American) evaluated construct validity and correct classification rates.

Results. Internal consistencies ($\alpha > 0.70$) and test–retest reliabilities (ICC > 0.60) were adequate for both measures. Neither measure correlated with total fat assessed by a 3-day food record ($P > 0.05$). The 21-item measure correlated significantly with percentage of calories from fat ($r = 0.36$, $P < .01$). Correct classification rate (71%) and sensitivity (81%) of the 21-item measure were good. Specificity (47%) was lower, indicating some subjects with a low-fat diet were misclassified by the screening measure.

Conclusions. The 21-item measure is quick to complete and score, is inexpensive to reproduce, and has demonstrated reliability and validity. The measure could be clinically useful, but further improvements should be attempted to improve specificity.

Key Words: dietary fat; nutrition; assessment; adolescents; primary care.

INTRODUCTION

The U.S. Clinical Preventive Services' guidelines recommend that Americans reduce fat intake to decrease the risk of cardiovascular disease, cancer, stroke, diabetes, and obesity [*1*]. Dietary guidelines from the U.S. Department of Agriculture [*2*] recommend consumption of no more than 30% of calories from total fat. Healthy People 2010 objective 19-9 is to increase to 75% the proportion of the U.S. population meeting the guideline for fat consumption [*3*]. Data from NHANES III (1989–1991) indicate that children and adolescents average 33 to 35% of their calories from fat [*4,5*]. Current estimates are that 30% of boys and 36% of girls ages 12 to 19 years meet the USDA guideline [*3*].

Physicians and other health care professionals are in an opportune position to assess and counsel youth about their diets. Most adolescents (70%) visit a physician at least once a year [*6*], and adolescents report relying on parents and physicians for health information [*7,8*]. Healthy People 2010 objective 1-3 is to increase the proportion of individuals appropriately counseled about health behaviors [*3*]. Dietary counseling with children and adolescents also has been recommended by the American Academy of Family Physicians, the American Academy of Pediatrics, and the American Medical Association [*9*]. Currently, about half of adolescent patients report that a physician has at some point discussed nutrition with them [*10*].

To guide dietary counseling, a screening measure that is accurate and reproducible is needed. For the clinical setting, the measure must be quick to complete and score. Ideally, the measure could be handed to patients by office staff and completed prior to the provider contact. The purpose is not to comprehensively assess an individual's dietary habits, but rather to identify individuals who are not meeting the guidelines and could

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benefit from counseling. In research and clinical practice, self-report has typically been the method of choice. More than a dozen dietary fat screening measures have been developed for adults [*11*]. The most frequently used is that of Kristal, which measures fat practices [*12*]. Young people, however, are less likely to be aware of preparation and purchasing behaviors assessed by this measure (e.g., low-fat cheese). Dennison modified Kristal's measure to assess diets of young children, but designed the measure to be completed by parents [*13*]. Extensive (>75 items) food frequency questionnaires (FFQ) have been evaluated with youth, but these are designed to estimate dietary consumption at the group, not the individual, level [*14,15*]. No brief measure of dietary fat intake has been developed and validated with youth for use in clinical settings.

The purpose of this set of studies was to identify a reliable and valid dietary fat screening measure for use with adolescents in primary care settings. Two measures of dietary fat intake were developed. Study 1 examined reliability of the measures. Study 2 evaluated concurrent validity and correct classification rates.

STUDY 1

Study 1 examined two types of reliability—internal consistency and test–retest. Internal consistency quantifies the degree to which items in a scale are related to one another. In this case, individual high-fat food items were evaluated to see if they clustered to represent the larger construct of a high-fat diet. Test–retest reliability indicates temporal stability, or how constant scores remain from one testing occasion to another [*16*]. Dietary behaviors are, however, expected to demonstrate some natural variation, making analysis one more of stability. A 1- to 2-week test–retest period was used, but it was recognized that the behaviors may have changed even during such a short time period.

Methods

Sample. Study 1 was conducted in two middle and two high schools in San Diego, California, and Pittsburgh, Pennsylvania. University institutional review boards and school districts approved the study protocol. Students had to provide assent, obtain passive parental consent (one of the schools required written parental consent), and speak English. Students were recruited from required classes. Overall participation in the study was 79%. Participation was much lower at the school requiring written (55%) compared with passive (90%) parental consent.

Measures. Brief, self-administered measures were developed to assess adolescents' dietary fat intake. The measures were based on the Block Simplified Fat Screener, developed for adults [*17*]. Modifications included the addition of high-fat ethnic foods [e.g., egg roll, lumpia (a traditional Filipino dish similar to a Chinese egg roll), chorizo (Mexican sausage)] and foods commonly eaten by youth (e.g., pizza with meat toppings, chicken nuggets, Tater Tots). A more immediate recall period was used ("past 7 days" instead of "past year or so"), because of concern that young people have difficulty recalling events in the distant past [*18*]. Serving sizes were not assessed. Subjects were asked to recall frequency of high-fat food intake from "did not eat it this week" (scored 0) to "twice each day" (scored 5). Scores reflected summed raw scale points. This scoring system was chosen for its simplicity and because it maximized reliability and validity of the measures. The measures were piloted with a small sample of adolescents ($N = 6$), diverse in age, reading level, and ethnicity.

The *21-item fat measure* assessed frequency of consumption of 21 high-fat foods. Possible total scores on the 21-item fat measure ranged from 0 to 105. The measure took 5 to 10 min to complete and 2 to 3 min to score.

The *4-category fat measure* assessed the same high-fat food items, but instead of rating the frequency of each item individually, frequency of consumption was assessed for the items collectively in four separate food categories: (a) high-fat meats, (b) high-fat dairy foods, (c) high-fat snacks, and (d) added fat. Examples of high-fat food items were provided for each food category (e.g., hot dogs in the meat category, ice cream in the dairy category, butter in the added fat category). Possible total scores on the 4-category fat measure ranged from 0 to 20. The measure took 5 to 7 min to complete and 1 to 2 min to score.

The *demographic questionnaire* assessed subjects' age, sex, and ethnicity.

Procedure. Data were collected during Winter 1997. Subjects completed the measures twice at an approximate interval of 2 weeks. Students completed the surveys individually in a classroom at school. Research staff administered the surveys and were available to answer questions, although questions were infrequent.

Analyses. Using Time 1 and Time 2 data, internal consistency was calculated as coefficient α [*19*]. Test–retest reliability was calculated as one-way model intraclass correlation coefficients (ICC), which indicated consistency or agreement of values within cases. Analyses were conducted for the full sample and for boys and girls within younger (grades 7–8) and older (grades 9–12) age groups separately.

Results

Descriptive statistics. The study sample consisted of 278 subjects, 231 of whom had complete data at both time points (28 subjects were absent from school at Time 2; 19 skipped one or more items on the fat measures). The sample had a mean age of 14.6 years ($SD = 1.5$); 57% were female. Ethnic distribution was Euro-American (41%), African American (26%), Asian/Pacific Islander (16%), Hispanic (4%), and other (13%). Mean scores were 25 ($SD = 15$) for the 21-item and 11 ($SD = 4$) for the 4-category fat screening measures (see Table 1). Analysis of variance tests showed no significant differences in scores by grade, sex, or ethnicity (all $P > 0.05$).

Internal consistency. Internal consistency coefficients were strong for both measures at both time points. Internal consistency was stronger for the 21-item fat measure (Time 1 $\alpha = 0.88$; Time 2 $\alpha = 0.87$), which had more items than the 4-category fat measure (Time 1 $\alpha = 0.74$; Time 2 $\alpha = 0.76$).

Test–retest reliabilities. Intraclass correlation coefficients for the four sex and age subgroups and the full sample are presented in Table 1. Boys tended to have lower reliabilities than girls. Older youth gave more reliable reports on the 4-category fat measure than younger youth. For the full sample, intraclass correlations for the two fat measures were similar.

STUDY 2

Study 2 examined validity of the measures expressed as a correlation coefficient for the screening measures with a comparison measure, a 3-day food record. The same individuals completed the measures at approximately the same time. The screening measure with stronger validity was further evaluated for identifying individuals not meeting dietary fat guidelines (i.e., correct classification).

The greatest obstacle to validating methods of dietary assessment has been the lack of an adequate criterion. For dietary assessment, the food record method is regarded as the standard against which other assessment methods are compared [*20,21*]. Foods are recorded as they are consumed or closely thereafter, allowing foods to be described more fully and lessening the problem of omission. Measurement of amounts of food consumed at each occasion also should provide more accurate portion sizes than if recalled later using food models. Nevertheless, the food record is dependent on the quality and completeness of the respondent's self-report. An additional concern with the food record method is potential reactivity to the assessment process. Subjects may change their eating behavior as a result of having to record their food intake (e.g., eating less to reduce recording, eating a more homogeneous diet to simplify recording, changing foods consumed to avoid judgment) or may become more aware of their eating habits. To reduce the potential for reactivity, subjects were encouraged not to change their eating habits and were asked only to record the food type and amount eaten (i.e., not fat or calories). The recording period was kept brief (i.e., 3 days).

Methods

Sample. Study 2 was conducted in San Diego in the same middle and high schools involved in Study 1. Half of the sample for Study 2 had participated in Study 1. Students were recruited from required courses. Of 192 eligible students, 82 or 43% returned required assent and parental consent forms to participate. Not all students enrolled in the study, however, due to time conflicts and limited study resources. The study sample consisted of 62 subjects (participation rate = 32%). Data were not available to directly examine differences between participating and nonparticipating students. Instead, Study 2 subjects were compared with San Diego subjects in Study 1 on all measures. For age, ethnicity, and the fat self-report measures, the two samples did not differ significantly. Study 2 had a larger proportion of girls than Study 1 (65% versus 45%, $\chi^2(1,174) = 6.31$, $P = 0.012$).

Measures Content, administration, and scoring of the fat screening measures and demographic form were identical to those described in Study 1.

TABLE 1

Mean Scores[a] and Test–Retest Reliability by Grade and Sex and for the Full Sample

			21-Item fat measure		4-Category measure	
Grade	Sex	N	*M* (SD)	ICC	*M* (SD)	ICC
7–8	Boys	40	26 (11)	0.62	10 (4)	0.50
	Girls	26	22 (12)	0.65	10 (3)	0.54
9–12	Boys	57	28 (17)	0.55	11 (4)	0.71
	Girls	104	24 (15)	0.68	11 (4)	0.65
Full sample		231	25 (15)	0.64	11 (4)	0.65

Note. ICC, intraclass correlation.
[a] All grade and sex mean comparisons are nonsignificant ($P > 0.05$)

The *3-day food record* assessed the foods and beverages and the amounts of each consumed for 2 weekdays and 1 weekend day. Consecutive days were assessed. Subjects were instructed to record in sufficient detail to adequately describe the foods and amounts consumed, including names of foods (brand names, if possible), preparation methods, recipes for food mixtures, and serving sizes. To estimate serving sizes, subjects were instructed in how to read food labels, measure food, and estimate portion sizes using food models. Subjects were provided with two-dimensional food model pictures developed by the University of Texas–Houston School of Public Health [*22*]. Subjects also were instructed to record the time, place (e.g., home, school, fast food restaurant), and type of meal (i.e., breakfast, lunch, snack, dinner) at which food was eaten. Subjects were encouraged to carry their food records with them and to record food at the time of the eating occasion. The form used for the current study was adapted from the record used in the National Cancer Institute's Women's Health Initiative Study.

A *dietary log sheet* was created to enhance the accuracy of food recording. Research staff called subjects to review their recording for the day, clarify entries, and probe for forgotten foods or ingredients. A registered dietitian trained research staff in systematic collection of dietary data.

Procedure. Data were collected during Spring 1998. An initial meeting was held to train subjects in procedures for dietary monitoring. A lunch or after-school snack was provided as an incentive and as a training tool for the food records. Subjects were taught how to use the two-dimensional food models to estimate serving sizes (e.g., measuring a bagel with a two-dimensional circle diagram). During the 3-day assessment period, research staff called subjects each evening to review the day's food record. A final meeting was held 9 days from the initial training (6 days from the completion of the final food record) to collect the food records and administer the fat screening measures.

Analysis. Dietary data from the food records were analyzed for total fat grams and percentage of calories from total fat using the Nutrition Data System, version 2.91 (NDS; [*23*]). NDS prompts for detailed descriptions of food intake at the level required for most dietary research. The dietary data were transferred to SPSS version 8.0 (SPSS Inc, Chicago, IL) for analysis with the fat screening measures [*24*].

Validity was evaluated in two steps. First, the fat screening measures were correlated with 3-day food record averages for grams of total fat and percentage of calories from total fat. Scatterplots were examined to assess for outliers. Second, the measure with the stronger validity coefficient was evaluated for its utility to classify subjects as meeting or not meeting clinical health guidelines for dietary fat intake.

A range of cutoff points was tested for scoring the dietary fat measures. Optimal cutoff points were determined by examining classification rates and relative operating characteristics (ROC) of the measures [*25*]. The ROC was derived from a standard two-by-two table with the actual condition alternatives (true case, noncase) as columns and two possible study classifications (case, noncase) as rows. For the current analyses, a *true case* was defined as an individual averaging more than 30% of calories from total fat as assessed by the 3-day food record. A true *noncase* was defined as an individual averaging no more than 30% of calories from total fat as assessed by the 3-day food record. The ROC is based on two indices: (a) the true-positive ratio (TPR), also considered an index of sensitivity; this is the probability that the case definition will identify a true case; (b) the false-positive ratio (FPR) indicates the proportion of *false alarms* or false positives. This is the probability that the case definition will wrongfully classify an actual noncase as a case. ROC analyses involved graphing the TPR against the FPR and seeing how these two indices covaried as the cut-point was changed. The optimal cutoff score was defined as that which optimized the TPR/FPR ratio and correct classification rate.

Correct classification rate, sensitivity, specificity, and positive predictive value were calculated using the determined cutoff score. Predictive value is dependent upon the prevalence of the studied condition in the population and is thus valid only for the sample in this study. Correct classification, sensitivity, and specificity are not influenced by prevalence and thus can be generalized to other populations.

Results

Descriptive statistics. Three subjects recorded total caloric intakes less than 500 kcal a day and were dropped from analyses. The final sample ($N = 59$) had a mean age of 13.9 years ($SD = 1.7$) and was 63% female. Ethnic distribution was Euro-American (37%), Asian/Pacific Islander (25%), Hispanic (12%), African American (3%), and other (13%). Mean scores on the 21-item and 4-category fat measures were 24 ($SD = 18$) and 10 ($SD = 4$), respectively. On the 3-day food records, subjects averaged 1,919 calories ($SD = 524$), 70 g of total fat ($SD = 24$), and 32% calories from total fat ($SD = 6$). Intraclass correlations averaging across the 3 days of food records were 0.47 for total fat grams and 0.31 for percentage of calories from fat.

Validity correlations. Correlations for the dietary fat measures with average total fat grams per day on the food record were not statistically significant ($P > 0.05$). The 4-category fat measure also was unrelated to percentage of calories from fat ($r = 0.12$,

TABLE 2

TPR and FPR Values for Calculating the Optimal Fat Cut-Point Based on the ROC

Fat cut-point	True-positive ratio (TPR)	False-positive ratio (FPR)
3	0	0
8	0.98	0.88
16	0.80	0.53
18	0.71	0.41
20	0.57	0.40
30	0.17	0.12
58	0.05	0.06
105	0	0

$P = 0.31$). The 21-item fat measure ($r = 0.36$, $P < 0.01$) correlated significantly with percentage of calories from dietary fat. Examination of scatterplots did not reveal problems with outliers.

Classification rates. The 21-item fat measure had the stronger validity data and was evaluated for correct classification. Table 2 presents the TPR and FPR values calculated for different potential cut-points. An optimal cut-point of 18 was identified through ROC analyses. This resulted in a TPR of 0.71 and FPR of 0.41, which optimized the TPR/FPR ratio at 1.73 (see Fig. 1). A more strict cut-point of 16, however, was found to maximize the correct classification rate and improve sensitivity of the measure, with a small decrease in specificity. The purpose of the screening measure was to identify patients for referral for further assessment and dietary counseling services; thus, sensitivity was prioritized over specificity and the cut-point of 16 was chosen. Fat scores of 16 or lower were classified as low-fat; fat scores greater than 16 were classified as high-fat. Correct classification rates are summarized in Table 3. The χ^2 value of 4.80 ($P = 0.028$) indicated that the diagnostic test provided better classification of subjects' dietary fat intakes than by chance alone.

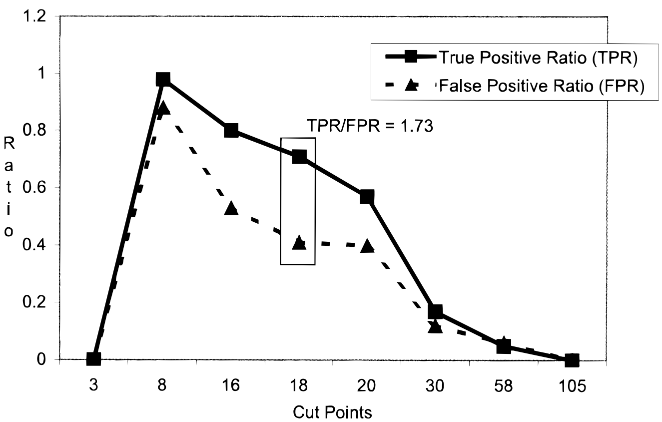

FIG. 1. Relative operating characteristics analysis for scoring of the 21-item fat measure.

TABLE 3

Classification Rates of the 21-Item Fat Measure

Fat screener	3-Day food record		
	≤30% Calories/fat	>30% Calories/fat	Total
Low (≤16)	8	8	16
High (>16)	9	34	43
Total	17	42	59

Note. $\chi^2 = 4.80$, $df = 1$, $P = 0.028$. Correct classification (8 + 34)/59 = 71%. Sensitivity (ability to detect high fat intake) 34/42 = 81%. Specificity (ability to rule out low fat intake) 8/17 = 47%. Predictive value of a positive (high fat) score 34/43 = 79%.

DISCUSSION

In Study 1, reliability of the fat screening measures was evaluated with a large diverse sample of adolescents. Both measures were found to have good internal consistency ($\alpha > 0.70$). Only one study in the literature was identified that reported internal consistency for a youth dietary measure. An 8-item dietary measure that included low-fat and high-fat foods was found to have reliability of $\alpha = 0.58$ [*26*].

Reproducibility of the fat measures over a 1- to 2-week period was comparable with (ICC > 0.60), if not better than, that reported in the literature for longer FFQs using less precise reliability statistics (e.g., Spearman's rank) [*21*]. In the literature, 1-year reproducibility of more lengthy (97–131 items) FFQs evaluated with children and adolescents has ranged from 0.14 to 0.64, with stronger reliability observed for older subjects [*14,27*]. A recent review of 14 dietary fat assessments evaluated with adults found test–retest reliability data available for only four measures [*11*]. Reliabilities ranged from 0.67 to 0.91. Three of the four studies reported Pearson correlations, which assess relative rather than exact agreement, and thus provide a less stringent test of agreement than intraclass correlations. Reliabilities were stronger for shorter retest periods.

In the current study, differences in reliability of the measures by sex and grade were small. Use of the measures with adolescents diverse with respect to age, sex, and ethnicity was supported. With dietary measures, a portion of the variance in the reliability correlation likely represents actual behavior change. Stability of the self-report measures in the current study probably would have been higher if readministered within a closer time period (e.g., 24 h).

Based on validity correlations, a preferred dietary fat screening measure was identified for adolescents. The 21-item fat measure correlated significantly ($r = 0.36$) with percentage of calories from fat as assessed by a 3-day food record. Due to the substantial variability in the criterion measure, this correlation is believed to be a conservative estimate of the association between the screening measure and the actual dietary intake. The small sample size in Study 2 prevented analysis of validity among subgroups of youth. Neither measure correlated significantly with total fat grams. Total fat grams consumed will be dependent upon how many calories are consumed, and total calories consumed will vary based on sex, age, body weight, and activity level of the individual. Percentage of total calories from fat adjusts for differences in fat consumption due to different amounts of energy consumed and is in many respects a better index of dietary quality. Guidelines for the nation relate to percentage of total calories from fat, rather than total fat grams [*3*].

In the literature, validity data for dietary fat measures developed for youth are relatively poor. An extensive FFQ correlated with a food record at $r = 0.11$ to 0.22 for dietary fat grams [*28*]. Averaged multiple administrations of a semiquantitative FFQ evaluated with 9- to 18-year-olds correlated with multiple 24-h recalls at $r = 0.37$ to 0.41 for dietary fat grams [*15*]. Averaging of multiple administrations, however, artificially increases validity correlations. A similar measure evaluated with 4th- to 7th-grade inner-city youth reported correlations ranging from $r = 0.01$ to $r = 0.31$ with multiple 24-h recalls [*14*]. The authors concluded that the 4th to 5th graders in their study were not developmentally mature enough to think abstractly and thus could not accurately report food intake on the FFQ. Compared with a FFQ, a short dietary habits survey produced correlations of $r = 0.40$ for total fat and $r = 0.54$ for saturated fat [*29*]. The FFQ, however, was developed for adults and never validated with youth. Dietary measures evaluated with adults have demonstrated a wide range of validity correlations. Of 14 dietary fat measures reviewed, 11 studies reported validity data [*11*]. Correlation coefficients ranged from

PACE+ Dietary Fat Screening Measure

Think about all the foods you ate over the past 7 days as part of a meal or as a snack. Check how often you ate each food item listed – from "did not eat it this week" to "more than twice each day."

Example: If you ate a ham, cheese, and mayonnaise sandwich with a cookie in the **past 7 days**, be sure to count each of these foods.

In the **past 7 days** how often did you eat…	Did not eat it this week	Once this week	2 to 3 times this week	4 to 6 times this week	Once or twice each day	More than twice each day
Hamburgers, beef taco or burrito, meatloaf	○0	○1	○2	○3	○4	○5
Beef such as steaks or roasts	○0	○1	○2	○3	○4	○5
Fried chicken, chicken nuggets, fried fish, fish sticks, lumpia	○0	○1	○2	○3	○4	○5
Hot dogs or corn dogs	○0	○1	○2	○3	○4	○5
Cold cuts/lunch meats (ham, salami, bologna)	○0	○1	○2	○3	○4	○5
Bacon, sausage, chorizo	○0	○1	○2	○3	○4	○5
Eggs, omelet, quiche (not egg substitutes)	○0	○1	○2	○3	○4	○5
Pasta with meat sauce	○0	○1	○2	○3	○4	○5
Pizza with meat toppings	○0	○1	○2	○3	○4	○5
Pizza with cheese	○0	○1	○2	○3	○4	○5
Pasta with cheese or cream sauce	○0	○1	○2	○3	○4	○5
Whole or 2% milk	○0	○1	○2	○3	○4	○5
Ice cream, malt shake (not frozen yogurt)	○0	○1	○2	○3	○4	○5
French fries, tater tots, onion rings	○0	○1	○2	○3	○4	○5
Potato chips, tortilla chips, buttered popcorn	○0	○1	○2	○3	○4	○5
Cake, cookies, brownies, candy bars	○0	○1	○2	○3	○4	○5
Doughnuts, pastries, muffins	○0	○1	○2	○3	○4	○5
Cheese or cheese spread	○0	○1	○2	○3	○4	○5
Regular margarine or butter (not diet or lite)	○0	○1	○2	○3	○4	○5
Salad dressings, mayonnaise (not diet or lite)	○0	○1	○2	○3	○4	○5
Peanut butter, other nuts, sunflower seeds	○0	○1	○2	○3	○4	○5
SCORING: Add up points in each column. You get a 0 for each check in column 1, a 1 for column 2, and so on. Sum the column values.	0 +	___ +	___ +	___ +	___ +	___
					TOTAL SCORE:	

FIG. 2. The 21-item fat screening measure: PACE+ (patient-centered assessment and counseling for exercise plus nutrition).

$r = 0.18$ to $r = 0.80$. The mean correlation of measures with percentage of calories from fat was $r = 0.53$.

Correlation indicates relative validity of a measure, the extent to which high values on a screening measure are associated with high values on a comparison measure. A more critical test of validity examines the ability of the measure to correctly classify subjects by their fat intake. For the 21-item fat measure evaluated in the current study, correct classification rate (71%), sensitivity (81%), and positive predictive value (79%) were good, indicating the ability of the measure to identify adolescents who have a high-fat diet and can benefit from counseling. Specificity of the measure (47%) was lower, indicating that some subjects with a low-fat diet were misclassified by the screening instrument. In the literature, few studies have evaluated correct classification rates of dietary measures for adolescents. Blom, Lundmark, Dahlquist, and Persson [*30*] had parents assist their young subjects (2 to 16 years of age) in completing a FFQ measure and the comparison food records. Use of the FFQ to identify high or low consumers of specific nutrients (e.g., fat) showed high specificity (91%), but low sensitivity (50%) and positive predictive value (67%). The extent to which the children and adolescents actually completed the dietary measures themselves was not reported.

Validity data for the 21-item fat measure in the current study cannot be directly compared with correlations reported for the Block simplified fat screener evaluated with adults [*31*]. Although Block et al. reported strong correlations (all $r \geq 0.60$), the comparison measure used was a FFQ similar in form to the brief measure. While a validated measure, correlations are likely to be inflated by shared method variance. Validity of the Block screener was calculated using Spearman's rank-order correlations. Spearman's correlation provides an index of correspondence in the ranks of scores, not the scores themselves. Spearman's and Pearson's correlations will yield similar values, except when there are a large number of tied ranks, in which case the Spearman correlation will be inflated. Comparing correct classification rates for the two measures, the 21-item fat measure demonstrated greater sensitivity (81% vs 52%) and positive predictive value (79% vs 57%) than the Block measure, but specificity was lower (47% vs 93%).

To demonstrate the legitimacy of a medical test, both the sensitivity and the specificity should be large. A limitation of the current measure is its low specificity—47% of patients will be identified inappropriately. If used in medical practice, a more extensive assessment would need to be administered to ensure that dietary counseling to reduce fat intake would be appropriate. It is possible that the initial training, the process of recording, and the follow-up calls may have primed the subjects to be more aware of their eating habits overall. However, students were not trained to assess the fat content of foods eaten and the 6-day delay between assessments was used to reduce potential carryover effects. Furthermore, if a priming effect occurred, it did not appear to influence validity of reports on the 4-category measure. The predictive value was dependent upon the prevalence of a high-fat diet in the current sample. Future investigation ought to evaluate the appropriateness of the identified cut-point in an independent sample and examine the need for subgroup norms (e.g., by age group, gender, ethnic group). Until more data are gathered, the cut-point of 16 is suggested for future clinical applications.

Strengths of the current pair of studies included ethnically diverse samples with youth representing different developmental levels. Findings support Baranowski and Domel's [*32*] observation that by age 10, children are able to give accurate dietary information and are aware of the foods they have eaten. Two brief self-report fat measures were created and evaluated. Both reliability and validity were assessed. The reliability sample in Study 1 was large and drawn from two geographically distinct areas. In Study 2, a highly regarded nutrition criterion measure was used to evaluate validity. The 21-item fat measure was further examined for screening individuals to clinically relevant health guidelines. The 21-item fat measure met the criteria of being brief, assessing a health-related dietary behavior, demonstrating adequate reliability, and correlating significantly with a food record. The measure could be clinically useful, but further improvements should be attempted to improve specificity. The measure has been incorporated into the PACE+ (patient-centered assessment and counseling for exercise plus nutrition) computer-mediated intervention for adolescents in primary care [*30*] and is referred to as the PACE+ Dietary Fat Screening Measure (see Fig. 2).

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