THE BASELINE CHARACTERISTICS OF PARENTS AND AFRICAN AMERICAN GIRLS IN AN ONLINE OBESITY PREVENTION PROGRAM: A FEASIBILITY STUDY

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ABSTRACT

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The purpose of this study was to analyze the baseline characteristics of girls and their parents in an online obesity prevention program created for 8-10 year old African American girls. Girls and a parent completed online dietary questionnaires. Two unannounced 24 hour dietary recalls were conducted with each girl. Child fruit and vegetable (FV) intake was significantly greater in the highest household education and income groups. FV home availability was higher with older and married parents. Child FV intake was positively related to child FV preferences, home availability, and accessibility, but was negatively related to barriers to FV consumption. These findings highlight the impact between parent psychosocial variables and demographic characteristics on child FV consumption. Obesity prevention programs for African American girls and their families should consider how child FV consumption may differ based on parent education, household income, child FV preferences, and parental psychosocial characteristics.

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CHAPTER I

INTRODUCTION

African American girls have a greater risk for obesity than non-Hispanic white girls.[1] For 6 to 19 year old girls, the prevalence of obesity was higher for African American girls (26%) compared to white girls (13%).[1] Obese children are more likely to become obese adults.[2] Thus, preventing obesity prior to adolescence may reduce the risk of obesity[3] and associated health issues, including hypertension and type 2 diabetes [4] during adulthood. Long term energy imbalance contributes to obesity risk, particularly when energy intake is greater than expenditure.[5] Diet and physical activity contribute to energy balance,[6, 7] and they are modifiable behaviors.[2] Thus, diet and physical activity are key targets for obesity prevention programs.

The diet and physical activity behaviors of African American girls contribute to their risk for obesity. In studies conducted with 8-10 year old African American girls, it was found they consumed a high fat diet and did not meet fruit and vegetable (FV) recommendations.[8-10] This is a concern because FV are low energy-dense, but high nutrient-dense foods.[11] Consuming more FV reduces overall energy density of the diet, improves satiety, helps with weight management,[11] and reduces the risk for chronic diseases.[12] Because diet and physical activity behaviors track into adulthood, establishing these healthy behaviors in childhood may contribute to healthy behaviors in adulthood and reduce the risk for obesity and associated diseases.[2]

Parents are the gatekeepers of the home environment; therefore, their participation in child-focused behavior change programs is essential.[13] Parental encouragement and support of healthful diet and physical activity behaviors may help children establish healthy behaviors that can extend throughout life.[13] Parent psychosocial variables (home FV availability and accessibility and family barriers to eating FV) and parent demographic characteristics (household income, education) influence child FV consumption.[14-20] Child FV preferences also influence child FV consumption.[21-24] The literature, however, is limited regarding the factors influencing FV intake in African American girls. Exploring the relationships between parent psychosocial variables related to the home environment and parental characteristics with child FV consumption may provide important insights for the future development of effective obesity prevention interventions for African American children.

CHAPTER II

LITERATURE REVIEW

OBESITY IN AFRICAN AMERICAN COMMUNITIES

Health disparities are present in the African American community. Black Americans were 1.5 times more likely to be obese compared to non-Hispanic whites.[25] According to data from the National Health and Nutrition Examination Survey (NHANES) 2011-2014, the prevalence of obesity for African American adults (37.9% of males and 56.5% of females) was higher than non-Hispanic white adults (34.0% of males and 35.3 % of females).[26] More specifically, obesity affects African American women at an alarming rate, with approximately 4 out of 5 being overweight or obese.[25] African American women have the highest rates of being overweight or obese compared to other ethnicities in the United States.[25] For women 20 years of age and over, 82.0 % of non-Hispanic Black women were overweight or obese compared to 63.5% of non-Hispanic white women in 2011-2014.[26] In 2014, African American women were twice as likely to be obese compared to non-Hispanic white women.[25] For women 18 years of age and over, 46.0 % of non-Hispanic Black women were obese compared to 26.3 % of non-Hispanic white women in 2014.[25]

Several factors contribute to higher rates of obesity and obesity related diseases in Black communities: income; access to quality education; access to affordable housing; unequal access to affordable; healthy food, and unequal access to resources for physical

activity.[27] Low-income households are associated with increased obesity because of unhealthy, calorie-dense foods that tend to be cheaper than healthy foods.[28] In addition, predominantly low-income and minority neighborhoods have less access to healthy foods and supermarkets.[27] One study found that only 8 % of Black residents lived in areas with one or more supermarkets compared to 31% of non-Hispanic white residents.[27]

The marketing of unhealthy foods contributes to the presence of obesity in Black communities. High-calorie, low-nutrient foods and beverages are advertised more often to African Americans.[27] It was found that outdoor advertisements in a majority of Black neighborhoods promoted foods with low nutrition value 13 times more often than non-Hispanic white neighborhoods. In regards to physical activity in African Americans, 80% were less likely to participate in physical activity compared to non-Hispanic whites.[25] In regards to access of physical activity resources, access to public parks and pools and green space is lower in predominately African American neighborhoods.[27] In order to address the disparities related to obesity in African Americans, the inequities to access of healthy eating and physical activity must be recognized.

Obesity disproportionately affects the health of African Americans. The risks for several diseases increase in those who are overweight. These diseases include cardiovascular disease (CVD), hypertension, type 2 diabetes, gallbladder disease, osteoarthritis, colon and prostate cancer in men, and breast, endometrial, and gallbladder cancer in women.[29] In African American adults, the rates of death from heart disease and stroke are higher compared to non-Hispanic white adults.[25] It has been reported that more than 80% of people with type 2 diabetes are overweight.[25] In regards to disparities, Black

adults are twice as likely to be diagnosed with diabetes by a physician compared to non-Hispanic white adults.[27]

OBESITY IN AFRICAN AMERICAN CHILDREN

Higher rates of overweight and obesity are present in African American children than other groups of children. Overweight is defined as a body mass index (BMI) at or above the 85th percentile and below the 95th percentile for children and adolescents of the same age and sex. Obesity is defined as a BMI at or above the 95th percentile for children and adolescents of the same age and sex.[30] For children ages 2 to 19, 35.2% of non-Hispanic Black children were overweight or obese compared to 31.8% of all children in 2011-2012.[31] Of overweight children ages 2 to 19, 35.1% were Black and 28.5% were non-Hispanic white from 1999-2012. Of obese children ages 2 to 19, 20.2% were Black and 14.3% were non-Hispanic white from 1999-2012.[32]

Similar to adults, the following factors influence the prevalence of overweight and obesity in African American children: lack of access to affordable healthy foods, exposure to media advertisements of unhealthy foods, and lack of access to resources for physical activity.[27] Furthermore, healthy lifestyle behaviors, including a healthful diet and moderate to vigorous physical activity, play a key role in maintaining a healthy weight.

The prevalence of overweight and obesity puts children at higher risk for developing chronic diseases including type 2 diabetes, hypertension and high blood pressure, sleep apnea, and asthma.[33] Type 2 diabetes is more likely to develop in non-Hispanic Black children compared to non-Hispanic white children. Data have shown for

children born in 2000, Black male children have a 40.2 % lifetime risk of receiving a diabetes diagnosis compared to 26.7 % risk for non-Hispanic white male children. Black female children have a 49% lifetime risk of receiving a diabetes diagnosis compared to 31.2% risk for non-Hispanic white female children.[34]

The risk of obesity is greater in African American girls than non-Hispanic white girls. Black 6-11 year old girls were 50% more likely to be overweight than non-Hispanic white girls in 2011-2014 at 21.6% versus 14.4%, respectively.[25] Recognizing that both Black women and girls have the highest risks for obesity, it is critical to start addressing obesity prevention in Black girls.

Obesity in childhood tracks into adulthood.[2] Also, it has been found that diet and physical activity behaviors developed in childhood track into adulthood.[2] Children who are overweight or obese in childhood have an increased risk of becoming overweight or obese in adulthood.[3] Thus, preventing obesity prior to adolescence may reduce the risk of obesity[3] and associated health issues, including hypertension and type 2 diabetes [4] during adulthood. Long-term energy imbalance contributes to obesity risk, particularly when energy intake is greater than expenditure.[5] Energy intake is derived from the energy contribution from the macronutrients: carbohydrate, protein, and fat.[5] Diet and physical activity contribute to energy balance.[6, 7] Since diet and physical activity are modifiable, [2] they are key behaviors on which to focus obesity prevention programs for both children and adults. Diet and physical activity behaviors of African American girls increase their risk of obesity.[8-10] In studies conducted with 8-10 year old African American girls, it was found that they consumed a high fat diet and did not meet the My Pyramid for Kids FV

recommendations of 8 servings.[8, 9] For girls in the Memphis and the Stanford Girls Health Enrichment Multi-site Studies (GEMS), the percentage of daily energy from fat was greater than 35%.[8,9] Among 9-10 year old girls in the National Heart, Lung, and Blood Institute (NHLBI) Growth and Health Study, Black girls had significantly greater intakes of the following food groupings compared to non-Hispanic white girls: sweetened beverages, juice, other breakfast grains, desserts, candy, eggs, fried fish or poultry, red meat, processed meats or sandwiches, ramen, legumes, other vegetables, and fried potatoes.[10]

Fruits and vegetables are nutrient-dense and rich in fiber.[11] Consuming more fruits and vegetables reduces overall energy density of the diet, improves satiety, reduces calorie intake, helps with weight management,[11] and reduces the risk for chronic diseases including CVD, stroke, hypertension, and type 2 diabetes.[12] The GEMS studies also reported that physical activity in 8-10 year old African American girls averaged at 21 minutes daily (Memphis) and a total of a half hour daily (Stanford) of moderate to vigorous physical activity [8-9] which is below the daily recommendation of at least 1 hour of physical activity for children.[35] Because diet and physical activity behaviors track into adulthood, establishing these healthy behaviors in childhood may contribute to healthy behaviors in adulthood and reduce the risk for obesity and associated diseases.[2]

PSYCHOSOCIAL FACTORS INFLUENCE CHILD FV CONSUMPTION

Child FV preferences correspond with FV consumption in children. Preferences refer to the liking for a food item and/or choosing one item over another.[21] Several studies have consistently found that children have a higher preference for fruits than

vegetables.[22-24] In a study with fourth and fifth grade students, the mean preference scores for fruits were higher than those for vegetables.[22] From 2003 to 2010, whole fruit intake increased 12% per year while vegetable intake did not change among children aged 2-18 years.[23] FV preferences were significantly correlated with FV consumption in school aged children.[21,22] Furthermore, a study with fourth and fifth grade students suggested that increasing the availability of FV in the home environment may improve FV preferences.[22]

Parents are the gatekeepers of the home environment. Therefore, their participation is essential in obesity related interventions for children and adolescents.[13] Behavior change is more likely when the family is involved because there is an increased likelihood that family members will take steps for healthful change and sustain healthy lifestyle behaviors. Parental encouragement of and support for healthful diet and physical activity behaviors are important factors to help children establish healthy behaviors early in life.[13] Parental influence and the family environment, including home food availability and accessibility, have been associated with FV consumption in children.[14-18] FV availability refers to FV available in the home or school, and FV accessibility refers to whether the FV are prepared, presented, and/or maintained in a form that allows or encourages the child to eat them.[18]

FV home availability and accessibility have been positively correlated with child FV intake. Hearn et al. found that home availability and accessibility were related to child FV consumption in third grade children based on data collected from parent telephone interviews and children's seven day food records.[18] Cullen et al. found that parent FV

home availability correlated with FV consumption in fourth to sixth grade children based on parent questionnaires and child food records.[16]

Family barriers to eating FV have been negatively associated with FV consumption in children.[17] In a study with fourth to sixth grade students, family barriers to eating FV were negatively related to lower F and total FV consumption. Family barriers refer to factors that influence preparing, serving, and consuming fruits and vegetables. Factors include time, cost, spoilage of FV, canned or frozen FV, and family cohesiveness.[17]

PARENTAL DEMOGRAPHICS INFLUENCE CHILD FV CONSUMPTION

Parental demographics, including highest level of education and household income, contribute to child FV consumption. In a study conducted with European schoolchildren, children living in households with higher levels of education reported higher consumption of low fat and low sugar foods, including F and V, compared to children living in households with medium and low levels of education.[36] Among Canadian adolescents, the frequency of FV intake increased as level of household education increased.[37] Furthermore, higher education was related to increased diet quality, including lower dietary fat and higher levels of vitamin C, calcium, and potassium for 9 and 10 year old girls.[38]

Low FV availability has been reported in low-income households.[16] Kirby et al. found that middle to high socioeconomic (SES) groups reported a larger variety of FV available in the home, and that low SES groups reported using more canned and frozen FV and had only the child's favorite fresh FV at home.[39] In addition, African American

children and those from low-income households are more likely to live in neighborhood environments with less access to healthy foods and more access to unhealthy foods.[19]

The literature supports the relationship between that household income and child FV consumption. For toddler and pre-school aged children in Malaysia, mean F intake was lower for children from lower income households and higher for children from higher income households.[40] The frequency of FV intake among Canadian adolescents increased as household income increased.[37] F intake was higher for the high SES group compared to the medium and low SES group in Norwegian children.[41]

OBESITY PREVENTION INTERVENTIONS

The literature consistently supports the relationship of FV availability, accessibility, and preferences to child FV consumption.[20,24] However, the literature is limited on how the factors influence FV intake in African American girls. For example, in the 2003-2010 National Health and Nutrition Examination Survey (NHANES), the average vegetable intake of African American children was lower than other ethnicities,[23] but further analysis is needed to explore what factors contribute to a lower V intake in African American children. Exploring the relationships between parent's behaviors, the home environment, child FV preferences, and child FV consumption may provide important insights for future developments of effective obesity prevention interventions for African American children.

Obesity prevention programs tailored to African American girls are critical to reducing the prevalence of overweight and obesity in this population. In order to create effective programs for African American girls, the motivations, attitudes, beliefs, and

behaviors related to body size, food, eating, and physical activity must be considered.[42] Cultural factors including food and activity preferences, symbolism, and traditions also influence diet and physical behaviors and must be applied to intervention programs for ethnic minorities.[42] Previous research studies have explored intervention programs culturally tailored for African American girls. The GEMS was a multi-site research program developed to test 4 interventions with the collective goal of preventing excess weight gain in 8 to 10 year old African American girls.[43] The intervention sites included University of Memphis, Stanford University, University of Minnesota, and Baylor College of Medicine. Each site created and tested separate interventions, but they shared similar eligibility criteria and measurements.[43]

The Memphis GEMS Study

The Memphis GEMS intervention focused on testing the efficacy of a two-year family based program in 8 to10 year old Black girls. To participate in the study, it was required that the girls' BMI $\geq 25^{th}$ percentile for age and gender, and one parent/caregiver had to be overweight or obese (BMI ≥ 25 kg/m^2). The study was carried out at different community centers in Memphis. Families were randomly assigned to 1of 2 intervention groups. The active intervention focused on diet and physical activity, and the alternative intervention focused on self-esteem and social efficacy.[8] Behavioral goals for the girls in the active intervention included eating a healthy diet, decreasing the intake of high-fat foods and sugar-sweetened beverages, increasing the intake of FV and water, increasing moderate to vigorous physical activity, and decreasing sedentary behavior.[8] None of these behavioral goals were focused on in the alternative group.

For each intervention group, weekly meetings were held for 14 weeks and then monthly for 20 months for a total of 34 sessions over the course of 2 years.[8] The intervention transitioned from meetings at the community centers to community based field trip sessions in the second year for both groups. The primary outcome for the study was change in BMI at 24 months. Data was collected at baseline, at 12 months, and at 24 months. Child dietary intake was measured by 24 hour dietary recalls (2 weekdays, 1 weekend), and psychosocial measures were collected from both the girls and the parents. Girls completed questionnaires on diet and physical activity behaviors, body image, and weight issues including food preferences.[8] Parents also completed questionnaires on diet and physical activity behaviors including home availability and accessibility of FV.

A total of 303 families were enrolled in the study. The majority of families (64%) had a household income that was less than $40,000, and most parents did not have a college education (69%). The mean BMI at baseline was 22 kg/m^2 for the girls. The mean baseline dietary outcomes for the girls included about one-third daily serving of F (0.35), less than 1 daily serving of V (0.94) and water (0.70), and 1 daily serving of sugar-sweetened beverages.[8] Mean FV servings (1.3 servings per day) were below the national My Pyramid recommendations of 8 servings per day.[8] My Pyramid was based on the 2005 dietary guidelines. Current dietary guidelines can be found in the 2015-2020 Dietary Guidelines for Americans.[44]

The Stanford GEMS Study

The Stanford GEMS intervention focused on testing the efficacy of a 2-year family and community based program for low-income, 8-10 year old African American

girls. The eligibility criteria for participants was similar to the Memphis study: girls' BMI $\geq 25^{th}$ percentile for age, and at least one parent/caregiver had to be overweight (BMI $\geq$ 25 kg/m^2). The study was held at community centers and the families' homes. The families were randomly assigned to 1 of 2 culturally tailored programs, the treatment intervention or the comparison intervention. The treatment intervention consisted of an after-school dance classes and a home based screen time reduction program. The dance component was called *The GEMS Jewels After School Intervention*, and it was offered 5 days per week for 24 months at community centers near the selected neighborhoods.[9]

Participants were taught 3 styles of dance which included Step, Hip-Hop, and traditional African dance. The duration of the dance classes was 45-60 minutes, and they were taught by female African American college students from the community. Additionally, the sessions included GEMS talks about the role of dance in the girls' lives and importance of dance in their community and culture. The screen time reduction component was called *Sisters Taking Action to Reduce Television (START),* and it was designed to include lessons on African or African American history. There were a total of 24 lessons for the duration of 2 years, and young adult African American females served as "START mentors" and met with families in their homes to deliver each session.[9]

The comparison intervention was called *The Active-Placebo Health Education Comparison Intervention*, and it consisted of an information-based health education focused on nutrition, physical activity, and reducing CVD and cancer risk.[9] It highlighted relevant topics to Black women, girls, and families and integrated Black history and heritage into the program. The intervention was disseminated by 24 monthly newsletters

each for girls and their parents and by quarterly community center health talks.[9] Data were collected every 6 months at the participants' homes.[45] Change in BMI over 2 years was the primary outcome measure. The girls' dietary intake was measured by 24-hour dietary recalls (2 weekdays and 1 weekend).

A total of 261 families were enrolled in the study. A substantial number of families had a household income that was less than $20,000 (41%) and highest household education level was some college or technical school (47%). At baseline, more than half the girls had a BMI ≥ the 85th percentile for their age and sex. The average BMI was 20.7 kg/m^{2}for the girls. There were no changes in BMI between intervention groups.[45] It was found at baseline that girls ate a high fat diet, consisting of greater than 35% of their daily energy from fat.[9]

The Minnesota GEMS Study

The Minnesota GEMS pilot study focused on testing an after-school community program for 8-10 year old girls. Eligibility criteria for the study included the girls' BMI ≥ 25th percentile for age and sex, being able to participate in physical education classes at school, and not having been held back more than one grade in school.[43] Girls were randomized into the intervention or the control group. The 12-week intervention program was called *Girlfriends for KEEPS*, where the acronym stood for keys to eating, exercising, playing, and sharing.[43] Club meetings were held after-school twice a week for 1 hour at each of the elementary schools. The meetings provided fun, culturally appropriate, and interactive activities for the girls which focused on practicing a particular health behavior assigned for that week.[43]

Dietary and physical activity goals were part of the intervention. Some of the dietary goals included decreasing consumption of high fat foods, increasing FV intake, and reducing consumption of sweetened beverages. An example of one of the messages delivered to the girls was on the benefits of drinking more water than soda. Some of the physical activity goals included increasing moderate to vigorous activity, reducing sedentary behavior, and developing positive feelings about being physically active. Increasing physical activity was key to the program, and girls were encouraged to participate in different activities such as dancing and jumping rope. A family component was also created to support the healthy eating and physical activity messages promoted in the program. One particular goal of the family component was to help families create a home environment that increased the availability of healthy foods and physical activity.[43]

The control group, the GEMS club, was an active placebo for the girls and parents; inclusion of a formal, no treatment control group was disapproved by parents and the community during formative research.[43] The program focused on the promotion of positive self-esteem and cultural enrichment. The girls participated in monthly Saturday meetings, which consisted of self-esteem activities, art and craft activities, and a musical workshop on African percussion instruments.[43]

BMI was not the primary outcome measure for this study since the sample size was small. The study was evaluated based on the intervention process measures and trends in the main measurements, including BMI, diet, physical activity, and psychosocial measures.[43] Data were collected at baseline and after completion of the 12-week intervention. The girls' dietary intake was measured by 24-hour dietary recalls (1

weekday, 1 weekend). Parent psychosocial variables measured included availability of lower fat and higher fat foods and food availability which included sub-scales for F, V, and sweetened-beverage availability.[43] A brief screener for percentage of energy intake from fat and FV intake also assessed parent's dietary intake.[43]

A total of 54 families were enrolled in the study. The majority of families were low income and 54% of parents reported a household income that was less than $30,000 per year.[43] A substantial number of parents (45%) reported education level as some college or technical school. The average BMI at baseline for the girls was 20.7 kg/m^2, with a 32.8 kg/m^2 average BMI at baseline for parents.[43] At 12 weeks follow up, girls in the intervention group had lower caloric intake, lower percent of calories from fat, and more servings of water/day than the control group.[43] Also, the daily number of FV servings was lower for the intervention group (1.5) compared to the control group (1.8); however, there were no significant dietary differences between the groups. In contrast, significant differences were found for parents of girls in the intervention group regarding less availability of higher fat foods, more low fat food practices, and lower energy intake from fat for the parents' diets.[43]

The Baylor GEMS Study

The Baylor GEMS pilot study focused on testing a 12-week intervention called the Fun, Food, and Fitness Project (FFFP) for 8 year old African American girls.[46] The FFFP consisted of a 4-week summer day camp for the girls and was followed by an 8-week Internet program for girls and parents.[46] Eligibility criteria for the study included: girls' BMI $\geq 50^{th}$ percentile for age and gender, having a home computer with Internet

access, child assent, and parental consent.[46] A total of 35 families were enrolled in the study. Families were randomized to the treatment or comparison group. The treatment group was created to target the girls' energy balance, and the comparison group was created to promote general health.[47]

The behavioral goals of FFFP were to increase the girls' FV intake, to increase water intake, and to increase moderate to vigorous physical activity to 60 minutes per day.[46] The summer camps were different for the treatment and comparison groups. For the treatment group, normal camp activities were mixed with activities for the FFFP. Some of the activities included dancing, educational games focused on increasing FV intake and physical activity, and snack recipe preparation.[46] Furthermore, girls in the treatment group were taught to set goals for eating more FV, to make decisions on choosing FV over unhealthy options, and to problem solve when they did not meet their goals. Girls were given rewards for meeting their goals with friendship beads.[46] In the comparison group, the girls only engaged in the regular camp activities at another camp site.

For the 8-week Internet program, 4 separate websites were designed for the treatment and comparison groups and the parents and girls. The treatment website focused on transferring the behaviors and skills learned in camp to the home and school environment, and the comparison website focused on providing general health information.[47] The treatment group was exposed to weekly sessions based on the intervention goals (i.e., maintaining 5 FV a day, drinking more water). The main feature of the treatment website was an on-screen comic format with 6 characters that

represented 8 year old African American girls and reflected making lifestyle changes specific to diet and physical activity. The weekly treatment website for the parent also included an on-screen comic with a parent character that provided an overview of the child's session. Parents were directed to select a method to help their daughters make a lifestyle change each week.[46]

Similar to the Michigan GEMS study, BMI was not the primary outcome measure for this study since there was a small sample size. The study was evaluated based on the intervention process measures and trends in the main measurements, including BMI, diet, physical activity, and psychosocial measures. Data were collected at baseline and following the 12-week intervention (4-week camp and 8-week Internet program). The girls' dietary intake was measured by 24-hour dietary recalls (1 during a clinic visit, 1 via a follow up phone call within 2 weeks). Weekly and monthly log on rates to the website were tracked for the Internet program.[46]

More than half of parents (54%) reported a household income that was greater than or equal to $40,000 per year.[43] A majority of parents reported highest household education level as college graduate or postgraduate. The average child BMI at baseline was 21.1 kg/m^2 for girls in the treatment and 26.3 kg/m^2 for girls in the control group.[46] Daily FV servings were consumed 1.2 times more by the treatment group than the comparison group at the end of the study. Log in rates to the website declined over the course of 8 weeks, and thus minimized the program's impact.[46] Compared to the other GEMS programs, the GEMS FFFP was unique in providing an Internet based intervention component in addition to a face-to-face component to help prevent obesity.

Food, Fun, and Fitness Internet Program

A pilot study, based on the GEMS FFFP study, with 8-10 year old African American girls tested whether an Internet-only based intervention could improve F, juice, and V consumption and physical activity.[48] The study design was a randomized, 2-group design with baseline and post intervention data collection. The groups differed on incentive schedule, immediate and delayed. The study included an 8-week Internet intervention, conducted from home, and promoted F, V, juice, and water intake and physical activity. The weekly program for the study consisted of role modeling comics, problem solving, and goal setting.

A total of 80 girls were enrolled in the program. FV consumption was measured using a 7-item food frequency questionnaire. Physical activity was measured with the GEMS activity questionnaire. There were statistically significant pre-to-post improvement behaviors exhibited in self-reported FV consumption ($p=0.002$), physical activity, and FV self-efficacy ($p =0.003$).[48] Girls reported a mean of 2.71 servings of FV at baseline and a mean of 3.72 servings of FV at post intervention.[48] For this study, there was greater change in FV intake and physical activity compared to the original FFFP GEMS pilot study. The use of an Internet-only approach and higher log on rates to the website contribute to this change.

Other online programs have the potential to promote healthy dietary behaviors in children. Squire's Quest II: Saving the Kingdom of Fivealot, a 10-episode online video game for fourth and fifth grade children, was developed to promote FV consumption.[49-51] Similarly an online program for 8-10 year old African American girls was developed to

promote healthy diet and physical activity behaviors.[52] It is important that interventions developed for a particular ethnic group be culturally sensitive and appropriate to enhance likelihood of success.[53] Developing characters that participants can identify with is also beneficial because it boosts personal relevance and increases the chance of participants paying attention to the program.[47]

Furthermore, it is important that interventions be easily accessible and available to families. To help reduce health disparities, accessibility to preventive programs must increase. African Americans are heavy users of the Internet. Pew Research Center found that 80% of African Americans use the Internet.[54] Internet usage is prevalent among children. For children 8-18 years old, 84% of homes had Internet access in 2009.[55] Thus, a culturally appropriate obesity prevention program delivered through the Internet would be ideal and enable healthy behaviors to be presented to African American girls in a familiar and convenient format.[49,50,56]

Recognizing that African American girls are at a greater risk for becoming obese than their non-Hispanic white peers,[1] obesity interventions are needed specifically for African American girls. *The Butterfly Girls Study and the Quest for Founder's Rock* (BFG) was an online obesity prevention program created for 8-10 year old African American girls and parents (Appendix A).[52] The purpose of this study was to analyze the baseline characteristics of girls and parents in the Butterfly Girls Study. In addition, hypotheses examined the differences in child FV intake and parent psychosocial variables by parent demographic characteristics as well as the relationships of child FV intake with child FV preferences and parent psychosocial variables.

NULL HYPOTHESES

The hypotheses included:

1) Child FV intake does not differ by: a) parent age, b) highest household education, c) household income, and d) parent marital status.
2) Parent FV home availability does not differ by: a) parent age, b) highest household education, c) household income, and d) parent marital status.
3) Parent FV home accessibility does not differ by: a) parent age, b) highest household education, c) household income, and d) parent marital status.
4) Family barriers to eating FV does not differ by: a) parent age, b) highest household education, c) household income, and d) parent marital status.
5) Child FV intake is not related to: a) child FV preferences, b) parent FV intake, c) parent FV home availability, d) parent FV home accessibility, and e) family barriers to eating FV.

CHAPTER III

METHODS

STUDY DESIGN

The study employed a 3-group design (treatment, comparison, wait-list control) with 3 periods of data collection including baseline, post 1 (immediately after completion of the intervention), and post 2 (3 months after post 1). The data analysis for this paper utilized only the baseline data.

PARTICIPANTS

Inclusionary criteria for the child included an African American girl, 8 to 10 years old, Internet access, a personal email address, and a parent or legal guardian willing to participate in data collection. Exclusionary criteria for the child included having mental, physical, or medical conditions that limited her ability to participate in data collection activities or taking medications that impact appetite, specific dietary behaviors, and physical activity. Inclusionary criteria for the parent included having a child participating in the program, willingness to participate in data collection, and having Internet access and a personal email address. Exclusionary criteria for the parent included physical restrictions that limited his or her ability to participate in data collection activities. A G power analysis (version 3.0.10) was conducted to determine the sample size. The primary outcome variable was body mass index (BMI). Thus, the final sample size was 324 participants, providing adequate power (≥80 %) to detect a small group by time

interaction effect (f=0.13) for BMI percentile. To account for a 20% attrition rate, 390 participants (child/parent pairs) were set for recruitment.[52]

INTERVENTION

The BFG study provided an online intervention program of 8 episodes delivered in an animated, interactive comic with a storyline (Appendix A). Community representatives, girls, and parents provided important feedback on the cultural relevance and developmental appropriateness of the program during development. [52] BFG promoted healthy eating and physical activity behaviors, specifically eating 5 servings of FV, drinking 5 glasses of water daily (40 fl oz), and 60 minutes of physical activity daily. [52] The characters in the program were 6 young African American girls, between 8-10 years old, with unique personalities and specific struggles related to consuming FV, drinking water, and being physically active (Appendix A). Participants were randomly assigned to a group after completion of baseline data collection (girl and parent online surveys, 2 child dietary recalls, child accelerometer wear for 7 days to assess physical activity).

Each of the 3 groups received the online intervention of the characters modeling common behavior change strategies and tools to increase FV intake, water intake, and physical activity. Each group varied according to the following:

Group 1 received the intervention with personal goal setting, reporting, and feedback components (treatment).

Group 2 received the intervention without personal goal setting, reporting, and feedback (comparison).

Group 3 received the intervention after completion of all 3 periods of data collection (wait-list control).

Participants were given 3 months to complete the online intervention. Girls were allowed to play 1 episode each week after they completed the previous episode. The duration of each episode was approximately 20 minutes. Girls participated in the study from a location of their choice (home, community) and were able to log on to view the episode at any time most convenient for them. Parents received an online newsletter that coincided with each episode the girls viewed. The research design is explained in more detail in the methods paper.[52]

PROCEDURES

Recruitment

Families were recruited in several ways including the volunteer database at the Children's Nutrition Research Center (CNRC), recruitment announcements on websites (i.e., CNRC, Baylor College of Medicine, and Texas Children's Hospital) and in newsletters, posting flyers in community locations, mailing flyers out to community members and organizations, and community events. The rolling recruitment method was utilized for the study. Recruitment began in November 2012 and ended in October 2014. A total of 342 girls plus 1 parent pair were enrolled. Written informed parental consent and child assent were received prior to participation in the study.

Baseline Data Collection

Self-report data. Self-report data were collected from both parent and child via online surveys (Table 1). The survey was completed over a secure, password protected

website. Parents and girls were emailed separate links and passwords to complete the online surveys. The measures for the surveys were collected from existing diet-related questionnaires with children and parents.

Table 1. Baseline Data Collection

Who	How	What
Girl	Phone	Dietary intake (2 recalls, NDSR 2012)
	Online	FV preferences
Parent	Online	FV intake brief screener
		FV home availability
		FV home accessibility
		Family barriers

1. *Child Self-Report survey (Appendix B).* The girls completed an online survey measuring the following child psychosocial characteristic (Appendix B): 37-item questionnaire reporting fruit, juice, and vegetable preferences [22] with a 3-item response format (0 = I do not like this one, 1 = I like this a little, and 2 = I like this a lot). Possible scores ranged from 0 to 74, with a higher score indicating greater preference. For the purpose of controlling potential bias in the self-report data, social desirability was also collected in a 9-item questionnaire [57,58] with the response options yes or no.
2. *Parent Self-Report survey (Appendix C).* Parents completed an online survey of demographic information which included age, highest level of education,

household income, household size, and marital status. Parents also completed self-report data measuring parent psychosocial characteristics:

a. *Parent FV Intake brief screener.* Parents identified how often (i.e., times per week, times per day) they ate or drank servings of fruits, juices, and vegetables in the past month on a 7-item questionnaire [59] with a 10-item response format (0 = never, 1 = 1-3 times/month, 2 = 1-2 times/week, 3 = 3-4 times/week, 4 = 5-6 times/week, 5 = 1 time/day, 6 = 2 times/day, 7 = 3 times/day, 8 = 4 times/day, 9 = 5 or more times/day). Possible scores ranged from 0 to 63, with higher scores indicating greater consumption.
b. *FV Home Availability.* Parents were asked to identify which of the 3 juices, 17 fruits, and 20 vegetables (40-item questionnaire in total) were available within the home environment in the last 2 weeks[15] with a 3-item response format (0 = no, 1 = not sure, 2 = yes). Possible scores ranged from 0 to 80, with higher scores representing greater availability.
c. *FV Home Accessibility.* Parents were asked to identify whether fruit, juices, and vegetables were at the front of the refrigerator and whether fruits and vegetables were visible on a surface in the home and cut up or ready to eat in a 6-item questionnaire [18,60] with a 3-item response format (0 = no, 1 = not sure, 2 = yes). Possible scores ranged from 0 to 12, with higher scores representing greater accessibility.
d. *Family Barriers to Eating FV.* Parents completed a 14-item questionnaire about barriers to buying, preparing, serving, and eating fruits and

vegetables in the home environment [17] with a 3-item response format (0 = disagree, 1 = agree a little, 2 = agree a lot). Possible scores ranged from 0 to 28, with higher scores indicating greater barriers.

Child Dietary Intake. Food and beverage intakes were measured from 2 unannounced 24 hour dietary recalls (1 weekday, 1 weekend) (Table 1). Recalls were conducted directly with the child over the phone, using the Nutrient Data System for Research (NDSR-2012, University of Minnesota) and food amounts booklets displaying 2-dimensional food and measurement models (Appendix D). The families were provided with a paper copy of the food amounts booklet for use in the dietary recalls. The girls were asked where they ate, what they were doing while eating, and who was present when they were eating. The dietary data collection team was blinded to participant group assignments in the online intervention program. For this thesis, baseline servings of FV were analyzed, using Cullen et al., methodology, from the 2 dietary recalls to determine the mean number of servings of FV consumed daily.[61] For the analyses in this study, the definition of FV intake included FV, but excluded 100% juice and high fat and fried V (HFV).[50] The analyses only examined FV because the intervention promoted increasing F and V intake, but not 100% juice and HFV.

After completion of all components of baseline data collection, both parent and child each received compensation in the amount of $40, and the child participants were randomized to 1 of the 3 groups for the online intervention program. Parents were randomized to the same condition as their daughter.

Statistical Analysis

Descriptive statistics were calculated for demographic, psychosocial, and dietary intake variables of the baseline data. Means and standard deviations were calculated for child FV intake and parent and child psychosocial variables. Frequencies and percentages were calculated for the demographic characteristics. Analysis of variance (ANOVA) was conducted to examine relationships in baseline parent demographic characteristics, child FV intake, and psychosocial variables (child and parent). Pearson correlation coefficients were calculated to examine the relationships between psychosocial variables (child and parent) and child FV intake. Statistical significance was set at $p < 0.05$. All statistical analysis was conducted using SAS (version 9.4, SAS Institute Inc., Cary, NC, 2010-12).

CHAPTER IV

RESULTS

DEMOGRAPHICS

The majority of the parents were African American (92%), female (99%), less than 40 years old (60%), and married (62%). Highest level of household education was fairly equally distributed, with 35% having less than a college education, 34% having a college degree, and 31% having a post graduate education. The majority of families (57%) had a household income greater than $42,000 (Table 2). All girls recruited for the study met the inclusionary criteria for an African American girl, 8-10 years of age.

Table 2. Descriptive statistics of parent characteristics (n=342)

	n	**Percentage**
Race/Ethnicity		
African American	315	92
Non-African American	27	8
Gender		
Male	4	1
Female	338	99
Age (yr)		
≤ 39 yr	204	60
≥ 40 to 59 yr	138	40
Parent marital status		
Non-Married	130	38
Married	212	62
Highest household education		
Less college	119	35
College Graduate	116	34
Post Graduate study	107	31
Household income		
< $42,000 US	147	43
>$42,000 US	195	57

BASELINE CHARACTERISTICS

Dietary intake of the girls and assessed girl and parent psychosocial characteristics are presented in Table 3. Mean daily child FV intake was 1.89 servings. FV servings were comprised of a mean of 0.74 ± 0.95 servings of F and 1.15 ± 0.85 servings of V. Internal consistencies for the child FV preference ($\alpha = 0.86$) and parent FV home availability questionnaires ($\alpha = 0.80$) were high (Table 3). Cronbach's alpha above 0.70 indicates a highly reliable or internally consistent measure.

Table 3. Baseline Measures of the Girls and their Parent (n=342)

	M ± SD	**Min-Max**	**Cronbach a**
FV Intake (servings/day)	1.89 ± 1.31	0, 9.50	--
Fruit (servings/day)	0.74 ± 0.95	0, 9.50	
Vegetable (servings/day)	1.15 ± 0.85	0,4.30	
Child FV Preference	47.28 ± 11.27	12, 73	0.86
Parent FV Intake	3.83 ± 2.29	0.13, 11	0.60
Parent FV Home Availability	45.37 ± 12.05	12, 78	0.80
Parent FV Home Accessibility	8.52 ± 2.78	0, 12	0.57
Parent Family Barriers to Eating FV	6.10 ± 3.00	0, 17	0.61

PARENT DEMOGRAPHIC CHARACTERISTICS, PARENT PSYCHOSOCIAL VARIABLES, AND CHILD FV INTAKE

Significant differences in child FV intake were found for highest household education and household income (Table 4). Girls living in households with one parent having a post graduate education had higher FV intakes than girls living in households with or without a college degree (p=0.001). Girls living in households with annual household incomes above $42,000 had higher FV intakes than those living in households with incomes $42,000 or less each year (p=0.004).

Significant differences in FV home availability were found for parent age and marital status (Table 4). FV home availability was higher in households with parents 40 to 59 years old compared to younger parents (p=0.007). FV home availability was also higher in homes where parents were married compared to those who reported not being married (p=0.033).

No differences were reported in child FV intake by parent age or marital status. In addition, no differences were found in FV home availability by highest household education or household income. Also, no differences were found in FV home accessibility or family barriers to eating FV by parent age, highest household education, household income, or marital status.

Table 4. Differences in Child FV Intake, FV Home Availability, FV Home Accessibility, & Family Barriers by Parent Characteristics

	Child FV intake[c]		FV Home Availability[d]		FV Home Accessibility[e]		Family Barriers to Eating FV[f]	
	Mean ± SE	**p-value**	**Mean ± SE**	**p-value**	**Mean ± SE**	**p-value**	**Mean ± SE**	**p-value**
Age (yr)		0.051		0.007		0.137		0.176
≤39 yr	3.63 ± 0.16		43.93 ± 0.84		8.33 ± 0.19		5.92 ± 0.21	
≥40 to 59 yr	4.12 ± 0.19		47.50 ± 1.02		8.79 ± 0.24		6.37 ± 0.26	
Education level*		0.001		0.840		0.564		0.131
Less college	3.47 ± 0.21[a]		45.74 ± 1.11		8.31 ± 0.26		5.94 ± 0.27	
College Graduate	3.56 ± 0.21[a]		44.84 ± 1.12		8.56 ± 0.26		6.55 ± 0.28	
Post Graduate study	4.53 ± 0.22[b]		45.53 ± 1.17		8.70 ± 0.27		5.79 ± 0.29	
Income		0.004		0.641		0.998		0.344
< $42,000 US	3.42 ± 0.19		45.02 ± 1.00		8.52 ± 0.23		5.93 ± 0.25	
> $42,000 US	4.14 ± 0.16		45.64 ± 0.86		8.52 ± 0.20		6.24 ± 0.22	
Marriage		0.104		0.033		0.771		0.122
Non-Married	3.57 ± 0.20		43.60 ± 1.05		8.46 ± 0.24		6.42 ± 0.26	
Married	3.99 ± 0.16		46.46 ± 0.82		8.55 ± 0.19		5.91 ± 0.21	

[*]The asterisk indicates means with different superscript (a or b) between education levels differ significantly with Tukey-Kramer adjustment.
[c]Child FV intake = servings per day
[d]FV Home Availability = 0 to 80; greater availability with higher scores
[e]FV Home Accessibility = 0 to 12; greater accessibility with higher scores
[f]Family barriers to Eating FV = 0 to 28; greater barriers with higher scores

For hypothesis 1, child FV intake did not differ by: a) parent age or d) parent marital status. Therefore, the null sub-hypotheses were accepted for parent age and marital status. Child FV intake differed by b) highest household education and c) household income. Therefore, the null sub- hypotheses were rejected for highest household education and household income.

For hypothesis 2, parent FV home availability did not differ by b) highest household education and c) household income. Therefore, the null sub-hypotheses were accepted for highest household education and household income. Parent home FV availability differed by a) parent age and d) parent marital status. Therefore, the null sub-hypotheses were rejected.

For hypothesis 3, parent FV home accessibility did not differ by: a) parent age, b) highest household education, c) household income, and d) parent marital status. Therefore, the null sub-hypotheses were accepted.

For hypothesis 4, family barriers to eating FV did not differ by: a) parent age, b) highest household education, c) household income, and d) parent marital status. Therefore, the null sub-hypotheses were accepted.

RELATIONSHIPS BETWEEN CHILD FV CONSUMPTION AND PSYCHOSOCIAL VARIABLES

Child FV intake was positively related to child FV preferences ($p<0.001$), home availability ($p=0.022$), and home accessibility ($p=0.002$), but child FV intake was negatively related to barriers to FV consumption ($p=0.000$) (Table 5).

Table 5. Correlations of girls' FV intake with girls' FV preferences and parent psychosocial variables

	Corr	p-value
Child FV Preference	0.24	<.0001
Parent FV intake	0.09	0.112
Parent Home Availability FV	0.12	0.022
Parent Home Accessibility FV	0.17	0.002
Parent Family Barriers to Eating FV	-0.20	0.000

Abbreviation: Corr = Pearson correlation

For hypothesis 5, child FV intake is not related to b) parent FV intake. The null sub-hypothesis was accepted. Child FV intake was related to: a) child FV preferences, c) parent FV home availability, d) parent FV home accessibility, and e) family barriers to eating FV. Therefore, the null sub-hypotheses were rejected for child FV preferences, parent FV home availability and accessibility, and family barriers to eating FV.

CHAPTER V

DISCUSSION

The purpose of this study was to analyze the baseline characteristics of girls and their parents participating in an online obesity prevention program created for 8-10 year old African American girls and parents. The online program delivered positive messages about healthy dietary and physical activity behaviors and targeted 8-10 year old African American girls and their parents. This study examined differences in child FV intake and parent psychosocial variables by parent demographic characteristics. It also examined the relationships between child FV intake with child FV preferences and parent psychosocial variables. Several differences and relationships were found.

The data showed significant differences in child FV intake for varying levels of household education, which is consistent with previous studies. In a study conducted with European schoolchildren, children living in households with higher levels of education reported higher consumption of low-fat and low-sugar foods, including F and V, compared to children living in households with medium and low levels of education.[36] Among Canadian adolescents, the frequency of FV intake increased as level of household education increased.[37] Furthermore, for 9 and 10 year old girls in the NHLBI Growth and Health Study, higher education was related to increased diet quality, including lower dietary fat and higher levels of vitamin C, calcium, and potassium.[38]

Consistent with the literature, children living in higher income households reported eating more FV. For toddler and pre-school aged children in Malaysia, F intake was significantly different by income levels.[40] Mean F intake was lower for children from lower income households and higher for children from higher income households.[40] The frequency of FV intake among Canadian adolescents increased as household income increased.[37] F intake differed significantly for Norwegian children by SES group.[41] F intake was higher for the high SES group compared to the medium and low SES group. Crawford et al. found that higher income was related to higher intakes of vitamin C and lower intake of dietary fat in 9 and 10 year old girls in the United States.[38]

New findings from this study regarding FV availability were that home FV availability was higher in households with older parents and in two-parent households. Perhaps older parents have more knowledge and experience (i.e., purchasing FV) and more FV available in the home than younger parents. The second new finding suggests that single parents may have limited time and resources for planning, shopping, and preparation in order to have FV available in the home compared to two-parent households.

The significant relationship between child FV consumption and FV preferences is supported by previous findings. Domel et al. found that FV preferences were consistently related to FV consumption in fourth and fifth grade children.[21,22] Similarly, Gross et al. found that students who reported higher FV preferences had higher daily average FV consumption.[62] In a study conducted with 11 year old European children, FV preferences were significantly correlated with FV intake.[63] Furthermore, in the Project EAT (Eating

Among Teens) study with adolescents, FV preferences were significantly correlated with FV intake.[64] Taken together, these studies suggested that child FV preferences positively influenced FV consumption.

There was no significant relationship between child FV intake and parent FV intake. However, the measures for child FV intake (24 hour dietary recalls) and parent FV intake (a brief screener) were different. The parent screener may not be sensitive enough to detect differences in daily FV consumption.

FV home availability and home accessibility were positively related to the girls' FV consumption. Previous studies support this relationship as well. Hearn et al. found that home availability and accessibility were related to child FV consumption.[18] Cullen et al. found that parent FV home availability was correlated with FV consumption in fourth to sixth grade children.[16] Furthermore, another study conducted with fourth to sixth grade children found that parent FV accessibility was correlated with FV consumption.[65] These findings suggest that FV home availability and home accessibility are key factors in improving child FV consumption.

Family barriers to eating FV were negatively related to the girls' FV consumption. This finding is supported by previous research. In a study with fourth to sixth grade students and their parents, family barriers to eating FV were negatively related with child FV intake.[17] Perceived barriers to healthy eating were also negatively correlated with FV consumption in high school students.[66]

The average F intake for the girls participating at baseline did not meet total daily F recommendations of 1-1.5 cups for girls ages 4 to 8, and 1.5 cups for girls ages 9-13.[67]

The average V intake did not meet total daily V recommendations of 1.5 cups for girls4 to 8, and 2 cups for girls-ages 9-13.[68] This supports the idea that factors influencing FV consumption in children must be explored specifically for African American girls.

Strengths of the study include a large sample size, a range of parental education and household income levels, and a strong measure of child FV intake by excluding 100% juice and HFV. Limitations include conducting the study in one geographic location, which could potentially limit generalizability; the age of the girls, which may have impacted the accuracy of the dietary recalls; and self-report data from the parents and girls have potential memory and recording errors. Despite these limitations, the findings provide important information on the relationships between psychosocial variables related to the home food environment and parental characteristics that influence the FV intake of 8-10 year old African American girls.

CHAPTER VI

CONCLUSION

In conclusion, this study with 8-10 year old African American girls highlighted significant findings between child FV consumption and parent psychosocial variables and demographic characteristics. Future research should explore the relationships between FV consumption and parental demographic characteristics, including household income and highest level of education. This would help provide important insights for developing future interventions to increase FV consumption based on different household income levels and education levels in African American families. In addition, future research should also examine how age and marital status influence FV home availability in order to tailor interventions to the needs and expectations of younger parents and single parent households.

Future research should also investigate the relationships between FV consumption and parental psychosocial variables, including FV home availability and accessibility. Findings would identify ways to help African American families make FV more available and accessible to African American children at home. Obesity prevention programs for African American girls and their families should consider how child FV consumption may differ based on parent education, household income, child FV preferences, and parental psychosocial characteristics. Interventions may need to be tailored to address the

specific needs of African American families in order to successfully promote increased FV consumption in the home environment.

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APPENDIX A

The Butterfly Girls and the Quest for Founder's Rock

The Butterfly Girls and the Quest for Founder's Rock

Storyline: Girls at MacGuffin Middle School are teased at camp by boys as they take pictures of butterflies, and the boys called the girls "butterflies" as a result.[29] Upon return to school, the girls find out that the boys have entered a citywide competition to find Founder's Rock, which is where the town of MacGuffin Springs was first settled. The girls decide to enter the competition and form The Butterfly Club. The teams have to go around the city to search for clues, and the first team to find Founder's Rock wins. The boys think the girls don't have what it takes to keep up with them, but the girls discover that eating FV, being physically active, and drinking water gives them the endurance to find the clues to win. The girls win the competition and share their strategy with the boys.

Characters (from left to right):

1. Jasmine is a star soccer player, and she is athletic and confident.
2. Breanna is a cheerleader, and she is the leader of the The Butterfly Girls Club.
3. Serena has an absent minded and friendly personality. She loves to laugh and have a good time.
4. Whitney asks the most questions out of the group. She is also a fashionista.
5. Loren is musical, fun loving, and goofy. She loves oranges soda.
6. Maya is brainy and logical, but shy. She is great with computers and this skill is helpful in the quest to find Founder's Rock.

APPENDIX B

BFG Child Self-Report Survey

BFG Child Self-Report Survey

FV PREFERENCES

Please click on the answer that shows how much you like each of the following foods. [response options = I do not like this; I like this a little; I like this a lot]

1. 100% orange juice
2. 100% apple juice
3. 100% grape juice
4. bananas
5. apples
6. cantaloupe
7. grapes
8. oranges
9. pears
10. plums
11. kiwi
12. strawberries
13. pineapple
14. grapefruit
15. fruit salad or fruit cocktail
16. applesauce
17. watermelon
18. raisins
19. peaches
20. carrots
21. celery
22. greens (spinach, collards, turnips, kale)
23. spinach
24. French fried potatoes
25. potato salad
26. other white potatoes
27. corn
38. green peas
29. tomatoes
30. broccoli
31. lettuce
32. green beans
33. cole slaw
34. cooked beans (pinto, black eyed peas, pork ‘n beans)
35. Sweet potatoes
36. Cabbage
37. Okra

APPENDIX C

BFG Parent Self-Report Survey

BFG Parent Self-Report Survey

PARENT FRUIT AND VEGETABLE CONSUMPTION
In the past month, about how often did you drink (or eat):
[Response categories are: never, 1-3 times/month; 1-2 times/week; 3-4 times/week; 5-6 times/week; 1 time/day; 2 times/day; 3 times/day; 4 times/day; and 5 or more times/day]

1. 100% orange juice or grapefruit juice?

2. … other 100% fruit juices, NOT COUNTING fruit drinks?

3. … green salad (with or without other vegetables)?

4. … French fries or fried potatoes?

5. … baked, boiled, or mashed potatoes?

6. In the past month, about how many servings of vegetables did you eat, NOT COUNTING potatoes and salad?

7. In the past month, about how many servings of fruit did you eat, NOT COUNTING juices?

FRUIT VEGETABLE HOME AVAILABILITY
In the last **2 weeks** have you had these 100% fruit juices or fruit in your home…
[response options = yes; no; not sure]

1. 100% orange juice
2. 100% apple juice
3. other 100% juices
4. bananas
5. apples
6. cantaloupe or musk melon
7. grapes
8. oranges
9. pears
10. plums
11. kiwi
12. strawberries
13. pineapple
14. grapefruit
15. fruit cocktail

16. applesauce
17. watermelon
18. raisins
19. dried fruit
20. peaches

In the last **2 weeks** have you had these vegetables in your home ….
[response options = yes; no; not sure]

1. carrots
2. Celery
3. greens, (like collards, mustard greens, or spinach)
4. French fries
5. potato salad
6. other white potatoes
7. corn
8. green peas (English peas)
9. tomatoes
10. broccoli
11. lettuce
12. green beans
13. cucumbers
14. jalapeños
15. salsa, pico de gallo
16. bell peppers (green, yellow, orange, red)
17. Cooked beans (like pinto, black-eyed peas, red beans, pork & beans)
18. sweet potatoes
19. cabbage
20. okra

FRUIT VEGETABLE HOME ACCESSIBILITY
In the last **2 weeks** did you have ….
[response options = yes; no; not sure]

1….fresh fruit visible on the kitchen counter, table or somewhere else in your home?
2….raisins, or other dried fruit visible on the kitchen counter, table or somewhere else in your home?

3….100% fruit juice at the front of the refrigerator shelf?
4….cut-up or ready-to-eat fresh vegetables at the front of the refrigerator shelf?

5….cut-up or ready-to-eat fresh fruit at the front of the refrigerator shelf?

6….100% fruit juices available for your child to drink?

FAMILY BARRIERS TO EATING FRUIT VEGETABLES

Please click the answer that best describes your family.

[response options = disagree; agree a little; agree a lot]

1. My family wastes too much food when I serve fruit and vegetables.
2. Nothing I do seems to get my children to eat more vegetables.
3. If I were to add more vegetables to my usual dishes, no one in my family would eat them.
4. Nothing I do seems to get my children to eat more fruit.
5. No one eats vegetables in my home.
6. I don't have time to make vegetables dishes.
7. If I were to serve fruit for desserts, no one in my family would eat them.
8. None of the dishes my family likes include fruit or vegetables.
9. Some fresh fruit and vegetables do not look appealing in the store.
10. Fresh fruit and vegetables spoil too quickly.
11. Fresh fruit and vegetables cost too much.
12. Canned vegetables are not as healthy as fresh or frozen vegetables
13. Canned vegetables do not taste as good as fresh or frozen vegetables
14. Frozen vegetables are not right for my family

DEMOGRAPHIC QUESTIONS

Please tell us something about yourself and your family.

1. How many children under the age of 18 live in your home?
   0 1 2 3 4 5 greater than 5
2. Not including yourself, how many adults live in your home?
   0 1 2 3 4 5 greater than 5
3. Who usually does the food shopping in your home?
   Me Another adult Child living in home Shared responsibility
4. Who usually does the food preparation in your home?
   Me Another adult Child living in home Shared responsibility
5. On average, how often do you or someone else go food shopping for your home?
   More than once a week
   Once a week
   Twice a month
   Monthly
   Less than monthly
6. On average, how many evening meals does your family eat together at home Monday through Friday?
   0 1 2 3 4 5
7. On average, how many meals does your family eat together at home on Saturday?
   0 1 2 3
8. On average, how many meals does your family eat together at home on Sunday?

0 1 2 3

9. On average, how many days a week does the child participating in this study eat at restaurants, like fast food restaurants, buffets, or other restaurants?

0 1 2 3 4 5 6 7

10. What is the highest level of education in your household?

≤6th grade
≤8th grade
Some high school
High school graduate or GED
Technical school
Some college
College graduate
Post graduate study

11. What is your average annual household income?

Less than $21,000 $21,000 - $41,000 $42,000 - $61,000 greater than $61,000

12. Does your child receive:

Receive free lunch at school
Receive reduced price lunch at school
Pay full price for lunch at school
None of the above

13. How does your daughter usually get to school? (Carpool means that other children rode in the car with your daughter, including friends, neighbors, or brothers/sisters).

Rode school bus
Carpool
Car
Metro Bus
Walked with an adult
Walked without an adult
Biked

14. What is your age?

Less than 20 20-29 30-39 40-49 50-59 greater than or equal to 60

15. What is your gender?

Male Female

16. What is your marital status?

Married/living with significant other
Single, never married
Divorced, separated, or widowed
Other (please explain):_____

17. Do you consider yourself Hispanic or Latino?

Yes No

18. Which race or races would you consider yourself (check all that apply)?

American Indian or Alaskan Native
Asian/Non Vietnamese
Black or African American
Native Hawaiian or Pacific Islander
Vietnamese
White
Other (please explain):_____

19. Do you consider the child participating in this program to be Hispanic or Latino?

Yes No

20. Which race or races would you consider the child participating in this program to be?

American Indian or Alaskan Native
Asian/Non Vietnamese
Black or African American
Native Hawaiian or Pacific Islander
Vietnamese
White
Other (please explain):_____

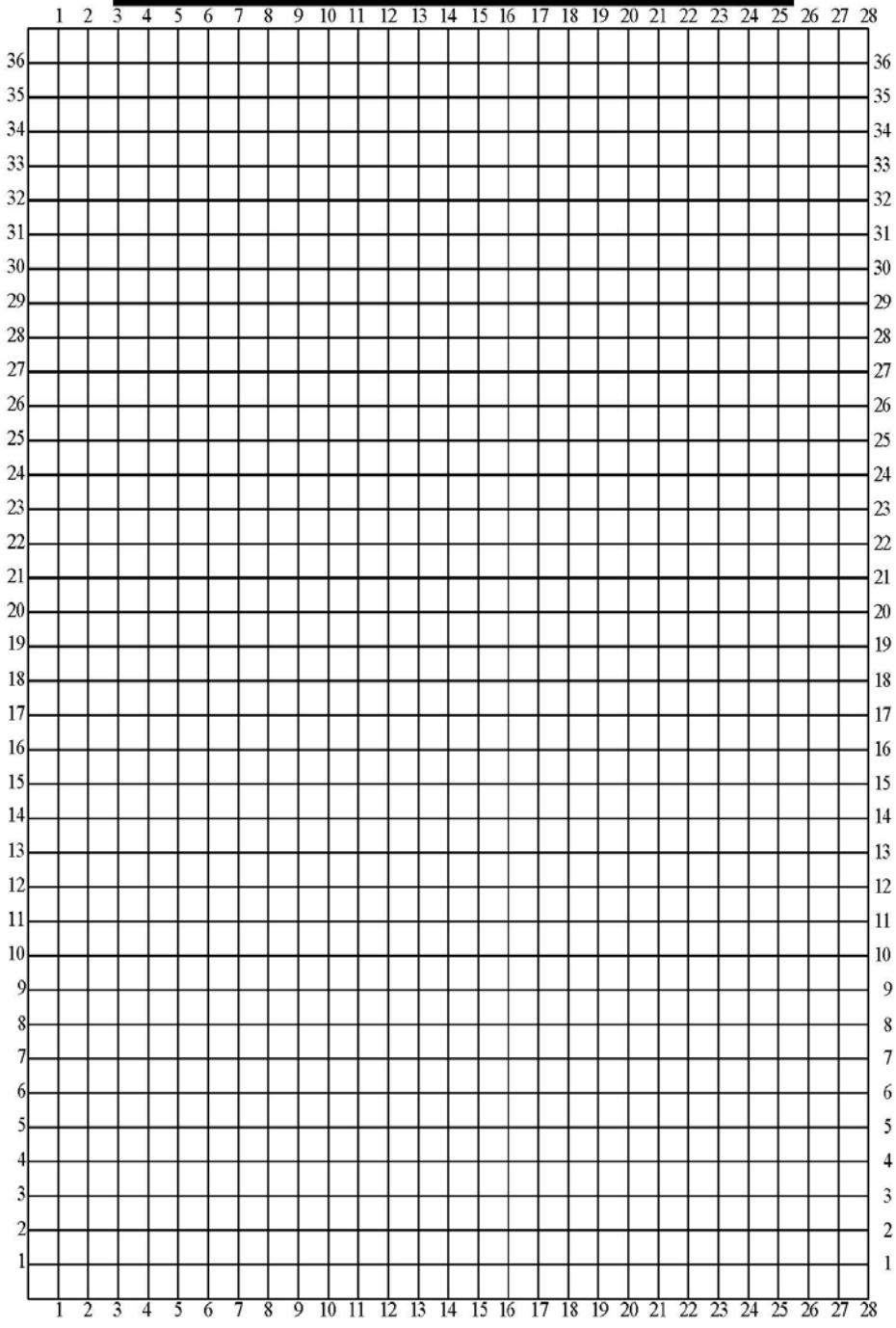
APPENDIX D

Food Amounts Booklet

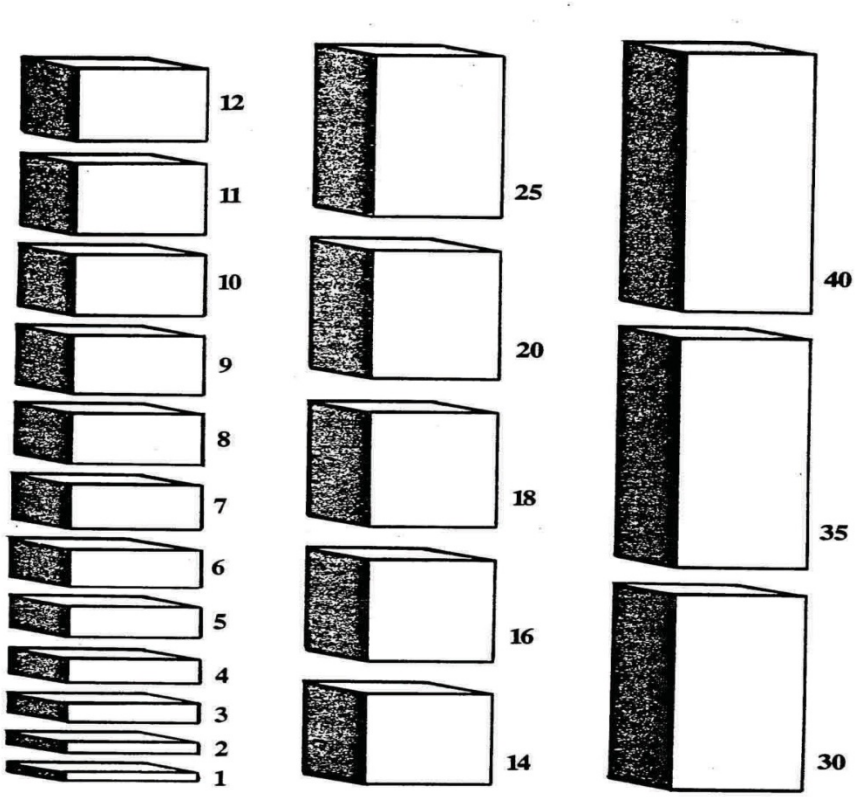
Food Amounts Booklet

Please have this with you when we call you to talk about what you eat and drink.

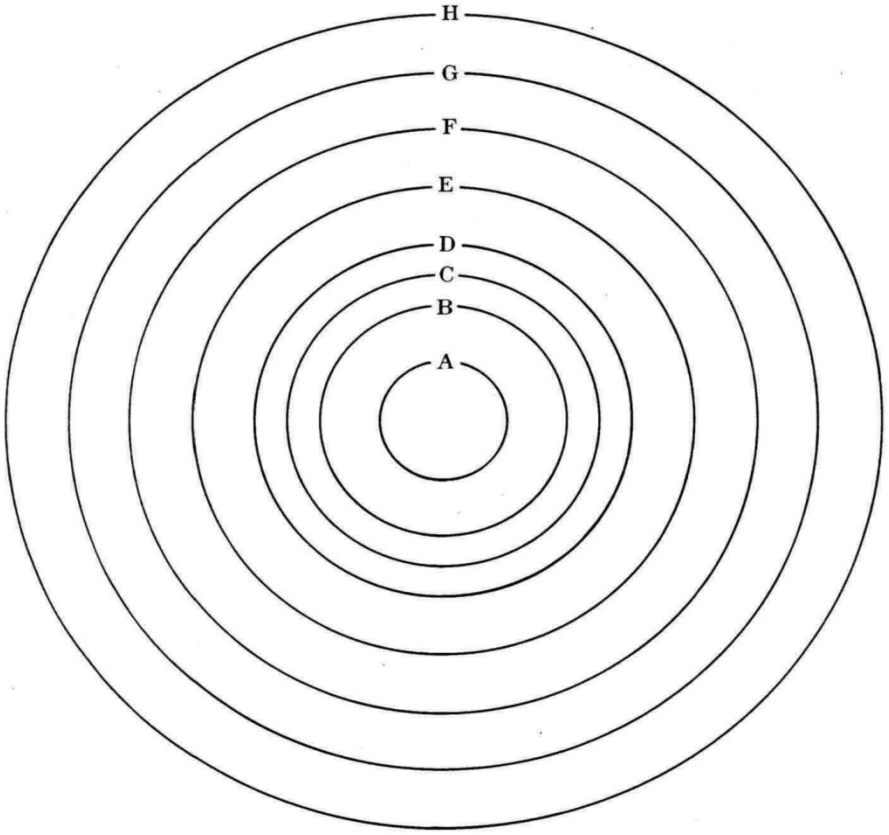
Squares and Rectangles



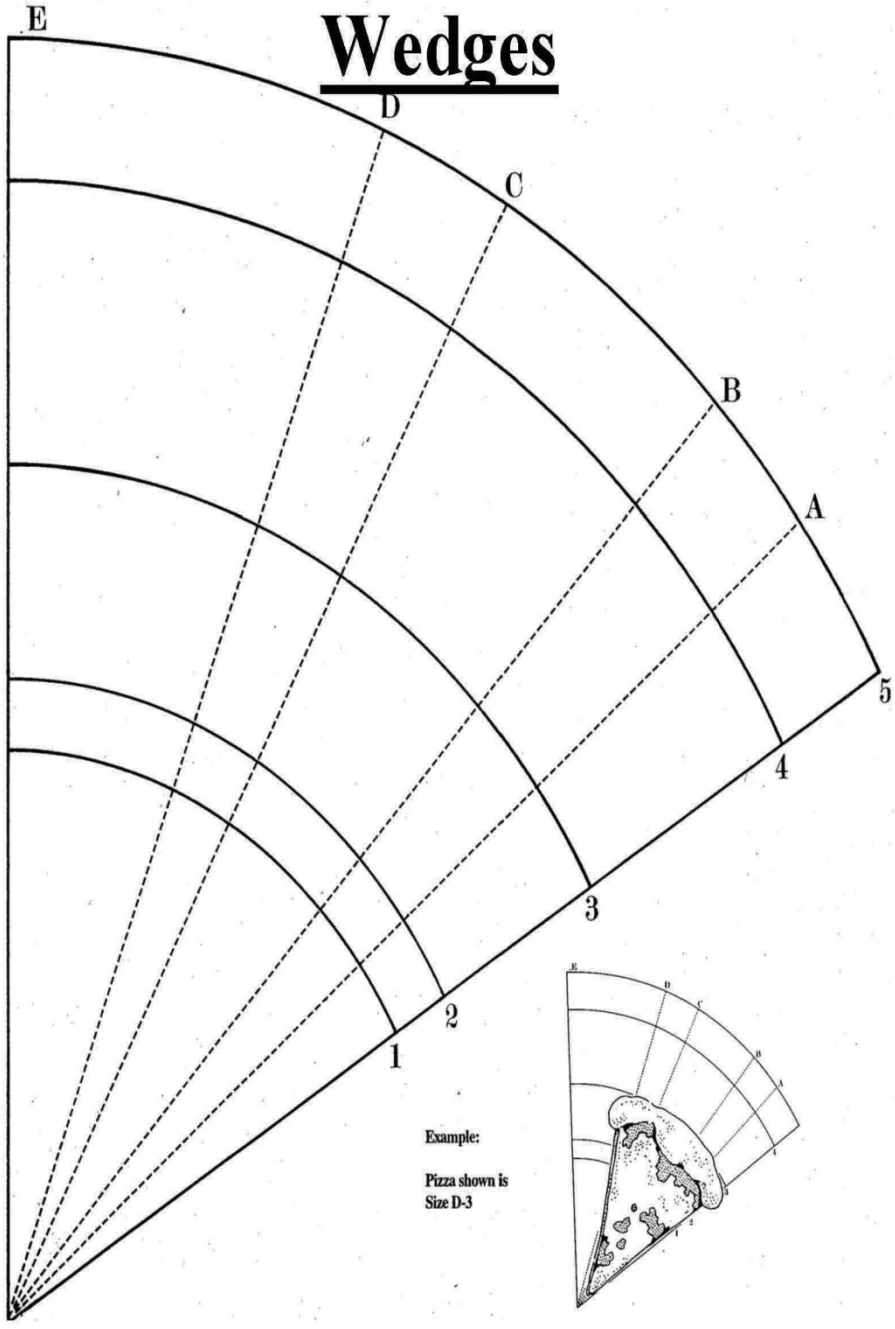
Thickness



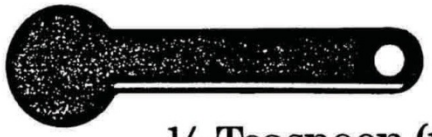
Circles



Wedges

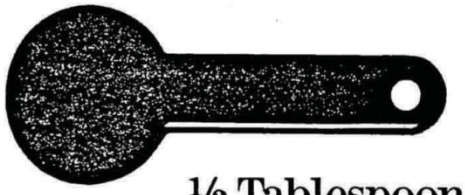


Measuring Spoons

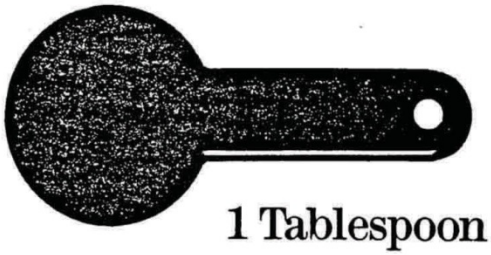


½ Teaspoon (tsp)

1 Teaspoon (tsp)

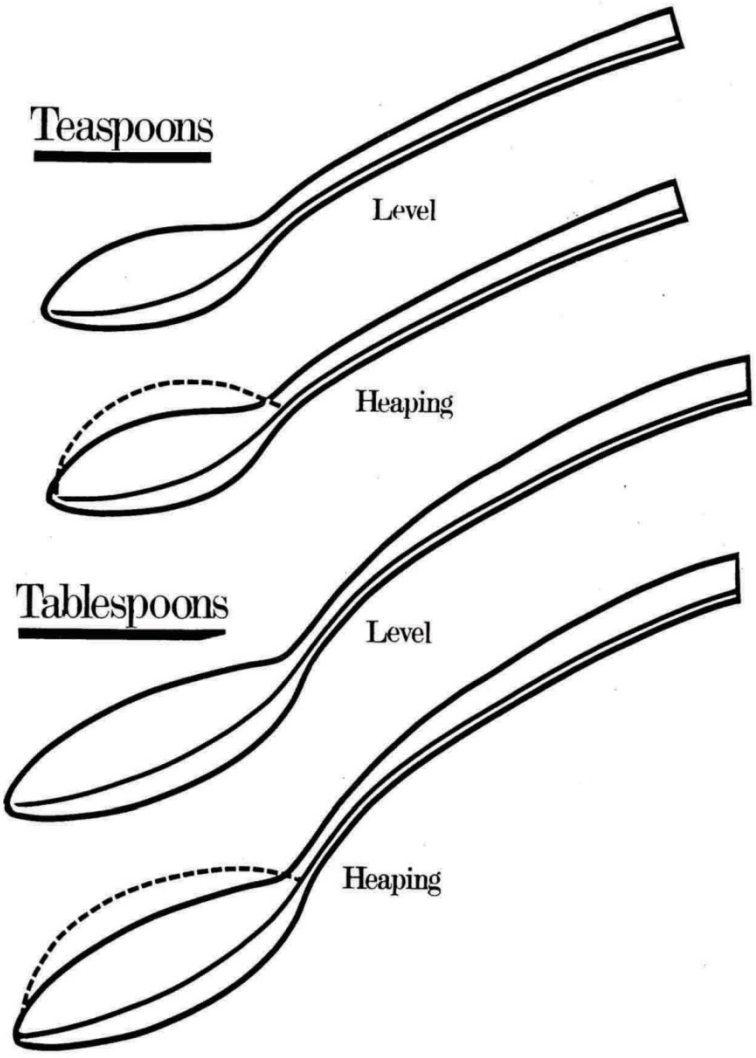


½ Tablespoon (Tbsp)



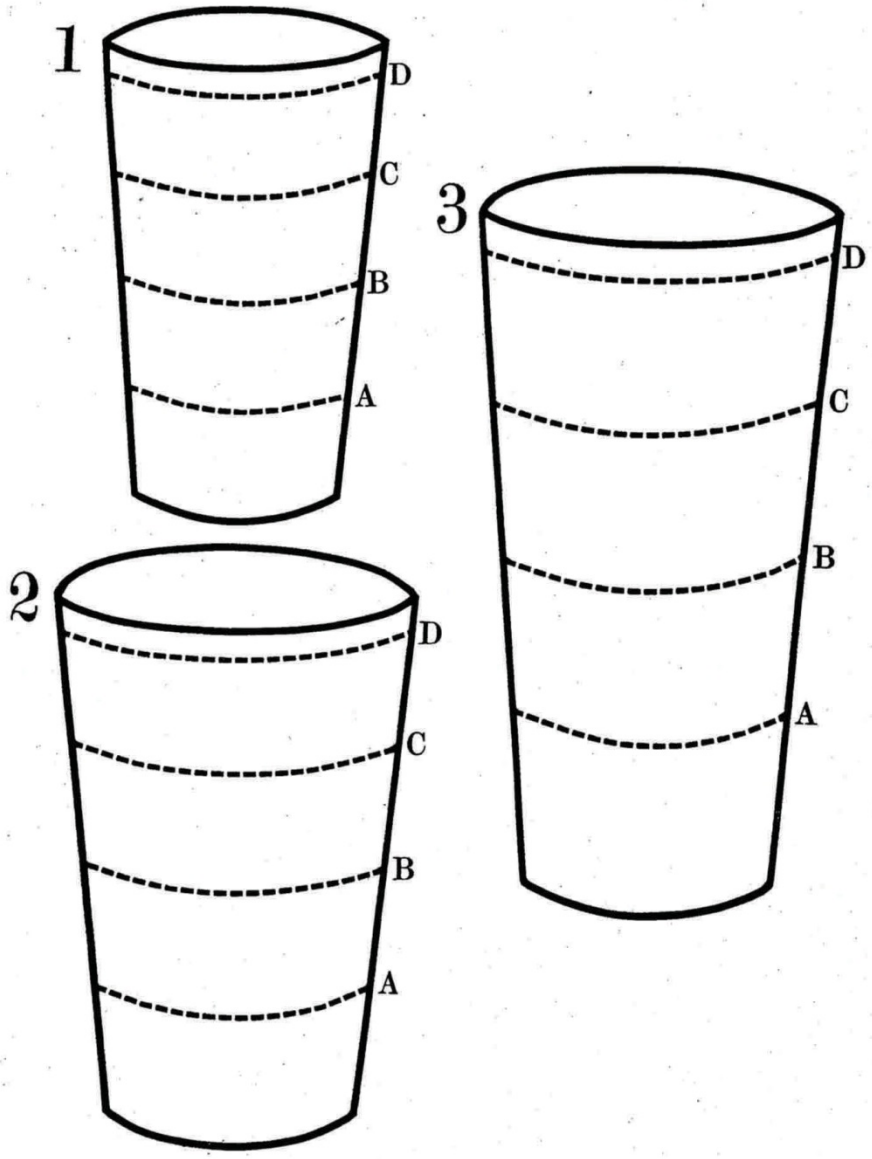
1 Tablespoon (Tbsp)

Eating and Serving Spoons

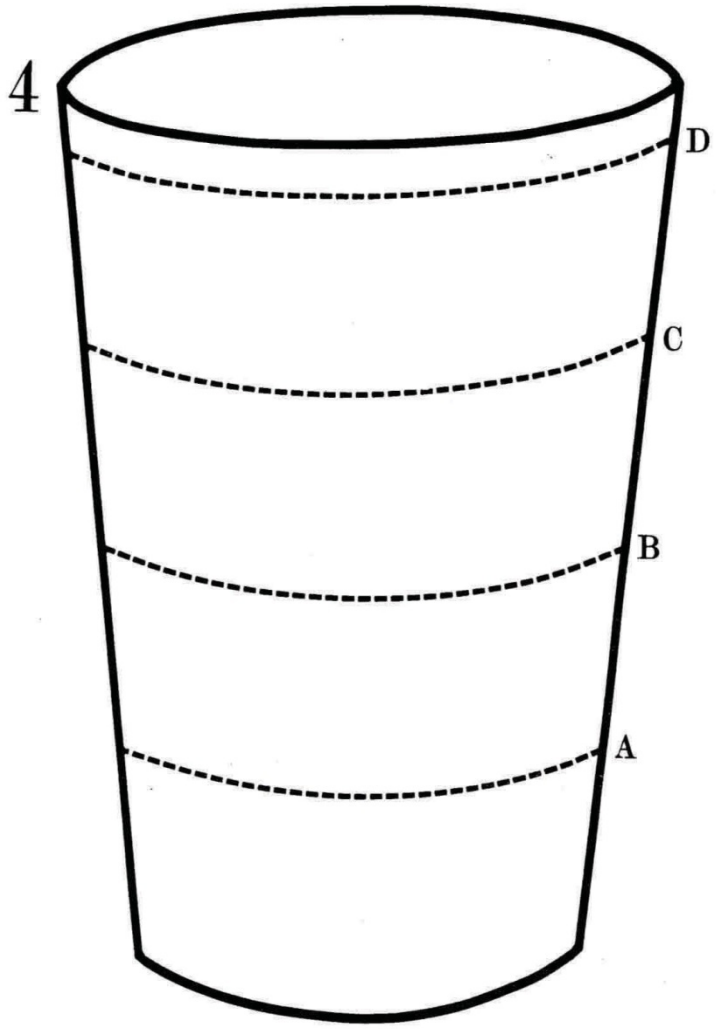


Measuring Cups

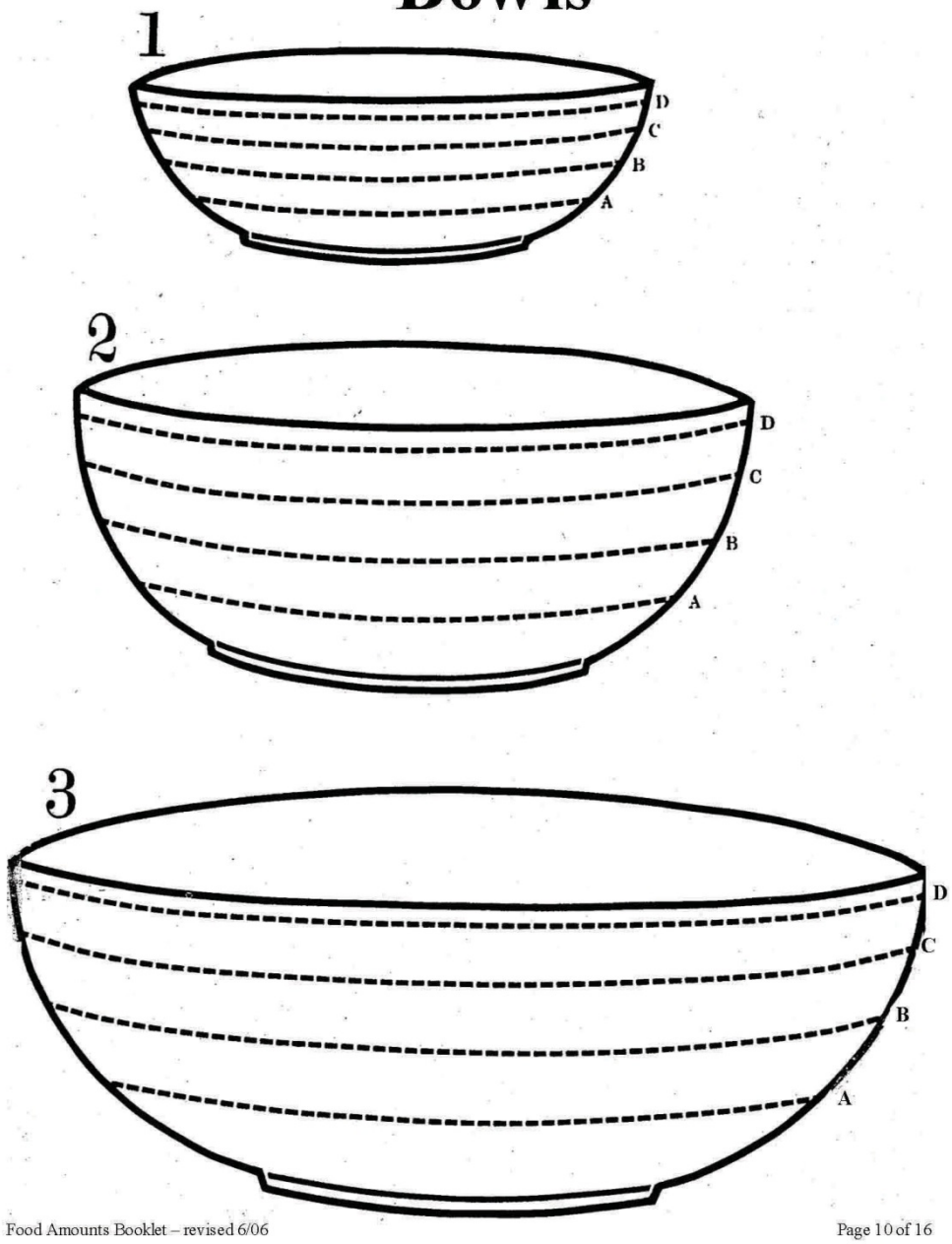
Glasses

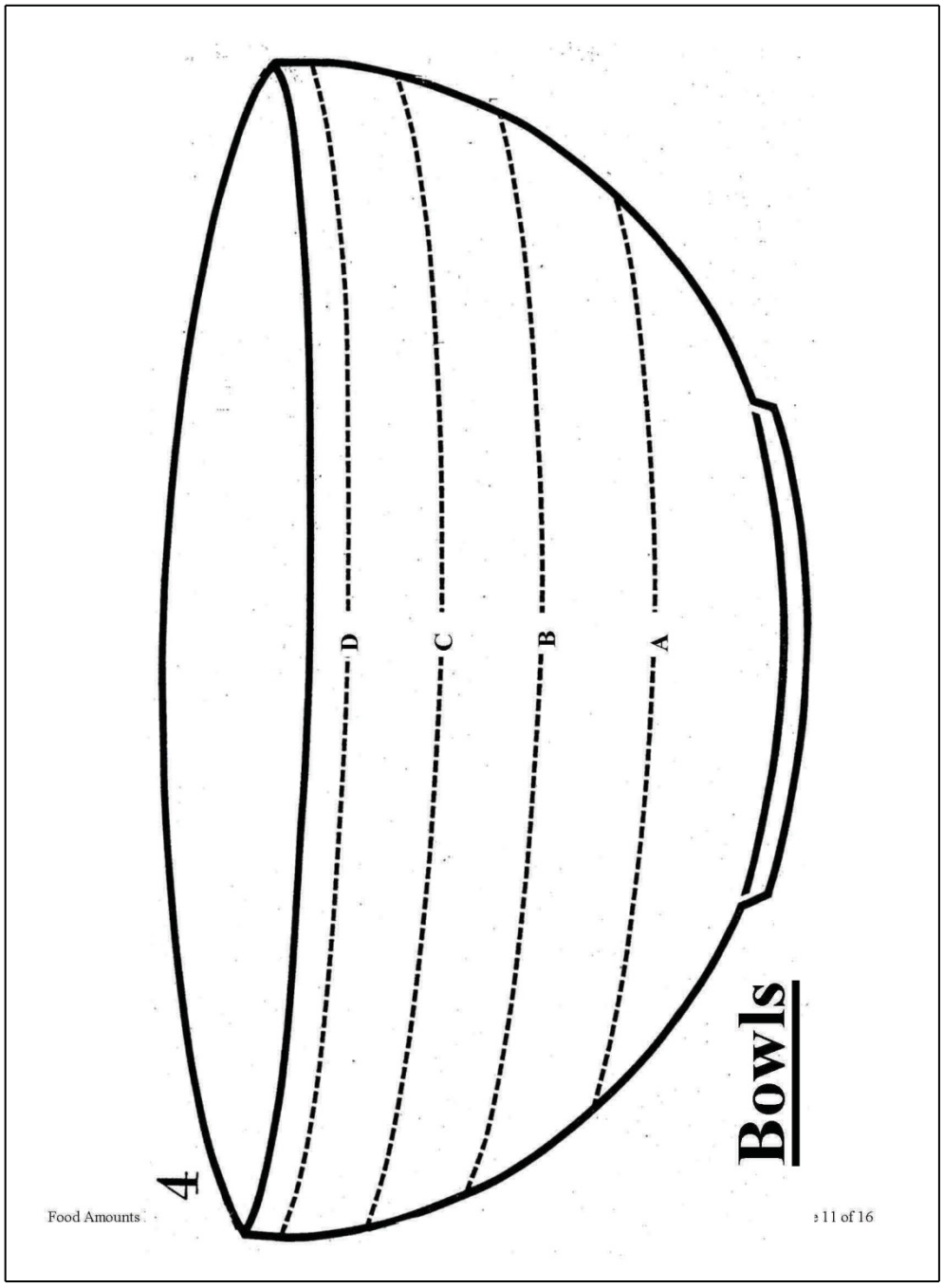


Glasses



Bowls




Bowls
A
B
C
D
4
Food Amounts
11 of 16

Mounds

1

2

Mounds

3

4

5