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## Perceived Social Support from Friends and Parents for Eating Behavior and Diet Quality among Low-income, Urban, Minority Youth

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### Abstract

**Objective**—Evidence of associations between social support and dietary intake among adolescents is mixed. This study examines relationships between social support for healthy and unhealthy eating from friends and parents, and associations with diet quality.

**Design**—Cross-sectional analysis of survey data.

**Setting**—Baltimore, MD.

**Participants**—296 youth ages 9-15 years, 53% female, 91% African American, participating in the B'More Healthy Communities for Kids study.

**Main Outcome Measure(s)**—Primary dependent variable: Diet quality measured using Healthy Eating Index 2010 overall score, calculated from the Block Kids Food Frequency Questionnaire. Independent variables: Social support from parents and friends for healthy eating (4 questions analyzed as a scale) and unhealthy eating (3 questions analyzed individually), age, gender, race, and household income, reported via questionnaire.

**Analysis**—Adjusted multiple linear regressions. Alpha,  $p < 0.05$ .

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**Results**—Friend and parent support for healthy eating did not have statistically significant relationships with overall HEI scores. Youth who reported their parents offering high fat foods or sweets more frequently had lower overall HEI scores ( $\beta=-1.65$ ;  $SE=0.52$ ; 95% CI:  $-2.66$  to  $-0.63$ ).

**Conclusions and Implications**—These results are novel and demonstrate the need for additional studies examining support for unhealthy eating. These preliminary findings may be relevant to researchers as they develop family-based nutrition interventions.

### Keywords

Social support; diet quality; healthy eating; unhealthy eating; eating behavior; adolescents; youth; dietary intake; friends; parents; Healthy Eating Index

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### Introduction

Adolescents often fall short of recommended dietary intakes, consuming diets high in sweetened beverages, fast food, and low in fruits and vegetables.<sup>1-4</sup> This is particularly problematic among low-income and racial and ethnic minority youth,<sup>5</sup> who are disproportionately impacted by obesity and other nutrition-related chronic diseases.<sup>6-8</sup> Social cognitive and social support theories suggest that psychosocial factors, such as social support from friends and parents, can influence health behaviors.<sup>9,10</sup> Social support is defined by Israel and Heaney as “aid and assistance [for health behaviors] exchanged through social relationships and interpersonal transactions”.<sup>9</sup> Studies among adults have found beneficial relationships between social support and health-related indicators including fruit and vegetable intake,<sup>11</sup> weight management,<sup>12</sup> and physical activity.<sup>13</sup>

The relationship between social support and diet-related health outcomes among adolescents has been studied far less than in adults. The few studies on adolescent social support report inconsistent findings.<sup>14</sup> Most adolescent social support studies to date have examined the relationship between social support for healthy eating from youth’s parents and/or friends and fruit and vegetable (FV) intake<sup>15-18</sup>. Most of these studies have found that parental support is associated with increased FV intake,<sup>15,16,18</sup> however 1 study among adolescents in California found that these relationships differ by gender and age, with the relationships strongest among girls and older youth.<sup>15</sup> Another study among low socioeconomic status Australian youth found no significant relationship between parent support and FV intake,<sup>17</sup> and instead found a positive relationship between friend support for healthy eating and FV intake among boys.<sup>17</sup> When examining fat intake as the primary outcome, 2 studies found no relationship between parent support for healthy eating and fat intake,<sup>15,19</sup> and 1 of these studies conducted in racially diverse rural youth found the unexpected result of a positive association between friend support for healthy eating and fat intake.<sup>19</sup> Taken together these results indicate that the relationships between social support and components of dietary intake among adolescents are mixed and need further investigation before conclusions can be drawn.

Traditional definitions indicate social support is always intended to be supportive of the health behavior of interest,<sup>9</sup> however, adolescents may be receiving messages from their

friends and parents that support unhealthy consumption. To date, only 1 study has examined the relationship between dietary intake and social support for both *healthy* and *unhealthy* eating as multidimensional constructs.<sup>20</sup> This study was conducted in middle to upper class Irish adolescents, and found that higher friend support for unhealthy eating was associated with an unhealthy diet.<sup>20</sup> The dearth of evidence regarding social support for unhealthy eating, combined with the mixed results of previous studies, indicates a need for additional examination. This study contributes to the literature by addressing the following research questions in a unique, high-risk population of urban, low-income, African American youth:

- How frequently do urban African American youth perceive that their parents and friends provide support for healthy and unhealthy eating behaviors?
- What are the relationships between perceived friend and parent support for healthy eating and unhealthy eating behaviors and diet quality among urban, low-income, African American youth?

Based on social cognitive and social support theories<sup>9,21</sup> and the literature, the research team hypothesized that adolescents who perceive higher levels of behaviors that support unhealthy eating from parents and friends will have poorer diet quality, and that adolescents who perceive higher levels of social support for healthy eating from parents and friends will have better diet quality.

## Methods

### Study Design and Sample

This is a cross sectional analysis using baseline data collected in the B'More Healthy Communities for Kids study (BHCK), an obesity prevention intervention in Baltimore, Maryland.<sup>22</sup> Eligibility criteria for this study included: living in a neighborhood participating in BHCK (low-income, African American, food desert neighborhoods); being 9-15 years old; and having a parent or guardian who was willing to provide consent for youth to participate.

Participants were randomly selected, through a process of creating a sampling frame for each neighborhood, then randomly selecting participants within each sampling frame.<sup>22</sup> A total of 296 participants met the eligibility requirements and completed the baseline assessment.

### Data Collection and Instruments

**Data Collection**—Trained data collectors collected all data via in-person interviews between June 2013 and June 2014. Household income data was self-reported by the participant's adult caregiver. Caregivers and youth provided consent/assent prior to each interview. Interviews took approximately 60 minutes to complete, and youth received \$30 in gift cards for participation. This study was approved by the Johns Hopkins Bloomberg School of Public Health IRB.

**Instruments**—Data from youth were collected by trained data collectors on 2 instruments – the Block Kids 2004 Food Frequency Questionnaire (FFQ) and a Child Impact

Questionnaire (CIQ). The Block Kids FFQ is a validated, semi-quantitative, FFQ that asks about frequency and amount of consumption of 77 food items based on NHANES 1998-2002 data.<sup>23–25</sup> The CIQ<sup>22</sup> is a 79-item questionnaire that measured the demographic, anthropometric, and social support data used in this analysis.

Most demographic data used in the analyses (age, gender, race) were collected via youth self-report. Anthropometric data (height and weight) were measured and BMI-for-Age percentiles were calculated using standard procedures.<sup>26</sup>

Social support data was collected from the youth via the CIQ, using a 14-item social support questionnaire developed by Fitzgerald and colleagues,<sup>20</sup> which is the only scale to date that assesses support for both healthy and unhealthy eating. Fitzgerald and colleagues developed this scale by adapting the Diet-specific Social Support Scale for Adolescents (DSSA),<sup>19</sup> which was taken from Sallis et al's diet-specific social support measure for adults.<sup>27</sup> The social support questionnaire used 4 sets of questions to measure 4 different aspects of social support: support from friends for healthy and unhealthy eating, and support from parents for healthy and unhealthy eating. The questionnaire asked the participant to report how often their friend or parent performed a certain task (i.e., offered them high fat foods or sweets) that supported healthy or unhealthy eating. Similar to the previous study using this questionnaire,<sup>20</sup> data collectors provided examples of high fat foods or sweets to youth for clarification of terms, but did not provide a specific time period in which participants' needed to frame their responses. Participants could respond to each question using 5-point Likert responses (ranging from never= 0 to very often = 4). Responses were summed for the sets of questions related to each of the 4 constructs to generate scales for each construct, however, the scales were later assessed and only select scales were retained for use in these analyses due to potential issues with internal consistency. Prior to implementation of the BHCK intervention, the social support for healthy and unhealthy eating questionnaires (along with the rest of the CIQ) was administered to a pilot sample of 10 youth similar to the study population to assess ability of the youth to cognitively understand and respond to the questionnaire. The results of the pilot testing indicated that the youth could understand and appropriately respond to the questionnaire, and did not indicate any issues with scale metrics.

The questionnaire contained 4 items that measured friend/parent support for healthy eating, and these items were analyzed as a scale (Cronbach's alphas=0.77 and 0.67 for friend and parent scales, respectively). The questionnaire contained 3 items that measured friend/parent support for unhealthy. Cronbach's alpha scores were low for the 3-item support for unhealthy eating questions (Cronbach's alphas= 0.59 and 0.52 for friend and parent scales, respectively). These values are similar to that what was seen in the literature.<sup>20</sup> These low values may indicate problems with internal consistency of when using these questions as a scale<sup>28</sup> meaning that these items should not be used together to measure a construct. To address this, the 3 support for unhealthy eating questions were each analyzed individually, in separate regressions rather than collectively as a summed scale, the 3 constructs related to support for unhealthy eating involved asking youth to report how often their parents and friends: offered them high fat foods or sweets, encouraged them to eat high fat foods or sweets; and said nice things about the high fat food or sweet they were eating.

## Calculation of the Healthy Eating Index 2010 Scores

Overall diet quality was measured by using the FFQ data to calculate the Healthy Eating Index (HEI) 2010<sup>29</sup> scores for each participant. HEI was selected as the dependent variable of interest because it provides a standardized summary score relating to the overall quality of the diet. HEI is a measure of diet quality that consists of 12 component scores, which are summed to provide the overall HEI score on a scale of 0-100.<sup>29,30</sup> Higher HEI scores (overall and for each component) indicate better diet quality, including scores for components that have recommendations for ‘moderate consumption’ (refined grains, sodium, and empty calories).<sup>29</sup>

The dietary data for each participant was taken from the FFQ and converted to approximate HEI component scores. Details of these calculations are published elsewhere.<sup>31</sup> Similar to previous studies, individuals were excluded from the analyses if their daily caloric expenditure from the FFQ was reported as <500 or >5,000 kcal, or if their HEI score was  $\pm 3$  standard deviations from the mean,<sup>32</sup> as these extreme values most likely represent issues with the accuracy of the FFQ data collection rather than actual participant intakes. A total of 18 youth participants were excluded due to these criteria, creating a final of  $n=278$ .

## Statistical Analyses

**Model Development**—The regression models were created based on theoretical understanding of the relationships of interest and knowledge of the literature.<sup>33</sup> The primary independent variables of interest in the models are the friend and parent support for healthy eating questionnaire items analyzed as scales; and friend and parent support for unhealthy eating questionnaire items analyzed individually (related to parents and friends offering, encouraging, or saying nice things about high fat foods or sweets). Self-reported age, gender, race, and household income variables were included in all models as potential confounders, meaning they are hypothesized to have a causal relationship with both the independent and dependent variables<sup>34</sup> and need to be controlled for in the analysis. Weight status was not included as a confounder because weight status may influence social support, but weight status is likely a result of unhealthy eating (i.e., consumption of high calorie, low nutrient dense foods in excess of caloric needs) rather than a cause of it,<sup>35</sup> and therefore does not meet the definition of confounding.<sup>34</sup> Interaction terms were tested in each model between parent support\*friend support; parent support\*gender and friend support\*gender. However, the interaction terms were dropped because they did not reach statistical significance in any of the regression models.

**Data Analysis**—Data analysis was conducted using Stata IC 13.1 software (Stata Corp., College Station, TX, 2013).

Four linear regression analyses were performed to assess the relationships between the dependent variable of HEI scores and the independent variables of friend and parent support for healthy eating questionnaire items (analyzed as a scale), and the 3 items from friend and parent support for unhealthy eating questionnaires, analyzed individually in separate analyses. Multiple linear regression analyses assume a linear relationship, statistical independence of errors, homoscedasticity, and little to no multicollinearity.<sup>36</sup> Residual versus

fitted plots were visually reviewed to assess homoscedasticity and functional form (i.e. linear relationship). Multicollinearity statistics were run and confirmed that the friend and parent responses to social support for healthy eating scales or the support for unhealthy eating questionnaire items did not result in problematic collinearity. Alpha was set at  $p < 0.05$ .

## Results

### Sample Characteristics

The sample was 53% female, predominately African American, with a mean age of  $12.3 \pm 1.5$  years, and 68% from households reporting annual incomes of less than \$30,000/year (Table 1). The mean and standard deviation of the HEI score of the sample was  $55.5 \pm 9.6$  (range: 30.5-80.1), and 42% of the sample was classified as overweight or obese.

### Perceived Social Support from Friends for Healthy and Unhealthy Eating

Table 2 shows the distribution of responses to each of the questions for social support for healthy and unhealthy eating from friends and parents. Over 60% of the sample reported their friends 'never' or 'rarely' provided social support for each of the 4 questions related to healthy eating. Related to support for unhealthy eating, 47% and 49% of participants reported that their friends offered them high-fat foods or sweets, or said nice things about the high-fat foods or sweets they were eating, 'often' or 'very often', respectively. Youth reported that their friends encouraged them to eat high-fat foods or sweets less frequently, with 28% reporting this happening 'often' or 'very often'.

### Perceived Social Support from Parents for Healthy and Unhealthy Eating

Most youth reported that their parents 'often' or 'very often' provide support for 3 out of the 4 questions in the healthy eating support questionnaire (Table 2). Youth reported that for the most part, parents did not support unhealthy eating behaviors, with more than 40% reporting that their parents 'never' or 'rarely' offer them high-fat foods or sweets or said nice things about the high-fat foods or sweets they may be eating. Most youth also felt that parents did not encourage them to eat high fat foods or sweets, with more than 75% of youth reported that this happened 'rarely' or 'never'.

### Perceived Social Support from Parents and Friends and HEI Scores

No relationship was found between friend or parent social support for healthy eating and overall HEI scores (Table 3). There was a statistically significant inverse relationship between parents' offering youth high-fat food or sweets and HEI scores ( $\beta = -1.65$ ;  $SE = 0.52$ ; 95% CI:  $-2.66$  to  $-0.63$ ;  $p = 0.002$ ). No relationships were found between HEI scores and parents or friends encouraging youth to eat high fat foods or sweets or saying nice things about high fat foods or sweets (Table 4).

## Discussion

This study provides new insight on social support for healthy and unhealthy eating behavior and diet quality in low-income, urban, African American youth. While some variation

existed, youth generally perceived their friends to provide support for unhealthy eating more frequently, and support for healthy eating less frequently. The opposite pattern emerged for parents, with youth reporting that parents provided support for healthy eating more frequently and support for unhealthy eating less frequently, which is consistent with the previous study that measured these constructs.<sup>20</sup>

The results of the regression analyses examining parent and friend support for healthy eating did not follow the research team's a priori hypotheses, as they found no significant relationships with HEI scores. This is consistent with the findings of Fitzgerald and colleagues<sup>20</sup> but not others that have investigated similar relationships between support for healthy eating and FV intake<sup>15,16,18</sup>. Two of the 3 regression models examining support for unhealthy eating questionnaire items did not find significant results. The regression model that assessed youth-reported frequency of parents offering high fat foods or sweets found that youth who reported that their parents offered them these foods less frequently had higher overall HEI scores.

### Limitations

One limitation is the cross sectional design, which limits the conclusions that can be drawn from this analysis. Cross sectional data only allow for descriptions of the associations between the variables assessed, but can make no claims about causality. Another limitation of this analysis is the ability to measure social support of unhealthy eating. The social support questionnaires used in this assessment are taken directly from the only other study that has examined social support for both healthy and unhealthy eating in adolescents.<sup>20</sup> This study used scales based on validated measures,<sup>27</sup> that were adapted for both use in adolescents<sup>19</sup> and for measurement of support for both healthy and unhealthy eating.<sup>20</sup> While these constructs are novel and important, the measurements used to assess them need to be improved. The low Cronbach's alphas for social support for unhealthy eating questionnaires indicates issues with internal consistency, so much so that the combined scores for support for unhealthy eating were not used in this study, but rather assessed by examining each question of the scale separately. The results of this study should be interpreted with this limitation in mind. Development and validation of improved scales using sophisticated techniques<sup>38</sup> has the potential to both clarify some of the disagreement seen in previous studies that measure social support for healthy eating, and assess new constructs associated with social support for unhealthy eating.

In addition, accurate collection of dietary data is difficult without requiring procedures that are overly burdensome or cost prohibitive. In this analysis, FFQ data was used to calculate diet quality scores, and it is possible that the FFQ measures overestimated dietary intake.<sup>39,40</sup> In the instance of this analysis, this is not particularly problematic because the HEI scores still allow for consistent ranking of diet quality among the participants, however this limits the transferability of the results to other samples. Additional research is needed to further explore and clarify these relationships with improved measures that assess multiple dimensions, sources, situations, and types of social support provided to adolescents along with other relevant factors to gain additional insight into drivers of diet quality among all adolescents.

## Implications for Research and Practice

Traditionally nutrition interventions have focused on individual behaviors, and have taken a limited view on the scope of influence that social relationships play. The results presented here indicate that there may be important dynamics occurring between youth and their parents related to support for unhealthy eating, in the form of parents offering youth high fat foods and sweets, which was found to be associated with differences in diet quality in this study. This finding is interesting and important because the behavior of parents offering their adolescents high fat foods or sweets is a potential target for nutrition interventions. Parents may be unaware of the frequency in which they offer their children high fat foods or sweets, and how this may be related to their child's diet quality. In addition, it is important to consider the interpretation of the results of these analyses through a socio-cultural lens. The sample of this study was predominately African American and low-income. Given the evidence that there may be preference for a larger body weight/shape in the African American culture,<sup>37</sup> additional studies should be conducted in other populations to determine if these results persist.

These analyses provide additional insight into the relationship between social support for healthy and unhealthy eating from parents and friends, but many questions remain. Moving forward it may be important for researchers to expand their conceptualization of social support to examine parents' behaviors that may be perceived by youth as supporting unhealthy eating, and to engage parents in being more mindful of their practices in offering food to their children. To aid in assessing and increasing awareness of support for unhealthy eating, further work needs to go into strengthening the reliability and validity of social support measures, including increasing the number of dimensions or types of social support (i.e. support for healthy versus unhealthy eating) examined in such measures.

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## References

1. Holman DM, White MC. Dietary behaviors related to cancer prevention among pre-adolescents and adolescents: the gap between recommendations and reality. *Nutr J*. 2011; 10:60. doi: 10.1186/1475-2891-10-60. [PubMed: 21631948]
2. Wang Y, Jahns L, Tussing-Humphreys L, et al. Dietary intake patterns of low-income urban african-american adolescents. *J Am Diet Assoc*. 2010; 110(9):1340–5. doi:10.1016/j.jada.2010.06.005. [PubMed: 20800126]
3. Bruening M, MacLehose R, Eisenberg ME, Nannery MS, Story M, Neumark-Sztainer D. Associations between sugar-sweetened beverage consumption and fast-food restaurant frequency among adolescents and their friends. *J Nutr Educ Behav*. 46(4):277–85. doi:10.1016/j.jneb.2014.02.009. [PubMed: 24735768]
4. Larson N, Dewolfe J, Story M, Neumark-Sztainer D. Adolescent consumption of sports and energy drinks: linkages to higher physical activity, unhealthy beverage patterns, cigarette smoking, and screen media use. *J Nutr Educ Behav*. 46(3):181–7. doi:10.1016/j.jneb.2014.02.008. [PubMed: 24809865]



5. Kirkpatrick SI, Dodd KW, Reedy J, Krebs-Smith SM. Income and race/ethnicity are associated with adherence to food-based dietary guidance among US adults and children. *J Acad Nutr Diet*. 2012; 112(5):624–635.e6. doi:10.1016/j.jand.2011.11.012. [PubMed: 22709767]
6. Eagle TF, Sheetz A, Gurm R, et al. Understanding childhood obesity in America: linkages between household income, community resources, and children's behaviors. *Am Heart J*. 2012; 163(5):836–43. doi:10.1016/j.ahj.2012.02.025. [PubMed: 22607862]
7. Wang Y, Beydoun MA. The obesity epidemic in the United States--gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiol Rev*. 2007; 29:6–28. doi:10.1093/epirev/mxm007. [PubMed: 17510091]
8. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA*. 2014; 311(8):806–14. doi:10.1001/jama.2014.732. [PubMed: 24570244]
9. Heaney, C.; Isreal, B. Social Networks and Social Support. In: Glanz, K.; Rimer, B.; Viswanath, K., editors. *Health Behavior and Health Education: Theory, Research, and Practice*. 4th. Jossey-Bass; San Francisco: 2008. p. 189-210.
10. McAlister, A.; Perry, C.; Parcel, G. How individuals, environments, and health behaviors interact: Social Cognitive Theory. In: Glanz, K.; Rimer, B.; Viswanath, K., editors. *Health Behavior and Health Education: Theory, Research, and Practice*. 4th. Jossey-Bass; San Francisco: 2008. p. 169-188.
11. Shaikh AR, Yaroch AL, Nebeling L, Yeh M-C, Resnicow K. Psychosocial predictors of fruit and vegetable consumption in adults a review of the literature. *Am J Prev Med*. 2008; 34(6):535–543. doi:10.1016/j.amepre.2007.12.028. [PubMed: 18471592]
12. Gorin A, Phelan S, Tate D, Sherwood N, Jeffery R, Wing R. Involving support partners in obesity treatment. *J Consult Clin Psychol*. 2005; 73(2):341–3. doi:10.1037/0022-006X.73.2.341. [PubMed: 15796642]
13. Prochaska JJ, Rodgers MW, Sallis JF. Association of parent and peer support with adolescent physical activity. *Res Q Exerc Sport*. 2002; 73(2):206–10. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/12092896>. Accessed February 16, 2014. [PubMed: 12092896]
14. McClain AD, Chappuis C, Nguyen-Rodriguez ST, Yaroch AL, Spruijt-Metz D. Psychosocial correlates of eating behavior in children and adolescents: a review. *Int J Behav Nutr Phys Act*. 2009; 6:54. doi:10.1186/1479-5868-6-54. [PubMed: 19674467]
15. Zabinski MF, Daly T, Norman GJ, et al. Psychosocial correlates of fruit, vegetable, and dietary fat intake among adolescent boys and girls. *J Am Diet Assoc*. 2006; 106(6):814–21. doi:10.1016/j.jada.2006.03.014. [PubMed: 16720122]
16. Di Noia J, Byrd-Bredbenner C. Adolescent fruit and vegetable intake: influence of family support and moderation by home availability of relationships with afrocentric values and taste preferences. *J Acad Nutr Diet*. 2013; 113(6):803–8. doi:10.1016/j.jand.2013.02.001. [PubMed: 23545060]
17. Stephens LDA, McNaughton SA, Crawford D, MacFarlane A, Ball K. Correlates of dietary resilience among socioeconomically disadvantaged adolescents. *Eur J Clin Nutr*. 2011; 65(11): 1219–32. doi:10.1038/ejcn.2011.107. [PubMed: 21697821]
18. Young EM, Fors SW, Hayes DM. Associations between perceived parent behaviors and middle school student fruit and vegetable consumption. *J Nutr Educ Behav*. 36(1):2–8. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/14756976>. Accessed February 16, 2014. [PubMed: 14756976]
19. Stanton CA, Green SL, Fries EA. Diet-specific social support among rural adolescents. *J Nutr Educ Behav*. 39(4):214–8. doi:10.1016/j.jneb.2006.10.001. [PubMed: 17606247]
20. Fitzgerald A, Heary C, Kelly C, Nixon E, Shevlin M. Self-efficacy for healthy eating and peer support for unhealthy eating are associated with adolescents' food intake patterns. *Appetite*. 2013; 63:48–58. doi:10.1016/j.appet.2012.12.011. [PubMed: 23268111]
21. Elder JP, Ayala GX, Harris S. Theories and intervention approaches to health-behavior change in primary care. *Am J Prev Med*. 1999; 17(4):275–284. doi:10.1016/S0749-3797(99)00094-X. [PubMed: 10606196]
22. Gittelsohn J, Anderson Steeves E, Mui Y, Kharmats AY, Hopkins LC, Dennis D. B'More Healthy Communities for Kids: design of a multi-level intervention for obesity prevention for low-income

- African American children. *BMC Public Health*. 2014; 14:942. doi:10.1186/1471-2458-14-942. [PubMed: 25209072]
23. Cullen KW, Watson K, Zakeri I. Relative reliability and validity of the Block Kids Questionnaire among youth aged 10 to 17 years. *J Am Diet Assoc*. 2008; 108(5):862–6. doi:10.1016/j.jada.2008.02.015. [PubMed: 18442512]
  24. Marshall TA, Eichenberger Gilmore JM, Broffitt B, Stumbo PJ, Levy SM. Relative validity of the Iowa Fluoride Study targeted nutrient semi-quantitative questionnaire and the block kids' food questionnaire for estimating beverage, calcium, and vitamin D intakes by children. *J Am Diet Assoc*. 2008; 108(3):465–72. doi:10.1016/j.jada.2007.12.002. [PubMed: 18313429]
  25. Smith C, Fila S. Comparison of the Kid's Block Food Frequency Questionnaire to the 24-hour recall in urban Native American youth. *Am J Hum Biol*. 18(5):706–9. doi:10.1002/ajhb.20475. [PubMed: 16917884]
  26. Kuczmarski R, Ogden C, Guo S, et al. 2000 CDC Growth Charts for the United States: Methods and Development. *Vital Heal Stat*. 2002; 246(11)
  27. 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 (Baltim)*. 1987; 16(6):825–36. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/3432232>. Accessed November 14, 2014.
  28. Bland JM, Altman DG. Statistics notes: Cronbach's alpha. *BMJ*. 1997; 314(7080):572–572. doi: 10.1136/bmj.314.7080.572. [PubMed: 9055718]
  29. Guenther PM, Casavale KO, Reedy J, et al. Update of the Healthy Eating Index: HEI-2010. *J Acad Nutr Diet*. 2013; 113(4):569–80. doi:10.1016/j.jand.2012.12.016. [PubMed: 23415502]
  30. Guenther PM, Kirkpatrick SI, Reedy J, et al. The Healthy Eating Index-2010 Is a Valid and Reliable Measure of Diet Quality According to the 2010 Dietary Guidelines for Americans. *J Nutr*. 2014 doi:10.3945/jn.113.183079.
  31. Sattler M, Hopkins L, Anderson Steeves E, et al. Characteristics of Youth Food Preparation in Low-Income, African American Homes: Associations with Healthy Eating Index Scores. *Ecol Food Nutr*. 2015:1–17. doi:10.1080/03670244.2014.1001982.
  32. Black MM, Hager ER, Le K, et al. Challenge! Health promotion/obesity prevention mentorship model among urban, black adolescents. *Pediatrics*. 2010; 126(2):280–8. doi:10.1542/peds.2009-1832. [PubMed: 20660556]
  33. Patrick H, Nicklas TA. A review of family and social determinants of children's eating patterns and diet quality. *J Am Coll Nutr*. 2005; 24(2):83–92. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/15798074>. Accessed November 14, 2014. [PubMed: 15798074]
  34. Pearl, J. *Causality: Models, Reasoning, and Inference*. 2nd. Cambridge University Press; 2009.
  35. Nicklas TA, Yang S-J, Baranowski T, Zakeri I, Berenson G. Eating patterns and obesity in children. The Bogalusa Heart Study. *Am J Prev Med*. 2003; 25(1):9–16. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/12818304>. Accessed September 25, 2015. [PubMed: 12818304]
  36. Weisberg, S. *Applied Linear Regression*. John Wiley & Sons; 2005. Available at: <https://books.google.com/books?hl=en&lr=&id=xd0tNdFOOjC&pgis=1>. Accessed September 25, 2015
  37. Becker DM, Yanek LR, Koffman DM, Bronner YC. Body image preferences among urban African Americans and whites from low income communities. *Ethn Dis*. 1999; 9(3):377–386. Available at: <http://www.scopus.com/inward/record.url?eid=2-s2.0-0033182562&partnerID=tZotx3y1>. [PubMed: 10600060]
  38. DeVellis, R. *Scale development: Theory and applications*. Sage Publications; 2003.
  39. Cade J, Thompson R, Burley V, Warm D. Development, validation and utilisation of food-frequency questionnaires - a review. *Public Health Nutr*. 2002; 5(4):567–87. doi:10.1079/PHN2001318. [PubMed: 12186666]
  40. Burrows TL, Martin RJ, Collins CE. A systematic review of the validity of dietary assessment methods in children when compared with the method of doubly labeled water. *J Am Diet Assoc*. 2010; 110(10):1501–10. doi:10.1016/j.jada.2010.07.008. [PubMed: 20869489]

**Table 1**

Anthropometric and Sociodemographic Characteristics of the BHCK Youth Sample (n=278)

<b>Gender, n(%)</b>	
Female	146(53%)
<b>Age (M±SD)<sup>a</sup></b>	
	12.3±1.5
<b>Race, n(%)</b>	
Black, African American	252(91%)
Mixed race	23(8%)
Other race	3(1%)
<b>Ethnicity, n(%)</b>	
Hispanic / Latino	11(4%)
<b>BMI Category, n(%)<sup>b</sup></b>	
Underweight	3(1%)
Normal weight	157(57%)
Overweight	52(19%)
Obese	64(23%)
<b>Overall HEI Scores</b>	
M±SD	55.5±9.6
Sample range	30.5-80.1
<b>Household Income (\$/year), n(%)<sup>c</sup></b>	
0-10,000	75(27%)
10,0001-20,000	56(20%)
20,0001-30,000	58(21%)
More than 30,001	75(27%)
Did not respond	14(5%)

<sup>a</sup>M±SD = Mean±Standard deviation<sup>b</sup>Classified by BMI-for-Age percentiles from CDC growth charts<sup>c</sup>Self-reported by caregivers

**Table 2**

Youth's Responses to Social Support Questions measuring Friend's and Parent's Support for Healthy and Unhealthy Eating, and Support for Healthy Eating Questionnaire Summed Scores (n=278)

How often do your friends/parents:	Relationship	Never (%)	Rarely (%)	Sometimes (%)	Often (%)	Very Often (%)
Questions related to support for healthy eating:						
Give you ideas on how to eat healthier foods?	Friends	45	21	21	7	7
	Parents	5	9	35	29	23
Offer you low-fat snacks?	Friends	40	22	19	12	7
	Parents	11	13	33	29	15
Encourage you to stay away from high-fat foods or sweets?	Friends	51	17	17	10	5
	Parents	8	11	25	25	31
Talk with you about eating more healthy foods?	Friends	47	15	19	12	6
	Parents	8	10	26	22	35
Questions related to support for unhealthy eating:						
Offer you high-fat foods or sweets?	Friends	15	13	26	25	22
	Parents	21	27	37	9	6
Encourage you to eat high-fat foods or sweets?	Friends	28	18	27	18	10
	Parents	50	27	16	6	2
Say nice things about the sweet or high fat foods you were eating?	Friends	17	12	22	20	29
	Parents	27	19	30	14	10
<b>Social Support for Healthy Eating Questionnaire Summed Scores (range 0-16)<sup>a</sup></b>						Total (M±SD)
Friend Support for Healthy Eating						4.6±3.9
Parent Support for Healthy Eating						10.1±3.4

<sup>a</sup>Scores are summed responses to the 4 support for healthy eating questions using a 5-point likert response rating how often friends/parents perform tasks from never=0 to very often=4.

**Table 3**

Associations between Perceived Social Support from Parents and Friends for Healthy Eating Behaviors and HEI Scores Overall (n=278)<sup>a</sup>

Support for Healthy Eating	HEI Index Score		
	$\beta$	Std. Err.	P-value
Parent Support for Healthy Eating	0.27	0.18	0.13
Friend Support for Healthy Eating	0.15	0.16	0.35

<sup>a</sup>Higher HEI scores imply better diet quality. The model was controlled for age, gender, race, and household income. Age was entered as a continuous variable (range 9.45-15.28). Race was entered as 1= African American, 0= not African American. Household income was entered as a dummy variable with the units where 0=0-10,000; 1=10,001-20,000; 2=20,001-30,000; 3=30,001+; 4=participant declined to respond. Social support for healthy eating measures were entered a continuous variables (range 0-16). Interaction terms (friend support for healthy eating\*parent support for healthy eating; friend support for healthy eating\*gender; parent support for healthy eating\*gender) were tested, but removed from the models due to lack of significance.

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**Table 4**

Associations between Perceived Social Support for Unhealthy Eating Questionnaire Items and HEI Overall Scores (n=278)<sup>a</sup>

Dependent Variable	HEI Overall Score		
	$\beta$	Std. Err.	P-value
<b>Questionnaire Item 1: How often do your:</b>			
Parents: Offer you high-fat foods/sweets	-1.65	0.52	0.002
Friends: Offer you high-fat foods/sweets	0.10	0.43	0.82
<b>Questionnaire Item 2: How often do your:</b>			
Parents: Encourage you to eat high-fat foods/sweets	-0.78	0.57	0.18
Friends: Encourage you to eat high-fat foods/sweets	0.61	0.45	0.18
<b>Questionnaire Item 3: How often do your:</b>			
Parents: Say nice things about high-fat foods/sweets you are eating	-0.80	0.49	0.10
Friends: Say nice things about high-fat foods/sweets you are eating	0.77	0.43	0.08

<sup>a</sup>Higher HEI scores imply better diet quality. All models were controlled for age, gender, race, and household income. Age was entered as a continuous variable (range 9.45-15.28). Race was entered as 1= African American, 0= not African American. Household income was entered as a dummy variable where 0=0-10,000; 1=10,001-20,000; 2=20,001-30,000; 3=30,001+; 4=participant declined to respond. HEI Index overall scores were entered as continuous variables (range 0-100). Social support scores were entered as continuous variables (range 0-4), analysis checks were conducted to assure scale mimicked continuous distribution. Interaction terms (friend support for each question\*parent support for each question; friend support for each question\*gender; parent support for each question\*gender) were tested, but removed from the models due to lack of significance