Assessment of Criterion Validity and Test-retest Reliability of an Interactive Educational Tool to Raise Parents/Caregivers’ Awareness of Children’s Sugar-Sweetened Beverage Intake

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Abstract

The purpose of this thesis study was to evaluate the criterion validity and test-retest reliability of an interactive educational tool, referred to as the Rethink Your Drink (RYD) Checklist. This checklist was created to raise awareness of children’s consumption of sugar-sweetened beverages (SSB) among parents/caregivers. Participants of this study included parents/caregivers of young, school-aged children (ages 6-12). This checklist will be incorporated into an educational booklet that will be used to further strengthen the RYD Nevada program. The goal of RYD Nevada is to promote healthful beverages and to reduce the consumption of SSB among households that are eligible or are enrolled in the Supplemental Nutrition Assistance Program. A descriptive design was employed to address the research objectives. Ninety parents/caregivers of young, school-aged children that were able to read and speak English were recruited from the waiting room of the University of Nevada School of Medicine (UNSOM) Family Medicine Center in Reno, Nevada in August 2018. Participants were asked to complete two surveys, one in-person and another by mail two weeks later (referred to as time one and time two). A total of 64 (71.1%) participants completed both surveys. Criterion validity was determined by comparing the mean number of different types of SSB consumed on a typical day as reported by parents/caregivers described on the RYD Checklist against the mean volume of SSB consumed per day as estimated by the BEVQ-15. Test-retest reliability was assessed by comparing responses reported on the RYD Checklist at time one versus time two. The results revealed that the mean number of different types of SSB consumed daily as reported by the RYD Checklist at time one was positively correlated to the mean volume of SSB consumed per day as described by the BEVQ-15 ($r = .6$;
P<0.05). The mean number of different types of SSB consumed daily on the RYD Checklist at time one and time two were also positively correlated (r=.8; P<0.05). In conclusion, this study provides evidence of criterion validity and test-retest reliability of the RYD Checklist. Future studies are needed to determine the validity and reliability of the RYD Checklist among a larger more generalizable samples as well as the extent in which the checklist raises awareness of children’s intake of SSB among parents/caregivers.
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Chapter 1

Introduction to Thesis

To begin, this thesis includes an introduction and study overview (Chapter 1); a review of literature (Chapter 2); a manuscript written for submission to the Journal of Academy of Nutrition and Dietetics (Chapter 3); and conclusions (Chapter 4).

Chapter 1 includes a statement of problem; context; purpose and methods; and summary and implications.

Statement of the Problem

In order to reduce chronic diseases risk among the American public, the Dietary Guidelines were developed as a tool to be used by the government to speak one voice when presenting advice about proper dietary eating patterns. The most recent guidelines, the Dietary Guidelines for Americans (DGA) 2015-2020 recommends that no more than ten percent of total daily calories come from added sugars. However, 58 percent of Americans exceed this recommendation.

Children (6-11 years) have been reported to, on average, consume 16.4 percent of their total daily calories from added sugars. The health consequences of excessive consumption of added sugars are associated excessive weight gain, dental caries, insulin resistance and type II diabetes.

Sugar-sweetened beverages (SSB) are the largest source of added sugars. Examples of SSB include soda (not diet), sweetened tea or coffee, sports and energy drinks. These beverages contain sucrose, high-fructose corn syrup, and dextrose.

Children (6-11 years) on average consumed 7.3 percent of their daily energy intake, not including other sources of added sugars in the diet, from SSB alone.
thirds of boys and girls (2-19 years) on a given day consumed one or more SSB. Girls and boys on average consumed 121 and 164 kilocalories (kcs) per day respectively. Overtime children’s (6-11 years) consumption of SSB has declined from an average of 190.6 kcs to 114.0 kcs per day.\textsuperscript{13} Although overall consumption of SSB have decreased overtime, SSB continues to remain the primary source of added sugars among children.\textsuperscript{12}

The National Health and Nutrition Examination Survey (NHANES) data suggests that socioeconomic status may have a role in consumption of SSB among children. In a study by Han and Powell,\textsuperscript{14} results indicated that children from low-income households had almost two times greater odds of heavy consumption of SSB ($\geq$500 kcal/day) when compared to children from high-income households. Race/ethnicity may also have a role.\textsuperscript{15} NHANES 2011-2014 results indicated that non-Hispanic black, non-Hispanic white, and Hispanic boys had similar percentage of total daily calories from SSB (non-Hispanic black, 7.6 percent; non-Hispanic white, 7.9 percent; and Hispanic boys, 7.3 percent). In contrast, non-Hispanic Asian boys had the lowest percent of total daily calories from SSB (3.5 percent).\textsuperscript{15} Among females, the percentage of total daily calories from SSB among non-Hispanic black was at the highest (8.9 percent), followed by non-Hispanic white (7.5 percent), and Hispanic (6.8 percent). Similarly to non-Hispanic Asian boys, non-Hispanic Asian girls had the lowest percentage of total daily calories of SSB (3.6 percent).\textsuperscript{15}

The excessive consumption of SSB among children is of concern due to associated health risks such as: decreased nutrient intake, excessive weight gain, insulin resistance and type II diabetes, and dental caries. Leung et al\textsuperscript{16} studied the association
between decreased nutrition intake and the consumption of SSB. They used Healthy Eating Index (HEI) scores as a composite measure of diet quality; the higher the score, the healthier the diet. This study determined that children who drank more than two servings of SSB a day had a lower HEI score for their intake of vegetables, whole fruit, total fruit, whole grains, greens and beans, dairy, seafood and plant proteins, and empty calories. These HEI score results indicated that the consumption of SSB may lead to a decreased nutrient intake. Consequently, excessive weight gain may also be a result of decreased nutrient intake. In 15 cohort studies and five trials, a positive association between children’s consumption of SSB and Body Mass Index (BMI) was determined. Among children, for each 12-ounce serving per day increase of SSB, a 0.06 change in BMI was indicated. Increasing obesity has also contributed in the incidence of insulin resistance among children. A study published by Santiago-Torres et al indicated that children’s consumption of SSB had a positive correlation with their BMI and Homeostatic Model Assessment of Insulin Resistance (HOMA\textsubscript{IR}) levels. HOMA\textsubscript{IR} levels indicate the level of insulin resistance. Furthermore, children who consume SSB regularly may have a higher prevalence of dental caries. Armfield et al demonstrated that children that consumed, on average, three or more SSB per day had more filled, decayed, and missing teeth when compared to children that did not consume SSB. Health related risks associated with the intake of SSB can be diminished through decreased consumption of SSB and promotion of healthful beverages.

There is a need for effective tools and strategies to reduce the consumption of SSB. The Rethink Your Drink (RYD) Checklist was developed as a tool for use by
parents/caregivers to raise awareness of the types of drinks (specifically SSB) their children consume.

**Context**

The overall goal and purpose of the RYD Nevada campaign is to promote healthful beverages and to decrease the intake of SSB among school aged children (6-12 years). Dr. Jamie Benedict initiated this program in 2011. RYD Nevada receives its funding from the Supplemental Nutrition Assistance Program- Education (SNAP-Ed). The goal of SNAP-Ed is, “to improve the likelihood that person eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current DGA and the USDA food guidance.” The target audience of RYD Nevada effort includes households that are enrolled or eligible to receive SNAP benefits that include one or more children between the ages of 6-12.

The RYD Nevada campaign is based in the principles of the Social-Ecological model (SEM) as well as social marketing. Evidence suggests that implementing changes at multiple levels of the SEM may be an effective approach to decrease the intake of SSB. Active engagement and support from multiple segments of society are needed to help individuals make healthier food choices. In addition, social marketing programs have been used to convey nutrition messages to SNAP-Ed audiences. Avenues that may be used are mass media, social media, earned media, peer-to-peer popular opinion leaders, and promotional media.

Sectors that the RYD Nevada campaign have influenced include healthcare practices, print, and digital media. Settings have included home and grocery stores. One example of a method that has been utilized by RYD Nevada that uses SEM and social
marketing principles are RYD toolkits. These toolkits were developed for use in medical and dental care settings and include a 12-ounce soda model, posters, stickers, brochures, and a Tool-kit Guidebook.22,23,24 In addition to these toolkits, RYD Nevada has reached out to SNAP-Ed eligible households through direct-mail, print media, and digital media.25,26,27,28 Other methods of communication include a website, Facebook page, and electronic newsletter.29 Recently, materials have been distributed in select grocery stores throughout Nevada that accepts SNAP-EBT cards.

The RYD Nevada team developed an educational booklet for use by parents/caregivers. The objectives of this educational booklet are as follows: 1) readers will be able to correctly assign select drinks to the “Go,” “Slow,” and “Whoa” categories; 2) readers will be able to correctly list three health risks associated with “Whoa” drinks; and 3) readers will have awareness of their children’s typical drink choices compared to recommendations. This educational booklet includes the RYD Checklist.

This checklist aims to raise parents/caregivers’ awareness of children’s intake of SSB by characterizing their typical daily beverage choices as “Go,” “Slow,” or “Whoa.” The RYD Checklist incorporates traffic light labelling as described by Hartigan et al30 which labels different beverage types as green, yellow, or red. Green beverages (A “Go” drink) are considered “almost anytime drinks” and can help children stay healthy (i.e. water, fat free or low-fat milk, and unsweetened flavored water). Yellow beverages (A “Slow” drink) are considered “sometimes drinks” because they are healthful, but children can drink too much (i.e. 100% fruit juice and flavored low-fat milk). Red beverages (A “Whoa” drink) are considered “once in a while drinks” because too many may be harmful
to children’s health. These drinks include soda (not diet), whole or 2% milk, energy
drinks, sweetened tea or coffee, sports drinks, and fruit-flavored drinks.

In order to determine if the RYD Checklist provides an accurate representation
of the intake of SSB among children, the criterion validity and test-retest reliability was
assessed. Criterion validity is achieved when the instrument --in this case the RYD
Checklist-- is able to measure what it purports to measure (i.e. intake of SSB). It is
compared to a measure of interest (i.e. the criterion). Test-retest reliability is present
when an instrument yields the same results on repeated trials. Validity and reliability
are measured by Pearson correlation coefficients.

Purpose and Methods

The purpose of this study was to assess the psychometric properties of the RYD
Checklist.

The research objectives of the study were as follows:

1. To assess criterion validity, compare the mean number of different types of
SSB consumed on a “typical day” as reported by parents/caregivers using the
RYD Checklist, to the mean volume of SSB consumed per day as derived from a
previously validated instrument (i.e. the 15-item Beverage Intake Questionnaire
(BEVQ-15)).

2. To assess test-retest reliability, compare the mean number of different types of
SSB consumed on a “typical day” as reported by parents/caregivers using the
RYD Checklist measured at two different times approximately two weeks apart
(herin referred to as time one and time two).
In order to address the research questions above, a descriptive design was employed. The sample of participants in this study included parents/caregivers of children within the ages of 6-12 that could read and speak English, and who were willing to take two surveys at two different times (time one and time two).

The University of Nevada, Reno Institutional Review Board approved this study protocol (Appendix A).

Participants were contacted personally and recruited from the University of Nevada School of Medicine (UNSOM) Family Medicine Center in Reno, Nevada with the use of recruitment flyers (Appendix B). Those who met the eligibility criteria and indicated interest in learning more about the study were provided with an information sheet that explained the study further (Appendix C). A research team member helped participants complete the survey at time one (Appendix D). The research team member used a script in order to maintain consistency (Appendix E). Once the survey at time one was completed, the participants were asked to complete a contact information sheet that was kept separate from their survey (Appendix F). Seven days after the first survey was completed, a phone call was made (Appendix G) to the participant reminding them that a second survey (time two) would be mailed to them. The mailed survey pack consisted of the following: The second survey (Appendix H); a personalized letter reminding the participant of the study and inviting them to fill out the second survey (Appendix I); and a self-addressed, stamped envelope.

The survey instrument at time one started with the RYD Checklist, then the BEVQ-15, and ended with a brief set of demographic questions (Appendix D). The survey at time two included only the RYD Checklist, followed by demographic questions
Both surveys included items that were unrelated to this study. The RYD Checklist included 14 beverage items and a location where participants could write down any additional beverages their child drank on a typical day as “other.” Seven of the 14 beverage items were SSB. SSB included: fruit flavored drinks, soda (not diet), sports drinks, sweetened tea or coffee, energy drinks, flavored milk, and flavored nut milk (Appendix D). In order to determine criterion validity of the RYD Checklist, the BEVQ-15 was used. The BEVQ-15 is a tool used to estimate habitual SSB and total beverage intake over the past month across 15 beverage items (Appendix D). In this study, researchers used measuring guides to facilitate the estimation for each beverage type for the BEVQ-15 portion of this study (Appendix J). Participants that completed the study were mailed a $20 gift card and were asked to fill out a receipt of the gift card (Appendix K).

Statistical analyses performed for this thesis were descriptive statistics, independent and paired sample t-tests, $\chi^2$ tests, multiple linear regression, and Pearson correlation coefficients.

Summary

The results of this study will be used to strengthen the RYD Nevada program by providing evidence that the RYD Checklist is a valid and reliable representation of children’s intake of SSB. Once finalized, the RYD Checklist will be included in an educational booklet for parents/caregivers.

In conclusion, this chapter summarized the research problem, context, purpose, and methods of the study.
Chapter 2

Review of Literature

In order to contextualize this thesis study, Chapter 2 will begin with a discussion of added sugars and the consumption patterns among children. Next an explanation of parents’ awareness and children’s consumption patterns will be examined. Next, health-related outcomes that may be related to the high consumption of SSB are discussed. A brief discussion of recommendations regarding added sugars and beverage consumption will then be explored, followed by approaches used to curb the intake of SSB among children. To conclude, a review on tools that promote nutritional health will be discussed.

Added Sugars and Consumption Patterns of SSB Among Children

Added sugars, present in many foods, provide minimal essential nutrients. The *Dietary Guidelines for Americans 2015-2020* describes a healthy eating plan that limits added sugars to no more than ten percent of total calories a day. However, it is estimated that 7.3 percent of children’s daily energy intake comes from SSB. SSB are defined as any beverage containing one or more added caloric sweeteners (i.e. brown sugar, corn sweetener, glucose, fructose, and high-fructose corn syrup). Examples include soft drinks (not diet), fruit-flavored drinks, sports and energy drinks.

A considerable number of studies have been conducted about the intake of SSB among children. The following provides a summary of consumption patterns, including differences by sex, age, race and Hispanic origin as well as socioeconomic status.

According to a National Center for Health Statistics (NCHS) Data Brief, based on the 2011-2014 the National Health and Nutrition Examination Survey (NHANES) cohort, almost two-thirds of girls and boys consumed at least one SSB on a typical day. Boys
aged 2-19 years were reported to have consumed an average of 164 kilocalories (kcal) a day from SSB, while girls ages 2-19 years were reported to have consumed an average of 121 kcal a day. As stated, there are reports that overall consumption patterns of SSB have decreased from 2003-2014. Bleich et al, who studied the trends in consumption from 2003-2014, using data from NHANES, indicated that children’s (6-11 years) daily consumption had significantly declined from an average of 190.6 kcal to 114.40 kcal a day. In addition, the percentage of children that drank SSB on a given day dropped from 81.8 percent to 63.5 percent. Although the overall consumption has decreased, SSB remains the primary source of added sugars across all age groups.

NHANES data from 2011-2014 also suggests that there may be a relationship between sex, ethnicity and Hispanic origin, and children’s (2-19 years) consumption of SSB. Boys, not including non-Hispanic Asian boys, had similar percentage of total daily calories from SSB (non-Hispanic black, 7.6 percent; non-Hispanic white, 7.9 percent; and Hispanic boys, 7.3 percent). In contrast, non-Hispanic Asian boys consumed 3.5 percent of total daily calories from SSB. Among females, the percentage of total daily calories from SSB among non-Hispanic black was 8.9 percent, non-Hispanic white was 7.5 percent, and Hispanic was 6.8 percent. Similar to non-Hispanic Asian boys, non-Hispanic Asian girls consumed 3.6 percent total daily calories from SSB.

Socioeconomic status may also play a role in the consumption patterns of SSB among children. In a study by Han and Powell, using NHANES 1999-2008 data, the results indicated that low-income children (ages 2-11) had almost two times higher odds of heavy total consumption of SSB (≥500 kcal/day) when compared to high-income children. Authors concluded that due to the higher odds of consumption of SSB among
children from low-income households, policies should be put in place to encourage the consumption of healthful beverages among this audience.

In summary, there is evidence that children’s consumption of SSB has decreased over time, but additional efforts are required to continue this trend. The role of sex, gender, race and Hispanic origin, and socioeconomic status should be explored further as these variables may be important in reducing children’s consumption of SSB. While past research has identified what may lead to high consumption patterns among children, parents/caregivers’ involvement is needed to reduce the consumption of SSB among children.

**Parents/Caregivers’ Awareness of Children’s Consumption of SSB**

Family-related factors, including home availability, parental knowledge, and misperceptions of SSB may be associated with children’s consumption patterns. A study by Zahid et al. reported that parental practices such as control of home beverage availability may be associated with child beverage intake. In this study, they examined the relationship between the intake of SSB and dairy beverages among children (9-12 years) and home/parental factors. Results indicated that home availability of SSB was associated with 48 percent higher odds of consuming SSB compared to homes that did not have SSB available. In addition, knowledge about SSB among parents was related to the intake of dairy among children. Children’s parents who had knowledge about sugar in beverages had 46 percent higher odds of consuming dairy. In contrast, knowledge of dairy/calcium and beverage nutrition was not related to the consumption of dairy. The authors concluded that parental knowledge and practices may have a role in the intake of beverages among children.
Similar to results by Zahid et al\(^3\), studies by Park et al\(^4\) also indicated that parental knowledge about SSB may be important. The first study discussed by Park et al\(^4\) examined the association between health conditions (i.e. weight gain) and SSB intake among US adults. After adjusting variables for sex, age, education level, race/ethnicity, annual household income, and geographic region, adults who were neutral on whether or not SSB contribute to weight gain had significantly higher odds of consuming SSB (≥2 times/day). In contrast, a more recent study by Parke et al\(^5\) analyzed the relationship of various health conditions (i.e. weight gain, diabetes, dental caries, high cholesterol, heart disease, and hypertension) and SSB intake among US Hispanic adults. Results indicated that after adjusting for sociodemographic and acculturation, a lack of knowledge was not related with their high intake of SSB (≥2 times/day).\(^5\) The authors concluded that health education regarding the contribution of excess energy intake from SSB to weight gain may contribute to lowering the intake of SSB among US adults in general, but education alone may not be sufficient among US Hispanic adults.

Lastly, misperceptions may also play a role. A study by Munsell et al\(^6\) was conducted to assess probable misperceptions among parents regarding the healthfulness of SSB for their children. Results demonstrated that from the options of SSB given, 50 percent of parents rated flavored waters (i.e. vitamin waters) as healthy. In regard to fruit drinks and sports drinks more than 25 percent of parents rated them to be healthy compared to other SSB such as energy drinks, regular soda, and diet soda. Parents also perceived specific products that they purchased as significantly healthier than those who did not. One example of this was with fruit flavored drinks. Thirty percent of parents rated fruit drinks as healthy, but when asked about a specific fruit drink product --for
example, Sunny D®-- 43 percent of parents rated it as healthy. The authors in this study concluded that due to the excess consumption of added sugars in the home among children, there is a need to further address parental misperceptions about the healthfulness of SSB.

**Health Conditions Associated with intake of SSB among Children**

Due to the excessive intake of SSB among children, health related effects have been studied. In adults, evidence has emerged linking the intake of SSB to weight gain and obesity, type II diabetes, cardiovascular risk, and non-alcoholic fatty liver disease. In children, studies are more limited.

The following will focus on a summary of evidence on the relationship between health-related outcomes with the high consumption of SSB. The health outcomes discussed include nutrient intake, excessive weight gain, insulin resistance and type II diabetes, and dental carries.

** Decreased Nutrient Intake**

Higher consumption of SSB is associated with a decreased nutrient intake. Maillot et al utilized NHANES data from 2009-2014 to explore diets in children ages 4-19 that were built around milk and milk beverages, 100% juices, milk and 100% juices, and other caloric beverages (i.e. SSB). The authors used Healthy Eating Index (HEI) scores to measure of diet quality; the higher the score, the healthier the diet. The most popular beverage of choice, out of the four categories, was other caloric beverages (i.e. SSB) (63.2 percent) when compared to milk, 17.8 percent; milk and 100% juice, 13.5 percent; and 100% juice, 5.6 percent. Children that mainly drank milk and 100% juice had the highest HEI score, but their diets were not different from other diets in terms of total
calories, added sugars, fiber, and vitamin E. Others that only consumed milk had higher amounts of dairy, calcium, potassium, vitamin A, and vitamin D when compared to other diet patterns. Meanwhile, children that only consumed 100% juice had a higher intake of fruit and vitamin C, and the same amount of whole fruit when compared to other diets. Children whose beverage consumption was built around other caloric beverages (i.e. SSB) provided the most added sugar.41

Another study by Leung et al16 came to similar conclusions that heavier SSB consumption equates to a lower HEI score. The study results indicated that children who drank more than two servings of SSB a day (heavy SSB drinkers) had an HEI score that was 9.5 points lower when compared to children who did not drink SSB.16 Specifically, heavy SSB drinkers had HEI score components that were 14 percent lower for vegetables, 31 percent lower for whole fruits, 32 percent lower for greens and beans, 42 percent lower for whole grains, 14 percent lower for dairy, 17 percent lower for seafood and plant proteins, 25 percent higher for sodium, and 39 percent lower for empty calories.16 Low HEI scores suggest that heavy SSB drinkers may have an overall decreased nutrient intake. Promoting the consumption of healthful beverages may be an effective strategy to improve children’s diet quality.

In contrast, heavy water drinkers’ HEI score components (compared to heavy SSB drinkers) were 13 percent higher for vegetables, 21 percent higher for total fruit, 40 percent higher for whole fruit, 41 percent higher for green and beans, 33 percent higher for seafood and plant proteins, 14 percent lower for sodium, 14 percent lower for refined grains, and 29 percent higher for empty calories.16 In conclusion, intake of SSB not only adds empty calories to children’s diet, but is also related to an overall lower diet quality.
Association Between Intake of SSB and Excessive Weight Gain

A consequence of eating empty calories may be unhealthy weight gain. Among a nationally representative sample, it is estimated that the prevalence of obesity is 18.4 percent among children (ages 6-11 years). In addition, a positive relationship between rates of obesity among children and intake of SSB have been described as noted below.

A systematic review and meta-analysis of randomized controlled trials and prospective cohort studies by Malik et al provided evidence of a positive relationship between the consumption of SSB and weight gain in children (6 months-14 years). Twenty original articles (15 cohort studies and five trials) were included and analyzed. Among children, a positive association between the consumption of SSB and Body Mass Index (BMI) was noted in prospective cohort studies; specifically a 0.06 change in BMI (kg/m²) for each 12 ounce serving per day increase over a one year period. Malik et al concluded that there is evidence to support that the consumption of SSB promotes weight gain in children.

In a cross-sectional study, Beck et al studied the association of beverage consumption with obesity among Mexican-American children ages 8-10 years. The authors asked mothers and children about the frequency and quantity of the child’s consumption of soda, other SSB, 100% fruit juice, milk, and water. Results demonstrated that those who consumed more servings of soda were at 29 percent higher odds of obesity than those that did not consume soda. In contrast, those who consumed more servings of flavored milk per week were at 88 percent lower odds of obesity than in those that did not consume flavored milk. In order to reduce the high obesity rates among Mexican-
American children, the author’s concluded that the consumption of SSB, such as soda, should be discouraged.\textsuperscript{5}

Beck et al\textsuperscript{5} studied associations of beverage consumption with obesity through gathering data on consumption patterns, while an intervention study by de Ruyter et al\textsuperscript{6} determined the effects of SSB on weight gain. In this study, they randomly assigned normal-weight children aged 4-11 years to receive either an eight ounce per day sugar-free, artificially sweetened beverage or a beverage containing added sugar that provided 104 kcal. After 18 months the children who drank non-caloric drinks gained less weight, had a smaller waist circumference, and had 43 percent less body fat than children who received caloric sweetened drinks.\textsuperscript{6} The authors concluded that by masking SSB with noncaloric beverages, normal-weight children had reduced weight gain and fat accumulation.\textsuperscript{6}

While there are many studies that show the relationship between weight gain and intake of SSB, there are some studies that have reported null results.\textsuperscript{43, 44} These studies are limited by their smaller sample sizes. In summary, children who have higher intakes of SSB may consume higher amounts of calories when compared to other similar populations. This may lead to excessive weight gain.

\textit{Insulin Resistance and Type II Diabetes}

A few studies have reported a positive association between insulin resistance risk and the intake of SSB among children. A cross-sectional study by Wang et al\textsuperscript{11} examined the association between the intake of SSB and metabolic syndrome (MetS) components in children (8-10 years) that were above and below the 85\textsuperscript{th} BMI percentile and those with or without impaired glucose tolerance. Results indicated that among children who
were overweight and who consumed a larger amount of SSB (100 mL higher) had significantly higher HOMA<sub>IR</sub> (Homeostatic Model Assessment of Insulin Resistance) levels and systolic blood pressure. Children who were glucose intolerant and had a greater intake of SSB (100 mL higher) also had significantly greater systolic blood pressure and larger waist circumference. The relationships between the higher consumption of SSB and MetS components were the most prominent among children who were overweight/obese and glucose-intolerant. A study published by Santiago-Torres et al evaluated Hispanic children’s (ages 10-14 years) relationships between the home food environment, diet, weight status, and insulin resistance. The results that focused on insulin resistance indicated that children’s consumption of SSB had a positive correlation with their BMI and HOMA<sub>IR</sub> levels. The authors in this study concluded that parental diet and the home food environment may have an important role in the intake and access to SSB among children, which may be a predictor of the child’s weight status.

Dental Caries

Evidence supports that the consumption of SSB is associated with dental caries among children. For example, a cross-sectional study by Armfield et al considered demographic and socioeconomic differences in the consumption of SSB and their association with dental caries among children ages 5-16 years. Results indicated that dental caries were significantly associated with SSB consumption. Children that consumed three or more SSB per day, on average, had 47.1 percent more missing, decayed, and filled teeth than children that did not consume SSB. Another cross-sectional study by Evans et al of low-income children ages two through six
demonstrated that those with the highest intake of SSB were 2.9 to 4.6 times more likely to have severe early childhood caries compared to children with the lowest intake of SSB. Lastly, a study published by Wilder et al examined the association between consumption of SSB and dental caries among third graders in Georgia. Results indicated that dental caries were 22 times greater for every SSB reported to be consumed per day.

**Recommendations Regarding Added Sugars and Beverage Consumption for Children**

The *Dietary Guidelines for Americans 2015-2020* recommend that added sugars be limited to no more than ten percent of one’s total daily energy. Other organizations, such as the American Academy of Family Physicians, have issued similar recommendations. A specific recommendation geared towards children is one by the American Heart Association that states that children under the age of two should not consume any added sugars. Children older than the age of two should consume no more than 25 grams of added sugars per day and should not drink more than one eight-ounce sugar-sweetened beverage per week.

Although 100% fruit juice is not considered a SSB in this study, the American Academy of Pediatrics and American Academy of Pediatric Dentistry recommend that children ages one to six years be encouraged to consume whole fruit instead of 100% fruit juice. If consumed, it should be limited to no more than six ounces per day. Children ages 7 to 18, it is recommended that no more than eight ounces a day of 100% fruit juice be consumed.
Approaches to Curbing Intake of SSB Among Children

In order to apply these recommendations, efforts have been undertaken to reduce the consumption of SSB. These changes have been sought through the environment, government policies and industry practices, and education.

Environmental modifications include ensuring water access and alternatives to SSB. Water access can be ensured through the availability of water fountains and ability to refill water bottles. Studies indicate those who drink more water, drink fewer other beverages. This pattern results in a reduction of calories from beverages such as SSB. For an example, Elbel et al investigated the influence of water fountains in nine schools compared to grade level schools (grades 5, 8, and 11) without water fountains. Results indicated that after a month, there was a three-fold increase in water consumption among grade level schools.

In addition, the access and consumption of healthful alternatives to SSB have been analyzed. A study by Zheng et al examined the association between beverage intake and substitutions of SSB (i.e. milk or water) in a cohort of nine year old children. Results indicated that replacing SSB with milk or water was associated with lower body fat development when compared to children that did not replace their intake of SSB.

Others have sought change on a broader scale through government policies and industry practices. These interventions include marketing/advertising, taxes, and governmental nutrition assistance programs such as the Supplemental Nutrition Assistance Program (SNAP). Children are exposed to advertising from television, billboards, magazines, and various forms of technology. The Federal Trade Commission reported in 2009, food and beverage companies spent 1.8 billion dollars on
youth-targeted marketing. The largest medium used to target youth was television. Powell et al\textsuperscript{53} determined that on average children saw two local SSB ads per week in 2003 through 2007. To mitigate the potential negative effects of advertising in children, public health advocates have called for advertising to follow principles outlined by the International Obesity Taskforce (IOTF) Working Group referred to as the Sydney Principles. The Sydney Principles state that reducing marketing should: Support the right of children; Afford substantial protection to children; Be statutory in nature; Be evaluated, monitored and enforced.\textsuperscript{54} Scientific associations, consumer and industry bodies, and health professionals have agreed that these principles would be needed in marketing to children. To date, the outcomes of these principles have not been reported.

Another change is that the FDA has required chain restaurants to provide nutrition labeling by May 2018.\textsuperscript{55} Through nutrition labelling, it is expected that consumers will have more information about the nutritional composition of foods and beverages they are consuming. In addition, there are various jurisdictions that tax SSB, with an emphasis on soft drinks. In general, the goal of taxing SSB is to reduce consumption and generate revenue to be used in efforts to prevent obesity.\textsuperscript{56,57}

One of the recommendations that the Bipartisan Policy Center (BPC) SNAP Task Force, in their March 2018 publication titled, \textit{“Leading with Nutrition: Leveraging Federal Programs for Better Health,”} suggested prioritizing nutrition in SNAP by eliminating SSB from the list of items that can be purchased.\textsuperscript{58} In order to eliminate SSB from SNAP-eligibility, the BPC explained that a precise definition should be prepared by the U.S. Department of Agriculture Secretary (USDA) along with the consultation of the U.S. Health and Human Services (HHS) Secretary. Research indicates that by pairing
positive incentives to the purchase of fruits and vegetables with restrictions on the eligibility of SSB may be more effective than restricting SSB alone.\textsuperscript{58} Although the BPC recommends the elimination of SSB from SNAP benefits, the ethics on the elimination of SSB is a topic of discussion and concern.\textsuperscript{59}

Education has also been used as a means to modify behavior and to decrease the consumption of SSB. For example, public health workers and researchers have sought to spread messages of the consumption of SSB through pediatricians.\textsuperscript{60} A study by Doymaz et al\textsuperscript{60} provided evidence that counseling given by physicians during patient visits was effective in reducing the consumption of SSB among children. Results indicated that, on average, there was a 0.9 cups reduction in the consumption of soda per participant among subjects that were counseled. In contrast, those that did not get counseled, there was a .27 cups reduction per participant on average.\textsuperscript{60}

Efforts to promote health messages as well as to remarket unhealthy products are underway to reduce the consumption of SSB. The Rethink Your Drink (RYD) Nevada campaign was developed to inform parents about SSB and encourage the consumption of healthy beverages.\textsuperscript{19} Several different types of communication methods have been utilized such as direct mail and the RYD Toolkit for use in dental and medical care settings. Through direct mail, parents who read the educational materials were more likely to monitor and limit their children’s intake when compared to those that did not recall receiving the educational materials in the mail.\textsuperscript{26,27} The toolkit has led to greater education by medical and dental care professional on sugary drinks.\textsuperscript{24} In summary, successful approaches to curb the intake of SSB among behavioral settings, government
policies and industry practices, and education have been employed to reduce the consumption of SSB and promote healthful beverages. Further efforts are needed.

**Tools that Promote Awareness of Nutritional Health**

Traffic-light labelling is a tool that uses the traffic light colors: red, yellow, green to educate and categorize foods/beverages.\textsuperscript{30} Green which labels “Go,” represents foods/beverages that would be considered almost anytime and can be incorporated into a healthy diet. Yellow labelled as “Slow” represents foods/beverages that would be considered healthful, but too much may lead to excess caloric intake. Red also labelled as “Whoa” represents foods/beverages that should be incorporated into one’s diet once in a while because too many may be harmful to one’s health.

Research has determined the effectiveness of traffic light labeling among children. Programs such as the Coordinated Approach to Child Health (CATCH) has utilized the principles of traffic light labelling as part of their curriculum to reduce unhealthy behaviors and promote lasting changes in dietary and physical activity among children and adolescents.\textsuperscript{61,62,63,64} In a study by Hartigan et al,\textsuperscript{30} who used the traffic light labelling in a children’s hospital, examined if limiting access to SSB and promoting consumption of more healthful beverages could reduce the sales of SSB and maintain overall beverage sales. Results indicated that the sales of SSB decreased (from average of 57 percent from baseline period to 32 percent at the end of the data collection period) and the overall beverages sales were maintained during the study period (baseline of study was $35,390, while the post-intervention period was $34,955).\textsuperscript{30} Hartigan et al\textsuperscript{30} concluded that this simple and cost effective education intervention may be used as a strategy to reduce the consumption of SSB.
In conclusion, Chapter 2 explained that the intake of SSB is high among children. Due to the high intake of SSB there may related poor health outcomes such as decreased nutrient intake, weight gain or obesity, type II diabetes and insulin resistance, and dental caries. Future efforts are needed in order to reduce the intake of SSB, traffic light-labelling is an effort that may be utilized. A tool that utilizes the principles of traffic light labelling for parents may serve to promote healthful beverages, thus resulting in the reduction of SSB.
Chapter 3

Study Manuscript

Assessment of Criterion Validity and Test-retest Reliability of an Interactive Educational Tool to Raise Parents/Caregivers’ Awareness of Children’s Sugar-Sweetened Beverage Intake

The following manuscript will be submitted to the *Journal of Nutrition and Dietetics*

Research Snapshot

*Research Questions:* Is the Rethink Your Drink Checklist a valid and reliable educational tool?

*Key Findings:* In this descriptive study, 90 parents/caregivers of school-aged children (ages 6-12) were surveyed. Results provided evidence of criterion validity and test-retest reliability of the Rethink Your Drink Checklist (P<0.05).
ABSTRACT

Background Sugar-sweetened beverages (SSB) are associated with decreased nutrient intake, excessive weight gain, Type II Diabetes, and dental caries among children. Further educational efforts are needed to reduce the intake of SSB.

Objective The purpose of this investigation was to evaluate the psychometric properties of the Rethink Your Drink (RYD) Checklist.

Design A descriptive design was employed to evaluate the criterion validity and test-retest reliability of the RYD Checklist.

Participants/setting Parents/caregivers of children (ages 6-12) that were able to read and speak English were recruited from the waiting room of a health clinic in Reno, Nevada during August 2018 (n=90). Participants were asked to complete two surveys: one in-person and another sent by mail two weeks later. A total of 64 (71.1%) participants completed both surveys.

Main outcome measures Criterion validity was determined by comparing parents/caregivers’ reports of the mean number of different types of SSB consumed on a typical day using the RYD Checklist against the mean volume of SSB consumed per day as derived from the BEVQ-15. The test-retest reliability was determined by comparing the RYD Checklist responses at time one versus time two.
Statistical analyses performed Analyses were completed using descriptive statistics, independent and paired sample t-tests, $\chi^2$ tests, multiple linear regression, and Pearson correlation coefficients.

Results The mean number of different types of SSB consumed daily as reported on the RYD Checklist at time one was positively correlated to the mean volume of the SSB consumed per day derived from the BEVQ-15 ($r=0.6$; $P<0.05$). The mean number of different types of SSB consumed daily on the RYD Checklist at time one and time two were positively correlated ($r=0.8$; $P<0.05$).

Conclusions This study provided evidence of the criterion validity and test-retest reliability of the RYD Checklist when administered to parents/caregivers of young, school-aged children.
**Introduction/Background**

The *Dietary Guidelines for Americans 2015-2020* describes a healthy eating plan as one that includes no more than 10 percent of total calories from added sugars.\(^1\) However, approximately 58 percent of Americans exceed this recommendation.\(^2\) A major source of added sugars are beverages that contain one or more added caloric sweeteners,\(^4\) such as dextrose, sucrose, and high-fructose corn syrup (herein referred to as sugar-sweetened beverages (SSB)).\(^1\) Examples of SSB include soft drinks, fruit-flavored drinks, sports drinks, and energy drinks.\(^1\) The National Health and Nutrition Examination Survey (NHANES) data, as analyzed by the American Heart Association, reports that from 2009-2012 children ages 6-11 years consumed on average 7.3 percent of their daily energy intake from SSB.\(^3\)

Excessive consumption of SSB among children is of concern due to the associated health risks including decreased nutrient intake,\(^{16,41}\) excessive weight gain,\(^{4,5,6}\) insulin resistance and Type II Diabetes,\(^{10,11}\) and dental caries.\(^{7,8,9}\) The National Center for Health Statistics (NCHS) Data Brief,\(^{15}\) using data from the 2011-2014 NHANES cohort, reports that almost two-thirds of girls and boys (2-19 years) consumed one or more SSB on a given day. Boys and girls (6-11 years) were reported to have consumed an average of 133 and 104 kilocalories (kcal) per day respectively from SSB.\(^{15}\) There is evidence however that children’s consumption of SSB has decreased.\(^{13,14}\) Using NHANES data from 2003-2014, Bleich et al\(^{13}\) reported that energy intake from SSB has declined from an average of 190.6 to 114.0 kcal per day, and the percentage of children (6-11 years) that drank SSB on a given day dropped from 81.8 percent to 63.5 percent. Although
overall consumption has decreased, SSB remain the primary source of added sugars across all age groups.\textsuperscript{12}

Family-related factors, including home availability, and parents’ knowledge and misperceptions of SSB, may be associated with children’s consumption patterns. One study reported that parental practices, such as control of home beverage availability, may be associated with child beverage intake. In a study by Zahid et al,\textsuperscript{33} the relationship between children’s intake of SSB and dairy beverages among children and home/parental factors was examined. It was reported that home availability of SSB was associated with a 48 percent higher odds of consuming SSB than homes that did not have SSB.\textsuperscript{33} Other research has indicated that the lack of parental knowledge about SSB may be important as well. Two separate cross-sectional studies by Park et al\textsuperscript{34,35} examined the relationship between the knowledge of SSB related health conditions and intake of SSB among US adults in general and among US Hispanic adults alone. Results indicated that after adjusting for variables (i.e. education level, race/ethnicity, annual household income), US adults who were neutral that SSB can contribute to weight gain had significantly higher odds of consuming SSB (≥2 times/day).\textsuperscript{34} In contrast, results were different among US Hispanic adults compared to all US adults. After adjusting for sociodemographic and acculturation, lack of knowledge was not related with Hispanic adults’ high intake of SSB (≥2 times/day).\textsuperscript{35} The authors concluded that health education regarding the contribution of excess energy intake from SSB to weight gain may help to lower SSB intake among adults, but education on this topic alone may not be enough among Hispanic adults.
Misperceptions may also play a role. A study by Munsell et al. was conducted to assess probable misperceptions among parents about the healthfulness of SSB for their children. Results demonstrated that over 50% of parents viewed SSB categories of flavored waters (i.e. vitamin water) and over 25% of parents viewed fruit and sports drinks as the healthy options for their children. Parents also perceived specific SSB that they purchased as significantly healthier than those who did not. These studies collectively suggest that family-related factors are important to consider in the effort to reduce the consumption of SSB.

Rethink Your Drink (RYD) Nevada is an on-going community-based effort to reduce intake of SSB and promote healthful beverage choices among young, school-aged children. Its target audience are households that are eligible for, or enrolled in the Supplemental Nutrition Assistance Program (SNAP). As part of this effort, the RYD Checklist was developed. The purpose of this interactive educational tool is to raise parents/caregivers’ awareness of their child’s intake of SSB by characterizing typical daily beverage choices as “Go”, “Slow” or “Whoa” drinks, otherwise known as traffic light labelling. “Go” represents drinks that are healthful and can be consumed almost anytime. “Slow” represents healthful drinks, that in excess may lead to a surplus of calories. “Whoa” represents drinks that should be limited because too many may be detrimental to children’s health (for example, SSB). Once finalized, the checklist will be included in an educational booklet about healthful beverages and distributed to parents/caregivers of young, school-age children. This checklist was modeled after the DETERMINE Your Nutritional Health Checklist designed to promote awareness and
understanding of the determinants of nutritional well-being among the elderly along with their health care providers.\textsuperscript{66}

Given the overall goal of RYD, this study was conducted to ensure that the checklist provided a valid and reliable representation of children’s intake of SSB before dissemination. The specific objectives were as follows: 1) to assess criterion validity,\textsuperscript{67} compare the mean number of different types of SSB consumed on a “typical day” as reported by parents/caregivers using the RYD Checklist, to the mean volume of SSB consumed per day as derived from a previously validated instrument (i.e. the 15-item Beverage Intake Questionnaire (BEVQ-15));

2) To assess test-retest reliability,\textsuperscript{67} compare the mean number of different types of SSB consumed on a “typical day” as reported by parents/caregivers using the RYD Checklist measured at two different times approximately two weeks apart (herein referred to as time one and time two).

**MATERIALS AND METHODS**

**Design**

A descriptive design was employed to address the research objectives using survey responses from a convenience sample of parents/caregivers of young, school-age children. Participants were asked to complete a survey on two separate occasions, time one and time two. In answering the survey questions, participants were instructed to report on the behavior of one child in their household that was between the ages of 6-12. If there was more than one present, the older child was selected for the purpose of this study at both times one and two.
The survey instrument at time one started with the RYD Checklist, then the BEVQ-15, and ended with a brief set of demographic questions. The survey at time two included only the RYD Checklist, followed by demographic questions. At both times one and two the survey instrument included items that were unrelated to this study.

The RYD Checklist included 14 beverage items and a location for participants to write down any additional beverage not yet recorded as “other.” Seven of the beverage items were SSB, defined as a beverage with added sugar. They included fruit flavored drinks, soda (not diet), sports drinks, sweetened tea or coffee, energy drinks, flavored milk, and flavored nut milk (Figure 1).

The BEVQ-15 was developed and validated by Hedrick et al. and is a tool used to estimate habitual beverage intake over a one month period across 15 beverage categories including an estimate of SSB intake. The BEVQ-15 has been used with adults, adolescents, and children. The presentation of the BEVQ-15 was modified for the purpose of this study. Alcoholic beverages were omitted similar to Hill et al. “Sweet tea” was removed since that particular reference is unusual in the West and was captured in the tea with sugar categories. Lastly, diet soda was removed. Two categories were further divided to allow for greater specificity (for example the original “sports and energy drinks regular” were separated to “sports drinks” and “energy drinks”).

Participants

It was determined that five participants for each item on the RYD Checklist would result in an adequate sample size for the assessment of test-retest reliability. Recruitment continued until a sample size of 90 was achieved, anticipating a dropout of no more than 25 percent from time one to time two. Parents/caregivers of children were
recruited from the waiting room of the University of Nevada School of Medicine (UNSOM) Family Medicine Center in Reno, NV in August 2018. Participant eligibility criteria were as follows: 1) 18 years of age or older; 2) parent or caregiver to at least one child between the ages of 6-12; 3) able to read and speak English; 4) willing to stay an additional ten to fifteen minutes after their appointment to complete the first survey (time one); and 5) willing to complete a second survey mailed to their home two weeks later (time two).

The University of Nevada Reno Institutional Review Board approved the study protocol. Participants were compensated with a $20 gift card upon receipt of the second survey. Participants were not aware of the specific purpose of the study; they were informed that the purpose was to learn more about a set of questions that measures what children drink. Ninety participants completed the survey at time one; 64 participants completed the surveys at both times one and two.

**Procedures**

*Time one*

A research team member used a script to obtain participants’ responses to the RYD Checklist and BEVQ-15. For the BEVQ-15 portion of this survey, measuring guides were developed and utilized to facilitate the estimation of quantity for each beverage type. The cups were marked with “A” to identify 4 fl/oz, “B” for 8 fl/oz, “C” for 12 fl/oz, “D” for 16 fl/oz, “E” for 20 fl/oz, “F” for 24 fl/oz, and “G” for 28 fl/oz. This method was adopted from the survey “What We Eat in America” used in NHANES. After the research team member obtained responses for the RYD Checklist and BEVQ-15
portion of the survey, participants were directed to complete the remainder of the survey independently.

*Time two*

Approximately seven days after the first survey was completed, participants received a reminder phone call about the second survey which was mailed to their home and scheduled to arrive two weeks after the first survey was completed. The packet included a personalized letter along with the second survey and a self-addressed, stamped envelope. Non-respondents were mailed another survey packet two weeks later.

**Data Analysis**

Statistical analysis was performed using IBM SPSS statistics 25.73 Descriptive statistics were computed for participants’ demographic characteristics, BEVQ-15, and RYD Checklist responses. Independent sample t-tests and $\chi^2$ tests were used to assess for potential sample bias as a result of attrition from time one to time two.

The total mean number of different types of SSB consumed on a “typical” day was computed by summing across all SSB marked on the RYD Checklist. For the BEVQ-15 the formula described by Hedrick et al$^{32}$ was used to compute the estimated daily volume (fl oz/d) and daily energy intake (kcal/d) for all SSB for the past month. The mean daily volume in the past month for each SSB was computed by multiplying the frequency “How often” (in units of times per day) to “How much” (in units of “fl oz”). The mean daily energy intake for each SSB was calculated by multiplying the mean fl oz/d for each different type of SSB by their respective mean “kilocalories/fluid ounces” conversion factors.
Pearson correlation coefficients were computed to evaluate similarities between the mean number of different types of SSB consumed on a “typical day” using the RYD Checklist compared to the mean volume of SSB consumed as derived from the BEVQ-15 (i.e. criterion validity). The coefficients were also computed to evaluate the mean number of different types of SSB consumed on a “typical day” as reported by the RYD Checklist at time one and two (i.e. test-retest reliability). Level of significance was set at .05.

Although it was not the primary focus of this investigation, independent and paired sample t-tests were performed to assess differences between the mean number of different types of SSB consumed on a “typical day” reported on the RYD Checklist between times one and two. In addition, multiple linear regression analysis was performed to determine which specific SSB items included on the RYD Checklist, best predicted the reported mean volume of SSB consumed a day as derived from the BEVQ-15.

RESULTS

Ninety parents/caregivers of school-aged children enrolled in this investigation and 64 of those completed the surveys at times one and two, representing a 71.1% completion rate. In Table 1, the demographic characteristics of participants and their children at time one of the study are presented. Independent sample t-tests and \( \chi^2 \) tests were used to assess potential differences between demographic characteristics of respondents that took the survey at times one and two versus (completers) those who only completed time one (non-completers). No significant differences were noted (\( P \geq 0.05 \)). Most participants were white (65.6%), not Hispanic (73%), and female (85.6%). The
mean age of parents/caregivers was 37.0 ± 8.6 years. Nearly all participants had at least a high school degree (84.4 %). The mean number of children in a household was 2.9 ± 1.6. The mean age of the child that parents/caregivers reported on was 9.4 ± 2.1 years.

Beverage Consumption

Results of the mean volume and energy intake of SSB consumed as indicated by the BEVQ-15, and the mean number of different types of SSB consumed on a “typical day” as indicated by the RYD Checklist, are reported in Tables 2 and 3. As shown in Table 2, the highest reported mean daily volume of SSB consumed as estimated by the BEVQ-15 was sports drinks (2.9 ± 7.7 fl oz/d per child), soft drinks regular (2.7 ± 6.2 fl oz/d per child), and sweetened juice drinks (2.7 ± 5.7 fl oz/d per child). Table 3 shows the number of different types of specific SSB items consumed on a “typical day” as indicated by the RYD Checklist at time one and two. Overall, the type of SSB consumed most often on a “typical day” at time one and time two respectively, was fruit flavored drinks (31.3%, 15.6%), followed by sports drinks (25.0%, 14.1%), and flavored low-fat milk (20.3%, 17.2%).

Criterion Validity and Test-retest Reliability

The mean number of different types of SSB consumed on a “typical day” as reported by parents/caregivers as described by the RYD Checklist at time one was 1.3 ± 1.3 SSB items per child. The mean daily consumed volume as reported by the BEVQ-15 was 9.3 ± 13.5 fl oz/d per child. These values were significantly correlated (r=0.6; P<0.05), providing evidence of criterion validity of the RYD Checklist.
The results of the test-retest reliability assessment of the RYD Checklist are reported in Table 4. The mean number of different types of SSB consumed on a “typical day” at time one was 1.0 ± 1.2 SSB items per child, and 0.6 ± 0.9 SSB items per child at time two. The results at times one and two were significantly correlated (r=0.8; P < 0.05), providing evidence of test-retest reliability.

In addition, a paired sample t-test was calculated to compare the mean number of different types of SSB consumed by children as reported by the RYD Checklist at time one and at time two. Results indicated that the mean number of different types of SSB consumed on a “typical day” was significantly lower at time two (t(63)= 4.5, P<0.05).

An independent sample t-test was performed to compare the mean number of different types of SSB consumed on a “typical day” among participants who only completed the RYD Checklist at time one (non-completers; n=26) to those that completed the RYD Checklist at both times one and two (completers; n=64). Results revealed a significant difference between the two groups (t(38)= 2.4, P < .05). The mean number of different types of SSB consumed daily as described by the RYD Checklist from non-completers was significantly higher (1.8 ± 1.5 SSB items per child) than completers (1.0 ± 1.2 SSB items per child) at time one.

A multiple linear regression was calculated to predict the mean volume of SSB consumed daily as reported on the BEVQ-15 from the reported consumption of seven different types of SSB consumed on a “typical day” as described by the RYD Checklist: fruit flavored drinks, soda (not diet), sports drinks, sweetened tea or coffee, energy drinks, flavored milk, and flavored nut milk (where “0”=not consumed and “1”=consumed). The results of the regression analysis indicated that the model using all
seven items of the RYD Checklist explained 51.1% of the variance of the mean volume of SSB consumed daily as reported on the BEVQ-15 ($R^2 = .515$) and which was statistically significant ($F(7,82)=12.4, p<.001$). Three of the RYD Checklist items, soda (not diet), sweetened tea or coffee, and sports drinks were significant predictors of children’s mean volume of SSB consumed daily as measured by the BEVQ-15. The remaining SSB items on the RYD Checklist were not (Table 5). The final predictive model was:

$$1.862 + 9.4(\text{SODA}) + 1.5(\text{FLAVORED MILK}) + 19.0(\text{ENERGY DRINKS}) + 1.6(\text{FRUIT FLAVORED DRINKS}) + 10.8(\text{SWEETENED TEA OR COFFEE}) + 11.4(\text{SPORTS DRINKS}) + 1.2(\text{FLAVORED NUT})$$

**DISCUSSION**

The RYD Checklist was developed as a tool to provide a valid and reliable representation of young, school-aged children’s intake of SSB. It was specifically designed to raise awareness among parents/caregivers. The results of this study revealed evidence of criterion validity. There was a significant correlation between the mean number of different types of SSB consumed on a “typical day” as reported by the RYD Checklist against the mean daily volume of SSB consumed a day as derived by the BEVQ-15. In addition, results revealed evidence of test-retest reliability. The mean number of different types of SSB consumed on a “typical day” as reported by the RYD Checklist at time one and time two were positively correlated. These results indicated that the RYD Checklist provides an accurate representation of children’s intake of SSB.31
The top three highest reported different types of SSB consumed as indicated on the BEVQ-15 and the RYD Checklist were dissimilar from one another. Results indicated that on the BEVQ-15 the highest reported mean daily volume of different types of SSB consumed were sports drinks, soft drinks regular, and sweetened juice drinks. On the RYD Checklist the largest reported mean number of different types of specific SSB items consumed on a “typical day” at time one and two were fruit flavored drinks, sports drinks, and flavored low-fat milk. These disparities may have been attributed to differences in the purpose of the instruments. The BEVQ-15 measures the habitual volume of beverages consumed over the past month, while the purpose of the RYD Checklist is to characterize the different types of SSB consumed on a “typical day.”

Further analyses were completed to examine the difference between the mean number of different types of SSB consumed on a “typical day” from time one (1.0 ± 1.2 SSB items per child) and time two (0.6 ± 0.9 SSB items per child) as described by the RYD Checklist. The mean number of different types of SSB consumed on a “typical day” was significantly lower at time two. These finding may be attributed to reactivity. Participants at time one may have been sensitized to the subject under investigation. As a result, participants may have under-reported SSB consumption at time two.74

Those who only completed the RYD Checklist at time one (non-completers; n=26) compared to those who completed the RYD Checklist at both times one and two (completers; n=64) were significantly different. The mean number of different types of SSB consumed as reported on the RYD Checklist from non-completers was significantly higher (1.8 ± 1.5 SSB items per child) than completers (1.0 ± 1.2 SSB items per child).
This may be attributed to differential attrition.\textsuperscript{75} The participants that completed the surveys were different than those that did not complete the survey, which may suggest sample bias.

Multiple linear regression analysis was used to determine which SSB items on the RYD Checklist best predicted the daily mean volume of SSB consumed as reported on the BEVQ-15. Results determined that soda (not-diet), sweetened tea or coffee, and sports drinks were significant predictors. This indicates that the checklist may be shortened to three SSB items, but further studies would be needed to make this determination. In addition, having three SSB items on the checklist may not support efforts to educate and raise awareness of the different types of SSB among parents/caregivers.

Results for the mean number of different types of SSB consumed on a “typical day” on the RYD Checklist at time one (1.0 ± 1.2 SSB items per child) was similar to previous results using NHANES 2011-2014 data that indicated almost two-thirds of boys and girls consumed at least one SSB on a typical day.\textsuperscript{15} The mean daily volume of SSB consumed as estimated by the BEVQ-15 was different compared to previous studies of the same age group that utilized the BEVQ-15. In a study published by Hill et al,\textsuperscript{70} BEVQ-15 results indicated that children between the ages of 6-11 consumed a mean daily volume of 4.0 ± 1.0 fl oz/d and had a mean energy intake of 52.0 ± 8.0 kcal/d. In this study, the mean daily volume of SSB consumed among children was 9.3 ± 13.5 fl oz/d and the energy intake was 119.3 ± 177.9 kcal/d (Table 2). Discrepancies between our findings and that of others\textsuperscript{70} may be attributed to differences in procedures. In this study standardized beverage models were used to help parents/caregivers estimate
consumption, and researchers assisted parents/caregivers with completing the BEVQ-15. Although the results in this were different from a previous study that utilized the BEVQ-15, they are similar to national averages. According to NHANES 2013-2015 (did not use BEVQ-15) children ages 6-11 consumed, on average 114 kcal/d from SSB.\textsuperscript{13}

One limitation of this study was the convenience sample of participants recruited from one clinic. This limits the generalizability of the findings. In addition, the RYD Checklist was administered differently at time one and time two of this study which may have led to participant’s under-reporting their child’s consumption of SSB at time two. At time one, the RYD Checklist was administered at the UNSOM Family Medicine Center with the aid of a research team member, while at time two the participant took the survey at home. Strengths of this study included a diverse sample with 34.4\% of the population identifying themselves as any other race than “white.” In addition, nutrition researchers were trained and followed a standardized script for data collection at time one. Lastly, the study utilized beverage models to help parents/caregivers recall volume of beverages consumed by their child, thus reducing participant burden.

Furthermore, repeating the study among a more generalizable sample would serve to confirm the validity and reliability of the RYD Checklist. Future research should determine if the RYD Checklist raises parents/caregivers’ awareness of children’s consumption of SSB. Ultimately, the RYD Checklist, with the use of the traffic-light labelling, may aid in educational efforts to reduce the intake of SSB.
CONCLUSIONS

Overall, these findings provide evidence that the RYD Checklist is a valid and reliable representation of children’s intake of SSB. Future studies are needed to confirm these results among a more generalizable sample.

FUNDING DISCLOSURE

This study was funded by the USDA’s Supplemental Nutrition Assistance Program-Education (SNAP-Ed) in cooperation with the Nevada Division of Welfare and Supportive Services.
What does your child drink on a typical day?

- Soda (not diet)
- 100% Fruit juice
- Water
- Unsweetened flavored water
- Flavored low-fat milk (such as chocolate milk)
- Energy drink
- Fruit-flavored drink (such as fruit punch)
- Fat-free milk, or low-fat milk
- Sweetened tea or coffee
- Unsweetened tea or coffee
- Whole milk or 2% milk
- Sports drink
- Unsweetened nut-milk (such as almond, cashew)
- Flavored-nut milk (such as almond, cashew)
- Other (list)______________________________

Figure 1. Rethink Your Drink Checklist as presented to parents/caregivers at time one and time two
Table 1. Characteristics of participants and their child at time one

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All Participants (N=90)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean ± standard deviation (Range)</td>
</tr>
<tr>
<td>Age of parent/caregiver</td>
<td>37 ± 8.6 (19-63)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>14.4 (13)</td>
</tr>
<tr>
<td>Female</td>
<td>85.6 (77)</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
</tr>
<tr>
<td>1st to 11th grade</td>
<td>15.6 (14)</td>
</tr>
<tr>
<td>High school diploma or GED</td>
<td>22.2 (20)</td>
</tr>
<tr>
<td>Some college or Associates degree</td>
<td>44.4 (40)</td>
</tr>
<tr>
<td>Baccalaureate degree or higher</td>
<td>17.8 (16)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>27.3 (24)</td>
</tr>
<tr>
<td>Not Hispanic</td>
<td>72.7 (64)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>5.6 (5)</td>
</tr>
<tr>
<td>Asian</td>
<td>4.4 (4)</td>
</tr>
<tr>
<td>Black or African American</td>
<td>15.6 (14)</td>
</tr>
<tr>
<td>Native Hawaiian or other Pacific Islander</td>
<td>4.4 (4)</td>
</tr>
<tr>
<td>White</td>
<td>65.6 (59)</td>
</tr>
<tr>
<td>Age of child mentioned in survey</td>
<td>9.4 ± 2.1 (6-12)</td>
</tr>
<tr>
<td>Number of children in household</td>
<td>2.9 ± 1.6 (1-9)</td>
</tr>
</tbody>
</table>

*There are no significant differences (P<0.05) between time one and time two. Independent sample t-tests and χ² tests were used to assess potential differences between demographic information of respondents that took the survey at times one and two.
Table 2. The mean volume (fluid ounces) and energy intake (kilocalories) consumed per day from SSB reported by parents/caregivers as estimated on the BEVQ-15 for their young, school-aged child (N=90)

<table>
<thead>
<tr>
<th>Beverage category</th>
<th>mean ± standard deviation</th>
<th>range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweetened Juice Beverage/Drink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fl oz/d</td>
<td>2.7 ± 5.4</td>
<td>0-28</td>
</tr>
<tr>
<td>kcal/d</td>
<td>38.4 ± 77.4</td>
<td>0 - 400.4</td>
</tr>
<tr>
<td>Soft drinks (Regular)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fl oz/d</td>
<td>2.7 ± 6.2</td>
<td>0-36</td>
</tr>
<tr>
<td>kcal/d</td>
<td>35.5 ± 82</td>
<td>0 - 478.8</td>
</tr>
<tr>
<td>Energy drink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fl oz/d</td>
<td>0.1 ± .9</td>
<td>0-8.6</td>
</tr>
<tr>
<td>kcal/d</td>
<td>1.3 ± 12.6</td>
<td>0 - 120</td>
</tr>
<tr>
<td>Sports drink</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fl oz/d</td>
<td>2.9 ± 7.7</td>
<td>0-60</td>
</tr>
<tr>
<td>kcal/d</td>
<td>41.1 ± 108.2</td>
<td>0 - 840</td>
</tr>
<tr>
<td>Sweetened tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fl oz/d</td>
<td>0.7 ± 2.9</td>
<td>0 - 24</td>
</tr>
<tr>
<td>kcal/d</td>
<td>3.7 ± 14.9</td>
<td>0 - 120</td>
</tr>
<tr>
<td>Sweetened coffee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fl oz/d</td>
<td>0.3 ± 1.4</td>
<td>0 - 8.6</td>
</tr>
<tr>
<td>kcal/d</td>
<td>2.6 ± 12.4</td>
<td>0 - 95.3</td>
</tr>
<tr>
<td>Total sugar-sweetened beverages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fl oz/d</td>
<td>9.3 ± 13.5</td>
<td>0 - 60</td>
</tr>
<tr>
<td>kcal/d</td>
<td>119.3 ± 177.9</td>
<td>0 - 840</td>
</tr>
</tbody>
</table>
Table 3. The mean number of different types of SSB consumed “on a typical day” reported by parents/caregivers as described by the RYD Checklist for their young, school aged child at times one and two (N=64)

<table>
<thead>
<tr>
<th>Beverage category</th>
<th>Time one</th>
<th>Time two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soda (not diet)</td>
<td>12.5 (8)</td>
<td>4.7 (3)</td>
</tr>
<tr>
<td>Flavored low-fat milk</td>
<td>20.3 (13)</td>
<td>17.2 (11)</td>
</tr>
<tr>
<td>Energy drinks</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Fruit flavored drinks</td>
<td>31.3 (20)</td>
<td>15.6 (10)</td>
</tr>
<tr>
<td>Sweetened tea or coffee</td>
<td>9.4 (6)</td>
<td>6.3 (4)</td>
</tr>
<tr>
<td>Sports drinks</td>
<td>25 (16)</td>
<td>14.1 (9)</td>
</tr>
<tr>
<td>Flavored-nut milk</td>
<td>6.3 (4)</td>
<td>4.7 (3)</td>
</tr>
</tbody>
</table>

*aPercentage (and number) of parents/caregivers who marked specific SSB items consumed on a typical day by their child*
Table 4. Assessment of the test-retest reliability\textsuperscript{a} of the RYD Checklist: The mean number of different types of SSB consumed on a “typical day” reported by parents/caregivers as indicated on the RYD Checklist among their young, school-aged child at times one and two (N=64)

<table>
<thead>
<tr>
<th>Beverage category</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Pearson correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total SSB</td>
<td>$1.0 \pm 1.2$</td>
<td>$0.6 \pm 0.9$</td>
<td>$0.8^*$</td>
</tr>
</tbody>
</table>

\textsuperscript{a}P<0.05
Table 5. Coefficients\(^a\) of the multiple linear regression analysis to predict the daily mean volume of SSB described on the BEVQ-15 from the reported consumption of seven different types of SSB consumed on a “typical day” as indicated on the RYD Checklist (N=90)

<table>
<thead>
<tr>
<th>Beverage category</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Standard Error</td>
</tr>
<tr>
<td>Soda (not diet)</td>
<td>9.3</td>
<td>3.0</td>
</tr>
<tr>
<td>Flavored low-fat milk</td>
<td>1.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Energy drinks</td>
<td>19.0</td>
<td>10.6</td>
</tr>
<tr>
<td>Fruit flavored drinks</td>
<td>1.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Sweetened tea or coffee</td>
<td>10.8</td>
<td>3.3</td>
</tr>
<tr>
<td>Sports drinks</td>
<td>11.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Flavored-nut milk</td>
<td>1.2</td>
<td>3.6</td>
</tr>
</tbody>
</table>

\(^a\)Dependent variable: fl oz/d on BEVQ-15

* P<0.05
Chapter 4

Conclusions

The purpose of this thesis study was to determine the psychometric properties of the RYD Checklist. The RYD Checklist was developed for use by parents/caregivers of young, school aged children (6-12 years). The results from this study may be used to decrease children’s intake of SSB by enhancing parents/caregivers’ awareness of their child’s consumption of SSB. The following research objectives guided this thesis study:

1) to assess criterion validity, compare the mean number of different types of SSB consumed on a “typical day” as reported by parents/caregivers using the RYD Checklist, to the mean volume of SSB consumed per day as derived from a previously validated instrument (i.e. the 15-item Beverage Intake Questionnaire (BEVQ-15)).

2) To assess test-retest reliability, compare the mean number of different types of SSB consumed on a “typical day” as reported by parents/caregivers using the RYD Checklist measured at two different times approximately two weeks apart (time one and time two).

This thesis study determined that the mean number of different types of SSB consumed on a typical day on the RYD Checklist was significantly correlated to the mean volume of SSB consumed per day as measured by the BEVQ-15. In addition, the mean number of different types of SSB consumed on a “typical day” on the RYD Checklist at time one and time two were significantly correlated. Providing evidence that the RYD Checklist offers a valid and reliable representation of children’s consumption of SSB.
Although the tool was found to be reliable, the results also demonstrated that the mean number of different types of SSB consumed by children on a “typical day” was significantly lower at time two. This may be explained by reactivity. As a result, participants may have under-reported consumption of SSB at time two.

The mean number of different types of SSB consumed daily from those who only completed the RYD Checklist at time one (non-completers) were significantly higher than those who completed the RYD Checklist at both times (completers). This may be because of differential attrition. The participants that completed both surveys were different through those that did not complete both surveys. This suggests that there may have been sample bias.

The RYD Checklist items of soda (not diet), sweetened tea or coffee, and sports drinks were significant predictors of children’s mean volume of SSB consumed daily as measured by the BEVQ-15. This indicates that, the checklist included the most significant drinks. In future studies, the checklist may be shortened, depending on the purpose.

Future research is needed to determine if the RYD Checklist effectively enhances parents/caregivers’ awareness of the beverages consumed by children. In addition to this, repeated studies are needed to provide further evidence of the validity and reliability of the checklist among other generalizable samples.

In summary, this thesis study provides evidence that the RYD Checklist is a valid and reliable representation of children’s intake of SSB.
References


73. *IBM SPSS Statistics 25.0 for Windows.* Chicago, IL: SPSS Inc; 2018.


Appendix A
Institutional Review Board Approval

DATE:      July 11, 2018
TO:        Jamie Benedict, PhD, RD
FROM:      University of Nevada, Reno Institutional Review Board (IRB)
PROJECT TITLE:  [508842-19] "Rethink Your Drink": Development of a Social Marketing Campaign to Reduce Intake of Sugar-Sweetened Beverages among School-Age Children
REFERENCE #: Social Behavioral; Children
SUBMISSION TYPE: Amendment/Modification
ACTION:    APPROVED
APPROVAL DATE: July 11, 2018
EXPIRATION DATE: November 13, 2018
REVIEW TYPE: Expedited Review
REVIEW CATEGORY: Expedited review #6 and 7

The UNR IRB has reviewed and approved in the above-referenced protocol in accordance with the requirements of the Code of Federal Regulations on the Protection of Human Subjects (45 CFR 46 and 21 CFR 50 and 56). This approval is based on assessment that the research met all applicable regulatory criteria. The research must be conducted in accordance with this approved submission. This submission has received Expedited Review based on applicable federal regulations.

Please prepare a Continuing Review/Progress Report Request at least 4 weeks prior to the approval expiration date using IRBNet https://www.irbnet.org. IRBNet will send you a courtesy reminder to that effect. Unless updated, the IRB is only authorized to approve a study activity for 12 months or less. There is no grace period. The study will be closed on the above stated expiration date unless the IRB receives and approves your annual update.

Instructions for preparing a modification, continuing review, or status report are located at http://www.unr.edu/research-integrity/human-research/irbnet. Call our office if you have any questions or problems with use of IRBNet software.

Approved Documents

• Amendment/Modification - Amendment Request June 2018.docx (UPDATED: 06/29/2018)
• Consent Form - Appendix B June 2018 Information Sheet.docx (UPDATED: 06/29/2018)
• Cover Sheet - Cover page June 2018.pdf (UPDATED: 06/29/2018)
• Other - Appendix I Hybe 2018 Receipt of Participant Gift Card.doc (UPDATED: 06/29/2018)
• Other - Appendix F June 2018 Phone Call Follow up Script.docx (UPDATED: 06/29/2018)
• Other - Appendix E Participant Contact Information.docx.docx (UPDATED: 06/29/2018)
• Other - Appendix A 2018 Recruitment Flyer.docx (UPDATED: 06/29/2018)
• Questionnaire/Survey - Appendix H June 2018 The Child Drink Survey II.pub (UPDATED: 06/29/2018)
• Questionnaire/Survey - Appendix D June 2018 Script for The Child Drink Survey I.docx (UPDATED: 06/29/2018)
• Questionnaire/Survey - Appendix C June 2018 The Child Drink Survey I.pub (UPDATED: 06/29/2018)

If you have any questions, please contact Nancy Moody at 775.327.2367 or at nmoody@unr.edu.

NOTE for VA Researchers: You are not approved to begin this research until you receive an approval letter from the VASNHCS Associate Chief of Staff for Research stating that your research has been approved by the Research and Development Committee.

Sincerely,

Richard Bjur, PhD
Co-Chair, UNR IRB
University of Nevada Reno

Janet Usinger, PhD
Co-Chair, UNR IRB
University of Nevada Reno

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Nevada, Reno IRB's record.
Appendix B
Recruitment Flyer

You're Invited!

To participate in a research study

The purpose of the study is to learn more about a set of questions that measures what children drink. If you volunteer for the study, you will be asked to complete two surveys: one at the Family Medicine Center and one at home. It will take no more than 10 minutes to complete each survey.

Volunteers must be:
1. Age 18 or older
2. Parent or caregiver to at least one child between the ages of 6 and 12.
3. Able to read, and speak English
4. Willing to stay for an additional 10-15 minutes after appointment
5. Willing to complete another survey that will be mailed to your home

If all above is true for you and you are interested in participating in the study, please let us know during your visit today. We are conducting the study in the waiting room.

All study participants will take home a $20.00 gift card to a local grocery store.
Appendix C
Information Sheet

Appendix B
Rethink Your Drink Study
Information Sheet

We are conducting a research study to learn about a set of questions that measures what children drink. The findings of this study will be used to improve Nevada’s ongoing Rethink Your Drink program.

You have been invited to participate because you are the parent or guardian of one or more children between the ages of 6 and 12 years-old.

If you volunteer for this study, you will be asked to complete two surveys. The first survey will be conducted in the waiting room of the Family Medicine Center either after your scheduled appointment. The second survey will be mailed to your home. Both surveys include questions about what your child drinks.

For the first survey, a nutrition researcher will ask you the survey questions and show you how to mark your responses. This will take about 10-15 minutes. The second survey will be mailed to your home about two weeks later. It is similar to the first survey but shorter in length. It should take no more than 10 minutes to complete. To make it easier for you to mail the second survey back, an addressed stamped envelope will be provided to you.

This study is considered to be minimal risk of harm. This means that the risk level is similar to what you might experience during daily activities. Because the waiting area is open to all patients, there is a possibility that someone else may overhear your answers to the survey questions. Please remember that you may refuse to answer any questions and may withdraw from the study at any time.

Benefits of doing research are not definite but we hope to learn more about a set of questions that measures what children drink. There are no direct benefits to you as a study volunteer.

Although you will not be paid for your time, we do appreciate your assistance. To thank you, you will receive a $20 Walmart gift card after we have received your second completed survey.

The researchers of the University of Nevada Reno, will treat your identity and information collected about you with professional standards of confidentiality and protect it to the extent allowed by law. Your name will not be included in any reports or publications that may result from this study. Please do not write your name on your survey. We will assign each study participant a different identification number. Your number will be written on the first page of your survey. The U.S. Department of Agriculture, the Division of Welfare and Supportive Services, the US Department of Health and Human Services, the University of Nevada, Reno Research Integrity Office and the Institutional Review Board may look at our study records.

You may ask questions of the researchers at any time by using the contact information below:

Jamie Benedict, PhD, RD, LD: email jamieb@cabnr.unr.edu, phone 775-784-6445
Deborah Jones, Nutrition Researcher: email DeborahNunes@nevada.unr.edu, phone 775-784-6450
Megan Wahrenburg, MS, Research Associate: email Mwahrenburg@cabnr.unr.edu, phone 775-784-6450

Your participation in this study is completely voluntary. You may stop at any time. If you decide not to participate or not to answer any specific questions, there will be no negative effects for you.

You may ask about your rights as a research participant. If you have questions, concerns, or complaints about this research, you may report them (anonymously if you choose) by calling the University of Nevada, Reno Research Integrity Office at 775-327-2368.
Instructions

The purpose of the study is to learn more about a set of questions that measures what children drink.

There is an ID number on your survey. This number lets us know that you have returned the survey. The results of the study, however, will never include your name. Please do not write your name on the survey.

Please answer every question in each part of the survey.

Please tell us about the children in your household.

1. What are the ages of the children in your household?

There are ___________ children in my household and their ages are ________________.

2. What is the name of the child that is _____.
   Child’s name: ____________________
Part 1. This part of the survey is about what your child drinks on a typical day. Please place a check in the boxes next to the drinks this child has on a typical day.

What does your child drink on a typical day?

☐ Soda (not diet)
☐ 100% Fruit juice
☐ Water
☐ Unsweetened flavored water
☐ Flavored low-fat milk (such as chocolate milk)
☐ Energy drink
☐ Fruit-flavored drink (such as fruit punch)
☐ Fat-free milk, or low-fat milk
☐ Sweetened tea or coffee
☐ Unsweetened tea or coffee
☐ Whole milk or 2% milk
☐ Sports drink
☐ Unsweetened nut-milk (such as almond, cashew)
☐ Flavored-nut milk (such as almond, cashew)
☐ Other (list)________________________
Part 2. This part of the survey is about your child’s drink choices during the past month. When you answer, think about your child’s drink choices. For each drink, please place a checkmark in boxes for “how often” and “how much each time.”

<table>
<thead>
<tr>
<th>Type of Beverage</th>
<th>HOW OFTEN [MARK ONE]</th>
<th>HOW MUCH EACH TIME [MARK ONE]</th>
<th>Less than 6 fl oz (1 cup)</th>
<th>8 fl oz (1 cup) B</th>
<th>12 fl oz (2/3 cups) C</th>
<th>16 fl oz (2 cups) D</th>
<th>20 fl oz (2 1/2 cups) E</th>
<th>More than 20 fl oz (specify amount below)</th>
<th>Write down either “F” or “G”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water or unsweetened sparkling water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100% Fruit Juice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweetened Juice Beverage/Drink (fruit punch, juice, cocktail, Sunny Delight, Capri Sun)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole Milk: red cap, Reduced Fat Milk 2%: purple cap, or Chocolate Milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Fat 1%: green cap, Fat Free/Skim Milk: light blue cap, Buttermilk or Soy Milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nut Milk (almond, cashew, coconut)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flavored, Original, or Plain Unsweetened</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft Drinks, Regular</td>
<td></td>
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Part 3. This part of the survey is about the practices in your household. When you answer these questions, think about your child __________. For each question, please check the answer that best describes what you do.

1. I offer my child a sugary drink when they are thirsty.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

2. I keep track of the amount of fruit-flavored drinks my child drinks.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

3. I serve my child milk with meals.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

4. When we leave our home, I bring sugary drinks along for my child.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

5. I limit the number of sugary drinks my child can have.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

6. I limit the number of energy drinks my child can have.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

7. I keep track of the amount of soda my child drinks.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

Sugary drinks have added sugar to make them taste sweet.
8. There are sugary drinks in our refrigerator.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

9. When my child (or children) has a sugary drink, I limit them to a small amount.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

10. I keep track of the amount of sports drinks my child (or children) drinks.
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

11. I avoid bringing sugary drinks home from the grocery store.
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

12. I read the ingredients list on product labels to avoid buying sugary drinks.
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

13. I limit the sugary drinks I consume.
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

14. I serve my child (or children) water with meals.
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always

15. I keep track of the amount of sugary drinks my child (or children) drinks.
    - Never
    - Rarely
    - Sometimes
    - Often
    - Always
Part 4. The last part of this survey is about you. For each question, please check the box that is true for you. (These questions will be used for statistical purposes only.)

1. What is your gender?
   - Female
   - Male

2. What was the highest level of school you completed? (check one):
   - 1st to 8th grade
   - 9th to 11th grade
   - High school diploma or a GED
   - Some college
   - Associates degree
   - Baccalaureate degree
   - Other (please specify): ________________________________

3. What race are you? (check all that apply to you)
   - American Indian/Alaskan Native
   - Asian
   - Black or African American
   - Native Hawaiian or other Pacific Islander
   - White

4. Are you Hispanic? (check one):
   - I am Hispanic
   - I am not Hispanic

5. What year were you born? (write the year) ________

6. How often do you decide what food and drinks are available in your home?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time

7. How often are you responsible for buying the food and drinks that are available in your home?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time
This material was funded by USDA’s Supplemental Nutrition Assistance Program – SNAP. SNAP provides nutrition assistance to people with low income. It can help you buy nutritious foods for a better diet. To find out more, contact (800) 992-0900.

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The Child Drink Survey I-Script
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Introduction/Screening Process
1. Hello, I’m [Interviewer’s name] and I am a Nutrition Researcher from the University of Nevada, Reno we are conducting a study to learn more about a set of questions we have developed. Did you have a chance to read the flyer?

| Interviewer: Show Recruitment Flyer (Appendix A) |

1.a. “Yes” response: Can I tell you more about the study and see if you would be interested in being a volunteer?

   “Yes” response: This study is to learn more about a set of questions that measures what children drink. If you choose to volunteer and are eligible, you will be asked to complete two surveys: one here (at the Family Medicine Center) and one at home. It should take no more than 10-15 minutes to complete each survey.

   “No” response: Thank you for your time and consideration. If you change your mind we will be here until {enter time}

1.b. “No” response: Can I leave this with you and come back in a few minutes?

   “Yes” response: Thank you, I’ll be back in a few minutes.

   | Interviewer: Leave Recruitment Flyer (Appendix A) and return a few minutes later. |

   After a few minutes return and start with 1.a.

   “No” response: Thank you for your time and consideration. If you change your mind we will be here until {enter time}

2. Would you be interested in taking part of our research study?

2.a. “Yes” response: Great, let’s confirm that you are eligible. I’ll have you take a few minutes to look over our eligibility criteria.

   | Interviewer: Show and point to the “Participant Eligibility Criteria Handout” shown on page 4 and give a few minutes to look over. |

2.b. “No” response: Thank you for your time and consideration. If you change your mind we will be here until {enter time}
Are the following true for you?

1. Age 18 or older

2. Parent or caregiver to at least one child between the ages of 6 and 12

3. Able to read, and speak English

4. Willing to stay for an additional 10-15 minutes after appointment

5. Willing to complete another survey that will be mailed to your home

Did you answer “yes” to all of the conditions above?
3. Did you answer “yes” to all of the conditions?
   3.a. Eligible (answered all yes): You are eligible to take part of this research study. Next, I am going to ask you to please read this Information Sheet that explains the study in detail. After you have time to read it, I’ll answer any questions you may have.
   
   Interviewer: Hand Information Sheet (Appendix B) and give parent/caregiver all the time that is needed them to read the entire sheet.
   
   3.b. Not Eligible (not all answers were “yes”): Unfortunately you are not eligible to take part of this study. Thank you for your time. Hope you have a wonderful day.

4. Do you have any questions about the study? Or the study procedures?
   4.a. “Yes” response with question: answer question(s).
   4.b. “No” response: Let’s continue.

5. Would you still like to continue with this study?
   5.b. “No” response: Thank you for your time and consideration. If you change your mind we will be here until [enter time]

**Beginning Instructions: Page 1 of Survey**

Again, this survey will take about 10-15 minutes to complete. There will be four parts to this survey. The first two (Part 1 and 2), I will assist you in filling out the survey. The last two parts (Part 3 and 4), you will answer on your own.

Any questions so far?

“Yes” response with question: answer question(s).

“No” response: Let’s continue.

6. Before we begin the survey, there are a few things that I want to go over. When taking this survey you will be answering the questions about one child in your household.

6.a. What are the ages of your children in your household?

Interviewer: Fill out Question 1 on page 1 of survey.

*Example: If parent/caregiver have three children who are 5, 7, and 9 years old, fill in the answer like this:*

*There are 3 children in my household and their ages are 5, 7, and 9*
6.b. Thank you. I have a couple questions now. What is the first name of the child that is \{enter child’s age that parents/caregiver gave as the oldest age\}?

Interviewer: write down the first name (pages 1-4 of Survey) and age of child and the age of child (just page 1 of Survey).

6.c. Thank you, let’s begin.


7. I will be helping you fill out this portion of the survey. Part 1 is about what your child drinks on a typical day. So to begin, what does \{enter child’s name\} drink on a typical day? If you need any further explanation of any of these drinks, please feel free to ask.

Interviewer: go through and say each listed beverages with parent/caregiver and place checks next to drinks that the parent/caregiver says that the child consumes on a typical day.

If explanations needed on certain drinks refer to page 9 of this document.

8. Before we move on, is there anything else that your child drinks on a typical day that I have not asked about?"

“Yes” response:
- What is the name of the drink?
- Are there any other drinks not listed that your child drinks on a typical day?

Interviewer: cycle through until a “No” response is given.

“No” response: Thank you, let’s move on to Part 2 of the survey.
Part 2. BEVQ: Page 3 of Survey

9. I will be helping you fill out this portion of the survey. This part of the survey is similar to Part 1 in that it is about what [enter child’s name] drinks, but instead of it being on a typical day, think about the past month. For each drink I am going to ask you about “how often” and “how much.”

<table>
<thead>
<tr>
<th>Interviewer: Some guidelines for BEVQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>o CYCLE THROUGH “9.a.” &amp; “9.b.” of the script. UNTIL ALL BEVERAGES ON BEVQ ARE FILLED OUT. ONCE COMPLETE, GO TO “9.c.”</td>
</tr>
<tr>
<td>o Have models ready for part 9.b.</td>
</tr>
<tr>
<td>o For Tea or Coffee (with creamer) section: For the Tea or Coffee (with creamer) section count milk/cream added to tea and coffee NOT in the milk categories; this includes non-dairy creamer.</td>
</tr>
<tr>
<td>o For Sports Drinks and Energy drinks &amp; Tea or Coffee sections count them separately and check appropriate boxes</td>
</tr>
</tbody>
</table>

**For drinks that are used in cooking or other preparation, such as milk or cereal, do not count those**

9.a. Out of these options [point to options] how often did [enter child’s name] drink [enter drink]?

<table>
<thead>
<tr>
<th>Interviewer: Write down parent’s/caregiver’s answer for “How Often.” If they say “Never or less than 1 time per week (go to next beverage).</th>
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</thead>
<tbody>
<tr>
<td>If more explanation needed say: For example, if your child drank 5 glasses of water per week, I will mark down 4-6 times per week on the survey.</td>
</tr>
</tbody>
</table>

9.b. Out of these container options, which container would resemble the closest to what [enter child’s name] typically drinks [enter drink type] from?

| Interviewer: Parent/caregiver chooses container/cup child drank from |

Can you please point to the line/letter on the cup that best matches the amount of [enter same drink name] your child drank each time?

| Interviewer: Allow parent/caregiver to point to line/letter. If letter is F or G, write down letter pointed to in appropriate box.
9.c. Before we move on, are there any other drinks that you can think of that your child has consumed in the last month that is not on this list?

“Yes” response:
- What is the name of the drink?
- How often did your child drink it?
- Out of these container options, which container would resemble the closest to what [enter child’s name] typically drinks [enter drink type] from?
- Can you please point to the line/letter on the cup that best matches the amount of [enter drink name] your child drank each time?
- Are there any other drinks not listed that your child drinks?

Interviewer: Cycle through 9.c. questions, until parent/caregiver responds with “No.”

“No” response: Thank you. Let’s move on to the Part 3 & 4 of the survey.

Part 3 & Part 4. Family Drink Survey & Demographic information: pages 4-6 of Survey
I am going to ask you to please fill out Parts 3 and 4 on your own. Let me tell you about what to expect. Part 3 of the survey is about the practices in your household. Part 4 of this survey, is about you. Please feel free to ask me any questions as finish the survey. When you are all done, please hand the survey to me.

Conclusion

Interviewer: Check that survey is complete.

Thank you for taking part of the child drink survey. Please remember that a second survey will be mailed to you in the next two weeks. It will be similar to the survey you just completed but a bit shorter.

Interviewer: Show participant the Child Drink Survey II (Appendix H). Point out that the survey is shorter than the one just completed.

Once we have received your second survey, we will mail you a $20 gift card from Walmart. I will be giving you a call within the next two weeks to remind you about this. In order to mail you the survey and your gift card, I will need your mailing address. Please provide this information on this form (Appendix E). This will be kept separate from your survey.

Do you have any questions that I can answer for you now?

Interviewer: Give parent/caregiver “Participant Contact Information Sheet” (Appendix E) and have them fill out their address.

“Yes” response:

Interviewer: Answer any questions parents/caregiver may have

“No” response: Thank you for your time. Have a wonderful day.
Drinks Explained

**Diet Soda:** A calorie-free carbonated beverage sweetened with saccharin or aspartame

**Energy drink:** Any of various types of beverage that are considered a source of energy, especially a soft drink containing a high percentage of sugar and/or caffeine or other stimulant. Examples are: red bull, 5 hour energy, monster energy, rockstar

**Fat-free milk:** when all the cream/milkfat is removed from whole milk. Less than .5% fat

**Flavored milk:** chocolate milk, strawberry milk,

**Flavored nut-milk:** Are flavored (chocolate, strawberry, etc) plant milk manufactured from nuts (almond, cashew, coconut) with a creamy texture and nutty flavor, although other types or brands are flavored in imitation of dairy milk.

**Fruit nectar:** Type of non-carbonated soft drink made by the flesh of fruits. It contains a lot of added sugar and very little fruit juice

**Fruit-flavored drink:** Drinks that contain a lot of added sugary and very little fruit juice.
Examples: fruit punch, lemonade

**100% Fruit Juice:** Everything in the bottle came from a fruit or vegetable. Examples are: apple juice, grape juice, cranberry juice, etc.

**Low-fat milk:** contains 1% milk fat

**Soda:** Coca-cola Classic, Pepsi-Cola, Mountain Dew, Dr. Pepper, Sprite, Fanta

**Sweetened tea or coffee:** tea or coffee that has added sugars to it

**Sports Drink:** a soft drink designed or marketed for consumption in conjunction with sporting activity or strenuous exercise, and which typically contains electrolytes such as sodium, potassium, and chloride, and high percentage of sugar to restore energy. Examples are: Gatorade, Powerade, Accelerate, etc.

**Unsweetened tea or coffee:** Tea or coffee not having added sweeteners or sugars

**Unflavored nut-milk:** plant milk manufactured from nuts (almond, cashew, coconut) with a creamy texture and nutty flavor, although other types or brands are flavored in imitation of dairy milk.

**Water:** water, sparkling water, unflavored water.

**Unsweetened flavored water:** Water seasoned with fruit, vegetables and/or herbs to give it flavor, may be sparkling.

**Whole milk:** Milk from which no constituent, such as fat, has been removed

**Examples of Drinks that would go under other category in RYD checklist**
- Soy milk, buttermilk, 2% whole flavored milk, sweetened-flavored waters, diet soda, fruit nectar
Appendix F
Contact Information Sheet

Rethink Your Drink Study
Contact Information

Name: ____________________________________________

Phone number: _______________________________________

Mailing address:
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

________________________________________________________
Appendix G

Phone Call Script

Good afternoon {Enter person’s name}. My name is {enter your name} and I am a Nutrition Researcher at the University of Nevada Reno working on the Rethink Your Drink study. Thank you again for your participation by answering questions in the Child Drink Survey at the Family Medicine Center. We appreciate your time.
The reason for this call is to remind you that you will be receiving the *The Child Drink Survey II* in the mail soon. As you may recall, this survey is similar to the one we filled out together at the Family Medicine Center but shorter. It should take you no longer than 10 minutes to complete. Also, please recall that when we receive your second survey, we will send you a $20 Walmart gift card as a way of thanking you for your time. You should receive the survey in the mail within a week. Do you have any questions that I can answer now?

“*Yes*” Response: {answer any question(s) that participant may have}

“No” Response: If you have questions after you have received your survey, please feel free to call us back.

Thank you again for your time.
Appendix H
The Child Drink Survey II
Instructions

The purpose of the study is to learn more about a set of questions that measures what children drink.

There is an ID number on your survey. This number lets us know that you have returned the survey. Please do not write your name on the survey.

Please answer every question in each of the three parts of this survey. Every question is important and will help us improve the Rethink Your Drink Program.

At the Family Medicine Center you answered our survey questions about your child, ________________ who is age ____. For Parts 1 and 2 of this survey, please do the same and answer the questions about this child.
Part 1. This part of the survey is about what your child ____________ drinks on a typical day. Please place a check in the boxes next to the drinks your child has on a typical day.

What does your child drink on a typical day?

☐ Soda (not diet)
☐ 100% Fruit juice
☐ Water
☐ Unsweetened flavored water
☐ Flavored low-fat milk (such as chocolate milk)
☐ Energy drink
☐ Fruit-flavored drink (such as fruit punch)
☐ Fat-free milk or low-fat milk
☐ Sweetened tea or coffee
☐ Unsweetened tea or coffee
☐ Whole milk or 2% milk
☐ Sports drink
☐ Unsweetened nut-milk (such as almond, cashew)
☐ Flavored-nut milk (such as almond, cashew)
☐ Other (list) _______________________________
Part 2. This part of the survey is about the practices in your household. When you answer these question, think about your child, __________. For each question, please check the answer that best describes what you do.

1. I offer my child a sugary drink when they are thirsty.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

2. I keep track of the amount of fruit-flavored drinks my child drinks.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

3. I serve my child milk with meals.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

4. When we leave our home, I bring sugary drinks along for my child.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

5. I limit the number of sugary drinks my child can have.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

6. I limit the number of energy drinks my child can have.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always

7. I keep track of the amount of soda my child drinks.
   - Never
   - Rarely
   - Sometimes
   - Often
   - Always
8. There are sugary drinks in our refrigerator.
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

9. When my child has a sugary drink, I limit them to a small amount.
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

10. I keep track of the amount of sports drinks my child (or children) drinks.
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

11. I avoid bringing sugary drinks home from the grocery store.
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

12. I read the ingredients list on product labels to avoid buying sugary drinks.
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

13. I limit the sugary drinks I consume.
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always

15. I keep track of the amount of sugary drinks my child drinks.
   ☐ Never
   ☐ Rarely
   ☐ Sometimes
   ☐ Often
   ☐ Always
Part 3. The last part of this survey is about you. For each question, please check the box that is true for you. (These questions will be used for statistical purposes only).

1. What is your gender?
   - Female
   - Male

2. What was the highest level of school you completed? (check one):
   - 1st to 8th grade
   - 9th to 11th grade
   - High school diploma or a GED
   - Some college
   - Associates degree
   - Baccalaureate degree
   - Other (please specify): ____________________________

3. What race are you? (check all that apply to you)
   - American Indian/Alaskan Native
   - Asian
   - Black or African American
   - Native Hawaiian or other Pacific Islander
   - White

4. Are you Hispanic? (check one):
   - I am Hispanic
   - I am not Hispanic

5. What year were you born? (write the year)________

6. How often do you decide what food and drinks are available in your home?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time

7. How often are you responsible for buying the food and drinks that are available in your home?
   - All of the time
   - Most of the time
   - Some of the time
   - None of the time
Thank You!

Please return your survey in the enclosed, stamped envelope.

When we receive your survey, we will send you a $20 Walmart gift card
This material was funded by USDA's Supplemental Nutrition Assistance Program – SNAP. SNAP provides nutrition assistance to people with low income. It can help you buy nutritious foods for a better diet. To find out more, contact (800) 992-0900.

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.
Appendix I
Follow-up Letter

UNR Letterhead

Date
Name
Address

Dear ________,

Two weeks ago you volunteered to be part of the Rethink Your Drink research study and completed a survey about your child’s drink choices at the Family Medicine Center. Thank you again for your assistance.

I am writing to ask you to complete the second survey, *The Child Drink Survey II*. This survey is similar to the first survey you completed but shorter in length. It should take no more than 10 minutes to complete. To make it easy for you to mail it back to us, a stamped, addressed envelope is enclosed.

As a reminder, your participation in this study is completely voluntary. You may skip any questions you do not want to answer and may quit at any time without penalty by not returning your survey to us. The study poses very little risk of harm and there is no direct benefit to you. Your survey answers will be kept confidential. Your name will never be included in any reports. The number written on the survey cover lets us know who has returned a survey to avoid unneeded mailings. Please do not write your name on the survey.

Your participation is very important to us since only a small number of households were mailed the survey. If we haven’t received your survey in a couple weeks, we will send a replacement survey – just in case yours was lost.

Although we cannot pay you for your time, we will send you a $20 Walmart gift card once we receive your completed second survey. Please note that you will be asked to sign a paper showing that you have received a gift card for accounting purposes only.

If you have questions regarding the study please call me (775) 784-6450 or send a note to DeborahNunes@nevada.unr.edu. There is an office that provides oversight called the Research Integrity Office. You may call them if you have any concerns about the conduct of the study at (775) 327-2368.

Sincerely,
Deborah Jones
Nutrition Researcher
Appendix J
Measuring Guides Used to Estimate Intake of Beverages

Model Name: Glases (G1-G5)
### Product Information on Containers

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Product Name</th>
<th>Volume (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Libbey</td>
<td>Rocks</td>
<td>12.25</td>
</tr>
<tr>
<td>G2</td>
<td>Libbey</td>
<td>Cooler</td>
<td>16.25</td>
</tr>
<tr>
<td>G3</td>
<td>Mainstays</td>
<td>Clear Tumbler</td>
<td>30</td>
</tr>
<tr>
<td>G4</td>
<td>Mainstays</td>
<td>Clear Tumbler</td>
<td>20</td>
</tr>
<tr>
<td>G5</td>
<td>Mainstays</td>
<td>Clear Tumbler</td>
<td>10</td>
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### Description of Marks on Containers

<table>
<thead>
<tr>
<th>Model</th>
<th>Level A (oz)</th>
<th>Level B (oz)</th>
<th>Level C (oz)</th>
<th>Level D (oz)</th>
<th>Level E (oz)</th>
<th>Level F (oz)</th>
<th>Level G (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>6</td>
<td>8</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>G2</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>G3</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>28</td>
</tr>
<tr>
<td>G4</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>16</td>
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<td>NA</td>
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<tr>
<td>G5</td>
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<td>8</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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</tbody>
</table>
Model Name: Mugs (M1-M2)

Product Information on Containers

<table>
<thead>
<tr>
<th>Model</th>
<th>Manufacturer</th>
<th>Product Name</th>
<th>Volume (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>Anchor Hocking Company TM</td>
<td>Rio Square Mug</td>
<td>14</td>
</tr>
<tr>
<td>M2</td>
<td>Mainstays</td>
<td>Square White Mug</td>
<td>12</td>
</tr>
</tbody>
</table>

Description of Marks on Containers

<table>
<thead>
<tr>
<th>Model</th>
<th>Level A (oz)</th>
<th>Level B (oz)</th>
<th>Level C (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>6</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>M2</td>
<td>6</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>
Model Name: Cartons (C1-C2)

Product Information on Containers

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<thead>
<tr>
<th>Model</th>
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<tbody>
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Description of Marks on Containers

<table>
<thead>
<tr>
<th>Model</th>
<th>Volume (oz)</th>
<th>Level A (oz)</th>
<th>Level B (oz)</th>
<th>Level C (oz)</th>
<th>Level D (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>16</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>M2</td>
<td>6.75</td>
<td>6</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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</table>
Model Name: Can

Product Information on Containers

<table>
<thead>
<tr>
<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Can</td>
<td>Custom Made</td>
</tr>
</tbody>
</table>

Description of Marks on Containers

<table>
<thead>
<tr>
<th>Model</th>
<th>Volume (oz)</th>
<th>Level A (oz)</th>
<th>Level B (oz)</th>
<th>Level C (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can</td>
<td>12</td>
<td>6</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>
Model Name: Bottles (B1-B3)

Product Information on Containers

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<th>Model</th>
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</thead>
<tbody>
<tr>
<td>Bottles</td>
<td>Custom Made</td>
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</table>

Description of Marks on Containers

<table>
<thead>
<tr>
<th>Model</th>
<th>Volume (oz)</th>
<th>Level A (oz)</th>
<th>Level B (oz)</th>
<th>Level C (oz)</th>
<th>Level D (oz)</th>
<th>Level E (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>20</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>B2</td>
<td>16.9</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>NA</td>
</tr>
<tr>
<td>B3</td>
<td>12</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
Appendix K
Gift Card Receipt

Rethink Your Drink
Receipt of Participant “Thank You” Gift

Instructions: To show receipt of your gift certificate, please print and sign your name below. This information will be provided to the UNR Controller’s Offices for accounting purposes only.

Name (please print):

________________________________________

Signature: ______________________________________ Date

Gift Card # ______________________________