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Predictors of Snack Food Consumption Among Upper Elementary Children Using Social Cognitive Theory

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This study examined the extent to which the constructs of social cognitive theory (SCT) can predict snack food consumption among elementary school-age children. A valid and reliable 22-item instrument was administered to 212 children. Snack food consumption was evaluated by asking children to recall and report all foods consumed outside of meals in the previous 24 hours. On average, the children consumed 513 calories from snack foods per day. Most came from sugar-sweetened beverages and calorically dense snacks. Fruit and vegetable snacks were positively predicted by self-control ($R^2 = 0.017$), and sugar-sweetened beverage snacks were negatively predicted by self-control ($R^2 = 0.022$). SCT is a prominent theory in health education and promotion. The findings suggest that self-control may be an important construct to snack food intake.

Keywords: *childhood obesity, snack foods, social cognitive theory*

Introduction

Childhood obesity continues to be a major issue not only in the United States, but also globally. Currently, 31.9% of children and adolescents in the United States are either overweight or obese. In other parts of the world, the prevalence is 23.5% among Eastern Mediterranean children, 25.5% among European children, and 10.6% among Southeast Asian children (Ogden, Carroll, & Flegal, 2008; Kosti & Panagiotakos, 2006). Obesity is an associated risk factor for many chronic diseases, including Type 2 diabetes. Harris, Pomeranz, Lobstein, and Brownell (2009) projected that in the next 25 years, the prevalence of Type 2 diabetes will rise by 36.5% in the United States, 75.5% in China, and 134% in India. Between 2001 and 2005, the annual costs in the United States associated with the hospitalization of children with a diagnosis related to obesity nearly doubled from $125.9 million to $237.6 million (Trasande, Liu, Fryer, & Weitzman, 2009). Medicaid alone paid for $118.1 million of these expenses in 2005, which was up from $53.6 million in 2001 (Transande et al., 2009).

Obesity has been recognized as being multicausative in nature, with elements of the home environment (e.g., authoritarian feeding styles), school environment (e.g., low access to and participation in physical education classes), and community environment (e.g., fewer large supermarkets) all contributing to its development (Harper, 2006; Kumanyika & Grier, 2006; Patrick & Nicklas, 2005). Characteristics of individuals' lifestyles, such as physical inactivity and

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unbalanced eating patterns, have also been identified as common risk factors. In a cross-sectional study evaluating physical activity patterns among children in Grade 6, Trost, Kerr, Ward, and Pate (2001) found that the overweight children participated in significantly fewer moderate and vigorous physical activities and engaged in fewer continuous 5-, 10-, and 20-minute bouts of such activities.

Dietary behaviors associated with obesity among children include the overconsumption of refined carbohydrates, dietary fat, and sugar-sweetened beverages, as well as the consumption of energy-dense foods and large portion sizes (Daniels, Jacobson, McCrindle, Eckel, & Sanner, 2009). Some studies have been conducted using social cognitive theory (SCT) to predict such behaviors, including physical activity behavior, consumption of water instead of sugar-sweetened beverages, limiting television viewing, and the consumption of fruits and vegetables (Murnan, Sharma, & Lin, 2006–2007; Sharma, Wagner, & Wilkerson, 2005–2006). One dietary behavior that has not been well studied is the consumption of snack foods. During the past few decades, snacking has increased among all age groups, including children and adolescents (Sebastian, Cleveland, & Goldman, 2008). Children consume approximately 25% of their total daily calorie intake in the form of snack foods (Jahns, Siega-Riz, & Popkin, 2001), and 91% have reported snacking at least once per day (Savige, Macfarlane, Ball, Worsley, & Crawford, 2007). Snack foods also tend to have greater energy density, so when they are consumed, they are less satiating, making them easy to passively overconsume (McCaffrey et al., 2008).

According to the American Dietetic Association's (ADA, 2010) evidence library, a collection of the best and most current answers for dietetic practice questions, snacking frequency and snack food intake in relation to childhood obesity hold only a Grade III evidence rating, indicating that snacking and weight status may or may not be associated. It is likely that this poor evidence grade was given because of the many definitions used to operationally define snack foods. Some researchers have defined snack foods as certain types of foods (e.g., sugar-sweetened beverages, energy-dense foods), whereas others have defined them as all foods eaten between meals (ADA, 2010). For example, Phillips and colleagues (2004) examined the longitudinal relationship of energy-dense snack intake with body fat percentage among children, and Sugimori and colleagues (2004), studied how eating between meals related to weight status among children. Nevertheless, snack foods are an important area to target for health promotion.

Snack foods are heavily advertised to children. In a study evaluating Saturday morning television advertisements aimed at children, 91% of food advertisements were for foods high in fat, added sugar, and sodium, and which were nutrient poor (Batada, Seitz, Wootan, & Story, 2008). Of all foods advertised during this time, snack foods were the third highest advertised food (18%), behind ready-to-eat breakfast cereals (27%) and restaurant foods (19%). One hundred percent of the snack foods were high in fat, sugar, and sodium (Batada et al., 2008).

Snack foods are also relatively cheap, making them easier to attain. In an observational study of children in Grades 4 to 6, Borradaile et al. (2009) found that when children bought snacks from a corner store before and after school, their average expenditure was only $1.07. This bought them, on average, 2.1 food/beverage items that averaged 356.6 calories. Snack foods have also been targeted at the policy level. The Institute of Medicine (2007) recommended that elementary schools should offer only fruits and vegetables as snacks in cafeterias. Since the publication of the Institute of Medicine report, 20 states have passed legislation, executive orders, and/or regulations to regulate foods sold in public schools that do not meet the nutrition standards that all foods under the National School Lunch Program must follow (Gonzalez, Jones, & Frongillo, 2009).

In addition to current policies being implemented, health education strategies to facilitate behavioral changes are needed. These strategies should be theory-based because theories discern measurable program outcomes, specify methods for behavioral changes, enhance communication between and among professionals, and improve future replication (Sharma & Romas, 2008). SCT is a popular and effective theory currently used in health education and health promotion. In a recent review of randomized controlled trials designed to favorably impact nutrition and physical activity behaviors among children, only four studies showed statistically or clinically significant improvements. Among the programs evaluated in these studies, two targeted snack food intake—the Coordinated Approach to Child Health (or CATCH) program and the Planet Health program. Neither study, however, included snacking in the evaluation plan. Thomas (2006) also noted that the programs from all four studies were either implicitly or explicitly based upon SCT. Primary constructs of SCT include self-efficacy, self-control, and outcome expectations and expectancies (Bandura, 2004). The purpose of this study was to determine whether the constructs of SCT could predict snack food consumption among school-aged children, which will help to provide direction for future theory-based health-promoting interventions.

Materials and Methods

Design

This study followed a cross-sectional design. Data were collected from children in Grades 4 and 5 in a public Midwestern school district. According to 2006–2007 statistics from the National Center for Education Statistics, students attending these schools are racially and ethnically diverse, with 40% White, 30% Black or African American, 13% Hispanic, 3% Asian, and 14% Other. Also, 42% of the children in these schools are eligible for the federal free or reduced lunch program (National Center for Education Statistics, 2009). Parent permission forms were distributed and collected from the children, and those children were then asked to give their written assent to participate in the study. Inclusion criteria for this study required the children to be in Grade 4 or Grade 5 at the targeted primary schools and for both children and parents to speak and read English because all forms used in this study were available only in English. It was decided to include all Grade 4 and Grade 5 children in the study, irrespective of weight.

Instrumentation

A 22-item survey was used to evaluate the constructs of the SCT (see Appendix). Constructs were measured on a 5-point Likert scale, with each construct having a unique response category. Response categories were 1 (*not at all sure*), 2 (*a little sure*), 3 (*moderately sure*), 4 (*very sure*), and 5 (*completely sure*). Ten items were used to evaluate two types of self-efficacy: self-efficacy for choosing healthier snack foods (four items) and self-efficacy for overcoming barriers to choose healthier snack foods (six items). All self-efficacy items started with the phrase, "How sure are you that you can," which was followed by a root phrase.

Self-control was evaluated using six items, whereby children reported how often they enacted self-regulatory behaviors such as planning and reminding themselves to consume healthier snack foods. Response categories for these items were 1 (*never*), 2 (*hardly ever*), 3 (*sometimes*), 4 (*almost always*), and 5 (*always*). All self-control items started with the phrase, "How often in the past week did you," which was followed by a root phrase.

Outcome expectations were evaluated using three items, and the children reported how often an anticipatory outcome may happen when they consume a healthier snack food. All outcome

expectation items started with the phrase, "If I eat lower calorie snack foods," which was followed by a root phrase. Response categories for these items were the same as the Self-Control subscale.

Finally, outcome expectancies were evaluated using the same three expectations from the previous subscale. All outcome expectancy items started with the phrase, "How important is it that you," which was followed by a root phrase. Children reported how important these expectancies were to them using the response categories of 1 (*not at all important*), 2 (*a little important*), 3 (*moderately important*), 4 (*very important*), and 5 (*extremely important*). The children understood all response categories because these options have been used in previously validated measures reported for this age group (Sharma et al., 2006).

Before the survey was administered, it was evaluated for face and content validity by a panel of six experts who had backgrounds in instrument development, child development, nutrition, and SCT. The assessment included two rounds of review, whereby the panel gave initial suggestions about appearance, item content, wording, and sentence structure in the first round. After changes were made, the instrument was reevaluated by the panel in the second round, and final comments were given.

Snack food consumption was evaluated by asking the children to recall and report all foods consumed outside of breakfast, lunch, and dinner in the previous 24 hours. Before the children answered questions pertaining to the SCT constructs, there was a set of lines on each instrument. A dietitian then led the children through a similar process as the U.S. Department of Agriculture's (USDA's) five-step multiple-pass method for collecting 24-hour recalls (as cited in Conway, Ingwersen, & Moshfegh, 2004). The children were first prompted to make a small list of all foods eaten between meals. They were then asked to recall forgotten foods, such as ketchup with French fries or milk on cereal. Then the dietitian went through the children's previous day's activities to further prompt any forgotten foods. Finally, the children were asked to be as specific as possible about the foods and drinks that they reported. For example, the children were asked about the amount of the food that they had actually eaten or whether a particular beverage was in a can, a bottle, or a large or small cup.

Foods were then entered into the USDA's National Nutrient Database for Standard Reference (Release 18), and total calories were summated. Next, snack foods were subcategorized into four groups of calorie source: (a) calorically dense but nutrient-poor snack foods (i.e., snack foods with a high number of calories but few essential nutrients), (b) sugar-sweetened beverages, (c) fruits and vegetables, and (d) all other. Calories were used as an indicator of snack food consumption because they are more sensitive to snack food type and portion size.

Reliability measures of the instrument used included Cronbach's alpha for internal consistency reliability and a Pearson product-moment correlation coefficient for test-retest reliability. Of the five subscales, three had adequate internal reliability (Self-Control, $\alpha = 0.85$; Self-Efficacy for Barriers, $\alpha = .79$; Self-Efficacy for Eating Healthier Snack Foods, $\alpha = .079$), and two were slightly lower than desirable (Outcome Expectancies, $\alpha = 0.66$; Outcome Expectations, $\alpha = 0.64$), but the Cronbach's alpha was greater than 0.60 for all the scales. Test-retest coefficients also were mixed, with two subscales having adequate measures (Outcome Expectations = 0.85; Self-Control = 0.70), and three were lower than desirable (Outcome Expectancies = 0.65; Self-Efficacy for Eating Healthier Snack Foods = 0.62; Self-Efficacy for Barriers = 0.49).

Confirmatory factor analysis using maximum likelihood estimation was used to determine construct validity. Screen plots and eigenvalues ranging from 1.1 to 2.9 indicated a one-factor solution for each

construct subscale. Each item loaded significantly on its given subscale, with all loadings greater than the a priori critical limit of 0.36 (Stevens, 1996).

Sample Size

An a priori sample size of 197 was calculated. The parameters for calculating sample size included an alpha of 0.05, power of 0.80, and effect size of 0.20 (Polit & Hungler, 1999).

Data Analysis

All data were analyzed by The Statistical Package for the Social Sciences version 16.0 (SPSS, Chicago, IL). Stepwise multiple regression was used to model the predictors of total snack food consumption and then for each subcategory of snack foods. The a priori criterion to enter the predictor model was set at an alpha of 0.05, and the criterion to be removed from the model was an alpha of 0.10. Predictors used included age, gender, race, self-efficacy for eating healthier snack foods, self-efficacy for overcoming barriers for eating healthier snack foods, self-control for eating healthier snack foods, and expectations/expectancies for eating healthier snack foods.

Results

The instrument was administered to 212 children in Grades 4 and 5, 38 of whom agreed to retake the instrument 1 week later to measure test-retest reliability. More female (59%) than male (41%) children participated in the study. The mean age of the children was 9.75 years (SD = 0.98). The sample was racially diverse, with 39% White or Caucasian, 23.3% Black or African American, 18.1% Hispanic, and 19.7% Other, which included Asian American children and children of mixed race and ethnicity. On average, the children consumed 513 calories from snack foods per day. The sources of calories from specific food groups are presented on Table 1.

Table 1: *Means and Standard Deviations of Total Calories From Snack Foods and Sources of Snack Foods*

Category	*M*	*SD*	Percentage of total snack calories*
Typical snack foods (e.g., chips, cookies, candy)	228	218	44%
Sugar sweetened beverages (e.g., fruit punch, soda)	67	113	13%
Fruits & vegetables (not including 100% juices)	35	66	7%
100% fruit juices	19	42	4%
Milk & other dairy	33	67	6%
All other foods	130	182	25%
Total calories from snack foods	513	356	100%

Note: *All subgroups summate to 99% due to rounding

Means and standard deviations for the constructs of the SCT are presented in Table 2. All constructs were slightly higher than in the middle of the range.

Table 2: *Means and Standard Deviations of Scores of SCT Constructs*

Category	*n*	Minimum	Maximum	*M*	*SD*
Self-efficacy for eating healthy snack foods	202	4	20	14.54	4.21
Self-efficacy for overcoming barriers for eating healthy snack foods	203	6	30	21.17	5.33
Expectations for eating healthy snack foods	208	10	100	60.94	19.25
Self-control for eating healthy snack foods	196	6	30	18.36	5.79

There were no significant predictors for total snack foods intake or from calorically dense but nutrient-poor snack foods. Table 3 summarizes the parameter estimates from the stepwise regression for the total calories from fruits and vegetables.

Table 3: *Parameter Estimates From Final Regression Model for Calories From Fruits and Vegetables as Predicted by Total Self-Control (Adjusted* R^2 *= 0.017;* n *= 178)*

	Unstandardized coefficients β	Standard error	Standardized coefficients β	*t*	*p*-value
Constant	3.777	15.72	--	--	--
Self Control	1.674	0.825	0.149	1.995	0.04

Table 4 summarizes parameter estimates for the total calories from sugar-sweetened beverages. Self-control was the only significant predictor for both types of snacks, accounting for 1.7% of the variance for fruits and vegetables and 2.2% of the variance for sugar-sweetened beverages.

Table 4: *Parameter Estimates From Final Regression Model for Calories From Sugar-Sweetened Beverages as Predicted by Total Self-Control: (Adjusted* R^2 *= 0.022;* n *=177)*

	Unstandardized coefficients β	Standard error	Standardized coefficients β	*t*	*p*-value
Constant	130.93	29.39	--	--	--
Self Control	-3.404	1.54	-0.165	-2.211	0.03

Discussion

As childhood obesity continues to rise, so does the need for innovative and effective theory-based interventions that can target such modifiable risk factors as diet and physical activity. The purpose of this study was to examine the extent to which selected SCT constructs (two types of self-efficacy: self-control and expectations) could predict the total snack food consumption and subcategories of snack foods among a sample of children in Grades 4 and 5. The results indicated that snacking is a major part of children's daily caloric intake. Energy-dense but nutrient-poor foods and sugar-sweetened beverages encompassed 57% of all snack foods consumed, whereas fruits, vegetables, and 100% fruit juice accounted for 11%, and foods and beverages in the dairy group only accounted for 6%.

The validity and reliability of the survey used in this study were measured, and most subscales were adequate for both. It is important to note, however, that some subscales did not meet the requirements for internal consistency and test-retest reliability measures. Investigators will measure this again in future studies, and if similar results are found, items will be revised to improve reliability.

To our knowledge, no researchers have reported findings showing how the constructs of SCT are related to snack food consumption. Previous studies that have reported other dietary behaviors associated with childhood obesity have found that some constructs of SCT appear more important than others. Sharma et al. (2006) reported that among children in the same age group, self-efficacy was identified as an important predictor for exercising daily and eating the correct number of fruits and vegetables, self-control was an important predictor for watching less television daily, and expectations were an important predictor for drinking eight glasses of water daily. Using a sample of children in Grade 3, Resnicow et al. (1997) reported expectations as a positive predictor for fruit and vegetable consumption.

In the case of calorically dense but nutrient-poor snack foods, it was unexpected that no construct was found as a significant predictor. This finding might suggest that consumption of these types of snack foods is more reliant on other factors that were not evaluated. For example, the availability and possibly the accessibility of such foods at schools or in their homes might be more important. Children also may not be aware of the amount of calorically dense but nutrient-poor snack foods that they eat because it can be easy to overly and passively consume them (McCaffrey et al., 2008).

When evaluating snack food consumption by children, using calories as an indicator of consumption appears to be an efficient method because it allows foods to be subcategorized qualitatively and accounts for portion size, which is a difficult task. Free programs such as the USDA's National Nutrient Database also make it easier to evaluate calories because the database has a relatively comprehensive list of foods and provides standard portion sizes and food types when descriptive information of the food is not available. A way to enhance the accuracy of recall when children report foods consumed on the previous day can be done with a validated method for using 24-hour recalls with food journals to assist children with memory recall (Lytle et al., 1993).

Finally, this study had some notable limitations. First, we did not randomly select the research participants, which could have introduced a sampling bias. For example, this was a racially diverse sample of children and was not representative of the U.S. population. The White/Caucasian children were underrepresented, and the Black or African American children were slightly overrepresented. It has not been well established that race is an important predictor of snack food consumption; therefore, more work is needed to clarify this issue.

Second, 1-day dietary recall was used to measure snack food consumption. Although this allowed us to evaluate total calories consumed from snack foods and categorize such foods into subgroups, the children were not always accurate in reporting types and sizes of consumed snack foods. In cases where the children were not specific, we used the "normal serving size" function offered in the USDA's National Nutrient Database. Snack foods are also sporadic by nature. Although meals typically happen three times a day, children could consume a large amount of snacks on some days and not consume any snack foods on others; however, because we sampled a relatively large number of children, we believe that variations of intake were accounted for.

Third, the instrument was self-report, which could have introduced measurement bias. Fourth, as previously mentioned, this study followed a cross-sectional design, and as such, nothing can be said

about the temporality of association. Finally, we did not include all constructs of the SCT. Although an advantage of the SCT is the comprehensive nature of the theory, in practice, there may be too many constructs to measure at once—especially with children, who have a shorter attention span than adults. Because self-efficacy is commonly believed to be the most important construct of the SCT, we measured two dimensions of self-efficacy (i.e., self-control and outcome expectancies and expectations) in this instrument. These two dimensions are also commonly measured and targeted in health education interventions. Future studies can build upon this instrument to include such constructs as situational perception, behavioral capabilities, emotional coping strategies, and the environment, which includes children's imposed, selected, and created environments.

Directions for Future Research

This study translates to current health education practice by identifying self-control as an important construct of the SCT that predicts two types of snack food consumption. Self-control was significantly positively associated with fruit and vegetable snack consumption and significantly negatively associated with sugar-sweetened beverage snack consumption. Ways to impact self-control include helping children to plan—not just passively eat—their snack foods and set goals for snacking and self-reward, preferably with a nonfood item, for accomplishing their goals. Even though self-control was significant in both accounts, however, it explained a rather small amount of the variance. This may have been an artifact of the low internal consistency and test-retest reliability scores found for some subscales.

To further improve this instrument, we recommend that the children read each question in a focus group setting and that feedback from them be solicited to further refine the questions. After changes are made, both reliability measures can be tested again using the same procedures as outlined in this study. Other constructs of the SCT not measured in this study may also be important for intervening in snack food consumption and should be tested as important mediating variables. It is likely to assume that environment, at home and at school, will play a large role in reducing the consumption of energy-dense but nutrient-poor snacks.

No constructs were significantly associated with total snack food consumption or calorically dense but nutrient-poor snack foods. This was not surprising for total snack food consumption. Many children reported mini meals, or smaller meals, as snack foods because they were eaten between the children's three main meals. As previously stated, because there is no standard definition for snack foods, it is difficult to evaluate them. Foods are usually categorized as being part of meals or snacks. Meals are typically cyclical in nature, that is, individuals who are hungry compensate by eating and then wait until they are hungry again to start the process over. Snacks are different and are commonly eaten when individuals are not hungry. Because appetite can be a learned response, eating four or five mini meals each day may be normal for some people, as it was with some children in this study (Graff, 2006). This study supports snacking as an important area for intervention in childhood obesity prevention efforts; however, when targeting snacking in health education and promotion efforts, focusing on types of snack foods rather than all foods eaten between major meals is recommended.

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Appendix

Survey: Promoting Healthy Snack Foods

University Of Cincinnati

Directions: This survey is voluntary, which means you may choose not to complete it or not to answer individual questions. Please put an X mark by the response that correctly describes your view. Thank you for your help!

Since yesterday at this time, make a list of all the snack foods you have eaten.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date of birth (mm/dd/yyyy): _____/_____/_____

Height (to nearest 1/8 inch): ____ feet _____inches _____ fraction of inch

Weight (to nearest ¼ pound): _____ pounds _____ fractions of a pound

How old are you today? _____

Are you a…? ☐ Boy ☐ Girl

What is your race? ☐ White ☐ Black or African American

☐ Asian ☐ American Indian

☐ Hispanic ☐ Other _____

The following questions will ask your thoughts about **LOWER** calorie snack foods and **HIGHER** calorie **SWEET** & **SALTY** snack foods.

Examples of **Lower Calorie** snack foods are fruits (like apples, grapes and pears), vegetables (like carrot sticks or celery sticks), pretzels, rice cakes, vanilla wafers, and graham crackers.

Examples of **Higher Calorie Salty** snack foods are potato chips, tortilla chips, Cheetos, and Doritos.

Examples of **Higher Calorie Sweet** snack foods are chocolate chip cookies, Oreo cookies, and candy bars.

Not At All Sure **A Little Sure** **Moderately Sure** **Very Sure** **Completely Sure**

How sure are you that you can...

1. eat a lower calorie snack food instead of a **higher calorie salty snack food** even if you do not like the taste? _____

2. eat a lower calorie snack food instead of a **higher calorie sweet snack food** even if you do not like the taste? _____

3. eat a lower calorie snack food instead of a **higher calorie salty snack food** even if you are really hungry? _____

4. eat a lower calorie snack food instead of a **higher calorie sweet snack food** even if you are really hungry? _____

5. eat a lower calorie snack food instead of a **higher calorie salty snack food** even if your friends do not eat them? _____

6. eat a lower calorie snack food instead of a **higher calorie sweet snack food** even if your friends do not eat them? _____

7. limit the amount of **higher calorie salty snack foods**?

   _____

8. limit the amount of **higher calorie sweet snack foods**?

   _____

9. read the calories on the food label for **higher calorie sweet snack foods**?

   _____

10. read the calories on the food label for **higher calorie salty snack foods**?

    _____

Never **Hardly Ever** **Sometimes** **Almost Always** **Always**

If I eat lower calorie snack foods . . .

11. I will feel better _____

12. I will have a healthy weight _____

13. I will feel satisfied _____

Not At All Important **A Little Important** **Moderately Important** **Very Important** **Extremely Important**

How important is it to you that you . . .

14. feel better _____

15. have a healthy weight _____

16. feel satisfied _____

Never Hardly Ever Sometimes Almost Always Always

How often in the past week did you . . .

17. plan to eat a lower calorie snack food instead of a **higher calorie salty snack food**?

    _____

18. plan to eat a lower calorie snack food instead of a **higher calorie sweet snack food**?

    _____

19. remind yourself to eat a lower calorie snack food instead of a **higher calorie salty snack food**? _____

20. remind yourself to eat a lower calorie snack foods instead of a **higher calorie sweet snack food**? _____

21. pay closer attention to the amount of calories that are in snack foods?

    _____

22. reward yourself with something other than food for eating a **lower calorie snack food**?

    _____

Thank you for your time!

The ***Journal of Social, Behavioral, and Health Sciences*** is an open-access, peer-reviewed, online interdisciplinary journal focusing on research findings that address contemporary national and international issues. Its objectives are to (a) encourage dialogue between scholars and practitioners in the social, behavioral, and health sciences that fosters the integration of research with practice; (b) promote innovative models of interdisciplinary collaboration among the social, behavioral, and health sciences that address complex social problems; and (c) inform the relationship between practice and research in the social, behavioral, and health sciences.

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