

**Using the Theory of Planned Behavior to Understand Drink Choices in Southwest Virginians**

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## ABSTRACT

**Background:** Between 1977 and 2002, the per capita intake of caloric beverages doubled in the United States, with most recent data from 2005–2006 showing that children and adults consume about 172 and 175 kcal daily, respectively, from sugar-sweetened beverages (SSB) (Brownell et al., 2009). Also, a high intake of SSB has been related to many adverse health outcomes including type 2 diabetes, obesity, dental caries and heart disease (Malik, Schulze, & Hu, 2006; Vartanian, Schwartz, & Brownell, 2007; Schulze et al., 2004; Ismail, Sohn, Lim, & Willem, 2009; Fung et al., 2009); however, few studies have explored factors that influence SSB consumption. In addition, no theory-based interventions have been implemented targeting this public health problem.

**Objective:** The primary objective of this study was to apply the Theory of Planned Behavior (TPB) (Ajzen, 1991) to investigate culturally specific attitudes, subjective norms and behavioral capabilities related to SSB, water, and artificially sweetened drink consumption among adults residing in rural Southwest Virginia. In addition, programmatic issues related to implementation of SSB interventions, including small group sessions and interactive voice response (IVR) technology was explored.

**Methods:** A total of 8 focus groups were completed with 54 participants. Each focus group took place with residents from one of the 11 identified rural Southwest Virginia counties. Four focus groups included individuals on city water and four contained residents on well water to investigate any discrepancies in attitudes, norms and perceived behavioral control related to the intake of various drinks. Participants needed to be at least 18 years of age, English speaking, and consume >1 cup of SSB per day. A semi-structured script guided by the TPB constructs was used to facilitate the focus group discussions. All focus groups were transcribed verbatim. Two researchers independently reviewed the transcripts and met to identify major themes and develop a coding system. Three researchers independently coded meaning units (MU) to the major themes and subsequently met to review codes and reconcile disagreements.

**Results:** The most notable themes that emerged included taste (n= 161 MU), availability/convenience (n= 95 MU), cost (n= 28 MU), and habit/addiction (n= 57 MU). Participants also continuously emphasized the importance of their doctor's advice and health concerns on their beverage choices. The majority of the participants (n=27 MU) indicated they would be willing to participate in a program with three small group sessions and phone calls, yet when asked specifically about receiving multiple interactive voice technology telephone messages, most participants said that they would not be receptive to an automated message (n=21 MU).

**Conclusions:** Collectively, these findings provide unique cultural insight to better understand the salient beliefs associated with beverage behaviors and helps inform intervention development and delivery in the targeted vulnerable region of Southwest Virginia.

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## CHAPTER 1

### Literature Review

#### *Sugar Sweetened Beverage Consumption*

Between 1977 and 2002, the per capita intake of caloric beverages doubled in the United States (Brownell et al., 2009; Duffey & Popkin, 2002.). The most recent data from 2005–2006 show that children and adults in the United States consume about 172 and 175 kcal daily, respectively, from sugar-sweetened beverages (SSB) (Brownell et al., 2009). It is estimated that these types of beverages account for 10% of total energy intake in adults (Nielsen & Popkin, 2004). SSB include soda, fruit drinks with added sugar, sports drinks, carbonated beverages with added sugar, sweet tea, energy drinks and other drinks with added sugar.

Sugar-sweetened beverage consumption has been related to many adverse health outcomes including obesity, type II diabetes, dental caries and heart disease (Malik, Schulze, & Hu, 2006; Vartanian, Schwartz, & Brownell, 2007; Schulze et al., 2004; Ismail, Sohn, Lim, & Willem, 2009; Fung et al., 2009). A systematic review, including many cross-sectional, prospective cohort and experimental studies has linked a greater consumption of SSB to weight gain and obesity (Malik et al., 2006). In a recent meta-analysis, Vartanian and colleagues (2007) also found a strong association between SSB intake and an increase in energy intake and body weight. Additionally, a positive association between SSB consumption and weight gain has been established, along with an increased risk for type 2 diabetes (Schulze et al., 2004). Because of the high glycemic load of SSB, consumption of these drinks would be expected to increase the risk of diabetes by causing insulin resistance and through direct effects on pancreatic islet cells. In contrast, non-caloric sweetened beverages have not shown this same effect (Ludwig, 2002; Yoshida et al., 2007). Sugar-sweetened beverage consumption has also been found to be a

significant predictor of dental carries (Ismail et al, 2009). In addition, it has been recognized through a prospective cohort study to increase the risk of coronary heart disease in women (Fung et al., 2009), adding to the list of undesirable health outcomes. This evidence indicates the overwhelming need for the reduced consumption of these beverages.

While SSB intake is rapidly increasing in the United States and health consequences are well documented, very few studies have carried out interventions exploring strategies to solve this escalating problem (Chen et al., 2009; Stookey, Constant, Popkin, & Gardner, 2008). Only two known experimental studies have examined the consumption of SSB in adult populations, and both have demonstrated a relationship between SSB intake and weight in adults (Chen et al., 2009; Stookey et al., 2008). The PREMIER trial, conducted by Chen and colleagues, was an 18-month randomized, controlled, behavioral intervention trial with 810 adult participants that was designed to test the blood-pressure lowering effects of two multi-component behavioral interventions (Chen et al., 2010). These interventions included a behavioral intervention group that received counseling on how to lose weight, increase physical activity and reduce intake of sodium, and another intervention group that was given the same counseling in addition to counseling on the DASH diet. Weight, height and a 24-hour diet recall were conducted at baseline, 6 months and 18 months. Findings indicated that reduced consumption of SSB was significantly associated with reduced blood pressure. Specifically, a reduction of 12 fluid ounces of SSB per day resulted in 1.8-mm Hg reduction in systolic blood pressure and a 1.1-mm Hg reduction in diastolic blood pressure. In a separate analysis of this trial, decreased consumption of SSB was associated with weight loss, a reduction of 100 kcal/d resulted in an average loss of .25 kg (Chen et al., 2009). Not only was a reduction in SSB significantly associated with weight loss at 6 and 18 months, but the weight loss effect of reducing liquid calorie intake was stronger

than that of solid calories. The data support the recommendation to limit SSB intake as a way to achieve weight loss.

Another study by Stookey and colleagues (2008), who suggest that drinking water leads to weight loss in overweight dieting women, also confirm this finding. This study included a secondary analysis from the Stanford A TO Z weight loss intervention of 173 premenopausal overweight women. The primary objective of this study was to test for associations between absolute and relative increases in drinking water and weight loss over 12 months. The absolute effects of drinking water compared to the consumption of no beverage was examined, along with the relative effects of substituting caloric beverages with water for weight loss over a 12-month period. Although replacing unsweetened and non-caloric drinks with caloric beverages proved to have less benefit than drinking water, this substitution was still linked with weight loss and a decrease in waist circumference (Stookey et al., 2008). These studies help to highlight the health consequences that can result from SSB consumption and also support the notion that decreasing intake may reverse the documented adverse effects. Although these studies provide insight into the effects of SSB intake, they did not set out to intervene or provide ways to decrease consumption of SSB. It also remains important to conduct similar studies using a theoretical based behavioral approach to guide intervention development and implementation to further enhance the results for addressing SSB issues.

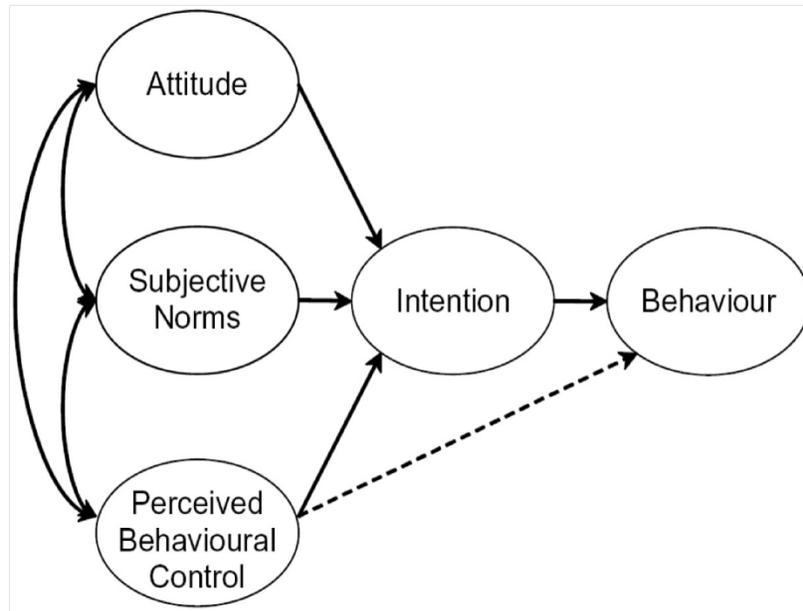
Although this quantitative information is important and signifies the magnitude of the SSB problem, qualitative data are needed to understand individual's attitudes, beliefs and norms related to SSB consumption. This information will assist in creating interventions to increase awareness of health outcomes related to SSB consumption, and ultimately decrease the amount of SSB consumed by the target population.

### *The Theory of Planned Behavior*

The Theory of Planned Behavior (TPB) as described by Ajzen (1991) is a theoretical approach that has been used to predict a variety of health behaviors (Glanz, Rimer, & Lewis, 2002; Armitage & Conner, 2001; Hardeman et al., 2002; Godin & Kok, 1996). This theory states that perceived behavioral control, along with subjective norms and attitude, impacts a person's behavioral intention. The intention of an individual then influences their behavior. Attitude toward the behavior is a person's overall positive or negative evaluation of the behavior. Attitude is determined by behavioral beliefs, belief that behavioral performance is associated with certain outcomes, as well as evaluation of behavioral outcomes, which is the value placed on a behavioral outcome. The subjective norm reflects a person's belief about whether most people would approve or disapprove of the behavior. This is established by normative beliefs, the belief or view of the behavior by the people they associate with, and by the individual's motivation to comply with these expectations. Perceived behavioral control is the measure of perceived control over the behavior; how easy or difficult displaying this behavior will be. Perceived behavioral control is determined by control beliefs, which consist of the barriers or facilitators to the behavior, along with perceived power, or the impact each factor has on the behavior, whether it be in a positive or negative way. Perceived behavioral control can also have a direct impact on behavior. Performance of a behavior not only depends on motivation, but also the individual's control of the behavior. If a person has limited to no control over a behavior, the behavior might not be implemented, even in the presence of strong motivational factors.

These three constructs, attitude, perceived behavioral control and subjective norm all influence a person's intention to perform a behavior, which in turn creates an impact on the

behavior itself (see **Figure 1**). Each construct includes different determinants that have the potential to influence a person's final behavior, which allows the ability to pinpoint the constructs that have a substantial impact on the behavior along with identifying those that do not have as great of an influence. Then, interventions can be created to modify these influential determinants, subsequently impacting intention and ultimately, behavior.



**Figure 1:** The Theory of Planned Behavior (Ajzen, 1991)

Currently, the TPB is one of the most promising and well-studied theories for understanding health behaviors. This theory has been successful in predicting a wide variety of health behaviors including use of contraceptives, smoking cessation, alcohol consumption, exercise and dieting among different populations (Glanz et al., 2002; Armitage & Conner, 2001; Hardeman et al., 2002; Godin & Kok, 1996). While the TPB has been used across an array of health behaviors, this review of literature focuses on studies utilizing this theory in the context of nutrition and dietary behaviors. It concentrates on qualitative, cross-sectional, longitudinal and intervention studies targeting adults, along with a brief discussion of the current literature on TPB studies including children.

### Qualitative TPB studies

There are currently three known studies using the TPB to qualitatively explore eating behaviors (Brug, Debie, van Assema, & Weijts, 1995; Deskins et al., 2006; Barberia, Attree, & Todd, 2008). Barberia and colleagues (2008) used semi-structured interviews to understand the eating behaviors of 17 Spanish women enrolled in weight-loss treatments. Seventeen obese or overweight female patients following a weight loss treatment in an outpatient clinic in Spain participated in individual interviews about eating attitudes and behavior. It was discovered that the women's evaluation of the outcome of a behavior influenced the positive or negative attitude given to that behavior. Women in this study either believed the diet would make them lose weight, leading to a positive attitude, or held negative beliefs about the diet, consequently leading to a negative attitude. Subsequently, these attitudes led to the likelihood of success.

A study conducted by Deskins and colleagues (2006) used the TPB to identify barriers to cholesterol screenings among 50 adults and 92 fifth-grade students in West Virginia. Concerns with screening outcomes were the primary influence on individuals' resistance to participate in cholesterol screenings. Although this study does not focus on a specific dietary behavior, it qualitatively explores behaviors of individuals in Appalachia, making it applicable to our study. This study revealed common themes for why both adults and children do not participate in cholesterol screenings. Similar themes among both groups included: concerns about screening outcomes, fear of needles, lack of knowledge and concern about health and cholesterol, lack of social pressure, and parental and Appalachian cultural beliefs.

Another study, conducted by Brug et al. (1995), used four focus groups totaling 29 participants to pinpoint determinants of fruit and vegetable consumption (boiled vegetables, salad, fruit) in adults. Six issues were identified as major influences on the consumption of fruits

and vegetables including: satisfaction, health consequences, social influences, habit, abilities and barriers, and awareness. Social influences, whether by members of the same household or others, were mentioned as a determinant of behavior. This was also seen as a common theme in Barberia et al. (2008) where social norms, for example, pressure to perform a certain behavior, ultimately influenced the probability of participants to engage in a specific health behavior.

#### Cross-sectional TPB studies

Explaining nutrition behaviors through cross-sectional methods using the TPB currently comprises the majority of the literature on this topic (Pawlak, Colby, & Herring, 2009; Paisley & Sparks, 1998; de Bruijn, Kroeze, Oenema, & Brug, 2008; Sun, Guo, Wang, & Sun, 2006; Sparks, Hedderly, & Shepherd, 1992; Pawlak, Connell, Brown, Meyer, & Yadrick, 2005; Goodwin & Mullan, 2009; Verbeke & Vackier, 2005; Pawlak, Malinauskas, & Rivera, 2009; Povey, Conner, Sparks, James, & Shepherd, 1999; Oygard & Rise, 1996; Astrom & Rise, 2001; Sjoberg, Kim, & Reicks, 2004; Brug, Lechner, & Vreies, 1995; de Bruijn, 2010). A total of fifteen articles were identified, with the issues most commonly investigated including general healthy eating, fat intake, fruit and vegetable consumption, multivitamin use and fish intake, among others.

In a review of the TPB as applies to health-behaviors, Godin (1996) uncovered that the strongest correlation was between attitude and intention for addictive, clinical/screening, eating, exercising, HIV/AIDS, and oral hygiene behaviors; every behavior examined except for driving. In addition, intention was a stronger predictor of behavior than perceived behavioral control for all health behaviors, with the exception of oral hygiene.

These findings contrast with the fifteen cross-sectional articles utilizing the TPB to explain dietary behaviors. Although each study focused on a specific dietary behavior, the

correlation between attitude, subjective norm, perceived behavioral control and intention varied from one study to the next, with no single construct showing a stronger correlation across studies. These findings could be explained by the fact that the targeted age group differed between studies. Even though this group of articles targeted adults, some focused on younger adults, such as college-aged students, while others concentrated on older adults, such as those residing in senior centers. In addition, the identified studies investigated a wide variety of nutrition behaviors, another likely explanation for the different results. The variation in nutrition studies made it difficult to compare the correlations and regression coefficients related to intention and behavior. Many articles did not present this information and the available results were very inconsistent, making it difficult to generalize the strongest predictor of intention and behavior across the dietary studies.

#### Longitudinal TPB studies

Three longitudinal studies have been documented that incorporate the TPB to investigate nutrition behaviors (Nejad, Wertheim, & Greenwood, 2004; Conner, Norman, & Bell, 2002; Masalu, & Astrom, 2001). Conner and colleagues (2002) applied the TPB to self-report measures to predict healthy eating intentions and behavior in individuals at a primary care setting. A survey was mailed to individuals after they attended a voluntary 30-minute health promotion session at their physician's general practice (N=251 respondents). Six months later, these patients were sent a second questionnaire (N=188 respondents), and then again six years later (N=144 respondents). The first questionnaire consisted of TPB measures, the second questionnaire also included measures derived from the TPB along with perceived past behavior, and in the third survey, respondents completed measures of health eating and behavior. These results concluded that the theory was successful in predicting healthy eating intentions, even over

considerable time period (Conner et al., 2002). Also, past behavior predicted intentions cross-sectionally, but not prospectively. This conclusion suggests that future interventions to promote health outcomes through different aspects of healthy eating should target attitudes and perceived behavioral control.

Masalu and Astrom (2001) investigated the applicability of the TPB in predicting intention and self-perceived behavior to avoid intake of sugared snacks and drinks in-between meals. Tanzanian college students (N=1,123) with a mean age of 26.4 years completed a questionnaire measuring the TPB constructs. Two hundred and twenty eight participants completed a follow-up survey four weeks later on self-perceived sugar avoidance. These participants were chosen by a systematic sample, a random sampling method where every 3<sup>rd</sup> person from the list was chosen. Perceived behavioral control was identified as the strongest predictor of intended sugar restriction, showing students' feelings of high control to make a decision to avoid between-meal intake. Overall, students' decision to avoid sugar-sweetened snacks was based on considerations of resources, obstacles, normative expectations and the consequences of performance. In another study including college-aged students, an extended and modified version of the TPB was used to predict dieting intention and behavior in 256 female undergraduates (Nejad et al., 2004). Three months later, seventy-eight of these participants completed a follow-up questionnaire to assess their subsequent weight-loss behaviors. The findings concluded that intention predicted follow-up dieting, with the strongest predictor of dieting intention being direct attitude, which was measured by asking women to respond the statement "If I diet in the next 3 months, this would be..." and included the answer choices harmful/beneficial, unpleasant/pleasant, useless/useful, foolish/wise, and bad/good on a 7-point scale, with a higher score indicating a more positive attitude (Nejad et al., 2004). In the

extended model, the inclusion of prior dieting behavior became the strongest predictor in both intention and follow-up dieting, indicating that once women begin to diet, they are more likely to continue dieting in the future. Descriptive norm was the only social norm variable that directly predicted intention. A year later, 117 additional female students completed questionnaires and findings were similar to the 6-month results.

From these nutrition studies, it remains evident that attitudes and perceived behavioral control contribute the most to intention, suggesting that interventions should target these constructs to instigate behavior change. Past behavior proved to affect intention, although varied in significance across studies. This further supports that the TPB constructs vary across health behaviors and that these components also depend on contextual factors.

#### Experimental TPB studies

Clearly absent from the literature are interventions grounded in the TPB focusing on creating a change in dietary habits. Only three studies have been identified utilizing the TPB to create and implement an intervention related to nutrition behaviors among adults (Armitage, 2004; Gardner & Hausenblas, 2005; Beale & Manstead, 1991). Armitage (2004) conducted a study investigating dietary fat intake using a validated food frequency questionnaire and a survey incorporating questions based on the constructs of the TPB. Participants (n=264) were then assigned to either the experimental or control group, which differed only in the respect that participants randomized to the experimental condition received written instructions to make a plan to eat a low-fat diet for the next month. The groups who received these instructions to create a plan to reduce dietary fat intake significantly decreased their fat intake between baseline and at the 1-month follow-up, suggesting health interventions that incorporate volitional strategies,

making a choice or decision, are more likely to be effective. This study highlights the importance of moving beyond motivational factors to promote action.

Like Armitage, Beale and Manstead (1991) also used a randomized control trial to predict mothers' intentions to limit the frequency of infants' sugar intake. They examined mothers' intentions to limit the frequency of their infants' sugar consumption by exposing one group of mothers to a one-time dental health education program (n=74), which consisted of a short talk by a dental health educator to each mother individually. The control group was not (n=66) given the presentation. All mothers were interviewed, but those assigned to the experimental group attended the intervention immediately following the initial interview. Another interview was conducted with every individual, regardless of group assignment, 1-4 weeks later. A reported change in attitude toward the behavior was present in the experimental group with no such change in the control group. Another important finding indicated that a perceived lack of behavior control significantly contributed to intention in mothers who had more than one child, but was not found in first-time parents. This result may suggest that personal experience influences intention, as mothers who have more than one child may have discovered they have little control over the frequency of their child's sugar consumption.

Gardner and Hausenblas (2005) prospectively examined the ability of direct and belief-based measures of the TPB components to predict exercise, diet intention and behavior of overweight women (n=117) enrolled in a 4-week exercise and diet program. Classes met 12 times over the 4-week period for 75 minutes each session. The inability of intention and PBC to predict behavior contrasts with most of the literature, which may have been caused by the participant's unfamiliarity of the diet and exercise program. PBC was the only significant predictor of exercise intentions and instrumental attitude, while subjective norm and PBC were

significant predictors of diet intention. It should also be noted that very few individual beliefs were significantly related to behavior, while almost all of the individual beliefs were strongly correlated to their direct measures and even were significantly associated with intention in some cases. One limitation to these studies is the duration and intensity of the interventions, as the first and second studies included only one point of contact, mailed instructions and a brief talk, respectively. This limitation and the scarcity of experimental studies grounded in the TPB illustrate the overwhelming need for additional theory-based nutrition interventions.

#### Children/adolescent TPB studies

Although the focus of this literature review is adults, it is important to acknowledge studies utilizing the TPB to investigate nutrition behaviors in children and adolescents. Some of the most widely researched dietary behaviors in adolescents include breakfast consumption, healthy eating and vegetable consumption (Kassem & Lee, 2004; Kassem & Lee, 2003; Diaz, Marshak, Montgomery, Rea, & Backman, 2009; DeJong, van Lenthe, van der Horst, & Oenema, 2009; Wu et al., 2009; Pawlak & Malinauskas, 2008; Gummesson, Jonsson, & Conner, 1997; Backman, Haddad, Lee, Johnston, & Hodgkin, 2002; Berg, Jonsson, & Conner, 2000). All studies used a quantitative approach; administering surveys to participants, who ranged from 10 to 19 years of age. The majority of the studies concluded attitude was the strongest predictor of intention, emphasizing the importance for parents, teachers and health professionals to encourage healthy drink alternatives and to recognize additional ways to create positive attitudes towards healthy eating (Kassem & Lee, 2004; Kassem & Lee, 2003; DeJong et al., 2009; Wu et al., 2009; Gummesson et al., 1997; Backman et al., 2002). Two studies examined the differences between males and females and noted females' attitudes were more indicative of concerns for healthy eating, feeling healthy and looking good (Diaz et al., 2009; Berg et al., 2000). On the other

hand, males' attitudes were focused more on athletic performance and staying healthy, strong and fit (Diaz et al., 2009; Pawlak & Malinauskas, 2008). Berg (2000) also supports this notion by reporting females and older children had greater knowledge about healthy alternatives and stronger intentions to consume healthier options.

Lautenschlager and Smith (2007) took an experimental approach and examined dietary habits among youth garden program participants. Youth ages 8-15 completed a pre- and post-survey (n=96, n=66) derived from the TPB constructs to assess eating and gardening behaviors. Participants also completed additional survey questions and a 24-hour recall to document fruit and vegetable consumption. The children attended a 10-week nutrition program, three days per week, using the TPB as the theoretical framework. The results concluded that the garden program positively impacted fruit and vegetable consumption. Although this study was conducted in adolescents, it was one of only four intervention studies in the literature utilizing the TPB for altering dietary habits.

It is important to note that two studies exist using the TPB to specifically target soft drink consumption in adolescents (Kassem & Lee, 2004; Kassem & Lee, 2003). These two studies utilized the same methods, although one focused on males and the other centered on females. Although this study targeted adolescents, the mixed method design, and the results can provide insight on influences related to SSB consumption. Two questionnaires were used, the first of which contained open-ended questions asking participants to list behavioral, normative, and control beliefs related to regular soda and diet soda consumption. A content analysis was conducted and the results were used to develop a quantitative survey. This questionnaire consisted of 80 items that targeted behavioral intentions, attitudes, subjective norms and perceived control related to daily regular soda consumption, along with demographics and soda

intake. Semantic differential scales with bipolar adjective pairs (good-bad) and Likert-like scales (not at all-very much) were used. Both intention and perceived behavioral control were positively associated with the behavior, although intention was the only independent predictor of the behavior. Both studies came to the same conclusion that attitude was the strongest predictor of intention, followed by perceived behavioral control and subjective norm (Kassem & Lee, 2004; Kassem & Lee, 2003). Although these studies were conducted in adolescents, they provide information about the factors that influence SSB consumption.

### *Targeted Population*

Sugar-sweetened beverage intake has been identified as a national concern, though higher consumption has been indicated in populations with low socioeconomic status (Rehm, Matte, Van Wye, Young, Frieden, 2008). While existing data proves SSB consumption is a problem at the national level, preliminary data confirms the extent of this issue in the target Southwest Virginia population (Zoellner, Estabrooks, Davy, Chen, & You, in review). In a pilot study of 119 participants in Southwest Virginia, the mean daily intake of SSB was 457 (430) kcals or 38 (34) fluid ounces. Eighty-two percent of respondents exceeded the recommendation to limit beverages sweetened with sugar to 0-8 ounces per day. These results emphasize that SSB consumption is a problem in this population and that individuals in this region could benefit from initiatives targeting SSB consumption.

This research project targets 11 at-risk rural counties of Southwest Virginia including Bland, Floyd, Patrick, Carroll, Wythe, Grayson, Smyth, Tazewell, Alleghany, Craig and Giles. These counties average a 6.3 on the 9-point Urban-Rural Continuum Codes (1=urban, 9=completely rural) (United States Department of Agriculture), further indicating the rural nature

of these communities. These 11 counties lie in a section of the United States known as Appalachia, a region that runs through 12 states starting at southern New York and ending at northern Mississippi.

Health literacy is a widespread problem in the United States; however, low income and rural populations are more likely to have poor health literacy skills due to the lack of a good education and available health care services (Passche-Orlow et al., 2005; Zahnd, Scaife, & Fancis, 2009). Compared to the state of Virginia and the national averages, the 11 Appalachia targeted counties have low socioeconomic status and literacy levels (US Census Bureau; Adult Literacy Estimates). The percentage of individuals residing in the selected counties that have completed a high school diploma and bachelor's degree is substantially lower than the averages for the state of Virginia (US Census Bureau). Only 62% of the region's population has completed high school compared with 82% of Virginia, and only 11% have obtained a college degree, compared with the 30% for the state of Virginia (Southwest Virginia Health Authority).

In addition to the existing educational disparities, this region is plagued with a variety of health and economic disparities including a higher incidence of disease, higher rate of mortality and an increased level of poverty compared to the national averages (United States Department of Agriculture; Food Environment Atlas; Appalachian Regional Commission; Virginia Department of Health). In 2006, the prevalence of diabetes in the Appalachia region of Virginia was 11%, compared to the non-Appalachia region of Virginia, with a rate of only 7.2% (Virginia Department of Health). Along with the escalating rate of diabetes, the mortality from diabetes in this region is almost twice as high as the state (Food Environment Atlas). The prevalence of diabetes has been inversely related to income and education level, which could explain the high rate of diabetes in these counties (Virginia Department of Health). Also, the rate of obesity in

the targeted counties exceeds the obesity rate of Virginia (Appalachian Region Commission), with 30.4% of Appalachians classified as obese compared to 24.6% of non-Appalachians (Virginia Department of Health). Also, there are financial and environmental barriers to quality health care in rural Southwest Virginia. Distance and lack of transportation to health care, health professional shortages, high cost of services, lack of health insurance and ability to pay for prescriptions add to the lengthy list of obstacles (Appalachian Region Commission).

Adding to the educational and health disparities, poor water quality is a major concern. Scientists estimate 7 million Americans are sickened by contaminated tap water every year, and nearly 40% of our rivers fail to meet current clean water standards (Clean Water Action). Due to the remote location of some residences, individuals' access to clean water in the Southwest region of Virginia is limited. Residents of Southwest Virginia primarily have access to well water or city water. On a national level, forty-percent of the United States depends on groundwater for their drinking supply. There are many natural processes that affect the water quality; therefore, well owners need to continuously test their water supply to ensure it is safe. Uncertainty about water safety may discourage consumers from drinking water that comes out of their well. On the other hand, city water is constantly treated with chemicals, giving off an unpleasant odor and taste, deterring many people from drinking the town water out of the tap. Although many regulations are in place related to pollutants and chemicals in the water supply and many current initiatives promoting clean water exist, water quality still remains an issue (Clean Water Action; Natural Resources Defense Council). It is feasible to suggest that concerns with water quality could impact the consumption of other beverages; for example, a higher intake of SSB and other caloric beverages.

Collectively, these quantitative data on the southwest Virginia Appalachia region indicate that the rural geographic location, the educational and health disparities, and issues with water quality may contribute to the consumption of a high amount of SSB and emphasize a need for interventions throughout this area. As the data indicate, health based research and interventions within this low income and health disparate population may help improve the health status of the residents. Yet in order to develop culturally appropriate behavioral intervention to meet the needs of this at-risk population, it is important to thoroughly understand the attitudes, subjective norms, perceived behavioral control and associated underlying beliefs towards SSB.

#### *Components Influencing Intervention Delivery*

Interactive voice response (IVR) technology, an automated telephone message, is an alternate method of intervention delivery. This technology has been used in a variety of health-related studies, weight loss, managing chronic disease and altering dietary behaviors (Estabrooks, Smith-Ray, 2008; Estabrooks, Shoup, Gattshall, Dandamudi, Shetterly, & Xu, 2009; Glasgow, Christiansen, Smith, Stevens, & Toobert, 2009). A review of the controlled studies of automated phone messages has shown to increase compliance among patients and caregivers, and has also been successful in producing improved health outcomes (Krishna, Balas, Boren, & Maglaveras, 2002). In addition, a literature review by Piette (2000) showed that information patients report during IVR assessments is at least as reliable as information obtained from structured clinical interviews or medical record reviews. Furthermore, patients are more inclined to report health problems to an IVR system than directly to a clinician, due to the feeling of anonymity.

Small groups for delivering nutrition education have also shown to be an effective method for behavior change. In a study by Siero and colleagues (2000), it was concluded that nutritional behavior change could be achieved by interactive group education in socio-economically disadvantaged populations. In addition, a study examining the effectiveness of small group interactive education vs. information-only programs on motivation to change and lifestyle behaviors found improvements in both groups, although those in the small groups showed more advanced motivation regarding diet and reported healthier diets after 3 and 12 months (Reusch, Strobl, Ellgring, & Hermann). Furthermore, interactive group sessions have achieved greater improvements in nutrition and physical activity compared to information delivered by mail (Dzator et al., 2003). These findings support the use of small group sessions to deliver an intervention aimed at decreasing SSB consumption in the health disparate region of Southwest Virginia.

### *Primary Aims*

The specific aim of the project was to qualitatively explore factors influencing SSB consumption among residents in rural Southwest Virginia. Eight focus groups with approximately 5-8 individuals each were carried out in the target population. Four focus groups contained individuals on non-city water (e.g. well water) and four had participants on city water. Questions were composed based on the constructs of the TPB behavior to provide insight into the attitudes, subjective norms and behavioral capabilities surrounding SSB, water and artificially sweetened beverage intake among this population. We also aimed to explore differences among TPB constructs related to beverage choices in participants on well water versus city water. The questions also explored media influences and other programmatic issues.

Insight gained through conducting focus groups will promote the development and implementation of culturally tailored interventions to improve SSB behaviors, and eventually improve the health of the targeted population.

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## CHAPTER 2

### Understanding Drink Choices in Southwest Virginians: An Application of the Theory of Planned Behavior

#### Abstract

**Objective:** The primary objective of this study was to apply the Theory of Planned Behavior (TPB) to investigate culturally specific attitudes, subjective norms and behavioral capabilities related to SSB, water, and artificially sweetened drink consumption in adults residing in rural Southwest Virginia. In addition, programmatic issues related to development and implementation of SSB interventions were explored. **Methods:** Eight focus groups were conducted with 54 adults in Southwest Virginia. Focus group participants were recruited through the assistance of Virginia Cooperative Extension (VCE) agents and other indigenous community members. Four focus groups included individuals on city water and four contained residents on well water to investigate any discrepancies in attitudes, norms and perceived behavioral control related to the intake of various drinks. All focus groups were audio taped and transcribed verbatim. Two researchers independently reviewed the transcripts and met to identify major themes and developed a coding system. Three researchers independently coded meaning units to the major themes and subsequently reviewed codes and reconciled disagreements. **Results:** The most notable themes that emerged included taste (n= 161 MU), availability/convenience (n= 95 MU), cost (n= 28 MU), and habit/addiction (n= 57 MU). Participants also continuously emphasized the importance of their doctor's advice and health concerns on their beverage choices. The majority of the participants (n=27 MU) indicated they would be willing to participate in a program with three small group sessions and phone calls, yet when asked specifically about receiving multiple interactive voice technology telephone

messages, most participants said that they would not be receptive to an automated message (n=21 MU). **Conclusion:** Collectively, these findings provide unique cultural insight to better understand the salient beliefs associated with beverage behaviors and helps inform intervention development and delivery in the targeted health vulnerable region of Southwest Virginia.

*Keywords: health behavior, qualitative research, beverages dietary habits*

## Introduction

Large increases in Americans' consumption of sugar-sweetened beverages (SSB) have been a topic of concern. Between 1977 and 2002, the per capita intake of caloric beverages doubled in the United States, with most recent data from 2005–2006 showing that children and adults in the United States consume about 172 and 175 kcal daily, respectively, from SSB (Brownell et al., 2007). It is estimated that these types of beverages account for 10% of total energy intake in adults (Nielsen & Popkin, 2004). Sugar-sweetened beverages include fruit drinks with added sugar, sports drinks, carbonated beverages with added sugar, sweet tea, energy drinks and other drinks with added sugar. High intake of SSB has been related to many adverse health outcomes including type 2 diabetes, obesity, dental caries and heart disease (Malik, Schulze, & Hu, 2006; Vartanian, Schwartz, & Brownell, 2007; Schulze et al., 2004; Ismail, Sohn, Lim, & Willem, 2009; Fung et al., 2009).

Despite the documented consequences associated with the intake of SSB, few interventions targeting SSB behaviors have been conducted. In a prospective analysis of the PREMIER trial, an 18-month randomized, controlled, behavioral intervention with 810 adult participants, reduced consumption of SSB beverages was significantly associated with reduced blood pressure (Chen et al., 2010). Specifically, a reduction of 12 fluid ounces of SSB per day resulted in 1.8-mm Hg reduction in systolic blood pressure and a 1.1-mm Hg reduction in diastolic blood pressure. In a separate analysis of the data, decreased consumption of SSB was associated with weight loss at 6 and 18 months, and the weight loss effect of reducing liquid calorie intake was stronger than that of solid calories (Chen et al., 2009). Stookey, Constant, Popkin, & Gardner (2008), examined overweight dieting women and confirmed similar weight loss findings. This study included a secondary analysis from the Stanford A TO Z weight loss

intervention of 173 premenopausal overweight women. The absolute effects of drinking water compared to the consumption of no beverage was examined, along with relative effects of substituting caloric beverages with water for weight loss over a 12-month period. It was concluded that replacing unsweetened and non-caloric drinks with caloric beverages proved to have less benefit than drinking water, but it was still linked with weight loss and a decrease in waist circumference. These studies highlight the health consequences that can result from SSB consumption and support the notion that decreasing intake can improve health outcomes. Importantly these studies emphasize the need for additional studies to explore future research initiatives to intervene on SSB consumption in various populations, as neither of these were designed a priori to focus on SSB, nor were they grounded in health behavior theory.

The Theory of Planned Behavior (TPB) as described by Ajzen (1991) is a theoretical approach that has been used to predict a variety of health behaviors (Glanz, Rimer, & Lewis, 2002; Armitage & Conner, 2001; Hardeman et al., 2002; Godin & Koch, 1996). The TPB states that perceived behavior control (PBC), along with subjective norms and attitude, impacts a person's intention. The intention of an individual then influences their behavior. Attitude toward the behavior is a person's overall positive or negative evaluation of the behavior. The subjective norm reflects a person's belief about whether most people would approve or disapprove of the behavior. PBC is the measure of perceived control over the behavior; how easy or difficult displaying this behavior will be. PBC can also have a direct impact on behavior because performance of a behavior not only depends on motivation, but also the individual control of the behavior. If a person has limited to no control over a behavior, the behavior might not be implemented, even in the presence of strong motivational factors.

The TPB has been applied to a wide variety of dietary behaviors including breakfast consumption, fruit and vegetable intake, eating behaviors, dieting and fat intake, along with many others. Although it has been used quantitatively in various cross-sectional studies, it has rarely been used in longitudinal research exploring nutrition behaviors (Masalu & Astrom, 2001; Conner, Norman, & Bell, 2002; Nejad, Wertheim, & Greenwood, 2004). It has also seldom been utilized in qualitative studies targeting dietary behaviors (Brug, Debie, van Assesma, & Weijts, 1995; Barberia, Attree, & Todd, 2005). In addition, very few research initiatives implementing an intervention targeting nutrition related behaviors have used this theory (Armitage, 2004; Gardner & Hausenblas, 2005; Beale & Manstead, 1991). Gaps in the current literature signify the need to use the TPB to qualitatively explore a nutrition behavior, including SSB consumption, and further use the collected data to construct theory-based interventions targeting this issue.

This research project targets 11 at-risk rural counties of Southwest Virginia including Bland, Floyd, Patrick, Carroll, Wythe, Grayson, Smyth, Tazewell, Alleghany, Craig and Giles. These counties lie in the healthy disparate region of the United States known as Appalachia. Compared to the state of Virginia and the national averages, these targeted counties have low socioeconomic status and literacy levels (US Census Bureau, Adult Literacy Estimates) and drink an enormous amount of SSB (Zoellner, in press). Health literacy is a widespread problem in the United States; however, low income and rural populations are more likely to have poor health literacy skills due to the lack of a good education and available health care services (Paasche-Orlow & Wolf, 2007; Zahnd, Scaife, & Francis, 2009). The percentage of individuals residing in the selected counties who have completed a high school diploma and bachelor's degree is significantly below the averages for the state of Virginia (Food Environment Atlas). In

addition, the prevalence of diabetes and obesity in this region exceeds that of the state of Virginia (Virginia Department of Health), and mortality from diabetes almost twice as high as the state (Food Environment Atlas). Also, financial and environmental barriers to health care enhance these health issues. Furthermore, the issue of water quality exists. Residents in Southwest Virginia have access to either city water or well water. There are many natural processes that affect the water quality; therefore, well owners need to continuously test their water supply to ensure it is safe and uncertainty may discourage consumers from drinking water that comes out of their well. On the other hand, city water is constantly treated with chemicals, giving off an unpleasant odor and taste, deterring many people from drinking the town water out of the tap. This issue prompted the investigation of any differences in beverage consumption between individuals having primary access to well water versus those who have primary access to city water.

In our previous cross-sectional quantitative study of 119 southwest Virginia participants, SSB intake averaged 457 ( $\pm$ 430) kilocalories/day. Utility of the TPB for SSB consumption was verified as the TPB model provided a moderate explanation of SSB intake ( $R^2=0.38$ ;  $F=13.10$ ,  $P<0.01$ ). Behavioral intentions had the strongest relationships with SSB consumption, followed by attitudes, perceived behavioral control, and subjective norms. However, the six belief constructs did not predict significant variance in the models. As a result of this study, and as recommended in application of the TPB (Montano, Kasprzyk D, 2008), an elicitation phase was needed to better understand the salient beliefs associated with SSB and to promote the development and implementation of culturally tailored interventions to improve SSB behaviors.

In this qualitative study targeting the health disparate Southwest Virginia region, we aimed to explore the attitudes, subjective norms, and perceived behavioral control related to

beverage behaviors and specifically sugar-sweetened beverages, water, and artificially sweetened beverages. To aid the invention development, programmatic factors were also explored.

## **Methods**

### **Study Design and Recruitment**

The Institutional Review Board at Virginia Tech approved this study and all participants provide informed signed consent. This study consisted of focus groups, as well as a quantitative screening questionnaire and an exit questionnaire. Focus groups were planned to evaluate potential differences among residents on city-water sources versus non-city water sources (e.g. well, stream, etc.).

Participants were recruited from five of the 11 at-risk rural counties of Southwest Virginia, including Scott, Washington, Stuart, Giles and Floyd. Eligibility criteria included residency in one of the targeted 11 counties, English speaking,  $\geq 18$  years of age, and consumption of  $\geq 1$  cup of SSB per day. In addition, participants had to meet the water source (city-water source versus non-city water source) for the focus group being planned in their particular county.

Three Virginia Cooperative Extension (VCE) educators and two Virginia Tech students who were residents of the targeted Southwest Virginia counties helped recruit participants and arrange logistics for the focus groups. As is common in focus groups, a purposeful sampling protocol was executed. Community residents were contacted either in person or via telephone and the screening questionnaire (described below) was administered to determine eligibility. Upon completion of the screening questionnaire, individuals were informed if they were eligible and eligible individuals were given the opportunity to accept or decline the invitation to participate. The participant was later contacted with the date and time of the focus group. In

total, eight focus groups were conducted including four with individuals on city-water sources and four on non-city water sources.

### **Screening Questionnaire**

*Beverage consumption.* Three items from the valid and reliable beverage intake questionnaire were used to determine SSB behavioral and study eligibility including regular soft drinks, sweetened tea, and sweetened juice beverages/drink (such as fruit aids, lemonade, punch or Sunny Delight) (Hedrick, Comber, Estabrooks, Savla, & Davy, 2010). The instrument queries seven frequencies including: never or less than 1 time/week, 1 time/week, 2-3 times/week, 4-6 times/week, 1 time per day, 2 times per day, or 3 or more times per day. Portion sizes are also reported in fluid ounces and include less than 6, 8, 12, 16, or more than 20. Participants were eligible if they consumed  $\geq 1$  cup of sugar-sweetened beverages per day.

*Water source.* Participants reported their primary source of drinking water. Response options included individual well that serves fewer than 15 residences; community well system (well serving 15 or more residences); river, stream, pond, or lake (individual system); city water system; or purchased bottled water. The primary water source was used to determine eligibility for the focus group being planned in their particular county.

*Demographic variables.* Demographic variables included gender, race, age in years, highest level of education reported across seven categories, and income level reported across 12 categories of \$5,000 increments.

### **Focus Groups**

Focus groups were conducted using methods suggested by Krueger and Casey (2009). Each focus group included 5-9 participants and lasted about an hour and a half. A trained lead moderator and co-moderator led each of the eight focus groups. The moderator was responsible

for facilitating discussion, while the co-moderator took notes during the focus group and was in charge of the audio recorder. When participants arrived, they were served a meal and the moderator introduced herself and explained the general process and topic of the focus group. After brief introductions, participants provided written informed consent followed by the start of the focus group.

A semi-structured script containing open-ended questions was used to guide data collection and probes were used to encourage elaboration of responses. Questions focused on each construct of the TPB. Examples of questions include: 1) attitudes: “Tell me about the good things associated with sugar-sweetened beverages”, 2) subjective norms: “Tell me why it is or is not important that you drink the same amount or type of beverages as your friends and family,” and 3) perceived behavioral control: “What would make it hard or easy to meet the recommendation for water?,” and 4) behavioral intention: “Tell me about your intentions to meet the drink recommendation of 1 cup or less of sugar-sweetened beverages per day in the next month.” The focus groups also investigated programmatic issues and presented scenarios including “Where do you learn about the benefits or harmful effects of certain drinks?” and “If a free program was offered in your community to educate and help improve the beverages people drink, what would you want that program to look like?”

### **Exit questionnaire**

Upon conclusion of the focus group, a self-administered exit questionnaire was administered to evaluate behavioral intentions and assess health literacy. Four single item behavioral intention questions on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) were asked about meeting SSB recommendations, meeting water recommendations, attending education sessions to learn about healthy drink choices, and receiving telephone

messages to learn about healthier drink options. In addition, participants completed Newest Vital Sign, an assessment to identify individuals at risk for poor health literacy (Weiss, 2005). A score of 0-1 suggests high likelihood of limited literacy, where as a score of 2-3 indicates the possibility of limited literacy and a score of 4-6 almost always indicates adequate literacy. Once all forms were completed and checked by the moderator, individuals were compensated with a \$30 gift card.

### **Data Analysis**

The screening and exit questionnaires were analyzed in SPSS version 18.0 and included frequencies, means, standard deviations, Chi-squared and one-way ANOVAs. The focus group data were obtained and analyzed using methods suggested by Rossman and Rallis (2003). Field notes were taken by the co-moderator to capture important information that would not have been tape-recorded. The principal investigator transcribed the tapes obtained from the focus groups verbatim. The transcripts were re-read to aid in providing leads for further data gathering. With oversight from the primary investigator, two graduate students independently generated initial key themes throughout the transcripts, and then met to resolve discrepancies and develop a distinct coding system. Then, three graduate students independently identified meaning units (MU) throughout each transcript that supported the initial themes and met to gain consensus on coding and resolve any disagreements. Meaning units (MU) are defined as the constellation of words or statements that relate to the same central meaning (Graneheim & Lundman, 2004). A meaning unit can also be referred to as a content unit or coding unit (Baxter, 1991), a keyword and phrase (Lichstein and Young, 1996), and a unit of analysis (Downe-Wamboldt, 1992). In this study, meaning units are considered words, sentences or paragraphs containing aspects related to each other through their content and context. In an iterative process, the primary

investigator and two graduate students (those who moderated the focus groups) further reduced and organized the data into meaningful themes and subcategories. Finally, the total number of MU and focus groups to support each theme was counted to aid in interpretation of the data.

Upon analyzing emerging themes, subcategories, and associated MU, there were no meaningful differences among residents on city-water sources versus non-city water sources (e.g. well, stream, etc.). Therefore, the data were collapsed and results were subsequently reported across all eight focus groups.

## **Results**

### **Participants**

In total, 75 individuals were screened, of which 63 were eligible and 54 participated. Ineligible participants included eight who consumed <1 cup of SSB/day and four who consumed enough SSB to qualify but yet were not eligible due their water source. Nine eligible individuals chose not to participate. The 54 participants included 33 females and 21 males, as well as 52 Caucasians and two African Americans. Seven participants had less than a high school education, 16 had a high school diploma or GED, 11 had some college or specialized training but no degree, and 20 had a college degree. Income distribution indicated that 21 had <\$14,999, 15 earned \$15,000-34,000 and 17 earned \$35,000-\$54,999. Chi-squared and one way ANOVA tests revealed that the 21 non-participants were not statistically different from the 54 participants in terms of gender, race/ethnicity, age, education level, or income level. Among participants, the average amount of SSB consumption was 27.3 (SD=23.3) ounces per day. Health literacy screening indicated that 10 participants had a high likelihood of limited literacy, 13 had the possibility of limited literacy and 31 had adequate literacy.

## Focus Group Results

### *Sugar-sweetened beverages*

#### Attitude

As illustrated in **Table 1**, numerous positive and negative attitudes were revealed. When asked about the good things associated with SSB (i.e., soda, energy drinks, juice drinks) an overwhelming number of comments related to positive beverage attributes (n= 97 MU). This category included three most frequently identified sub-categories included taste (n= 38 MU) mentioned across all eight focus groups, as well as caffeine/energy (n= 31 MU) and vitamins (n= 12 MU), which were talked about in seven and six focus groups, respectively. The remaining sub-categories consisted of electrolytes, high water content, novelty, not as much sugar, and antioxidants. Two positive health outcomes comprising 11 MU were noted, including helps when sick (n= 6 MU) and quenches thirst (n= 5 MU). Cost was discussed as both a positive quality of SSB (n= 6 MU), especially in reference to juice drinks, as one participant said “Cheap to buy too. Sunny-D’s not very expensive”, as well as a negative aspect (n= 3 MU), with one individual stating “I just don’t like the price on them [energy drinks]. They’re outrageous.” There were many additional negative statements about SSB that emerged. Of the identified negative SSB attributes (n= 78 MU), 22 MUs were about the sugar content, and this sub-category appeared in all eight focus group. Caffeine (n= 21 MU), taste (n= 13 MU), and acidity (n=12 MU) were also common sub-categories. Additional MUs which were mentioned in one or two focus groups included unnatural, sodium, carbonation, and don’t work, as one participant said, “*I hadn’t had a lot of sleep the night before so I don’t know why I thought the red bull was going to get me through it, but I drank it and oh golly I felt horrible...I was so sleepy and I would shake my head and stick my head out the window and my dad was snoring and I’m turning the*”

*music on and I'm singing, oh golly, I was so miserable*". Related to the 27 negative health outcome MUs, cavities, more thirsty, and weight emerged as the top negative health outcomes associated with SBB, providing 6, 5 and 4 MUs, respectively. The remaining 12 MUs fell under more thirsty, indigestion, kidney problems, diabetes, makes kids hyper, heart trouble, bone loss and need to use the restroom, which were mentioned in two or fewer focus groups.

### Perceived Behavioral Control

When asked what would make it hard to limit their SSB consumption, participants provided an abundance of responses to why this would be a difficult task. The negative health consequence of not having the caffeine (n= 21 MU) was confirmed in every focus group, as one mother said, *"I know what would make it hard, I'm going to have a severe headache."* The abundance of SSB (n= 14 MU), the size of cans (n= 12 MU), and cost (n= 12 MU) were also major obstacles when discussing why it would be hard to limit consumption. The remaining sub-categories, taste and disliking alternatives provided 7 additional MUs. Although participants could provide numerous reasons for why it would be hard to limit their SSB consumption, health reasons (n= 8 MU) and increasing the availability and convenience of other beverages (n= 18 MU) were the only consistent ideas when discussing what would make it easy to limit SSB intake. Additional MUs, each mentioned in only focus group included knowledge, do something else, taste of other drinks, cook at home, and exercising.

### Subjective Norm

When asked how they felt about the recommendation for SSB being eight ounces a day or less, only a few responses (n= 4 MU) suggested that individuals were likely to follow this recommendation. Seven responses indicated amore neutral view as participants thought it was a good recommendation, but would be hard to follow. A large majority of responses indicated

unlikeliness to meet the recommendation (n= 16 MU). As one soda consumer said, “*Most people that buy a soda aren’t going to drink 8 ounces and throw the rest away*”. When considering normative beliefs, doctor recommendation (n= MU 11) and peers (n= 3 MU) emerged as important influences on the amount of SSB consumed.

### Intention

When asked about their intentions to meet the recommendation for SSB over the next month, findings were mixed, as some participants (n= 12 MU) indicated that it would be impossible while others illustrated plans to meet the recommendation (n= 7 MU). Some participants held a more neutral view (n= 9 MU), as one participant said, “*I think I would have to attempt it and let you know.*” Participants expressed ways to meet this goal, such as to drink more water (n= 8 MU) and replace SSB with healthier options (n= 5 MU). The remaining MUs reflect strategies such as gradually decrease SSB consumption, drink small amounts of SSB throughout the day, limit availability of SSB, quit cold turkey and buy real fruit juice. In the exit questionnaire, participants averaged a 5.5 (SD=1.7) when responding to the 7-point Likert scale (1= strongly disagree to 7= strong agree) statement “I plan to limit my sugar-sweetened drinks to less than one cup each day.”

### *Water*

#### Attitude

As seen in **Table 2**, when asked about the good things associated with water, positive health outcomes were the most prominent theme (n= 30 MU), capturing a positive attitude. Sub-categories included helps your body, flushes kidneys, keeps you hydrated, refreshing, and helps metabolism. Among the 14 positive beverage attributes, taste was the most commonly mentioned beverage attribute with 8 MUs. The remaining 6 MUs included natural, no calories,

and no sugar. Cost was also mentioned as a positive aspect of water (n= 4 MU). An overwhelming amount of participants expressed negative issues related to water (n= 41), including chemicals or contamination of water sources. One mother on city water mentioned, *“Those letters we get from the health department, they’re really scary.”* Taste, a negative beverage attribute, was also consistent among focus groups (n= 19 MU). Negative health consequences, including drinking too much water and cancer from water, along with cost of water comprised the remaining four MUs. In addition, one individual mentioned cost as a negative aspect of bottled water as he stated, *“Yea, it is [expensive] for what they got in it...most of the bottled water they’re taking right out of the tap.”*

#### Perceived Behavior Control

When asked what would make it hard to increase their water consumption, the majority of responses related to negative health outcomes (n= 16 MU). This category encompassed no bathroom access (n= 8 MU), fills you up (n= 6 MU), and makes me sick (n= 2 MU). Some participants also stated the availability of other options made it difficult to consume the recommended amount of water (n= 7 MU). Another category, negative beverage attributes included temperature of the water (n= 4 MU), as participants said they would not drink water unless it was really cold, with the remaining MU referring to the plain taste. Many individuals expressed a more neutral attitude, saying that it depended on the availability of their preferred water source, as one participant on well water expressed, *“If you live in the city and town water’s just horrible and you don’t want to buy it.”* Hydration (n= 17 MU), the only positive health outcome mentioned, and the availability and convenience of water (n= 16 MU) made it easy for many participants to consume the recommended amount of water.

#### Subjective Norm

When asked about how they felt about the recommendation to drink 5-8 cups of water per day, more than half of participants (n= 17 MU) claimed they met the recommendation. Some participants said they sometimes met the recommendation (n= 7 MU), and other said they did not meet the recommendation (n= 9 MU). Unlike SSB, normative beliefs did not emerge in reference to water.

#### Intention

When asked about their intention to meet the recommendation for water over the next month, very few participants responded. Ten MUs were provided for individuals intending to meet the recommendation, while five people said they already meet the recommendation. No one voiced that they did not intend to meet this recommendation. Ways to consume more water provided 15 MUs including replace SSB with water, increase availability of water, measure water consumption, and limit availability of SSB. In the exit questionnaire, participant's response to the 7-point Likert scale (1= strongly disagree to 7= strong agree) statement "I plan to drink 5-8 cups of water each day" averaged 6.0 (SD=1.5).

#### *Artificially sweetened beverages*

##### Attitude

When asked to discuss the good things associated with artificially sweetened beverages, participant responses focused on positive beverage attributes. Sub-categories included less calories/sugar (n= 12 MU), taste (n= 13 MU), and caffeine (n= 1 MU). Positive health benefits (n= 6 MU) were also discussed. When asked about the bad things associated with artificially sweetened beverages, negative health consequences were validated across all focus groups, with cancer being the most frequently mentioned (MU= 15), as one participant said "diet sodas have aspartame and those are showed to cause cancer". Headaches and body craves sugar consisted of

5 additional MUs. Taste was the most common sub-category of negative beverage attributes, with 13 MUs. “I don’t like the aftertaste that comes when you use those artificial, like those diet sodas. I don’t know there’s just a bad taste after. I don’t like them,” was one participant’s opinion about the taste of artificially sweetened drinks. Unnatural and caffeine made up the remaining MUs. Inconsistent evidence and cost were also mentioned as negative aspects of artificially sweetened beverages, totally three MUs.

#### Perceived Behavioral Control

When participants were asked what would make it hard to meet the recommendations for artificially sweetened beverages (i.e. <32 ounces per day), positive beverage attributes (n= 7 MU), availability of artificially sweetened beverages (n= 4 MU), bottle size (n= 2 MU) and cost (n= 2 MU) emerged as categories. When asked what would make it easy to meet artificially sweetened beverage recommendations, MUs were spread across categories, as participants mentioned knowledge, negative beverage attributes, specifically taste, and negative health outcomes. Four MUs revealed strong stance against the recommendation suggesting consumption of artificially sweetened beverages. For example, one participant said, “*Well they couldn’t tell me anything. I wouldn’t drink it, no matter what they said.*”

#### Subjective Norm

When asked how they felt about the recommendation to drink 32 ounces or less of artificially sweetened beverages a day, the majority of participants (n= 31 MU) said it was a bad suggestion, with one participant saying, “*It’s worse for you than the sugar-sweetened,*” although most comments suggesting this did not have a reason to back up this statement. A few participants (n= 3 MU) were unsure about the recommendation, and many people (n= 11 MU) felt good about the recommendation, as they were already meeting it. Similar to SSB, doctor’s

influence emerged as a normative belief (n= 11 MU), as individuals stated their consumption of artificially sweetened beverages would be determined by their doctor's advice.

### Intention

There was an underwhelming amount of responses when participants were asked about their intentions to meet this recommendation in the next month. Four MUs were provided for participants who already meet the recommendation, with no additional comments from individuals who did not meet the recommendation, although participants noted limiting availability as a way to decrease artificially sweetened beverage intake (n= 6 MU). When asked their opinions about replacing regular soda with diet soda, a little more than half of the individuals said they would not be willing to replace diet soda with regular (n= 16 MU), as one participant expressed, *"I would just quit all together instead of drinking diet."* Almost half of participants said they would be willing to replace diet with regular (n= 13 MU), although many said not until they felt like they had to. For example, one woman said, *"I would like if I ever became a diabetic of something like that."*

### ***Non-specific beverage themes***

In addition to themes and MUs specific to individual beverages, there were other important themes identified that were not directly linked to SSB, water, or artificially sweetened beverages. For example, time of day (n=37 MU) was the most notable influence on personal beverage choices. Certain foods (n= 11 MU) and locations (n= 5 MU) also emerged, as participants noted they were more likely to consume a particular drink depending on what food they were eating, and were more likely to consume a SSB when going out to eat. For example, one participant said, *"I think sometimes certain foods, you just feel like you want that fizziness to go with it and stuff with the soda. You know, it's hard to drink pizza and just drink water [laughs]. You know that's the kind of thing you know, like certain foods like pizza, or Mexican,*

*especially, yea.”* The majority of MUs indicated that drink patterns were different on the weekends (n= 30 MU) as one participant said, *“I think I’m more tempted to go with the soft drinks on the weekends because you’re more with friends. More of a chance you’re going to be going out the eat or something like that.”*

When asked about friends and family, the majority of responses (N= 27 MU) indicated that it was not important to drink the same drinks as their friends and family. However, when asked about who or what influences their drink choices, members of the household (n= 19 MU) was the most prominent theme. When asked what influenced the beverage choices of their family and friends, emerging themes included availability or convenience of a drink (n= 18 MU), taste (n= 22 MU), caffeine (n= 21 MU) and health concerns (n= 26 MU).

Furthermore, habit was a common theme that emerged (n= 57 MU) across the focus groups. One participant said, *“I just like drinking coffee and soda pop. I drank it ever since I was a kid, so it’s just something, that I’ve gotten used to.”* While another individual expressed, *“Habit’s what going to keep me from it, just plain right down habit. It’s like I said about the green tea. Now I’ve gotta have it, I actually want it.”*

### ***Informing program delivery***

Additional questions and scenarios were provided to understand programmatic aspects of intervention development and delivery. When asked where they heard about the benefits and harmful effects of certain drinks, many participants agreed they received their information through the media (n= 18 MU); however, most denied that media advertisements influenced their drink choices (n= 12 MU). All but a few responses indicated that weekly beverage sales and in-store promotions (n= 27 MU) greatly impacted participants’ beverages purchases. Community programs (MU= 12) and friends (n= 7 MU) were also common sources of information. In

addition, most participants agreed that health care professionals were the most respected and trusted when it came to health information (n= 28 MU) and most of the participants agreed that their doctor had talked to them about the benefits and harmful effects of certain drinks (n= 24 MU).

The majority of the participants (n=27 MU) indicated they would be willing to participate in a program with three small group sessions and phone calls, yet some (n= 5 MU) were unsure or indicated reasons why they would not participate. When asked specifically about receiving multiple interactive voice technology telephone messages, most participants voiced concerns, indicating they would prefer a live person (n= 34 MU) and that they would not be receptive to an automated message (n=21 MU), for example, *“No, most people would hang up or they’re not going to answer it.”* Participants offered a number of helpful suggestions related to the structure (e.g. time of day, frequency) of the telephone message and alternative communication options (e.g. texts messages or emails).

When asked what they would want a free program in their community to look like, participants offered a lot of information about content issues (n=72 MU), as they wanted it to be informative, interactive, and educational as well as provide visuals and positive alternatives and substitutions. Individuals also offered insights regarding the structure of a program (n=39 MU), noting that small groups, time of day, not time consuming, and location were each an important factor for promoting attendance. The influence of family and peer was also a strong theme (N= 22 MU), for example one individual stated *“My friends, somebody that would go with me. I don’t think I would just up and decide on my own I was going to go to that.”* Finally, incentives were another general theme (N=20 MU), as participants mentioned that the program should be free and provide coupons, new products, or other small giveaways to ensure participation.

On the 7-point Likert scale (1= strongly disagree to 7= strong agree) exit questionnaire statement, participants averaged a 5.5 (SD=1.8) when asked to respond to the statement, “I would attend education sessions to learn about how I could chose healthier drinks and improve my health.” The statement for “I would be willing to receive telephone messages to learn about how I could choose healthier drinks and improve my health” yielded an average of 4.6 (SD=2.1).

### **Discussion**

This is first known study to qualitatively explore beverage choices in adults using the Theory of Planned Behavior (TPB). Collectively, these findings provide unique cultural insight to better understand the salient beliefs associated with beverage behaviors. Across all the beverages and theory-grounded questions, the most notable themes that emerged included taste (n= 161 MU), availability/convenience (n= 95 MU), cost (n= 28 MU), and habit/addiction (n=57 MU). Participants also continuously emphasized the importance of their doctor’s advice and health concerns on their beverage choices, emphasizing the effect of normative beliefs and perceived behavioral control, respectively, on their beverage consumption. Taste was the most frequently mentioned positive beverage attribute across all drinks, although participants enforced this sub-category the most for SSB. Negative beverage attributes, as well as negative health outcomes surfaced for all three beverages. An additional negative aspect emerged for each beverage including cost for SSB, quality issues for water, and inconsistent evidence for artificially sweetened beverages. The presence of ambiguity, especially about the health consequences associated with artificially sweetened beverages, warrants the need for debunking myths about drinks. Positive beverage attributes were more abundant than negative beverage attributes for SSB and artificially sweetened beverages, but more comments focused on the negative beverage attributes of water. On the other hand, when talking about health outcomes,

participants discussed more negative health outcomes for SSB and artificially sweetened beverages, and more positive health outcomes related to water. This information demonstrates that participants recognize the health outcomes of their beverage choices, but that the positive beverage attributes outweigh these risks.

When asked what would make it hard to limit (or increase) consumption of a particular beverage, availability and convenience was the only common response across beverages. Participants stated it would be hard to decrease their SSB and artificially sweetened beverage consumption due to the availability of these beverages, and expressed difficulty in increasing their water intake due to the availability of other options (e.g., soda). Health outcomes were the only common answer when questioned what would make it easy to increase (or limit) consumption, although the context of these health consequences varied, with negative health outcomes listed when discussing SSB and artificially sweetened beverages, and positive health outcomes when talking about water.

A doctor's recommendation was important when discussing SSB and artificially sweetened beverage consumption, but was not mentioned as an influence on water intake. Peer influence was only mentioned in reference to SSB consumption, suggesting that encouraging peer support may help to change beverage patterns.

In regard to programmatic factors, participants seemed to contradict themselves when discussing media influences on their beverage choices, establishing media influences as an important intervention component. Participants supported the idea of small groups, but expressed concerns about the time of day, length and location of the group session, important factors to take into account before planning logistics of the intervention. To add to that, participants wanted to ensure the program would be engaging and informative, providing positive

alternatives to their current drink choices in an environmental where all opinions are valued, confirming the importance of a non-threatening, interactive setting. In addition, many participants were not receptive to receiving telephone messages, although were open to the idea of receiving texts or emails, thoughts that need to be considered before establishing every element of the intervention. Due to the established health consequences of SSB consumption, studies investigating determinants of beverage consumption are warranted. In addition, using this data to inform interventions aimed at decreasing SSB consumption are necessary. This is important when informing interventions, as doctor guidance could help to change their beverage patterns.

Additional research is needed to provide a foundation for creating and implementing theory-based interventions focusing on nutrition behaviors, specifically, SSB intake. Currently, there are minimal studies that utilize the TPB to qualitatively explore a dietary behavior and no studies that qualitatively investigate influences on beverage choices in adults (Brug, Debie, van Assema, & Weijts, 1995; Barberia, Attree, & Todd, 2008). It is important to use qualitative methods to examine nutrition behaviors, especially when the results are used to inform an intervention. Individuals are able to freely express their feelings about the issue at hand and can emphasize what they would like to see included in the effort to change the targeted behavior. These results give insight into the community and the inclusion of their ideas will likely result in a more successful initiative.

In addition, there are few dietary interventions targeting adults utilizing the TPB and no theory-based interventions targeting SSB consumption (Armitage, 2004; Gardner & Hausenblas, 2005; Beale & Manstead, 1991). Future research should explore ways to intervene on this overwhelming issue to improve the drinking habits and overall dietary quality of individuals.

This study has laid the groundwork for future efforts to reduce SSB consumption in Southwest Virginia. The attitudes, subjective norms and behavioral capabilities addressed in the focus groups will be used to create culturally appropriate interventions for adults in the targeted counties.

The specific aim of the proposed project was to qualitatively explore factors influencing drink choices among residents in rural Southwest Virginia, while also investigating programmatic issues related to beverage choice. Future initiatives in other regions of the United States focusing on SSB consumption would also benefit from conducting preliminary qualitative and/or quantitative data. The data collected will establish a need in the target population and ensure the visions of the researchers are parallel to the needs of the community. Preliminary data will also help to secure funding and buy-in from other researchers and guarantee the intervention is tailored to the targeted community.

The following limitations of this study are acknowledged. This study was conceptualized to identify potential differences among residents on city-water sources versus non-city water sources, yet no major differences emerged, the probable result of a small sample size for each water source. Furthermore, due to the focused region in which this study was conducted, it may not be reasonable to generalize the results to other geographical regions.

In conclusion, the major rise in consumption of SSB in the United States calls for interventions to decrease intake of these beverages in a variety of populations. These findings suggest that cost, habit/addiction and taste are major determinants of beverage consumption across constructs and also emphasize the role of the media in beverage choices. In addition, these results provide input from participants on what they would like to see in an intervention. These results will be used to inform a theory-based intervention targeting SSB consumption and

nutrition literacy, and ultimately decrease the intake of SSB among the target population.

Theme		Category	Example MUs
Attitude	Positive	Positive Beverage Attributes G= 8, MU= 97	<ul style="list-style-type: none"> <li>“I was absolutely addicted to Lime-Aid and Lemonade because the taste was so good, nice and tart, that was the good thing.”</li> </ul>
		Positive Health Outcomes G= 5, MU= 11	<ul style="list-style-type: none"> <li>“If you’re a little sick to your stomach, I find you can drink coke and it will settle it.”</li> </ul>
		Positive Attitude: Cost G= 3, MU= 6	<ul style="list-style-type: none"> <li>“Cheap to buy too. Sunny-D’s not very expensive.”</li> </ul>
	Negative	Negative Beverage Attributes G= 8, MU= 78	<ul style="list-style-type: none"> <li>“The bad thing about energy drinks is they’re overloaded with caffeine.”</li> </ul>
		Negative Health Outcomes G= 7, MU= 27	<ul style="list-style-type: none"> <li>“I heard if you drink one soda, one can of soda a day, you’ll gain 12 pounds in a year.”</li> </ul>
		Negative Attitude: Cost F=2, MU= 3	<ul style="list-style-type: none"> <li>“I just don’t like the price on them [energy drinks]. They’re outrageous.”</li> </ul>
PBC	Hard	Negative Health Consequences G= 8, MU= 21	<ul style="list-style-type: none"> <li>“What makes it impossible for me is the caffeine withdraws.”</li> </ul>
		Availability & Convenience of SSB G= 6, MU= 14	<ul style="list-style-type: none"> <li>“I drink pop mostly for the convenience. It’s easier to grab a can than it is to get a glass and pour milk.”</li> </ul>
		Size of Cans G= 6, MU= 12	<ul style="list-style-type: none"> <li>“And the cans of the soda should be 8 ounces instead of 12 or whatever they are now.”</li> </ul>
		Cost G= 4, MU= 12	<ul style="list-style-type: none"> <li>“Soda and all that stuff is a lot cheaper than buying bottled water.”</li> </ul>
		Taste of SSB G= 4, MU= 4	<ul style="list-style-type: none"> <li>“It’d be hard for me to give up the Welch’s grape because I’m, it just a taste that I really like. It’d be hard to give that up.”</li> </ul>
		Dislike Alternatives to SSB G= 3, MU= 3	<ul style="list-style-type: none"> <li>“Well at the store we would have to drink water and I don’t want to drink that water. The town water I don’t want to drink.”</li> </ul>
	Easy	Availability & Convenience G= 6, MU= 18	<ul style="list-style-type: none"> <li>“More easily available, that’s a good example of the schools or workplace having water bottled vending machines or juice vending machines.”</li> </ul>
		Health Reasons G= 4, MU= 8	<ul style="list-style-type: none"> <li>“I either drink that or um, Sprite, a lemon-lime drink. I try not to drink too many of those because I have a corn allergy so the high fructose corn syrup.”</li> </ul>
Subjective Norm	Motivation to comply with recommendation	Likely to meet the recommendation G= 3, MU= 4	<ul style="list-style-type: none"> <li>“I think it’s pretty healthy.”</li> </ul>
		Neutral/unsure about the recommendation G= 5, MU= 7	<ul style="list-style-type: none"> <li>“It’s probably a good recommendation that most people don’t follow.”</li> </ul>
		Unlikely to meet the recommendation G= 7, MU= 16	<ul style="list-style-type: none"> <li>“It would probably be better for you just to drink one cup, but the likelihood of that happening is not very likely.”</li> </ul>
	Normative beliefs	Peer influence G= 3, MU= 3	<ul style="list-style-type: none"> <li>“So I don’t know, probably because we’re all together all the time and we’re going to peer pressure one another.”</li> </ul>
		Doctor recommendation G= 2, MU= 11	<ul style="list-style-type: none"> <li>“Well if you’re coming with uh, say, diabetes, and you didn’t about it until you went to a doctor and he says, “Hey, you have diabetes and you need to cut down on your sugar and few other thing...” that would influence me, I know that.</li> </ul>

**Table 1:** Determinants of SSB consumption

\* G= number of groups (out of 8), MU= number of meaning units

Theme		Category	Example MU
Attitude	Positive	Positive Health Outcomes G= 8, MU= 30	<ul style="list-style-type: none"> <li>“I know I always feel better if I notice I drink more water during the day. I always feel better, you know...”</li> </ul>
		Positive Beverage Attributes G= 5, MU= 14	<ul style="list-style-type: none"> <li>“I’ve always like water. I’ve just liked the taste of water. I always did.”</li> </ul>
		Positive: Cost G= 3, MU= 4	<ul style="list-style-type: none"> <li>“It’s cheap, it’s not that expensive.”</li> </ul>
	Negative	Negative: Quality Issues G= 7, MU= 41	<ul style="list-style-type: none"> <li>“I guess you never know if you well’s clean or not, there’s always ya know, there’s always .”</li> </ul>
		Negative Beverage Attributes G= 6, MU= 20	<ul style="list-style-type: none"> <li>“I’ve lived in both situations. A cup of coffee made with bleach water [in reference to city water] tastes terrible.”</li> </ul>
		Negative Health Consequences G= 3, MU= 4	<ul style="list-style-type: none"> <li>“But I’ve actually heard you can drink too much water. I’ve heard that too. That it causes electrolytes to go crazy.”</li> </ul>
PBC	Hard	Negative Health Outcomes G=4, MU= 16	<ul style="list-style-type: none"> <li>“Sometimes you have to limit your water intake because you can’t take the time to go to the bathroom.”</li> </ul>
		Availability of other options G= 3, MU= 7	<ul style="list-style-type: none"> <li>“Just the option of having the sugar-sweetened beverage I guess.”</li> </ul>
		Negative Beverage Attributes G= 3, MU= 5	<ul style="list-style-type: none"> <li>“Yea, as long as it’s cold I’ll drink it. And if it’s warm, I still try and drink it, but I guess I don’t drink as much if it’s been warm than if it’s cold.”</li> </ul>
	Neutral	Depends on availability of preferred water source G= 6, MU= 9	<ul style="list-style-type: none"> <li>“Well water, spring water, that’s about all I’ll drink.”</li> </ul>
	Easy	Positive Health Outcomes G= 7, MU= 17	<ul style="list-style-type: none"> <li>“I mean, it’s just a, ya know, when you’re working and it’s a hot environment and you’re sweating a lot, I mean you just got to replace fluids.”</li> </ul>
		Positive: Availability & Convenience G= 6, MU= 16	<ul style="list-style-type: none"> <li>“Because it’s handy. I always have at least one case of bottled water in the house.”</li> </ul>
Subjective Norm	Motivation to comply with recommendation	Likely the recommendation G= 8, MU= 17	<ul style="list-style-type: none"> <li>“I think it’s pretty good. I drink more than that. I drink about 3 of those 32 ounce cups a day.”</li> </ul>
		Neutral/unsure about the recommendation G=2, MU= 7	<ul style="list-style-type: none"> <li>“Just depends on how I feel.”</li> </ul>
		Unlikely to meet the recommendation G= 5, MU= 9	<ul style="list-style-type: none"> <li>“I say no, most of the time I don’t meet it. I uh, I just want to add cool-aid mix to it.”</li> </ul>

**Table 2:** Determinants of water consumption

\* G= number of groups (out of 8), MU= number of meaning units

Theme		Category	Example MU
Attitude	Positive	Positive beverage attribute G= 8, MU= 32	<ul style="list-style-type: none"> <li>“I’ve actually tried like the crystal light and stuff like that and they taste pretty good.”</li> </ul>
		Positive health outcomes G=3, MU= 6	<ul style="list-style-type: none"> <li>“I mean, it’s certainly a benefit for folks who are diabetic.”</li> </ul>
	Negative	Negative health consequence G= 8, MU= 20	<ul style="list-style-type: none"> <li>“Diet sodas have aspartame and those are showed to cause cancer.”</li> </ul>
		Negative beverage attribute G= 5, MU= 16	<ul style="list-style-type: none"> <li>“I don’t like the aftertaste that comes when you use those artificial, like those diet sodas. I don’t know there’s just a bad taste after. I don’t like them.”</li> </ul>
		Negative: Inconsistent evidence G= 2, MU= 2	<ul style="list-style-type: none"> <li>“But we, that’s what I use is a lot of Splenda. I don’t like the Sweet n’ Low or the Equal, but it’s just as bad as sugar, so they say.</li> </ul>
PBC	Hard	Positive beverage attributes G= 4, MU= 7	<ul style="list-style-type: none"> <li>“I’m like her, I can pretty much drink any type of diet. But the caffeine would be the hardest to give up.”</li> </ul>
		Availability of artificially sweetened beverages G= 2, MU= 4	<ul style="list-style-type: none"> <li>“Exactly, you can go into almost any store and they’ll have a fountain set up for you to get that and you can get a bigger cup with the soft drink, normally at a flat rate price so, they bargain hunt and normally go for the big one versus the smaller one.”</li> </ul>
		Cost G= 2, MU= 2	<ul style="list-style-type: none"> <li>“Uh, probably the price.”</li> </ul>
		Bottle size G= 1, MU= 2	<ul style="list-style-type: none"> <li>“Well, our machines sell 20 oz bottles and when I drink 3 of them and I do drink diet most of the time. But just the way everything’s packaged it’s hard to do that.”</li> </ul>
	Easy	Negative health outcomes G= 3, MU= 6	<ul style="list-style-type: none"> <li>“For me it was an easy choice because it was a health issue, like I said the blood pressure, so I thought I really have to do something.”</li> </ul>
		Nothing G= 3, MU= 4	<ul style="list-style-type: none"> <li>“I don’t think you’re going to convince most people to change their drinking habits.”</li> </ul>
		Knowledge G= 3, MU= 4	<ul style="list-style-type: none"> <li>“The only thing I could do is knowing if it’s healthy for you or not. I mean, most of these drinks aren’t healthy for you.”</li> </ul>
		Negative beverage attributes G= 1, MU= 6	<ul style="list-style-type: none"> <li>“I think the taste could be the biggest thing, they have such an aftertaste that most of them, well I’ll try some of the new one’s when they come out but it’s not the same.”</li> </ul>
Subjective Norm	Motivation to comply with recommendation	Likely to meet the recommendation G= 5, MU= 38	<ul style="list-style-type: none"> <li>“I feel great about that, I feel good about that. I feel like I can have some more Diet Pepsi.”</li> </ul>
		Neutral/unsure about the recommendation G= 3, MU= 6	<ul style="list-style-type: none"> <li>“They’re giving you three times as much, so it’s gotta be- they must think it’s better for you. I don’t know who they is.”</li> </ul>
		Unlikely to meet recommendation G= 1, MU= 1	<ul style="list-style-type: none"> <li>“No I go over, I go over.”</li> </ul>
	Normative beliefs	Doctor recommendation G= 3, MU= 11	<ul style="list-style-type: none"> <li>“A doctor telling me to, of course. When you have motivation like that, of course, it’s a lot easier.”</li> </ul>

**Table 3:** Determinants of consumption of artificially sweetened beverages

\* G= number of groups (out of 8), MU= number of meaning units

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## CHAPTER 3

### Conclusions and Implications for Future Research

It is well established that the consumption of sugar-sweetened beverages (SSB) is on the rise in the United States (Brownell et al., 2007) and there is ample evidence that SSB intake is linked to weight gain, diabetes, cavities, and heart disease (Malik, Schulze, & Hu, 2006; Vartanian, Schwartz, & Brownell, 2007; Schulze et al., 2004; Ismail, Sohn, Lim, & Willem, 2009; Fung et al., 2009). It is also evident that consumption of SSB is higher in low-income populations. The purpose of this study was to qualitatively explore the attitudes, behavioral beliefs and subjective norms that influence beverage choices and specifically SSB, water, and artificially sweetened beverages. Eight focus groups were conducted with individuals in Southwest Virginia, a region that is part of the health disparate region of Appalachia. The findings of this study indicate that habit, taste, and availability/convenience were major determinants of beverage consumption across themes. Cost and health outcomes were also categories that emerged as major influences to beverage consumption. In addition, a doctor's recommendation was cited as advice that would cause participants to change their beverage patterns. Although participants denied that the media had an influence on their beverage choices, they stated that they learn health information from media sources and the media influences their family member and friends drink choices. Collectively, the qualitative focus groups helps to more fully understand the underlying beliefs that impact beverage behavior. This culturally-specific information, grounded in the TPB, is critical to development of metrics and intervention messages and strategies to address this noteworthy problem. Two examples, including a doctor figure to discuss health consequences of SSB, and utilizing media literacy strategies to inform participants about the sales tactics and the power of persuasion could be effective strategies to

incorporate into future intervention efforts.

This study fills several gaps in the literature. First, it is the only known qualitative study that explores the influences of sugar-sweetened beverages, water, and artificially sweetened beverages in adults with low health literacy. Second, it focuses on drink choices in vulnerable populations. Finally, as recommended in application of the TPB, it illustrates the importance of elicitation in developing culturally appropriate intervention messages and strategies to change behavior.

The findings of this qualitative study are currently being used to inform an experimental intervention that focuses on enhancing nutrition and media literacy in residents of Southwest Virginia to improve their drink choices and health outcomes. Therefore, we purposefully used an individual level theory to understand drink choices. While understanding and intervening on individual level behavior is important it is well known that nutritional choices go beyond individual factors (Sallis, Owen, & Fisher, 2008). While the TPB addresses some broader social factors through subjective norms, it is important to more fully investigate interpersonal, organization, community, and policy level factors as well. These additional aspects help inform intervention strategies and efforts beyond the individual level.

Future research should apply a broader socio-ecological model to understand additional factors that influence beverage choices. The socio-ecological model proposes that behaviors are influenced by the interaction between an individual and their environment, including interpersonal, organizational, community and policy level factors (Sallis, Owen, & Fisher, 2008). This model has been widely used in health promotion and public health initiatives including physical activity promotion, increasing the consumption of fruits and vegetables (Sallis, Owen, & Fisher, 2008; Richard, Gauvin, & Raine, 2011).

The socio-ecological model can also be used to identify multilevel influences on SSB consumption. For example, the family environment has a strong impact on what an individual chooses to drink. The role of the home environment on adolescents drink consumption was investigated by Sdrali and colleagues (2010) and identified multiple environmental family variables that affected SSB consumption. This theme was also apparent in the focus groups, as members in the household was a common response when discussing influences on drink purchases. Focus group participants mentioned pressure to buy certain beverages from their spouse, kids and/or other family members. They also acknowledged how their beverage choices impacted what their family drank, as what they bought was available to their kids.

Another widely investigated topic is the impact of the built environment on health behaviors (Sallis & Glanz, 2009). This is true with beverage choices, especially because many areas promote SSB consumption due to the high density of fast food restaurants and convenient stores offering SSB at a low price. Grocery stores also have promotions, weekly specials and strategically place SSB around the store to promote sales of these items. Focus group participants described that in-store promotions greatly influenced their decision on what brand and how much SSB to purchase. Although the majority of participants denied that the media influenced their SSB consumption, they noted that commercials and new products were of interest to their children who sometimes persuaded them to purchase a new drink.

The media also has the potential to significantly affect influences on health (Flora, Maibach, & Maccoby, 1989). Incorporating media literacy and teaching participants to recognize the influence of the media on their beverage choices should be a key aspect of interventions targeting this issue. One example is the New York City campaigns against soda and other sugary drinks (New York City Department of Health and Hygiene). Formative

research, including focus groups, was conducted to develop the ads. These advertisements ask consumers, are you pouring on the pounds? An example of this effort includes a video of a man drinking pure fat. Creators are hopeful that this in your face approach will make people acknowledge the health consequences of drinking SSB and promote a behavior change. Efforts are needed to evaluate the effectiveness of these media message in reducing SSB intake.

Environmental and policy changes can also help to address issues with the overconsumption of SSB. Two examples include eliminating soda and other SSB from school vending machines and the taxation of SSB. Nearly one fourth of adolescents drink more than 26 oz/day of SSB, which provides at least 300 kcal, approximately 12% to 15% of their daily caloric need (Fried & Nestle, 2002). Many schools across the country are banning vending machines or implementing specific nutritional standards for drinks and foods that can be sold (National Conference of State Legislatures). This initiative will limit the availability of sugary drinks to children and only allows them to only have access to healthier options throughout the school day. In addition, an example of a currently policy issue is the current debate on a taxation of SSB. Brownell and colleagues (2009) support this effort, as they say this tax would have positive effects on reducing consumption. In addition, they claim this tax would provide revenue toward public health initiatives targeting obesity and other health-related programs.

In conclusion, SSB consumption is a major public health issue, as it leads to many negative health consequences that can be prevented. This study qualitatively explored beverage choices through eight focus groups based on the constructs of the TPB and has provided a foundation to inform future interventions targeting SSB consumption among individuals in Southwest Virginia. While this study begins to address the limitations in the current body of literature, it is also apparent that additional efforts are needed to decrease consumption of sugary

beverages and initiatives must target broader social, community, environmental, and policy level factors.

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## **Appendices**

Appendix A: IRB Approval

Appendix B: Focus Group Screening Protocol

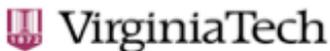
Appendix C: Focus Group Informed Consent

Appendix D: Focus Group Script

Appendix E: Focus Group Exit Survey

Appendix F: Health Literacy Screener

## Appendix A: IRB Approval



Office of Research Compliance  
Institutional Review Board  
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### MEMORANDUM

**DATE:** June 8, 2010

**TO:** Jamie Zoellner, Erin Krzeski

**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires June 13, 2011)

**PROTOCOL TITLE:** Sugar Sweetened Beverage Consumption in Southwest Virginians

**IRB NUMBER:** 10-419

Effective June 8, 2010, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

### PROTOCOL INFORMATION:

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 6, 7**

Protocol Approval Date: **6/8/2010**

Protocol Expiration Date: **6/7/2011**

Continuing Review Due Date\*: **5/24/2011**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

### FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federally regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

*Invent the Future*

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*An equal opportunity, affirmative action institution*

## Appendix B: Focus Group Screening Protocol



Human Nutrition, Foods & Exercise

### Understanding Drink Choices in Southwest Virginians Focus Group Screening Script & Protocol

Hi *insert community member's name*,  
[INTRODUCE YOURSELF].

[READ]: I am contacting you on behalf of Virginia Tech. I am helping them conduct a study to understand the health behaviors of adults living in Southwest Virginia. I am trying to recruit and sign-up people to participate in a focus group. A focus group is where 6-10 people come together and share their opinions and ideas related to the topic at hand, in this case health behaviors. The faculty members and students at Virginia Tech hope to use the findings from the focus groups to develop programs about health behaviors in Southwest Virginia communities.

Should you agree to participate in the focus group, your name will not appear on any records, and all records will be kept private. You will not be singled out or identified as a result of this study. Also, you will not have to read any forms to participate in this study because everything will be read aloud to you. The focus group will take a total of about 1 ½ hours to complete. To compensate your time involved, Virginia Tech will give you a \$30.00 gift card and a meal will be provided at the focus group. Can I ask you a few questions that will take about 5 minutes to see if you qualify to participate?

**[If NO, thank them for their time and discontinue the encounter]**

**[If YES, then continue with the Focus Group Screening Questionnaire]**



[ID NUMBER]: |\_\_||\_\_||\_\_|



Human Nutrition, Foods & Exercise

### Focus Group Screening Questionnaire

Remember that all the information you provide is confidential and that you will not be singled out or identified as a result of this study.

This first set of questions is about the types of beverages you have drunk in the past month. Please feel free to ask any question you have regarding the directions, frequency options, or serving size options.

1. How often do you drink **regular soft drinks**?

- Never or less than 1 time per week
- 1 time per week
- 2-3 times per week
- 4-6 times per week
- 1 time per day
- 2 times per day
- 3 or more times per day

1a. When you drink **regular soft drinks**, how much do you normally drink?

- less than 6 fluid ounces (or  $\frac{3}{4}$  cup)
- 8 ounces (1 cup)
- 12 ounces (1  $\frac{1}{2}$  cups)
- 16 ounces (2 cups)
- more than 20 ounces (2  $\frac{1}{2}$  cups)

2. How often do you drink **sweetened tea**?

- Never or less than 1 time per week
- 1 time per week
- 2-3 times per week
- 4-6 times per week
- 1 time per day
- 2 times per day
- 3 or more times per day

2a. When you drink **sweetened tea**, how much do you normally drink?

- less than 6 fluid ounces (or  $\frac{3}{4}$  cup)
- 8 ounces (1 cup)
- 12 ounces (1  $\frac{1}{2}$  cups)
- 16 ounces (2 cups)
- more than 20 ounces (2  $\frac{1}{2}$  cups)

3. How often do you drink **water**?

- Never or less than 1 time per week
- 1 time per week
- 2-3 times per week
- 4-6 times per week
- 1 time per day
- 2 times per day
- 3 or more times per day

3a. When you drink **water**, how much do you normally drink?

- less than 6 fluid ounces (or  $\frac{3}{4}$  cup)
- 8 ounces (1 cup)
- 12 ounces (1  $\frac{1}{2}$  cups)
- 16 ounces (2 cups)
- more than 20 ounces (2  $\frac{1}{2}$  cups)

4. How often do you drink **sweetened juice beverages/drinks such as fruit aides, lemonade, punch, or Sunny Delight**?

- Never or less than 1 time per week
- 1 time per week
- 2-3 times per week
- 4-6 times per week
- 1 time per day
- 2 times per day
- 3 or more times per day

4a. When you drink **sweetened juice beverages/drink**, how much do you normally drink?

- less than 6 fluid ounces (or  $\frac{3}{4}$  cup)
- 8 ounces (1 cup)
- 12 ounces (1  $\frac{1}{2}$  cups)
- 16 ounces (2 cups)
- more than 20 ounces (2  $\frac{1}{2}$  cups)

These next two questions are about physical activity. Moderate activities make your heart beat faster than normal. During these activities you can talk, but you can't sing, and you are breathing harder than normal. Examples include brisk walking, bicycling, vacuuming, gardening, or anything else that causes an increase in breathing or heart rate.

5. Do you do 30 minutes or more per day of moderate physical activity 5 or more days per week?

- Yes
- No

6. Do you do activities to increase muscle strength, such as lifting weights, twice a week or more?

- Yes
- No

The next three questions are about your drinking water at home.

7. Where do you get most of your drinking water?

- Well (Individual well or well that serves fewer than 15 residences)
- Community well system (well serving 15 or more residences, but not a city system)
- River, stream, pond, or lake (individual system)
- City water system
- Purchase bottled water
- I don't know

8. Do you agree or disagree with the following statement: "Your tap water at home is safe."

- Strongly agree
- Agree
- Unsure
- Disagree
- Strongly disagree

9. Does your family drink tap water at home?

- Always
- Sometimes
- Never

9a. If you choose never, why does your family not drink tap water at home, why not? Check all that apply.

- I don't like how it tastes
- I think tap water will make us sick

- We were told not to drink the water
- Other: \_\_\_\_\_

This final part of the questionnaire is needed to help us understand the people taking in this survey.

10. What is your gender?

- Male
- Female

11. What is your race?

- Black
- White
- Hispanic
- Other

12. What is your age? (Please fill-in): \_\_\_\_\_

13. What is the highest level of school or education you have completed?

- Less than 9th grade
- 9th -12th grade- some high school
- High school diploma or GED
- Some college or specialized training- no degree
- Received Associate's degree (2-year college graduate)
- Received Bachelor's degree (4-year college graduate)
- Attended graduate school

14. Of these income groups, can you tell me which number best represents your family's total income in the last 12 months?

- Less than \$5,000
- \$5,000-9,999
- \$10,000-14,999
- \$15,000-19,999
- \$20,000-24,999
- \$25,000-29,999
- \$30,000-34,999
- \$35,000-39,999
- \$40,000-44,999
- \$45,000-49,999
- \$50,000-54,999
- More than \$55,000

[If this person **consumes  $\geq 1$  cup of sugar-sweetened beverages, READ**]:

“You qualify for this study, would you be willing to participate in a focus group?”

- Yes

No, why not: \_\_\_\_\_

[Inform interested participants of the day, time and location of the focus group, and READ]:  
“Thank you for scheduling an appointment. About 1 or 2 days prior to your appointment I will call you and remind you of your appointment. What is the best phone number that I may reach you?”

[If this person **does NOT** consume  $\geq 1$  cup of sugar-sweetened beverages, READ]:  
“I really appreciate your willingness to participate. However, you do not qualify for this study. Would you like for me to make a note of your information and contact you again in the future if another study comes up? Thank you.”

Yes

No

## **Appendix C: Focus Group Informed Consent**



### **Informed Consent for Participants: Focus Group**

**Study Title: Understanding Drink Choices in Southwest Virginians**

**Investigators:** Dr. Jamie Zoellner and Erin Krzeski

#### **I. Purpose**

The purpose of this study is to explore the types of drinks people in Southwest Virginia like to drink, and understand what factors influence drink choices. By conducting this research we can develop programs to improve the health behaviors of people living in Southwest Virginia.

#### **II. Procedures**

Your participation requires you to attend a focus group setting. You may choose whether or not to participate in this study. Your participation will require you to verbally answer questions about your attitudes and opinions towards different types of drinks. After the focus group is finished, you will need to complete a brief 5-10 minute paper-and-pencil exit questionnaire that I will read aloud.

The entire study will take approximately 90 minutes to complete. Discussion among other members in the group is encouraged, except during the last 5-10 minutes when you fill out a short questionnaire. The Virginia Tech Institutional Review Board has approved this study.

#### **III. Risks**

There is no foreseeable risk of adverse effects. The only foreseeable risk is the possible inconvenience associated with answering the focus group questions. You do not have to answer any questions that make you feel uncomfortable and you may stop participating at any time.

#### **IV. Benefits**

You will have the opportunity to experience and understand the process involved in focus group research. The findings from this research may be used to develop programs and promote healthy behaviors for your community members. It is important to mention that no promise or guarantee of benefits have been made to encourage you to participate.

#### **V. Extent of Confidentiality**

We will audio record the focus group session. The recordings will be converted to computer audio format (MP3) and be downloaded to a password protected external drive. A trained research assistant will transcribe the information and compile a report.

The research is confidential. We will collect your names but will not disclose your information to other people. We will audio record your responses to the questions without identifying the answers with the person in the final report. Only the research team will know that you participated in this study. The data will be stored for 3 years or until the research is published, then destroyed.

**VI. Compensation**

In return for your input, we will provide you with a \$30 gift card. Even if you decide not to continue the study, you will still receive a \$30 gift card.

**VII. Freedom to Withdraw**

If you decide not to participate, please inform the researcher. If you start to participate and then change your mind, you may stop at any time and notify the researcher. If you choose to withdraw, you will not be penalized.

**VIII. Subject’s Permission**

I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent:

\_\_\_\_\_ Date \_\_\_\_\_

Subject signature

Should I have any pertinent questions about this research or its conduct, and research subjects' rights, and whom to contact in the event of a research-related injury to the subject, I may contact:

Dr. Jamie Zoellner  
Assistant Professor of Human Nutrition, Foods and Exercise  
Virginia Tech  
540-231-3670  
[zoellner@vt.edu](mailto:zoellner@vt.edu)

Contact Information of IRB Chair:

If I should have any questions about the protection of human research participants regarding this study, I may contact

Dr. David Moore  
Chair Virginia Tech Institutional Review Board for the Protection of Human Subjects  
Office of Research Compliance  
2000 Kraft Drive, Suite 2000 (0497)  
Blacksburg, VA, 24060  
540-231-4991  
[moored@vt.edu](mailto:moored@vt.edu)

## Appendix D: Focus Group Script



Human Nutrition, Foods & Exercise

### Understanding Drink Choices in Southwest Virginians

#### Focus Group Script

“Good afternoon, my name is \_\_\_\_\_. I am currently a student at Virginia Tech and I would really appreciate your help today in teaching me about your attitudes and beliefs about the beverages or drinks that you enjoy. We are interested in developing health promotion education programs for people in Southwest Virginia, so the information you provide will help us better understand the needs of your community so we can make better programs. Any feedback is welcome and any information you can give will be very helpful to me and my project.”

#### [INDIVIDUAL-LEVEL]

“To get us started, I want you to take a look of the paper in front of you. First, I would like you to circle individual at the top left-hand corner of the page. Then, using the beverage pictures, I would like you to look through the pictures of the different beverages and circle the beverages YOU most commonly drink. You can also add any beverages that are not shown on the paper. Also, please take some time to write down any feelings, thoughts, or draw any pictures that come to mind when thinking of these drinks.”

[ATTITUDE]: “I would like to start with introductions, so we’re going to go around the table and if you can say your name and tell us about the drinks you circled and about the types of drinks you consume most often and why.

[ATTITUDE]: “Tell me about the feelings or thoughts that you associated with the drinks you consume most often.”

[PERCEIVED BEHAVIORAL CONTROL]: “Talk to me about what things influence your drink choices.”

[IF NEEDED PROBE: WHY do you drink these beverages?]

[ATTITUDE/BEHAVIOR]: “Okay, let’s think a bit more specifically about a typical weekday for you. I want you to reflect on the types of beverages you drink throughout the day, starting with when you wake up in the morning until when you go to bed at night. I am interested in learning more about what **influences** your drink choices. What sort of drink do you choose first thing in the morning and/or for breakfast, and why?”

[IF NEEDED CONTINUE TO PROBE ABOUT]:

How about between breakfast & lunch, and why?  
How about at lunch, and why?  
How about between lunch & dinner, and why?  
How about at dinner, and why?  
How about after dinner, before bed, and why?

[PERCEIVED BEHAVIORAL CONTROL]: “If you wanted to change the drinks you consume most often on a weekday, tell me what would make that hard or easy.”

[ATTITUDE/BEHAVIOR]: “Talk to me about your beverage patterns on the weekends.”

[IF NEEDED PROBE]: Probe for differences and/or similarities between weekdays and weekends.

[PERCEIVED BEHAVIORAL CONTROL]: “If you wanted to change the drinks you consume most often on a weekend, tell me what would make that hard or easy.”

**[FRIENDS & FAMILY]**

“Now, I want you to take out the other sheet of beverage pictures and first circle family and friends at the top left hand corner. Then, I want you to circle the beverages that your FAMILY AND FRIENDS drink most often. You can think about your children, your spouse, you co-workers, and/or your friends. Again, you can add any beverages that are not shown on the paper and you please write down any feelings or thought and draw pictures that come to mind when thinking of these drinks.”

[SUBJECTIVE NORM]: “Now we are going to go around the table again and I want you to introduce the group to one or a few of your family and/or friends, and tell us about the drinks that they drink most often.”

[PERCEIVED BEHAVIORAL CONTROL]: “Tell me about anything that might influence your family and/or friends to drink those beverages.”

[SUBJECTIVE NORM]: “Tell me why it is or is not important that you drink the same amount or type of drinks as your friends and family.”

[ATTITUDE (indirect-behavioral belief)]: “When people in your community think of healthy beverages, which ones come to mind?”

[IF NEEDED PROBE: What makes these drinks healthy?]

[ATTITUDE (indirect-behavioral belief)]: “When people in your community think of unhealthy beverages, which ones come to mind?”

[IF NEEDED PROBE: What makes these drinks unhealthy?]

[ATTITUDE]: “Let’s talk again about the beverages viewed as being “healthy”. Tell me about how a beverage that is labeled “healthy” impacts whether you drink it or not.”

[ATTITUDE]: “Let’s talk again about the beverages viewed as being “unhealthy”. Tell me about how a beverage that is labeled “unhealthy” would influence your decision to drink it or not to drink it.”

**[SUGAR-SWEETENED BEVERAGES]**

“Now, we are going to turn our focus to only the drinks that have added sugar, or sugar-sweetened beverages. This includes regular sodas, energy or sports drinks, juices drinks such as Sunny delight, lemonade, punch, cool-aids; and sweet tea or coffee w/ sugar. This does NOT include diet drinks or any drinks sweetened with artificial sweeteners. Drinks in this category are listed across the top row of your beverage sheet.”

[ATTITUDE]: “Let’s start with soda, tell me about the good things associated with drinking soda.”

[ATTITUDE]: “Tell me about the bad things associated with drinking soda.”

[ATTITUDE]: “Now let’s move on to energy or sports drinks. Tell me about the good things associated with drinking energy or sports drinks.”

[ATTITUDE]: “Tell me about the bad things associated with drinking energy or sports drinks.”

[ATTITUDE]: “How about juice drinks like lemonade, sunny delight, Capri Sun, Koolaide. Tell me about the good things associated with drinking these juice drinks.”

[ATTITUDE]: “Tell me about the bad things associated with drinking these juice drinks.”

[ATTITUDE]: “And finally, how about coffee and/or tea with added table sugar (not sweetener packets). Tell me about the good things associated with drinking coffee and/or tea with added sugar.”

[ATTITUDE]: “Tell me about the bad things associated with coffee and/or tea with added table sugar.”

“Health professionals recommend that people drink 1 cup or less of sugar-sweetened beverages per day.” [SHOW PARTICPANTS BEVERAGE MODELS TO INDICATE ONE CUP]

[SUBJECTIVE NORM (Motivation to comply)]: “Tell me how you feel about this recommendation.”

[PROBE]: “Do you currently meet or exceed this recommendation? What makes it easy to drink this amount? What makes it hard for you to drink only 1 cup of a sugar-sweetened beverage?”

[INTENTION]: “I want you to tell me about your intentions to meet the drink recommendation of 1 cup or less of sugar-sweetened beverages per day in the next month. (If you already meet the recommendation, do you have plans to continue to meet this recommendation?)”

[PERCEIVED BEHAVIORAL CONTROL]: If you intend to limit, what would your plan look like? When, where, and what drinks would you limit? What would make this plan hard or easy? If you have no plans to limit, what would prevent you from meeting the recommendation?”

[PERCEIVED BEHAVIORAL CONTROL]: What would you and/or your family and friends need to help meet this recommendation?” OR “What would it take for someone to convince you and/or your family and friends that it is important to drink 1 cup or less of sugar-sweetened beverages per day?”

### [WATER]

“Ok great, now we are going to focus more specifically on water.”

[ATTITUDE]: “Tell me about the good things associated with drinking well water.”

[ATTITUDE]: “Tell me about the bad things associated with drinking well water.”

[ATTITUDE]: “Tell me about the good things associated with drinking city/town water.”

[ATTITUDE]: “Tell me about the bad things associated with drinking city/town water.”

[ATTITUDE]: “Tell me about the good things associated with drinking bottled water.”

[ATTITUDE]: “Tell me about the bad things associated with drinking bottled water.”

[ATTITUDE]: Can you talk to me specifically about the differences between drinking city water, well water and bottled water?

“Health professionals recommend that people to drink 5-8 cups of water per day.” [SHOW PARTICPANTS BEVERAGE MODELS TO INDICATE 5-8 CUPS]

[SUBJECTIVE NORM (Motivation to comply)]: “Tell me how you feel about this recommendation.”

[PROBE]: “Do you currently meet this recommendation? What makes it easy to drink this amount? What prevents you from drinking this amount?”

[INTENTION]: “Now, I want you to tell me about your intentions to meet the drink recommendation of 5-8 cups of water per day in the next month. (If you already meet the recommendation, do you plan to continue to meet it?)”

[PERCEIVED BEHAVIORAL CONTROL]: “If you do plan to meet this recommendation, what would your plan look like? What would make this plan hard or easy to follow? If you have no plans to meet this recommendation, what prevents you from meeting this recommendation?”

[PERCEIVED BEHAVIORAL CONTROL]: What would you and/or your family and friends need to help meet this recommendation for water?" OR "What would it take for someone to convince you and/or your family and friends that it is important to drink 5-8 cups of water each day?"

### **[ARTIFICIAL SWEETNERS]**

"Now we are going to switch our focus again and talk about diet drinks and drinks sweetened with artificial sweeteners. This includes diet sodas, crystal light, sugar-free drinks and tea or coffee with sweetener packets including splenda, sweet n' low and equal."

[SHOW PARTICIPANTS DIET DRINKS AND SWEETENER PACKETS]

[ATTITUDE]: "Tell me about the good things associated with drinking artificially sweetened beverages."

[ATTITUDE]: "Tell me about the bad things associated with drinking artificially sweetened beverages."

"Health professionals recommend that people drink 32 ounces or less of artificially sweetened beverages per day (4 cups or a little less than 3 cans of soda)." [SHOW PARTICIPANTS BEVERAGE MODELS TO INDICATE 32 OUNCES]

[SUBJECTIVE NORM (Motivation to comply)]: "Tell me how you feel about this recommendation."

[PROBE]: "Do you currently meet this recommendation? What makes it easy for you to drink this amount now? What makes it difficult to meet the recommendation of 32 ounces or less?"

[INTENTION]: "Now I want you to tell me about your intentions to meet the drink recommendation of 32 ounces or less of artificially sweetened beverages per day per day in the next month. (If you already meet this recommendation, do you plan to continue to meet it? Why?)"

[PROBE]: "If you're planning to meet this recommendation, what would your plan look like? If you have no plans to meet this recommendation, what prevents you from meeting this recommendation?"

[PERCEIVED BEHAVIORAL CONTROL]: "If a health care professional asked you to replace a portion of your sugar-sweetened drinks (soda, sweet tea, etc) with diet drinks, would you be willing to make this replacement, why or why not?"

[PERCEIVED BEHAVIORAL CONTROL]: "What would it take for someone to convince you and/or your family and friends that it is OKAY to drink up to 32 ounces of artificially sweetened beverages each day?"

### **[ENVIRONMENTAL]**

"Where do you learn about the benefits or harmful effects of certain drinks?"

“Tell me about the person, group, or organization in your community that is most respected and trusted when it comes to health information?”

[IF NEEDED PROBE: Whose advice about health related issues do you follow?]

“Has anyone’s doctor or another health care provider ever talked to you about the health risks and benefits of certain drinks?”

“Who or what influences the types of drinks you purchase?”

[IF NEEDED PROBE: WHY do you purchase the drinks you do? Any family members, friends in your social networks, health status]

“I want you think about media advertisements on the TV or magazines, tell me if these ads influence your drink choices.”

“Now I want you to think about weekly beverage sales ads or in-store promotions, tell me how these deals impact your drink purchases.”

### **[SCENARIO]**

“Now I want to offer a few scenarios and I want you to tell me what you like and don’t like about these things. This is very important so ANY feedback you have will be helpful.”

“Let’s pretend that a free program was offered in your community to educate and help improve the beverages people drink. What would you want that program to look like?”

[IF NEEDED PROBE: What kind of program would it have to be to make YOU want to attend? Ex. small group classes, one-on-one sessions, telephone calls, brochures, etc.]

“If a free program was offered and included small group education sessions, what would you like or not like about this type of program?”

[IF NEEDED PROBE: What would attract you or people you know to a small group setting? What would make you or people you know NOT want to participate in a small group setting?

If a program was set up and included multiple telephone messages, what would you like or not like about this type of program? This would be interactive voice response (IVR) technology. So it would be an automated message that would prompt you to different questions.

[IF NEEDED PROBE: Why would you want to receive phone messages? Why would you NOT like to receive phone messages? Tell me the pros and cons if the phone message was automated versus if it was a real person.]

“If there was a program that would include three small group education classes and phone calls to educate, remind, and encourage people to make healthy drink choices, would you be interested and willing to participate? Why or why not?”

[IF NEEDED PROBE: What things would prevent or encourage people to attend the **education sessions** about drink choices?

[IF NEEDED PROBE: What things would prevent or encourage people to receive **telephone messages** about drink choices?]

“OK, now that we’re done, I want to open it up for any other ideas and comments. This can be something you just thought of or anything that has been on your mind throughout the focus group.”

## Appendix E: Focus Group Exit Survey

[ID NUMBER]: |\_|\_|\_|\_|\_|\_|\_|\_|\_|\_|



Human Nutrition, Foods & Exercise

### Focus Group Exit Questionnaire

Remember that all the information you provide is confidential and that you will not be singled out or identified as a result of this study.

Please circle your answer and ask any question you have regarding the directions.

1. I plan to limit my sugar-sweetened drinks to less than 1 cup each day.

1	2	3	4	5	6	7
Strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree

2. I plan to drink 5-8 cups of water each day.

1	2	3	4	5	6	7
Strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree

3. I would **attend education sessions** to learn about how I could choose healthier drinks and improve my health.

1	2	3	4	5	6	7
Strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree

4. I would be willing to **receive telephone messages** to learn about how I could choose healthier drinks and improve my health.

1	2	3	4	5	6	7
Strongly disagree	moderately disagree	slightly disagree	neutral	slightly agree	moderately agree	strongly agree

## Appendix F: Health Literacy Screener

For this next section, please use the nutrition label provided to answer the questions. This nutrition label is on the back of a container of pint of ice cream. I want you to pretend like you are going to eat this ice cream. If you don't know the answer it is okay to guess or check the "I don't know" box.

1. If you eat the entire container, how many calories will you eat?

\_\_\_\_\_

I don't know

2. If you are allowed to eat 60 grams of carbohydrate as a snack, how much ice cream could you have?

\_\_\_\_\_

I don't know

3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have a total of 42 grams of saturated fat each day, which includes one serving of ice cream. If you stop eating the one serving of ice cream, how many grams of saturated fat would you be eating each day?

\_\_\_\_\_

I don't know

4. If you usually eat 2500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?

\_\_\_\_\_

I don't know

5. Pretend that you are allergic to the following substances: Penicillin, peanuts, latex gloves, and bee stings. Is it safe for you to eat this ice cream?

\_\_\_\_\_

I don't know

6. If you answered “NO” TO QUESTION #5, Why not?

\_\_\_\_\_

I don't know

**Thank you for participating in this research project!!**

Please provide any additional comments below:

<b>Nutrition Facts</b>			
Serving Size			½ cup
Servings per container			4
Amount per serving			
Calories	250	Fat Cal	120
			%DV
<b>Total Fat</b>	13g		20%
Sat Fat	9g		40%
<b>Cholesterol</b>	28mg		12%
<b>Sodium</b>	55mg		2%
<b>Total Carbohydrate</b>	30g		12%
Dietary Fiber	2g		
Sugars	23g		
<b>Protein</b>	4g		8%

\*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

**Ingredients:** Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.