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## Diet-specific Social Support among Rural Adolescents

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### Abstract

**Objective**—The relationships among primary sources of social support in adolescents' environments (family and friends) and eating behaviors (fat and fiber consumption) were examined in a sample of rural adolescents.

**Design**—Cross-sectional baseline health surveys were administered in classrooms as part of a larger randomized trial evaluating a cancer education program.

**Setting**—Data were collected in middle schools drawn from 22 rural counties in Virginia and New York.

**Participants**—1942 sixth graders with a modal age of 12 years, roughly equal gender distribution, and racially diverse (53% white, 37% black).

**Main Outcome Measure**—Variables included a 10-item scale of social support from family and friends for healthy eating, a brief food frequency questionnaire estimating daily grams of fat and fiber intake, and demographics (age, gender, race).

**Analysis**—Hierarchical multiple regressions and analyses of variance (ANOVAs).

**Results**—Controlling for demographics, family and friend support were found to significantly predict fat ( $P < .05$ ) and fiber ( $P < .01$ ) intake. Black respondents reported higher support from friends than did white adolescents ( $F = 47.49$ ,  $P < .01$ ).

**Implications for Research and Practice**—Support for healthful eating was related to healthful dietary practices and differed among racial subgroups. Identifying and fostering sources of positive support for healthful eating is critical to developing effective health promotion programs targeting high-risk adolescents.

### Keywords

social support; adolescent nutrition; dietary fat; dietary fiber; rural health

## INTRODUCTION

The diets of adolescents in the United States often fail to meet current dietary recommendations and frequently include popular and widely available snack food products

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that are high in sugar or fat and low in disease-preventing food such as fruits and vegetables.<sup>1-4</sup> Eating patterns established in youth may provide the basis of lifelong dietary preferences and are critical to the prevention of cancer and conditions such as diabetes and obesity in adulthood.<sup>5,6</sup> Social support has been posited as an important variable in the adoption and maintenance of healthful eating behaviors. Social support that is specific to healthful eating has been found to be associated with dietary habits.<sup>7,8</sup> This study examined the relationship between social support from family and friends for healthful eating and the fat and fiber intake of rural adolescents.

Social support has been found to be associated with a number of health behavior outcomes, including fruit and vegetable consumption,<sup>7,9,10</sup> adherence to dietary change programs,<sup>11,12</sup> physical activity,<sup>13,14</sup> and smoking cessation.<sup>15,16</sup> However, far less is known regarding the extent to which social support for healthful eating is relevant to adolescents. Although numerous “general” social support measures have been developed for adolescents, the specific components of support for healthful dietary behaviors have not received attention. Sallis and colleagues<sup>8</sup> developed a diet-specific measure for adults that has been reported to be both psychometrically sound and theoretically predictive of dietary behavior. For example, diet-specific social support, but not general social support, was related to eating behaviors.<sup>8</sup> Less is known, however, regarding diet-specific social support for adolescents. In particular, the context of healthful eating may be different for teens compared to adults and may vary according to food items that are available/accessible to adolescents at home, with peers, and at school, as well as how teens perceive dietary behaviors to be supported by significant others in the adolescent’s life.

This study focused on rural adolescents who have been found to be underserved for cancer prevention efforts. Rural populations have been found to have proportionally higher rates of life-threatening and chronic illnesses such as cardiovascular diseases and cancers.<sup>17,18</sup> Health promotion and cancer prevention are particularly important in rural areas because these areas tend to have lower incomes, lower education levels, and limited access to quality medical care and health-promoting activities.<sup>19-23</sup> Minority adolescents, in particular, are at increased risk for many chronic diseases because they are less likely to have a regular source of medical care than either adults or children.<sup>24,25</sup> The empirical literature on the dietary habits of rural adolescents is scarce, and this dearth of information impedes the design of effective programs that will prevent the development of chronic diseases in these underserved populations.

In light of the above considerations, the goal was to better understand the relationship among primary sources of social support in adolescents’ environments (family and friends) and eating behaviors (fat and fiber consumption). Because health promotion interventions often seek to improve social support as a mediator of health behavior change, a better understanding of these relationships in a population at high risk for high-fat and low-fiber diets has implications for informing health promotion programs that target adolescents in rural and racially diverse communities.

## STUDY DESCRIPTION

### Description of the Sample

Data were available from a total of 1942 sixth-grade students from 22 counties in rural Virginia and New York participating in the baseline survey of a larger randomized trial evaluating a cancer-education program, Goals for Health (GFH).<sup>26,27</sup> GFH is a school-based cancer prevention program designed to reduce fat intake, increase fiber intake, and prevent the initiation of tobacco use in sixth-grade, seventh-grade, and eighth-grade students in rural counties of New York (N = 296) and Virginia (N = 1646).<sup>26,27</sup> All GFH questionnaires and

passive consent procedures were reviewed and approved by the Institutional Review Board of Virginia Commonwealth University. Trained staff administered baseline assessments of key health variables of diet and tobacco use in sixth-grade classrooms. Students who were absent on the day of the survey were asked by their teachers to complete a survey on their return. The students' modal age was 12 years (Virginia mean = 12.00, SD = 0.55; New York mean = 11.90, SD = 0.51) with a roughly equal gender distribution in both the Virginia and the New York schools. The racial composition of the New York sample (0% black, 0% Hispanic, 86% white, 4.4% Indian, 0.7% Asian, 9% other/mixed) differed from the larger and more racially diverse Virginia sample (44% black, 0.9% Hispanic, 48% white, 2% Indian, 0.9% Asian, 5% other/mixed).

### Description of Measures

A brief food frequency questionnaire (FFQ) was included in the assessment battery to estimate daily intakes of fat and fiber in this rural adolescent population. Respondents selected a frequency option for each of approximately 35 food items. The range of frequency options varied from never to 3 times a day. Each food was associated with a "grams of fat" value and a "grams of fiber" value. These values reflect the amount of the food component in a typical serving size of each food item. The food items that were selected represented major contributors to fat and fiber dietary intake. As detailed by Buzzard and colleagues,<sup>28</sup> an extensive process was used to develop, format, and evaluate the properties of this brief FFQ. Compared to other similar food frequency instruments,<sup>29,30</sup> the final instrument was found to have reasonable reproducibility, with correlation coefficients for nutrient scores indicated as 0.58 for fat, 0.49 for fiber, and 0.51 for fruits and vegetables.<sup>28</sup> The measure also has reasonable validity (group differentiation, predictive, and criterion), as demonstrated by the ability of the instrument to adequately categorize individuals as high, medium, or low fat intake compared to a 24-hour recall, predict fat consumption similar to other previously validated predictors of fat consumption, and correlate with demographic and psychosocial measures in predicted directions.<sup>26,28</sup>

Diet-specific social support for adolescents (DSSA) was measured by a 10-item scale adapted from an adult measure of diet-specific social support.<sup>8</sup> Students rated on a 5-point Likert scale (never to very often) how often a family member or friend performed a behavior that was supportive of healthful eating in the past month. The factor structure of the DSSA was confirmed in the sample using principal components analysis with varimax rotation. The solution contained 2 factors, "Positive Friend Support" (eigenvalue = 3.98) and "Positive Family Support" (eigenvalue = 1.51), accounting for 55% of the variance associated with diet-specific social support. All analyses were conducted using SPSS statistical software (SPSS for Windows, 10.0.0, SPSS Inc., Chicago, IL, 1999). Items, factor loadings, and Cronbach  $\alpha$  are presented in Table 1.

## RELATIONSHIP OF SOCIAL SUPPORT WITH DIETARY FAT AND FIBER INTAKE

Linear regression analyses using a hierarchical method were used to examine each of the 2 outcome measures (fat and fiber intake). For each analysis, demographic variables (age, gender, State, and race) were entered in the first block, followed by a block containing the family and friend social support scales. Finally, the interaction term of family and friend support was entered to test whether there is an additive effect of both sources of support. Regression diagnostics were conducted prior to running the analyses, and as is commonly done with food frequency instruments, fat and fiber nutrient scores were transformed by the  $\log_e$  method to improve normality.<sup>29</sup> Although the friend and family subscales of the DSSA were significantly correlated ( $r = 0.45$ ,  $P < .01$ ), tolerance statistics from multicollinearity

analyses indicated that the subscales contributed independently to the model and could be retained as separate factors.

Table 2 summarizes the results for the 2 regression models predicting rural adolescents' fat and fiber intakes. The overall regression model accounted for 10% of the variance in child fat intake, compared to only 4% of the variance in fiber intake. In the model predicting child fat intake, demographic variables accounted for 8.6% of the variance. Boys reported greater intake of dietary fat compared to girls, and black students reported greater intake of dietary fat compared to white students. After controlling for demographic variables, total subscale scores of family and friend diet-specific support were found to significantly predict fat and fiber intake but only accounted for a marginal amount of the variance. Support for healthful eating from friends was positively associated with dietary fat intake, whereas no independent relationship was detected for family support and dietary fat. Both family and friend support were positively associated with fiber intake, which indicated that greater levels of support were associated with higher fiber intake. The interaction term was not significant.

## RELATIONSHIP WITH DEMOGRAPHIC VARIABLES

Because of the significant main effect of the demographic variables on fat intake, the investigators examined the direct association of these variables with the family and friend subscales. Results of a series of one-way analyses of variance (ANOVAs) indicated that there was not a significant gender, age, or State difference in family or friend support for healthful eating. However, a significant difference was detected in the association of race and diet-specific social support from friends ( $F = 47.49, P < .01$ ). Black students (mean = 9.12,  $SD = 4.30$ ) reported higher perceived social support from friends than did white students (mean = 7.80,  $SD = 3.65$ ). The difference in levels of reported family social support between blacks (mean = 13.56) and whites (mean = 13.19) was not statistically significant ( $P = .11$ ).

## DISCUSSION

This study examined the relationship between fat and fiber intake and social support for healthful eating in a sample of rural sixth graders. It was found that the DSSA subscales for family and friend support were associated with higher intakes of dietary fiber. Moreover, friend support was positively associated with fat intake. It may be that this positive association reflects the fact that those adolescents who receive any kind of diet-specific comments from friends may be those who are most in need of support or who have higher calorie diets. Further research is needed in this area to examine the moderating effect of body mass index (BMI) and how social support varies according to the degree of risk for obesity, diabetes, or other chronic diseases. This line of research also has important implications for differential effectiveness of family-based versus peer-based interventions and for whom specific sources of social support can be protective against the development of poor dietary habits.

Racial differences in perceived dietary-social support were also found, with black students reporting greater positive friend support compared to white students. This finding may also be related to a possible association between adolescents who are more likely to have higher caloric intakes and be more cognizant of their eating behaviors, to also have friends who are more supportive of dieting behaviors. Alternately, this finding may have resulted from differences in how food and eating behaviors are culturally instilled. It has been reported that black women perceived clear differences in eating patterns between blacks and whites and that the social context of where and with whom food is eaten was found to be at least as important as attitudes about specific food items.<sup>31</sup> In adult populations, the prevalence of

obesity and related chronic conditions is notably higher among black women in general compared with that of white women.<sup>32</sup> Corwin and colleagues<sup>33</sup> studied the impact of social-cognitive factors on fourth graders' dietary practices and found that black children had more exposure to food items higher in fat and sugar in a 24-hour period than did white children in that sample. Exposure to healthful food items was also positively associated with a social support scale reflecting encouragement from parents, teachers, and peers for eating fruits and vegetables.<sup>33</sup> This 3-item measure was found to have low reliability and did not differentiate between family and friend support.<sup>33</sup> Results of this study suggest that family and friend support may have differential influence for subgroups of rural adolescents, and it is important to assess these sources of support separately.

## STUDY LIMITATIONS

Although results of this study provide preliminary evidence of a relationship between perceived diet-specific social support and an estimate of fat and fiber intake in rural sixth graders, social support accounted for a marginal amount of variance in the models tested, with over 90% of the variance in fat and fiber intake unexplained. There are several limitations that may have contributed to these results. This study focused on just one of many social/environmental factors that may impact dietary choices in adolescence. Longitudinal models that examine interactions among multiple levels of social influence such as parental modeling, food availability/accessibility, and cultural perceptions of food and healthful eating will likely yield richer dynamic models that can better explain the complexities of adolescents' diets. Based on these results, the authors hypothesize that diet-specific social support will be one of those factors that contributes to the interplay of psychosocial influences on dietary choices.

Models were also limited by lack of family level variables, such as income, and individual level variables, such as BMI and taste preferences. Low adjusted  $R^2$  in the models may also be attributed, in part, to measurement error. Measures failed to include a social desirability scale. FFQs do not take into account total caloric intake and only provide an estimate of specific food consumption. The FFQ used was developed specifically to capture food items that are major contributors to fat and fiber in the rural communities sampled in this study.<sup>28</sup> This study focused on specific rural communities, and therefore generalizability of results to other regions is limited.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

The current study presents preliminary evidence that adolescents' perceptions of the extent to which family members and friends provide support or prompts for healthful eating behaviors may be related to healthful dietary practices. Conceptually, identifying sources of positive support for healthful behaviors in adolescents' social environments has critical implications for the development of health promotion programs. Communication-based programs that address optimal ways that family members and friends can support each other in healthful behavior change may hold great promise. Moreover, cultural and rural differences in eating patterns indicate that sources of support may differ among racially and culturally diverse adolescents, and programs need to be sensitive to subgroup differences. Dietspecific social support may be an important construct that has a mediating influence on the effectiveness of family-based and/or peer-based health promotion interventions. Additionally, measuring specific forms of support from family and friends in public health research may help identify protective influences in the social environment of adolescents that can be targeted to promote lifelong healthful eating habits.

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## REFERENCES

1. Popkin BM, Siega-Riz AM, Haines PS, Jahns L. Where's the fat? Trends in U.S. diets 1965-1996. *Prev Med.* 2001; 32:245-254. [PubMed: 11277682]
2. Peterson S, Sigman-Grant M. Impact of adopting lower-fat food choices on nutrient intake of American children. *Pediatrics.* 1997; 100:E4. [PubMed: 9271619]
3. Jahns L, Siega-Riz AM, Popkin BM. The increasing prevalence of snacking among US children from 1977 to 1996. *J Pediatr.* 2001; 138:493-498. [PubMed: 11295711]
4. Krebs-Smith SM, Cook A, Subar AF, Cleveland L, Friday J, Kahle LL. Fruit and vegetable intakes of children and adolescents in the US. *Arch Pediatr Adolesc Med.* 1996; 150:81-86. [PubMed: 8542012]
5. US Department of Health and Human Services. , editor. *Healthy People 2010: Understanding and Improving Health.* US Government Printing Office; Washington, DC: 2000.
6. Willett WC. Diet and cancer. *Oncologist.* 2000; 5:393-404. [PubMed: 11040276]
7. Campbell MK, Symons M, Demark W, et al. Stages of change and psychosocial correlates of fruit and vegetable consumption among rural African-American church members. *Am J Health Promot.* 1998; 12:185-191. [PubMed: 10176093]
8. Sallis JF, Grossman RM, Pinski RB, Patterson TL, Nader PR. The development of scales to measure social support for diet and exercise behaviors. *Prev Med.* 1987; 16:825-836. [PubMed: 3432232]
9. Kubik MY, Lytle L, Fulkerson JA. Fruits, vegetables, and football: findings from focus groups with alternative high school students regarding eating and physical activity. *J Adolesc Health.* 2005; 36:494-500. [PubMed: 15901514]
10. Sorensen G, Stoddard A, Macario E. Social support and readiness to make dietary changes. *Health Educ Behav.* 1998; 25:586-598. [PubMed: 9768379]
11. Boutin-Foster C. Getting to the heart of social support: a qualitative analysis of the types of instrumental support that are most helpful in motivating cardiac risk factor modification. *Heart Lung.* 2005; 34:22-29. [PubMed: 15647731]
12. Wilson DK, Ampey-Thornhill G. The role of gender and family support on dietary compliance in an African American adolescent hypertension prevention study. *Ann Behav Med.* 2001; 23:59-67. [PubMed: 11302357]
13. Allgower A, Wardle J, Steptoe A. Depressive symptoms, social support, and personal health behaviors in young men and women. *Health Psychol.* 2001; 20:223-227. [PubMed: 11403220]
14. Prochaska JJ, Rodgers MW, Sallis JF. Association of parent and peer support with adolescent physical activity. *Res Q Exerc Sport.* 2002; 73:206-210. [PubMed: 12092896]
15. Carlson LE, Goodey E, Bennett MH, Taenzer P, Koopmans J. The addition of social support to a community-based large-group behavioral smoking cessation intervention: improved cessation rates and gender differences. *Addict Behav.* 2002; 27:547-559. [PubMed: 12188591]
16. Janson E, Engstrom G, Lindstrom M, Berglund G, Hedblad B, Janson L. Who are the "quitters"? A cross-sectional study of circumstances associated with women giving up smoking. *Scand J Public Health.* 2005; 33:175-182. [PubMed: 16040457]
17. Eberhardt, MS.; Ingram, DD.; Makuc, DM., et al. *Health, United States, 2001.* National Center for Health Statistics; Hyattsville, Md: 2001. *Urban and Rural Health Chartbook.*

18. Miller MK, Stokes CS, Clifford WB. A comparison of the rural-urban mortality differential for deaths from all causes, cardiovascular disease and cancer. *J Rural Health*. 1987; 3:23–34. [PubMed: 10284088]
19. Coughlin SS, Thompson TD, Hall HI, Logan P, Uhler RJ. Breast and cervical carcinoma screening practices among women in rural and nonrural areas of the United States, 1998-1999. *Cancer*. 2002; 94:2801–2812. [PubMed: 12115366]
20. Desch CE, Penberthy L, Newschaffer CJ, et al. Factors that determine the treatment for local and regional prostate cancer. *Med Care*. 1996; 34:152–162. [PubMed: 8632689]
21. Desch CE, Smith TJ, Breindel CL, Simonson CJ, Kane N. Cancer treatment in rural areas. *Hosp Health Serv Adm*. 1992; 37:449–463. [PubMed: 10122367]
22. Monroe AC, Ricketts TC, Savitz LA. Cancer in rural versus urban populations: a review. *J Rural Health*. 1992; 8:212–220. [PubMed: 10121550]
23. Pickle, LW.; Mason, TS.; Howard, N.; Hoover, R.; Fraumeni, JF, Jr. Atlas of U.S. cancer mortality among nonwhites: 1950–1980. U.S. Gov. Printing Office; Washington, DC: 1990. DHHS Publication No. (NIH) 90-1582
24. MacKay, AP.; Fingerhut, LA.; Duran, CR. Health, United States. National Center for Health Statistics; Hyattsville, Md: 2000. Adolescent Health Chartbook. Publication no. 00-1232
25. Wilson, DK.; Nicholson, SC.; Krishnamoorthy, JS. The role of diet in minority adolescent health promotion. In: Wilson, DK.; Rodriguez, JR.; Taylor, WC., editors. *Health-Promoting and Health-Compromising Behaviors among Minority Adolescents*. American Psychological Association; Washington, DC: 1997. p. 139-151.
26. Fries E, Meyer A, Danish S, et al. Cancer prevention in rural youth: teaching goals for health: the pilot. *J Cancer Educ*. 2001; 16:99–104. [PubMed: 11440071]
27. Meyer A, Nicholson R, Danish S, Fries E, Polk V. A model to measure program integrity of peer-led health promotion programs in rural middle schools: assessing the implementation of Goals for Health. *J Educ Psychol Consult*. 2000; 11:223–252.
28. Buzzard IM, Stanton CA, Figueiredo M, et al. Development and reproducibility of a brief food frequency questionnaire for assessing the fat, fiber, and fruit and vegetable intakes of rural adolescents. *J Am Diet Assoc*. 2001; 101:1438–1446. [PubMed: 11762739]
29. Rockett HR, Wolf AM, Colditz GA. Development and reproducibility of a food frequency questionnaire to assess diets of older children and adolescents. *J Am Diet Assoc*. 1995; 95:336–340. [PubMed: 7860946]
30. Willett WC, Sampson L, Stampfer MJ, et al. Reproducibility and validity of a semiquantitative food frequency questionnaire. *Am J Epidemiol*. 1985; 122:51–65. [PubMed: 4014201]
31. Airhihenbuwa CO, Kumanyika S, Agurs TD, Lowe A, Saunders D, Morssink CB. Cultural aspects of African American eating patterns. *Ethn Health*. 1996; 1:245–260. [PubMed: 9395569]
32. Kumanyika SK, Morssink C, Agurs T. Models for dietary and weight change in African-American women: identifying cultural components. *Ethn Dis*. 1992; 2:166–175. [PubMed: 1467754]
33. Corwin SJ, Sargent RG, Rheame CE, Saunders RP. Dietary behaviors among fourth graders: A social cognitive theory study approach. *Am J Health Behav*. 1999; 23:182–197.

**Table 1**

Items, Factor Loadings, Percent of Variance Explained in Dietspecific Social Support, and Cronbach  $\alpha$  of a Brief Measure of Diet-specific Social Support for Adolescents (N = 1942)

Item	Factor 1	Factor 2
<i>(Family Support Subscale)</i>		
Said nice things about what you eat	0.24	0.52
Offered you low-fat snacks	0.12	0.67
Gave suggestions on how to eat more healthfully	0.14	0.81
Encouraged you not to eat high-fat food items	0.14	0.81
Talked with you about eating more healthful food	0.23	0.75
<i>(Friend Support Subscale)</i>		
Gave suggestions on how to eat more healthful food	0.79	0.21
Offered you low-fat snacks	0.72	0.19
Encouraged you not to eat high-fat food	0.73	0.17
Talked with you about eating more healthful food	0.81	0.14
Said nice things about what you eat	0.68	0.17
<i>Percent of Variance in Social Support</i>	<i>29.58%</i>	<i>29.40%</i>
<i>Cronbach <math>\alpha</math></i>	<i>.75</i>	<i>.82</i>



Table 2

Estimated Linear Regression Coefficients ( $\beta$ ), Associated 95% Confidence Intervals, and Adjusted  $R^2$  (Cumulative) for Demographic and Social Support Predictors of Log-transformed Total Fat and Total Fiber Intakes (N = 1942)

Block Variable	Fat Intake			Fiber Intake		
	$\beta$	95% Confidence Interval	Adjusted $R^2$	$\beta$	95% Confidence Interval	Adjusted $R^2$
<i>Demographics*</i>						
Age	.006	-0.056, 0.067	0.086	.003	-0.047, 0.053	0.005
Gender	.152	0.086, 0.219		.009	-0.045, 0.063	
State	-.055	-0.151, 0.042		.119	0.040, 0.198	
Race	.408	0.335, 0.480		.069	0.010, 0.129	
<i>Social Support<sup>†</sup></i>						
Family Support	.007	-0.008, 0.021	0.098	.023	0.010, 0.035	0.044
Friend Support	.040	0.011, 0.068		.023	0.000, 0.047	
<i>Interaction term</i>						
Family X Friend	-.001	-0.003, 0.001	0.098	-.001	-0.002, 0.001	0.044

\* For demographic variables, age (range 8.17-14.25 years) was entered as a continuous variable. Gender (0 = female, 1 = male), State (0 = Virginia, 1 = New York), and race (0 = nonblack, 1 = black) are dichotomous.

<sup>†</sup> Social support scales were entered as continuous variables (range 5-25).