TEXT2COPE Program for Parents of Overweight or Obese Preschool-Aged Children

by

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ABSTRACT

Children are five times more likely to be overweight at the age of 12 years if they are overweight during the preschool period, and 60% of overweight preschoolers are overweight at the age of 12 years (Matusik & Malecka-Tendera, 2011). Primary care interventions are urgently needed to improve healthy lifestyle behaviors in families. Parental influence plays an important factor in the development of healthy behaviors in children. Cognitive behavioral interventions have demonstrated preliminary success in promoting healthy lifestyle behaviors in both adults and children. Mobile technology used to supplement interventions aimed at behavior change offers an outlet to bridge gaps in health disparities and generate innovative evidence. Therefore, the purpose of this research was to establish the feasibility, acceptability, and preliminary effects of a cognitive-behavioral intervention (TEXT2COPE) synergized with mobile technology on the healthy lifestyle behaviors of parents of overweight and obese preschoolers. Primary aims of the proposed pilot study were to (a) examine the feasibility and acceptability of the TEXT2COPE program among parents of overweight or obese preschoolers with mobile phones; (b) evaluate the preliminary effects of the TEXT2COPE program on healthy lifestyle behaviors in families with overweight or obese preschoolers; and (c) evaluate the relationship among the study variables (i.e., cognitive beliefs, perceived difficulty, and healthy lifestyle behaviors). Findings indicate that this program is feasible and acceptable in this population. The intervention improved healthy lifestyle beliefs and behaviors in parents. Further supported are the interconnected relationships between parental beliefs, thoughts, and behaviors.

DEDICATION

To my mentors, family, and friends who have blessed my life,

you have provided me with more love and support than ever imaginable.

Everything I have is because of you.

Thank you.

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CHAPTER 1. INTRODUCTION

The debilitating health of Americans with its associated costs is problematic. American society has become obesogenic, characterized by environments that promote increased food intake, non-healthful foods, and physical inactivity (Sherry, Blanck, Galuska, Pan, & Dietz, 2010). Data from the 2012 Centers for Disease Control and Prevention's (CDC's) Behavioral Risk Factor Surveillance System (BRFSS) indicate continued increases in self-reported obesity with no states reporting less than 20% prevalence rates of obesity and 39 states reporting prevalence rates greater than 25% (CDC, 2012). Nearly 21% (~$190.2 billion) of annual medical spending in the United States is due to obesity-related illnesses (National League of Cities, 2012.).

The CDC defines *overweight* in children as having a body mass index (BMI) equal to or greater than the 85th percentile to the 95th percentile for gender and age (Ogden & Flegal, 2010). *Obesity* is defined as having a BMI greater than the 95th percentile for gender and age (Ogden & Flegal, 2010). A diagnosis of overweight/ obesity (OW/OB) in children increases the likelihood of several risk factors associated with cardiovascular disease, dyslipidemia, hypertension, and coronary artery disease. OW/OB in children negatively impacts cardiac, endocrine, orthopedic, neurologic, pulmonary, and psychological systems. Orthopedic (e.g., slipped capital femoral epiphysis), pulmonary (e.g., asthma symptoms), and psychological (e.g., low self-esteem, depression) sequelae all may develop, each of which are correlated with OW/OB (American Academy of Pediatrics, 2003; CDC, 2013a; Ebbeling, Pawlak, & Ludwig, 2002). Obesity and obesity-related behaviors (ie., energy intake exceeds energy expenditure) during childhood significantly predict obesity in adulthood and are

associated with long-lasting physical and psychological effects (Berry et al., 2004; Drohan, 2003; Ogden, Carroll, Curing, Lamb, & Flegal, 2010). If rates of childhood obesity are not reversed, one third of all boys and two out of every five girls born after 2000 are predicted to be diagnosed with type 2 diabetes at some point in their lives (National League of Cities, 2012) and be at high risk for the associated health sequelea. Treatment or reversal of childhood obesity is difficult to achieve and treatment efforts are often unsuccessful (American Academy of Child and Adolescent Psychiatry [AACAP], 2011a; Ebbeling et al., 2002).

Researchers have demonstrated the positive protective effects of healthy lifestyles (Hildebrand & Betts, 2009; Hingle, O'Connor, Jayna, Dave, & Baranowski, 2010), yet the rate of childhood obesity and associated chronic illness remains high. The increased prevalence of obesity and obesity-related illnesses are troubling as children with excess weight may be amenable to modifiable lifestyle behavior changes. Feasible and acceptable efforts to promote healthy lifestyle choices are greatly needed, particularly in young children prior to formation of poor lifestyle choices and associated illness. Childhood obesity stems from increased portion sizes, poor nutrition, increased fast food consumption, and reduced physical activity (American Heart Association [AHA], 2010). For the purpose of this pilot study, healthy lifestyle behaviors encompass choices related to decreasing consumption of sugar-sweetened beverages (SSB), increasing daily physical activity, reducing screen time/viewing time/sedentary behavior, and increasing fruit and vegetable consumption. These healthy lifestyle behaviors were targeted as they contribute to the overall well-being of children and are amenable to behavior change.

The consumption of SSBs has increased with the rate of childhood obesity (Ebbeling et al., 2012; Ludwig, Peterson, & Gortmaker, 2001). SSB are nutrient deficient and contribute to increased caloric intake. Across populations, an estimated 15% of daily caloric (kcal) intake comes from SSB, with an average of 357 daily kcal of SSB consumption by adolescents (Wang, Bleich, & Gortmaker, 2008). In a landmark study, Ludwig et al. (2001) found that for each additional serving of SSB, both BMI and frequency of obesity increased ($p = 0.03$, $p = 0.02$ respectively). Three more recent publications (De Ruyter, Olthof, Seidell, & Katan, 2012; Ebbeling et al., 2012; Qi et al., 2012) provide compelling evidence to suggest the consumption of SSB may influence the development of obesity among children, adolescents, and adults (Caprio, 2012). In the first study, De Ruyter et al. (2012) provided evidence through a double blind randomized controlled trial (RCT) in a large sample (n=641) of normal weight school-aged children (ages 4 years to 11 years) in which the replacement of SSB with non-caloric beverages diminished weight gain. Participants were randomized to receive eight ounces of a sugar-free beverage or a similar sugar-containing beverage distributed in a school setting. At 18 months, 477 participants completed the study, and data were imputed for 136 of participants who discontinued the study. BMI z-scores increased by 0.06 standard deviations (SD) in the non-caloric beverage group compared to 0.12 SD in the sugar-containing group ($p = 0.06$). The study was limited by the 26% attrition rate, predominantly white, Dutch ethnic population, of normal weight. Therefore, the study findings may not be generalizable to other ethnic groups, obese preschool aged children, or adults. However, the study strengths, including the double-blind design, rigorous implementation, and cautious analyses, suggest that the observed differences in body fat

and BMI *z*-scores are most likely attributed to the assigned beverage. The findings suggest replacement of SSB by a non-caloric drink may help to reduce the high prevalence of obesity in these children.

The second study by Ebbeling et al. (2012) is a RCT of 224 OW/OB adolescents who routinely consumed SSB (reported consuming one 12-ounce serving per day of SSB or 100% fruit juice). The intervention consisted of home delivery of non-caloric beverages (i.e., bottled water) every 2 weeks with written messages not to buy SSB, monthly motivational telephone calls (30 minutes or longer), and three 20-minute home visits. Consumption of SSB significantly differed between the experimental and control groups at 1 year ($p<0.001$) and at 2 years ($p=0.005$). BMI changes were significantly different ($p=0.045$) for the treatment versus the control group 1 year following the intervention, yet the BMI did not differ significantly between the two groups at 2 years. The study strengths were the duration of the intervention (1 year), implementation in a home setting (where most SSB beverage consumption occurs), cultural diversity among the participants, and retention rates (97% at the end of year one, 93% at the end of year two). The study was limited by reliance on self-reported dietary intake and physical activity, the use of a relatively inaccurate method to measure body fat, the specific adolescent sample, and lack of data on obesity-related risk factors. Furthermore, cost-analyses were not reported and may have outweighed the benefit of the intervention.

Lastly, in two large prospective adult cohorts ($n=6,934$ women from the Nurses' Health Study, 4,423 men from the Health Professionals Follow-up Study, and 21,740 women from the Women's Genome Health Study), Qi et al. (2012) analyzed the interaction between genetic predisposition (calculated from multiple genetic variants) and

the intake of SSB. Across cohorts, the combined genetic effects (ie., genotyped data, relative risks on incident obesity) on BMI among persons consuming one or more servings of SSB per day were approximately twice as large as those among persons consuming less than one serving per month (Qi et al., 2012). The study had a restricted sample (i.e., European ancestry), limiting generalizability to other populations and to child sub-groups. Furthermore, the proportion of total energy intake derived from SSB was not calculated, and the potential for confounding by unmeasured or unknown dietary factors could not be fully eliminated. However, the large sample size, prospective design, use of repeated measures and replication across three cohorts lend strength to the authors' findings. Collectively, the findings from these most recent studies underscore the need to for continued efforts to reduce consumption of SSB as it relates to obesity, but warrants further study specifically with regards to the effects of SSB consumption in preschool-aged children.

It is recommended that preschoolers should engage in at least 60 minutes up to several hours a day of unstructured physical activity, and should not be sedentary for more than 60 minutes at time (unless sleeping; National Association for Sport and Physcial Education [NASPE], 2009). Yet, sedentary behaviors appear to be increasing and are thought to be the result of the increased utilization of media, which includes the Internet, computer games, easily accessible movies/screen time, and mobile phones (AACAP, 2011a; McDonough, 2009). On average, children ages 2-5 years spend 32 hours a week watching television, Digital Versatile Discs (DVDs), digital video recorders (DVRs), videos, and using a game console (McDonough, 2009). Some 290 million Americans, in 114.7 million households, own at least one television (The Nielsen

Company, 2012). Parents record children's favorite TV shows on DVRs, where nearly 50% of commercials are watched by children ages 2 to 5 years (McDonough, 2009). In 2009, the fast food industry spent more than $4.2 billion on marketing, to include a 21% increase in ads for preschoolers (Harris, Schwartz, & Brownell, 2010). A reported 15% of preschoolers ask to go to McDonald's every day, and 84% of parents take their child to a fast food restaurant at least once a week (Harris et al., 2010).

The National Initiative for Children's Healthcare Quality (NICHQ, 2011) and other organizations have developed 3- to 5-point childhood obesity prevention models to translate research into practice. Examples include NICHQ's (2008) BB2-1-0, the Consortium to Lower Obesity in Chicago's Children's (CLOCC) 5-4-3-2-1 GO!, Maine's 5210 Every Day!, and Nemours' in Delaware 5 2 1 Almost None programs. Universally, the models focus on children consuming five or more servings of fruits and vegetables each day, 2 or less hours of screen time involvement every day, and 1 or more hours of moderate-to-vigorous physical activity daily. While the 5-4-3-2-1 model is a promising intervention (Evans, Christoffel, Necheles, Becker, & Snider, 2011), the prevalence of engaging in physical activity, decreased screen use, and fruit and vegetable consumption continues to be a challenge. Fruits and vegetables are important for optimal child growth, weight management, and chronic disease prevention (U.S. Department of Health & Human Services [HHS], n.d., 2005) and are a source of essential vitamins, minerals, and fiber. Yet, French fries were the most common vegetable consumed, and fruit juices were found to make up 40% of fruit intake in children, rather than whole and unprocessed fruits and vegetables which are high in fiber (Harris et al., 2010). Wolfenden and colleagues (2012) aimed to assess the impact of interventions designed to increase the

consumption of fruit and vegetables among children less than 5 years. Five trials were identified with disparate findings and no intervention cost-effectiveness reporting, thus highlighting the paucity of trials targeting fruit and vegetable consumption in this child age group and the lack of effective interventions available to clinical practice and policy makers (Wolfenden et al., 2012). With regard to screen time, data highlight additional media sources to include mobile media, computers, and video games that contribute to added screen time in younger children (Common Sense Media, 2011).

In 2009-2010, obesity prevalence among children 2-5 years was 12.1% (Ogden, Carroll, Kit, & Flegal, 2012). However, in the same age group for both males and females of all racial/ethnic groups, prevalence for overweight (>85th%) was 26.7% (Cynthia L Ogden et al., 2012). The rate of childhood obesity and associated chronic illnesses continues to remain high with approximately one in three children now OW/OB (Keane, Layte, Harrington, Kearney, & Perry, 2012). Children are five times more likely to be overweight at the age of 12 years if they are overweight during the preschool period, and 60% of overweight preschoolers are overweight at the age of 12 years (Matusik & Malecka-Tendera, 2011). Adiposity rebound, eating habits, and physical activity patterns are already established by the adolescent years (Small, Anderson, & Melnyk, 2007). As such, the child preschool age group is a priority for surveillance and intense intervention because obesity trends in this group are a predictor of trends in older children and adults (Sharma et al., 2009; Small et al., 2007).

To date, the majority of childhood obesity research has been conducted with children in middle to late childhood (Small et al., 2007). The extant gap in the research literature regarding preschool children and their parents is that there are no intervention

studies examining the effects of a cognitive behavioral intervention delivered in a primary care setting and facilitated with mobile messaging to support families with OW/OB preschoolers. When considering the frequency with which clinicians confront the problem of OW/OB preschoolers and the lack of available treatment options, the need for strong research evidence conducted in this population, in the primary care setting is underscored. Clinicians seek effective evidence-based interventions that can be delivered in primary care setting to assist parents and guide clinical practice.

Theory of the Problem

Sidani and Braden (1998) defined the theory of a problem as the causal interactions that occur and result in the worsening or improvement of a problem. The early establishment of healthy lifestyle behaviors may lower the risk of becoming obese and developing related diseases (Daniels et al., 2005), suggesting an opportunity for healthy lifestyle interventions to be initiated during the preschool years. The most influential individuals in an overweight child's life are the parents (Doolen, Alpert, & Miller, 2009), with a unique role to leverage behavior change in obese children (Faith et al., 2012). Behaviors during childhood are linked to parental beliefs, attitudes, and practices (i.e., behaviors), each of which represents important modifiable aspect (Anderson, Hughes, Fisher, & Nicklas, 2005). Children of OW/OB parents are at risk of becoming OW/OB (Larsen, Mandleco, Williams, & Tiedeman, 2005; Thompson, 2010). Keane and colleagues (2012) utilized cross-sectional data (n = 8,568) from the first wave of the Growing Up in Ireland (GUI) study to investigate the association between measured parent weight status and the risk of childhood obesity at age 9. In two-parent families, when one parent was obese, the likelihood of childhood obesity increased from

11% (in two-parent families with normal weight parents) to 24.7%, and 49.2% when both parents were obese. Similarly, in single parent homes, childhood obesity increased from 34.1% when the parent was overweight compared to 41% when the parent was obese. When compared to the single parent/both parents being overweight, the odds of childhood obesity increased nearly threefold when the single parent/both parents were obese (Keane et al., 2012). Comparable findings resulted in a prospective study of 150 children (birth to 9.5 years) by Agras, Hammer, McNicholas, and Kraemer (2004). The authors found that having an overweight parent was found to be the strongest risk factor for childhood overweight. While strong in the approach to better understand the interrelated factors of parental attitudes, feeding styles, parenting styles, and child behavior on childhood obesity, the study was limited by its sample size, self-reported data, and ability to generalize to other populations (sample parents had higher education levels and overall lower minority representation).

From a social ecological model approach, a myriad of factors contribute to childhood obesity. Public policy, community organizations, social institutions, family, friends, and the individual child constitute factors that shape health habits in children. With the multitude of influences, parents of OW/OB preschoolers may lack accurate knowledge, or have negative attitudes and beliefs about proper nutrition and physical activity for their children. Negative responses to nutritional guidance are so ingrained in today's consumers, benign messages take on a negative and moralistic spin (Satter, 2008). If maladaptive thoughts and distorted views are present in parents, children then may adopt the same maladaptive thinking patterns and distorted views towards healthy food and lifestyle choices. Parent-child struggles about eating reflect and exacerbate

children's negative eating attitudes and behaviors, poor nutritional status, and poor growth (Satter, 2008). Washington, Reifsnider, Bishop, Ethington, and Ruffin (2010) found that mothers of overweight children were more likely to associate food with positive emotion and were thought to communicate this thinking pattern inadvertently to their children. Wrotniak, Epstein, Paluch, and Roemmich (2004) found that changes in parent BMI *z*-scores significantly predicted child BMI *z*-score change at 0-6 month ($p<0.001$) time points and 0-24 time points ($p<0.009$). Antecedents to childhood obesity have been identified by some researchers to include lack of parental knowledge about child nutrition and physical activity and poorly informed parental beliefs (i.e., a big child is a healthy child, food is love; Garcia, 2004). Therefore, cognitive dissonance may exist in parents of OW/OB children who desire to do what is best for their child, but lack the knowledge and skills to make choices related to healthy behaviors.

According to Beck (1976), the way one cognitively appraises the world is stored as bodies of knowledge that one can code and comprehend. Cognitive theory (CT) puts forth one perspective regarding how new life experiences are combined with previously developed cognitions. Maladaptive thinking is the result of repeated exposures to misconceptions over time, influencing affective and behavioral patterns. One's cognitive appraisal (i.e., beliefs) is then stored as bodies of knowledge. Schemas, either positive or negative, are then linked with a person's thoughts, emotions, and resultant actions. Negative schemas and maladaptive thinking manifests through faulty cognitive appraisal. Negative cognitive appraisal can influence parents' abilities to engage in healthy lifestyle behaviors. In turn, poor lifestyle choices by parents for children may then materialize into childhood OW/OB.

Encouraging healthy eating and activity behaviors through providing parent information and role modeling increases the likelihood that young children will adopt these behaviors as lifelong habits (Gyovai, Gonzales, Ferran, & Wolff, 2003; McKee, Maher, Deen, Fornari, Fletcher, & Blank, 2010). The accumulation of evidence suggests prevention and early intervention efforts are likely to be more effective in preschool and young school-aged children and should be considered to negate the barriers associated with childhood obesity (American Academy of Pediatrics, 2003; Horodynski & Stommel, 2005; Small et al., 2007; Ward-Begnoche & Gance-Cleveland, 2005).

Critical inputs. Critical inputs reflect the key components that should be integrated into the intervention—what is necessary to produce the expected effects (Sidani & Braden, 1998). Parental knowledge, attitudes, and beliefs towards food, feeding habits, and energy expenditure are antecedents to childhood obesity. Previous strategies to treat childhood obesity include core behavior change techniques such as self-monitoring, goal-setting, stimulus control (e.g., structuring the home environment to make it more healthier), and positive parenting strategies (Faith et al., 2012). Therefore, critical inputs to include nutrition and physical activity knowledge, problem solving, goal setting, effective communication, positive self-talk, and positive thinking, which are important components of cognitive-behavioral skills building (Jacobson & Melnyk, 2012; Melnyk et al., 2007; Melnyk et al., 2013), were part of the intervention.

Parental knowledge. In 2012, the second National Survey of WIC Participants conducted by the U.S. Department of Agriculture (USDA, 2012) reported that in a sample (n=82) of children 2-5 years of age, 20.8% were overweight, 35.4% were at risk of becoming overweight, and an astonishing 87.9% were deemed to have inappropriate

nutrition practices in place. When considering the obesity epidemic and associated comorbidities, it appears that there may be a knowledge deficit by parents (Satter, 2008; Small, Melnyk, Anderson-Gifford, & Hampl, 2009). Disparate findings in the literature suggest that parents of OW/OB preschoolers may lack the appropriate knowledge, attitude, and beliefs about how to engage in healthy lifestyle choices. In a grounded theory study of 25 multi-ethnic, low-income parents in the United States, McGarvey and colleagues (2006) found that regardless of race or ethnicity, obesity was thought to be associated with health problems after the age of 5. However, through focus groups with 11 Mexican parents of preschoolers, Small, Sidora-Arcoleo and colleagues (2009) found that parents felt that excess weight in children was unhealthy. Gomel and Zamora (2007) qualitatively analyzed 17 English-speaking and 20 Spanish-speaking mothers with at least one preschool child between the ages of 2 and 5. Although all groups reported knowing that 'junk food' was unhealthy, all groups reported that their children ate junk food (e.g., chips, soda, candy, cookies). Children's dietary patterns are central to relative energy intake, and their physical activity patterns are associated with energy expenditure. The storage of fat results from excess caloric intake relative to energy expenditure, and research has suggested higher percent of fat intake is correlated with higher percent of body fat (Davidson & Birch, 2001). Protein, fat, and carbohydrate are macronutrients, which are major calorie-contributing nutrients and affect satiety (Satter, 2008). Macronutrients are distinguished from vitamins and minerals, which are micronutrients that are needed in much smaller quantities (Satter, 2008). People often eat *meals* that lack one or more macronutrients (Satter, 2008).

This lack of knowledge may be directly correlated to feeding styles. Food preparation or feeding strategies were done with consideration to the child's food preferences (Gomel & Zamora, 2007). Using a grounded theory approach in a multiethnic group of parents (*n*=25, four focus groups), McGarvey and colleagues (2006) reported that parents used food to shape their children's behavior without recognizing the link between feeding styles and obesity. Across focus groups, three themes emerged: (a) lack of awareness of the relationship between increased physical activity and health, (b) use of food to influence behavior, and (c) the loss of parental control over feeding when a child starts school/childcare (McGarvey et al., 2006). In another qualitative study with eight focus groups (four English and four Spanish), Gomel and Zamora (2007) found parental disconnects between the domains of eating, obesity, and a child's health. English-speaking mothers tended to use food to influence their child's behavior (reinforcement or punishment tactics). Spanish-speaking mothers used food to reinforce good behavior (Gomel & Zamora, 2007) and tended to have more indulgent feeding styles (Chaidez, Townsend, & Kaiser, 2011). Bante, Elliott, Harrod, and Haire-Joshu (2008) found that nearly 48% of parents attempted to get their child to eat something when the child was not hungry. In that same study, those parents who used inappropriate feeding practices (i.e., feeding when not hungry, using food to shape behavior) were less likely to be worried that their child was overweight (Bante et al., 2008). The use of sweet foods as reward and pressure to eat fruits and vegetables may actually increase a child's likelihood of developing a dislike for foods they are pressured to eat and a preference for restricted foods (Thompson, 2010). Methods that parents currently use to promote healthy food choices may be more detrimental than beneficial for children in the long

term. Yet parents' interest in their preschoolers' eating habits may make them particularly receptive to learning about and facilitating healthy choices in more behaviorally appropriate ways (Tucker, Irwin, He, Bouck, & Pollett, 2006).

Parental attitude/perceived difficulty. Parental use of food to control children's behavior is thought to alter the child's self-regulation of food intake (Satter, 2008; Thompson, 2010). Satter has suggested that restraint and disinhibition eating in parents, parallels a cyclical pattern between *being good* and *being bad* (Satter, 2008). Disinhibited eating often comes with a sense of careening out of control (Satter, 2008). Satter (2008) describes a clinical case in which a female patient would try not to eat or would try not to eat as much as she wanted, leaving her feeling deprived and consequently overeating. Feeling *out of control* is a theme that is echoed throughout the literature, in various contexts. Similar to the findings by McGarvey and colleagues (2006), parents attributed school attendance and the prevalence of fast food restaurants leaving them feeling *no control* over their child's food intake (Contento, Zybert, & Williams, 2005). Parents cited obstacles to adopting childhood obesity recommendations to include convenience, child preference, difficulty changing habits, lack of information, accessibility, and food costs (Sonneville, Pelle, Taveras, Gillman, & Prosser, 2009). Furthermore, there is a fear that eating for enjoyment is contradictory to good nutrition (Satter, 2008). However, parents cited reassurance and an opportunity to discuss parent priorities as reasons for primary care office visits during preschool years (Radecki, Olson, Frintner, Tanner, & Stein, 2009). Parents value an ongoing relationship with a clinician who is child-focused and respects parental expertise (Radecki et al., 2009).

Parental beliefs. Based on a systematic review of literature (summarizing literature published from 2005 through 2010) on parental feeding and childhood obesity in preschool-aged children, Thompson (2010) concluded that parental beliefs and knowledge about their child's perceived weight and obesity influenced their motivation to seek information and make changes to feeding practices. However, the literature indicates an alarming disconnect that exists between children's physical appearance and parental perception of their child's weight (Doolen et al., 2009; Fisher & Birch, 2001; Killion, Hughes, Wendt, Pease, & Nicklas, 2006). Low levels of parental education, ethnicity, and socioeconomic status have been identified by some researchers as risks for developing childhood obesity (Doolen et al., 2009). However, across the literature and regardless of the child's age, mothers failed to accurately perceive the weight of their overweight child. Nelson, Carpenter, and Chiasson (2006) found that 97% of parents reported their child's weight as being normal, when 93% of the sample was overweight. Similarly, in a sample of 1,082 families with children between 3 and 5 years of age, Carnell, Edwards, Croker, Boniface, and Wardle (2005) found that only 17.1% of parents with obese children accurately identified their child as being OW/OB. Parents of OW/OB children reported that diets low in fat were not important (Contento et al., 2005). Challenging embedded beliefs, such as *food is love* and that *a larger child is a healthy child* is still a barrier to embracing childhood obesity recommendations (Garcia, 2004). Overweight babies are healthier is a belief culturally reinforced by friends, grandparents, and history (Garcia, 2004).

> My own mother shared the same beliefs about infant nutrition—eat more, fat babies are healthy babies. My mother wanted me to eat more, and still does, even now that I am thirty-nine years old. She wonders why my daughter is so thin,

> why she "doesn't eat," why my wife and I don't force her to ingest food when she's not hungry. (Garcia, 2004, p. 216)

In the literature, an alarming 60% of mothers who thought their child was overweight were not worried about the child's current health and future health implications (Genovesi et al., 2005). Forty percent of mothers with an at-risk-for-overweight or overweight child did not associate food intake with their child's weight (Genovesi et al., 2005). In more recent literature, of a predominantly white, educated sample, most parents (90.7%) of overweight preschoolers classified their child as normal weight (Harnack et al., 2009). An even higher percentage (94.7%) of children at risk for overweight were classified as normal weight by their parents. The literature is saturated with empirical evidence to highlight knowledge deficits, inaccurate estimations of child body size, and inaccurate perceptions by parents, as well as parental desires for accurate knowledge and strategies to promote health. As with previous battles convincing parents that their child does not need antibiotics for a viral infection has decreased for some populations (Garcia, 2004), a positive shift in beliefs can occur. Parents described obesity as an *illness* but were interested in *knowing* if their child was a healthy weight or overweight (McGarvey et al., 2006; Small, Melnyk et al., 2009), highlighting an opportunity to facilitate positive change towards healthy lifestyle behaviors.

Nevertheless, more studies promoting healthy lifestyle behaviors in a primary care setting need to be implemented. Crawford, Timperio, Telford, and Salmon (2006) found that 89% of parents with 5- to 6-year olds were not aware that their child was overweight. Perhaps this is in part due to healthcare professionals' perceived barriers to childhood obesity prevention efforts to include (a) American culture, (b) parental attitude,

(c) lack of practice resources, and (d) lack of family resources (Barlow, 2007; Larsen et al., 2005; Passehl et al., 2004; Spivack, Swietlik, Alessandrini, & Faith, 2010; Story et al., 2002).

Innovation Using Mobile Technology

As of September 2013, 91% of all adults own some kind of cell phone, with 81% of all owners sending or receiving text messages (Duggan, 2013). Due to the number of users, there is potential value in using technology to promote health. However, there is a dearth of scholarly literature available to support programs delivered through multimedia as a method to influence behavior change (Papastergiou, 2009; Wartella, Vandewater, & Rideout, 2005; Wartella, Rideout, Lauricella, & Connell, 2013). Unlike the technology predecessor, computers, mobile phones are the first technology to reach across demographics (to include subpopulations that experience low socioeconomic status and subpopulations with poor health (Fjeldsoe, Marshall, & Miller, 2009; Smith, 2010). In a sample of 2,076 cell phone users, Hispanic populations sent or received the most text messages (87%) relative to black (85%) and white (79%) populations (Duggan, 2013). In that same survey, households that earned less than $30,000 annually utilized text messaging 78% of the time, while households making greater than $50,000 annually sent or received text messages 88% of the time (Duggan, 2013).

Therefore, mobile technology was introduced to trigger skills to promote positive cognitive reframing and subsequent healthy lifestyle behavior choices. The intent of the mobile trigger was to reinforce positive skill enactment and disrupt negative repeated actions (habits). Repeated action is represented in specific action patterns within cognitive schemas and contextual cues and can trigger everyday habits (i.e., walking into

a dark room can trigger reaching for a light switch) (Neal, Wood, Labrecque, & Lally, 2012; Neal, Wood, & Quinn, 2006; Wood, Tam, & Guerrero-Witt, 2005). The goal was for mobile messaging to build upon the intervention to trigger positive behaviors related to healthy lifestyle choices and to disrupt contextual cues associated with negative behavior choices (i.e., messages can be tailored to be sent during a certain time of the day).

Problem Statement

Programs designed to enhance the partnership between parent and providers through cost-effective, tailored solutions are needed to promote healthy lifestyle behaviors. Maladaptive thinking or faulty cognitive appraisal by parents of OW/OB preschoolers can manifest through obesogenic behaviors. Therefore, this study focused on linking the problem to the intervention. This theory-based, cognitive behavior skills-building program targeted the critical inputs of parental knowledge, attitude, and beliefs towards healthy lifestyle behaviors and was synergized/facilitated with mobile technology. The program was implemented in a primary care setting to capture parents and OW/OB preschoolers seen during recommended schedule of health supervision visits for 3- to 5-year-olds and those recommended by their providers (Drohan, 2003). The proposed study sought to address gaps in the literature and provide the research needed support clinical practice.

CT facilitated with mobile technology behavioral cues to parents provided the theoretical basis for this intervention. Wood, Quinn, and Kashy (2002) stated that habit performance reflects the routine repetition of past acts cued by stable features of an environment. Faith and colleagues (2012) suggest that restructuring the home

environments can be an effective strategy for weight control in children. For instance, make healthier (i.e., less energy-dense foods) foods available while reducing access to less healthy foods (i.e., more energy-dense foods), or not permitting televisions in children's bedrooms. Therefore, the TEXT2COPE (Creating Opportunities for Parent Empowerment) program, adapted from the COPE Healthy Lifestyle TEEN (Thinking, Emotions, Exercise, and Nutrition) program (Melnyk et al., 2013) consists of educational components, cognitive behavior skills-building (problem solving, cognitive reframing, cue recognition with behavioral modification, and mobile triggers) as an adjunct to clinical care to support healthy lifestyle behaviors in families with OW/OB preschoolers. The goal of the TEXT2COPE program is to reframe maladaptive parental cognitions towards engaging in healthy lifestyle through cognitive behavioral skills building and strengthening the relationships among parental beliefs and attitudes/feelings to influence healthy behaviors for families with OW/OB preschoolers.

The overarching long-term goal is to incorporate the intervention model into a primary care setting, an important resource for all families, to facilitate healthy behaviors in families and children. The TEXT2COPE intervention was implemented in a primary care setting designed to enhance the healthy lifestyle behaviors for families with OW/OB preschoolers. This study is the first in a trajectory of research. Building on the strengths of the literature and addressing gaps, the specific aims as outlined below are the first steps in a program of research to develop an evidence-based healthy lifestyle primary care intervention for parents of OW/OB preschoolers.

Aim 1. To examine the feasibility and acceptability of the TEXT2COPE program among parents of OW/OB preschoolers between the ages 3 to 5 years (henceforth referred to as preschoolers) with mobile phones.

1a. What is the feasibility of the TEXT2COPE intervention in parents of OW/OB preschoolers as evaluated by rates of participant retention and adherence to the study protocol?

1b. What is the acceptability of the TEXT2COPE intervention in parents of OW/OB preschoolers as measured by participant evaluation of the intervention protocol?

Aim 2. To evaluate the preliminary effects of the TEXT2COPE program on nutrition/physical activity knowledge, cognitive beliefs, and perceived difficulty towards engaging in healthy lifestyle behaviors, and healthy lifestyle behaviors in parents of OW/OB preschoolers between the ages 3 to 5 years.

2a. What is the preliminary effect of the TEXT2COPE program on the healthy lifestyle behaviors in parents of OW/OB preschoolers?

2b. What is the preliminary effect of the TEXT2COPE program on parental beliefs about their ability to increase healthy lifestyle behaviors?

2c. What is the preliminary effect of the TEXT2COPE program on parental perceived difficulty of achieving healthy lifestyle behaviors?

Aim 3. To evaluate the relationship among the study variables (i.e., the intervention, cognitive beliefs, perceived difficulty, healthy lifestyle behaviors).

3a. What are the associations (correlations) among cognitive beliefs towards engaging in healthy lifestyle behaviors, and perceived difficulty in leading a healthy lifestyle, and healthy lifestyle behaviors in parents of OW/OB preschool children?

CHAPTER 2. LITERATURE REVIEW

Theoretical Perspectives Informing the Research

It is evident that the etiologies of childhood obesity are multifactorial. Therefore, the strategy to combat childhood obesity must encompass a variety of facets. As such, "multiple theoretical perspectives to guide this project and identify critical aspects of the entire method" were used to guide the proposed research (Small, Sidora-Arcoleo et al., 2009, p. 30). Aspects of Fogg's (2011) behavior model informed the overarching strategy for the study, while Beck's (1976) CT guided the selection of study variables and manualized content delivery. In the TEXT2COPE program, participants were provided with education about healthy nutrition and physical activity and elements of cognitive behavior skills building (CBSB). CBSB encompassed problem solving and overcoming barriers, goal setting, positive self-talk, and restructuring negative thoughts.

Congruent with the literature and building upon the work of Melnyk and colleagues theory-based interventions (Jacobson & Melnyk, 2012; Melnyk et al., 2007, 2009) to promote healthy lifestyle behaviors with the Creating Opportunities for Personal Empowerment-COPE/Healthy Lifestyles Program, CT guided the selection of study variables (parental knowledge, attitude, beliefs, and behaviors), the development of the proposed intervention, and the associated analyses. Theory describes or explains why a phenomenon occurs the way it does (Fleury & Sidani, 2012; Melnyk & Fineout-Overholt, 2011; Sidani & Braden, 1998). Therefore, utilizing a theoretical framework is critical to guiding research, conceptualizing the process of change, and guiding the creation of the intervention components, such as the text-messaging system. Previous work by Melnyk and colleagues (Jacobson, & Melnyk, 2012; Melnyk et al., 2007, 2009) and Hekler and

colleagues (Hekler, Klasnja, Froehlich, & Buman, 2013) suggests that individuals who cognitively appraise healthy lifestyle choices as more difficult are less likely to have the intentions to make healthy lifestyle choices and engage in healthy lifestyle behaviors. As previously highlighted, parents of OW/OB preschoolers may have inaccurate perceptions of their child's weight, perceived difficulty adopting childhood obesity guidelines in their lifestyles, and may have a lack of knowledge and skills related to child feeding and physical activity.

Beck's (1976) CT links a person's cognitions to behavior. Cognitions represent a synthesis of internal and external stimuli. Beck (1976) proposed that one's thoughts and perceptions are cognitively organized into schemas, which help one to process and organize complex information into meaningful patterns over time (Jacobson & Melnyk, 2012). Thus, "Schemas are complex structures that represent the person's constructed concepts of reality and behavioral responses to that reality" (David, Lynn, & Ellis, 2010, p. 14). As an integrated theory linking cognitive, affective, social, and developmental processes to behavior, cognitive formation of beliefs, assumptions, and attitudes are best understood as the result of the interplay of an individual's internal processes of direct observation and interpretation of new experiences (Jacobson & Melnyk, 2012). The theory posits that an individual's emotions and behaviors are determined by how an individual cognitively appraises the world (Beck, Rush, Shaw, & Emery, 1979).

Beck (Beck et al., 1979) highlighted assumptions of CT stating, "Cognitions (verbal or pictorial events in his stream of consciousness) are based on attitudes or assumptions (schemas), developed from previous experiences" (p. 3). Both often unexamined, attitudes are based on feelings and beliefs, influencing behavior and

dictating priorities (Satter, 2008). The cognitive triad depicted by Beck (1976) states that negative views about oneself leads to negative views of the world and negative views about the future. Most people today feel ambivalent and anxious about eating and doubt their ability to do a good job with food management (Satter, 2008). For many parents and children, feeding has become a confusing struggle (Satter, 2008). Problems manifest with schema formation over time, reinforcing negative beliefs and behaviors related to parental feeding strategies (i.e., using food to shape behavior) and poor choices related to healthy lifestyles. Parents who diet do not do as well with feeding their children; subsequently, their children go on and off diets along with them (Satter, 2008). If the joy goes out of eating, nutrition suffers; attitudes and behaviors around eating are punishing and negative and cannot be sustained (Satter, 2008). In a focus group study, Mexican parents of preschool children characterized people who were OW/OB as having "lack of self-responsibility" and a "negative state of mind" (Small, Melnyk et al., 2009, p. 6). A majority of mothers reported that children develop eating habits from observing their own parents' eating behaviors (Gomel & Zamora, 2007). Evidence from RCTs is inconclusive whether more or less family involvement promotes better weight-related outcomes in children; however, better parental compliance with behavior strategies (e.g., targeting specific behaviors, self-monitoring, goal setting, stimulus control/environmental cues, positive parenting strategies) are predictive of better child outcomes (Faith et al., 2012).

Although parents may not perceive their child to be OW/OB, once a diagnosis of OW/OB is made at a routine well child check this can trigger a set of negative beliefs and emotional responses. Mexican parents of preschool children indicated that they believed

obesity was related to how a child was raised from childhood, and that parents were particularly responsible for childhood weight in young children (Small, Melnyk et al., 2009). Previous research demonstrates that parents of overweight children report feeling criticized and blamed for their child's obesity; they feel guilty and angry that they did not meet the expectations of their child's weight and were frustrated they did not know how to help their children (Pierce & Wardle, 1997; Schwartz & Puhl, 2003). Studies are needed to determine the best ways for clinicians to communicate information and encourage skills related to eating habits/physical activity, family relations, or self-esteem in the primary care setting (Faith et al., 2012; Moyer et al., 2005).

Parents perceive the term *obesity* as stigmatizing and blaming (Puhl, Peterson, & Luedicke, 2011; Schwartz & Puhl, 2003). A sizable number of pediatricians, pediatric nurse practitioners, and registered dietitians perceived themselves as having low proficiency in behavioral management strategies and parenting management techniques (Faith et al., 2012). Yet, in a study of 117 parents of children 5-10 years old, conveniently sampled after a clinic visit, greater than 80% of parents believed that it was important for healthcare providers to share information with them about their child's weight and physical activity, diet, and sedentary practices (Kubik, Story, Davey, Dudovitz, & Zuehlke, 2008). Small, Sidora-Arcoleo et al. (2009) found similar results in their focus group qualitative study. The idea of *knowing* or *not knowing* was important to Mexican parents of preschool children. Key themes that emerged were (a) misunderstanding and lacking information regarding their child's health was a concern, and (b) healthcare providers would provide this information to them (Small, Melnyk et al., 2009). After a primary care intervention to increase the proportion of 5- to

10- year-old children receiving annual BMI screening and counseling about physical activity and dietary practices, parents were significantly (p=0.49) more likely to report receiving information from their healthcare provider. This finding coincided with a reported 25% (treatment) versus 9% (usual care) of parents intending to encourage five or more servings of fruits/vegetables on most days in the month upcoming (Kubik et al., 2008). These combined findings highlight the importance of primary care providers and their ability to positively or negatively influence parental intentions to change behavior in the families of young children. Therefore, the primary care provider becomes a key informant in the process of diagnosing and treating OW/OB. Helpful and purposeful communication of information and skills to overcome negative thought processes during the initial stages of diagnosis and treatment are crucial.

In parents of OW/OB preschoolers, a cyclic process of negative views of oneself (believe they are helpless), negative views of their environment (filled with obstacles and having no control), and views of their future (unable to change) may contribute to negative self-beliefs and choices related to healthy lifestyle behaviors. The effects of negative cognitions about oneself are more profound when there are skill deficits (e.g., poor problem-solving skills, cognitive distortions, and failure to attribute positive outcomes to one's behavior (Melnyk et al., 2009). Figure 1 highlights a model for information processing as described by CT.

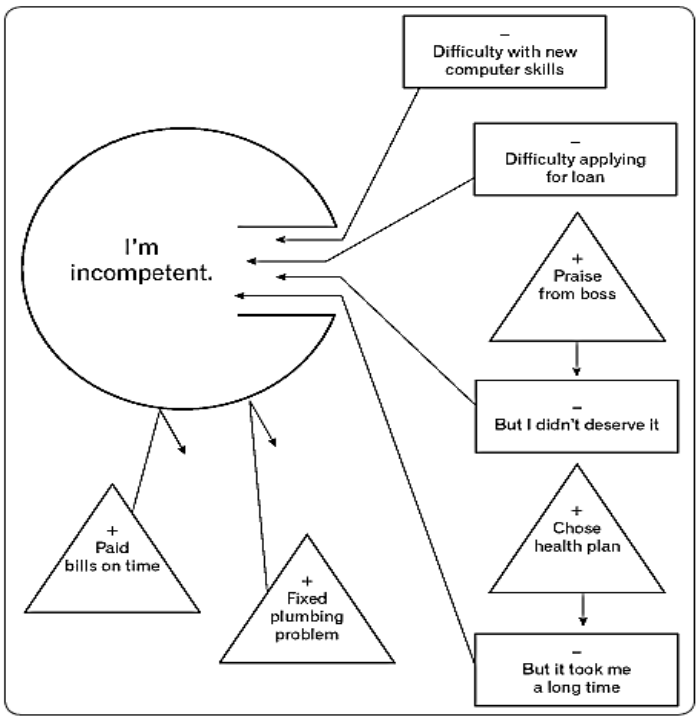


Figure 1. Information processing model as explained by cognitive theory. Adapted from *Cognitive Behavior Therapy: Basics and Beyond*, by J. S. Beck, and A. T. Beck, 2011, Guilford Press, New York, NY, p. 34.

The information-processing model can be modified to depict proposed information processing in parents of an OW/OB preschooler. Take the illustration from Figure 1 and insert *negative belief* in lieu of *I'm competent*. The parent may have a negative belief such as believing they are unable to engage in healthy lifestyle behaviors for themselves or their family. This is reinforced through a diagnosis of OW/OB in their preschooler, difficulty in preparing and feeding themselves or their child healthy food, and difficulty engaging in physical activity. As a result, positive data are not processed, and over time, the negative schema becomes stronger (Beck & Beck, 2011). Therefore, if one is experiencing unwanted feelings and behaviors, it is important to identify the

thinking that is causing the feelings and behaviors. The process of behavior change can be demanding and complex. In using a cognitive approach, an assumption is that most human responses (e.g., feelings, behaviors) are cognitively penetrable (David et al., 2010). Momentary sense of impediment towards a goal, through fear or frustration, can be overridden by a more firm sense of confidence (Carver & Scheier, 1998). As part of the theory, a response is the outcome of cognitive processing and that a change in cognition will induce a change in the expressed response (David et al., 2010). By providing one with the tools to cognitively reframe maladaptive thinking, negative cognitions may be restructured.

Cognitive and behavioral strategies to promote behavior change guided by CT consist of highly specific learning experiences designed to teach persons (a) to monitor automatic negative thoughts about one's self; (b) to recognize the connections between cognitions, affect, and behavior; (c) to examine the evidence for and against negative automatic thoughts; and (d) to learn to identify and alter dysfunctional beliefs, which predispose them to distort experiences (Beck et al., 1979). One of the goals of CBSB is to help parents identify and process the positive data, over time reframing the core beliefs to be more positive. To successfully problem-solve, the participant must be able to recognize, understand, and change incorrect knowledge, distorted views, and maladaptive thinking. Patients are capable of answering questions posed to them, and therapeutic strategies may help to reorganize existing cognitions to promote an effective response (David et al., 2010). Therefore, a core assumption of CT is that the participant will learn to master their own life problems (Beck, 1995; Beck & Beck, 2011).

Cognitive Behavior Therapy emphasizes short-term, problem-focused cognitive and behavioral intervention strategies derived from the science and theory of learning and cognition (Craske, 2012). Incorporating aspects of Beck's psychotherapy of the 1960s, CBT is directed toward solving current problems and modifying inaccurate and/or unhelpful thinking and behavior (Beck, 1976; Beck & Beck, 2011). Cognitively, the aim of CBT is to modify maladaptive cognitions or beliefs by identifying misappraisals and underlying distorted beliefs (Craske, 2012). If one holds negative beliefs about one's ability to engage in healthy lifestyle behaviors and cognitive appraisals that healthy lifestyle behaviors are difficult, then one would be less inclined to make healthy choices and tend to engage in less healthy behaviors (Kelly, Melnyk, Jacobson, & O'Haver, 2011). Therapeutic techniques are designed to identify, reality-test, and correct beliefs underlying the cognitions (Beck et al., 1979). Treatment using CBT encompasses a variety of techniques to produce "cognitive change—modification in the patient's thinking and belief system—to bring about enduring emotional and behavioral change" (Beck & Beck, 2011, p. 2). From a behavioral perspective, "interventions aim to decrease maladaptive behaviors and increase adaptive ones by modifying antecedents and consequences and by behavioral practices that result in new learning" (Craske, 2012, p. 106). Thorndike examined behavior as early as the late 1800's, coining the *Law of Effect*, wherein operant conditioning involves learning from the consequences of behavior (McLeod, 2007; Thorndike, 2012). Simply stated, any behavior followed by pleasant consequences is likely to be repeated, and any behavior followed by unpleasant consequences is likely to be stopped. Therefore, CBT is based on the theoretical

assumption that decreasing maladaptive and increasing adaptive cognitive and behavioral responses will result in improved functioning (David et al., 2010).

Core beliefs influence the development of attitudes and development of automatic thoughts. Automatic thoughts are ideas that "just seem to pop up in your mind" and can trigger a particular reaction (Beck & Beck, 2011, p. 3). For example, consider a parent feeding a picky preschool-aged child. Preschoolers are developmentally known to have food fads, when they will only eat one food repeatedly (Heird, 2007). A parent may try to feed their child a healthy food and the child refuses and throws a tantrum (food neophobia). This may lead the parent to feel sad and frustrated (emotion) and *give in*, feeding the child an unhealthy food that the child prefers (behavior). Instead of allowing the parent to believe that they cannot feed their child in a healthy way, CBSB helps the parent to avoid *giving up*. Instead, the validity of the situation is examined. In this situation, the parent is given research-based information that fear of new foods is common in preschool children and that multiple exposures are needed before the child will be brave enough to taste it (Heird, 2007). The parent will be taught to offer the preferred food by the child with a variety of other foods at each meal and that the child will eventually eat what is offered when hungry (Heird, 2007). By targeting the basic beliefs of parents of OW/OB preschoolers about themselves, their world, and their relationship with their children, lasting improvements in feeding strategies and perceived ability to engage in a targeted behavior should result.

Originally used to treat depression, CBT has been successfully adapted to a surprisingly diverse set of populations with a wide range of problems (e.g., general anxiety disorder, social phobia, posttraumatic stress disorder, panic disorder);(Beck &

Beck, 2011; Butler, Chapman, Evan, & Beck, 2006). Studies by others (Jelalian, Mehlenbeck, Lloyd-Richardson, Birmaher, & Wing, 2006; Melnyk et al., 2009; Melnyk et al., 2013; Rossini et al., 2011; Tsiros et al., 2008) have shown CBT interventions positively impacting healthy lifestyle behaviors and BMI in OW/OB adolescents and adults. Therefore, this study employed treatment techniques adapted from CBT to reframe maladaptive thinking that parents of OW/OB preschoolers may have related to their ability to engage in healthy lifestyle behaviors. CBSB will adapt principles of CBT to promote behavior change. While mental health professionals trained in the modality conduct CBT, CBSB can be learned and taught by healthcare clinicians (Kelly et al., 2011; Lusk & Melnyk, 2011; Melnyk et al., 2009). CBSB consists of learning experiences designed to teach persons (a) to monitor negative cognitions about one's self or the situation (i.e., the feeding situation); (b) to recognize the connections between cognitions, affect, and behavior; (c) to examine the evidence for and against distorted automatic thoughts; (d) to substitute more reality-oriented interpretations for biased cognitions; and (e) to learn to identify and alter dysfunctional beliefs (i.e., towards food, using food to shape behaviors, perceiving their child's weight) (Beck et al., 1979). The goal of using CBSB is to reframe parental thinking that may be negative into more positive thinking (or reinforce positive parental thinking), leading to more positive choices made for their children with regard to healthy lifestyle behaviors. Per CT and CBT, if one re-evaluates their thinking in a more realistic way, one should experience improvement in one's emotional state and behavior (Beck & Beck, 2011).

Frameworks provide information on the intervention strategies likely to address the determinants, linking the transformation process and targeted outcomes (Fleury &

Sidani, 2012). In addition to CBSB, mobile messaging will be used to communicate information from the TEXT2COPE program and send reminders to parents, and will also be used to trigger CBSB content reminders for parents of OW/OB preschoolers. Therefore, aspects of Fogg's (2011) behavior model will be used to explicate the behavioral process of change.

Through a process of providing information, delivering prompts for goal-oriented action, and individualizing entertainment, when a person adopts mobile technology, the technology has the ability to persuade behavior by becoming part of how the person interacts with the world (Fogg et al., 2007). By using mobile technology as part of the intervention implementation, the target audience may be engaged. Mobile technology provides a new means to engage people that is cost-efficient and convenient (Fogg et al., 2007). Also, mobile technology is individualized to the user (i.e., the technology can be used to respond to or prompt the user) (Fogg et al., 2007). Text messaging was selected as a means of facilitating the intervention in this study due to a few key characteristics. Text messaging in health is beneficial because (a) texting works on almost any mobile phone, (b) most people have their phone with them all of the time, (c) messages can provide reminders and can push simple questions to users, (d) inbound messages can be used for simple data collection, and (e) incoming messages trigger phones to notify the users (Meyer, 2009).

As part of Fogg's (2011) behavior model, *trigger* is described as a concept that prompts or calls a person to action and may be tailored to the target user's context. Triggers serve to facilitate, spark, or signal an action from external stimuli (i.e., an alarm) or from routine stimuli (i.e., walking in a kitchen may trigger one to open the fridge)

(Fogg, 2011). Triggers that spark, motivate behavior; triggers that facilitate, make a behavior easier; triggers that signal, remind (Fogg, 2011). For the purpose of this study, text messaging was used to signal a behavior. For instance, a text message at the beginning of the day may signal participants to enact a specific behavior, *try to drink one less can of soda today*. However, dependent on the user, there may be instances when the text message acts as a spark. If the same message is delivered at lunchtime, a time when the participant usually has a can of soda, the message is viewed as a spark, and is presented to users at a moment when they can take action. Fogg (2009) also describes triggers as *hot* and *cold*. Hot triggers are presented when users can take action, as depicted above. Cold triggers are presented when users cannot take action at that moment (e.g., getting a text message while driving a car). Utilization of hot triggers is more closely associated with a behavioral response (Fogg, 2009). This principal investigator (PI) will strived to have hot triggers for a better part of the mobile intervention by allowing participants to set the timing of the messages. In using text messaging to communicate with study participants, the TEXT2COPE program is designed to cue participant parents the most desirable behaviors using interactive technology that encourages them to receive a trigger and perform the target behavior immediately (Fogg, 2011). Fogg's (2009, 2011) behavior model illustrates the shift in behavior moving from *hard to do* to *easier to do*. The conceptual model of CT and Fogg's behavior model to guide this study are highlighted in Figure 2.

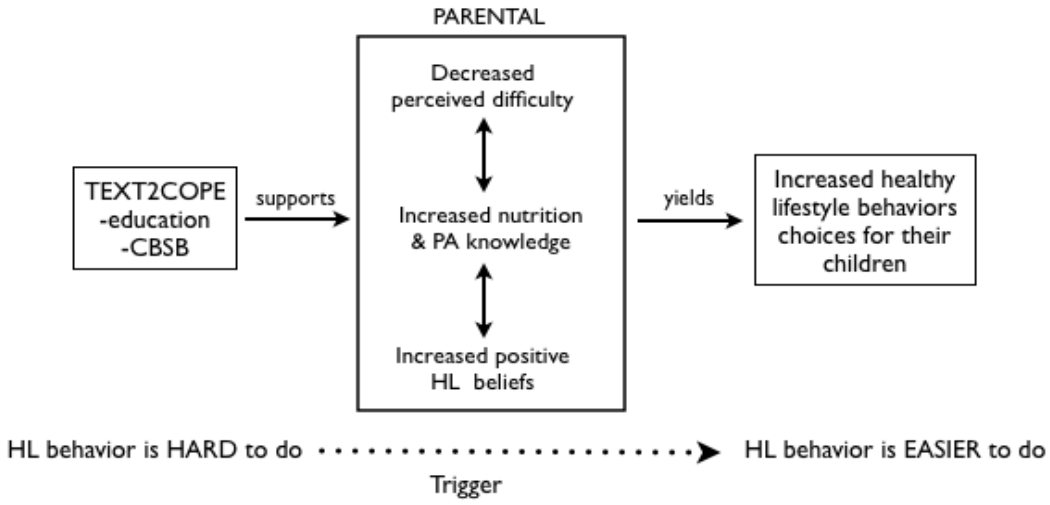


Figure 2. TEXT2COPE program conceptual model.

Cognitive and neurological changes that occur when behavior is repeated are reflected in habit formation (Neal et al., 2006). Habitual actions are triggered from stable cues formed from associations in the memory between practiced action and typical performance time, locations, or other stable features of context (David et al., 2010). Repeated action is represented in specific action patterns within cognitive schemas (Cooper, 2002; Whitlock, O'Connor, & Williams, 2010; Wood et al., 2005). Therefore, contextual cues can automatically prompt associated response through schema activation (Wood et al., 2005). As such, mobile triggers from the TEXT2COPE program served to disrupt the habitual repetition of past actions that have resulted as a function of negative schemas reinforced over time. For example, through short messaging services (SMS), a message like *try to include your child in picking out and preparing tonight's dinner!* will facilitate, spark, or signal an action.

The proposed research provides a theoretical basis for testing a CBSB, mobile-enhanced intervention tailored to individual families to promote healthy lifestyle behaviors in parents of OW/OB preschoolers. Shapiro et al. (2008) assessed self-monitoring, adherence, attrition, acceptability, and preliminary efficacy of a healthful behaviors program in conjunction with three psychoeducational group sessions in a sample (*n*=58) of children (ages 5-13 years) with parent participation. Jacobson (2009; Jacobson, & Melnyk, 2012) implemented a Healthy Choices Intervention program with OW/OB school-age children and their parents (n=17 parent-child dyads) through four face-to-face sessions in a primary care clinic and telephone follow-up. Evidence shows that three to four face-to-face sessions have demonstrated feasibility and acceptability; therefore parents of the TEXT2COPE program were asked to attend four face-to-face

sessions as an adjunct to health supervision visit or minor acute visits for their preschooler.

To optimize the benefits of theory-based interventions, Michie, Johnston, Francis, Hardeman, and Eccles (2008) assert appropriate application of behavior change techniques depends on mapping the techniques to the proposed behavioral determinants. The initial step is to determine the behavioral determinants, and the next step is to identify behavior change techniques (Michie et al., 2008). For example, it might be appropriate to rehearse practical skills where the determinant is lack of skill (i.e., with CBT homework assignments) (Michie et al., 2008). The last step is to identify the link between behavior change techniques and behavioral determinants (Michie et al., 2008). Similarly, Wood et al. (2005) contend that behavior change interventions need to be tailored to mechanisms guiding actions. Accordingly, interventions should be tailored with regard to (a) actions triggered by contextual cues that are vulnerable to changes in context, or (b) actions that are oriented to attain certain outcomes/avoid others that are vulnerable to changes in beliefs (Wood et al., 2005). By identifying the behavioral determinants (i.e., critical inputs), identifying behavior change techniques (i.e., CBSB), and linking the behavior change techniques to behavior determinants (i.e., think, feel, act), the combined utilization of CT and constructs from Fogg's behavior model (e.g., triggers, ability) provides one causal model approach to healthy lifestyle behavior change in parents of OW/OB preschoolers. Presenting content through face-to-face sessions, manualized reinforcement, and homework, all supplemented by text messages, highlights the multifaceted approach to tailor the intervention to a variety of users. Through multiple reinforcement methods, the proposed study aimed to help parents recognize

unhelpful or destructive patterns of thinking and modify or replace those with more realistic and positive beliefs.

Review and Critical Appraisal of Existing Literature

Parental influence and a review of parent-focused interventions. Research conducted over the past 20 years demonstrates a relationship between parental feeding practices and a child's risk for obesity (Birch & Davison, 2001; Birch & Fisher, 1998; Thompson, 2010). A child's family is very influential on a child's attitude towards food, eating habits, and understanding satiety (Towns & D'Auria, 2009). It is substantiated that children of OW/OB parents are at risk for becoming OW/OB (Drohan, 2003; Larsen et al., 2005; Newby et al., 2003). Family members guide behaviors related to diet between the ages of 1 to 4, thereby making preschool years a critical time to establish healthy lifestyle behaviors to prevent the onset of OW/OB (Horodynski & Stommel, 2005; Towns & D'Auria, 2009). However, most families with preschool children are more engaged in illness prevention rather than health promotion (Roden, 2003). Parental influences have been documented as a crucial factor of dietary and physical activity patterns of children (Davidson & Birch, 2001; Davis, Befort, Steiger, Simpson, & Mijares, 2012; Haire-Joshu et al., 2003; McWhorter, Wallman, & Alpert, 2003; Satter, 2008).

Five evidence reviews have been conducted evaluating interventions aimed at the family or parents/adult caregivers as agents of change for dietary intake or treating obesity in children (Faith et al., 2012; Golan, 2006; Hingle, O'Connor, Jayna, Dave, & Baranowski, 2010; Knowlden & Sharma, 2012; Small et al., 2007). In an earlier review of the literature, Golan (2006) found that targeting parents as the exclusive mediator of

change resulted in a better reduction in the children's percentage overweight and improvement in obesogenic environment and behaviors when compared with parent and child or child only intervention sessions. Citing the need to address to what extent and in what specific ways parents and caregivers help the treatment of obese youth, the AHA recently put forth a scientific statement on the role of parents and caregivers as agents of change for the treatment of childhood obesity (Faith et al., 2012). Parents as agents of change are uniquely positioned to treat childhood obesity due to genetic and environmental influences, with children dependent on parents to structure their home environment and daily routines. Of the 12 studies reviewed that incorporated parent involvement on reductions in child overweight studies, none of the studies targeted parents of children under the age of 5. The review yielded limited and inconsistent evidence from RCTs with regard to level of parent involvement associated with child outcomes. However, parental adherence to core behavior change strategies (e.g., specifying target behaviors, goal setting, stimulus control, self-monitoring, positive reinforcement strategies) predicted better child weight outcomes. Gaps in the literature that warrant future research attention include examination of family relationships, culturally tailoring interventions, and the incorporation of new technologies.

Hingle et al. (2010) conducted a systematic review of parent interventions to improve child dietary intake to determine whether parent involvement enhanced intervention effectiveness. Of the 24 articles that met review criteria, only four studies met >70% of CONSORT (CONsolidated Standards Of Reporting Trials) items (Calvert et al., 2013; Turner et al., 2012). While limited conclusions could be drawn from the literature, direct approaches with parents (e.g., parent attendance at nutrition education

sessions) were more likely to result in positive outcomes versus indirect approaches (e.g., newsletters, tip sheets, email).

Knowlden and Sharma (2012) reviewed nine studies, with eight producing significant results. The majority of the interventions included educational sessions targeted at the parents, with all of the studies requesting home-based activities to reinforce behavior modification.

Small et al. (2007) sought to determine the effect of prevention or early intervention treatments versus comparison/control in OW/OB, or young children at risk. Of the 12 RCTs (six prevention studies, six treatment), none targeted parents as agents of change in children less than 5 years. Updated to identify effective treatments for the growing number of preschool children who are OW/OB, Small and colleagues (2012) conducted a rigorous review of literature analyzing the effects of portion size manipulation with young children and dietary education/training interventions on dietary intake with adults. The review was conducted on nine studies dating from 2000 through 2010.

Analysis of the evidence suggested that adults do have the ability to accurately estimate portion size following education and training (Small, Lane, Vaughan, Melnyk, & McBurnett, 2012). Parent-focused training sessions teaching portion size and reducing error were more successful than computer module sessions. Personal delivery of sessions that are interactive, lasting 30-60 minutes, and used 2- and 3-dimensional visual models appear to be more effective (Small, Lane, et al., 2012). Furthermore, the authors found that overall energy intake in many of the children was affected by the size of the portion, with larger portions resulting in greater daily energy intake (Small, Lane, et al., 2012).

However, large portions of vegetable consumption in advance may not reduce subsequent intake. This finding is unclear as Spill, Birch, Roe, and Roll (2010) found that large portions of vegetables did not affect the amount of other foods eaten afterwards. The literature was limited by the extent to which the findings could be generalized to other settings (e.g., studies were conducted in well-controlled environments, not real-life home settings). Also, it was unclear whether accurate portion size estimate would translate into providing age-appropriate portion sizes to children.

Building upon the existent literature using a standard for evidence-based practice (Melnyk & Fineout-Overholt, 2011), a PICOT (Patient population, Intervention of interest, Comparison or Control intervention, Outcome, and Time) question was developed to guide the evidence review for this study. The PICOT question for the literature review was: "In parents of preschoolers (P), how do parent-focused interventions (I) versus other interventions (C) affect outcomes in preschoolers (O) within the past 10 years (T)?" A systematic search of the literature was conducted to determine the literature on parent-focused interventions in families with preschool-aged children. Using a combination and/or of major heading (MH) or major subject headings (MeSH) of *parent, education, intervention, parenting skills, healthy lifestyle behaviors, dietary intake, nutrition, and preschool* limited to systematic reviews, meta-analyses, experimental trials, yielded 397 hits. When the limit of 2-5 years was applied, 147 remained with only 27 parent-focused. Titles and abstracts were reviewed. Three studies were not relevant, 13 were not parent-focused intervention studies, one assessed a measure, one was solely focused on school-aged children, and one was qualitative, yielding eight studies for review. Additional hand searching and perusing bibliographies

yielded an additional two studies, for 10 total. The studies, dating from 2001 to 2013, are outlined in Appendix A.

Parent-focused interventions appeared feasible and acceptable across a myriad of child-related behavioral outcomes. An estimated 62% of the studies reviewed employed a theory or framework to guide the research. Only two of the studies evaluated dietary or healthy lifestyle outcomes in young children (Evans et al., 2011; Stark et al., 2011). Parental measures tended to gravitate towards stress, depression, anxiety, and hassles in relation to child's behavior, with measures of parental stress the most prominent across the literature (~50% of studies). Both group and individualized sessions were used with varying success rates. However, attrition rates appeared higher with in-group or non-tailored interventions. A reoccurring theme limiting the literature was the lack of comparison or control groups. Studies that employed waitlist control were limited in longitudinal analyses (i.e., if waitlist group is enrolled at 6 months, a posttest past at 1 year on the control group is not feasible), but it is unethical to withhold a treatment that could prove beneficial to families in need. Nearly half of the studies reviewed gathered longitudinal data. Three of the ten studies were able to obtain longitudinal data at 12 months posttest, and one study was able to gather 9-month data. Using a two-group study tended to result in nonequivalent groups. Furthermore, multiple methods were used to recruit families. Despite qualitative feedback on having both parents present, only one parent typically attended the intervention sessions. Families appeared more sensitive to participant burden, with attrition contributed to other family commitments (i.e., higher attrition with older children, holidays, or time of the intervention). Families appeared to

have difficulty prioritizing the interventions when competing with work, other sibling activities, and daily demands of living.

Preschool is an ideal time to utilize parental influence to develop positive attitudes and behaviors towards healthy lifestyle behaviors. The overall strengths of the literature on parent-focused interventions on child outcomes include the use of core behavior strategies to influence behavior change, the attention to parental stressors as it impacts a child's health, and the demonstrated feasibility and acceptability of direct parent-focused interventions. Tailored interventions that minimize participant burden while incorporating elements to problem-solve and reduce parental stress appear favorable. Clinic staff and environment were used to promote recruitment efforts. Parents were encouraged to bring their children to the face-to-face sessions to deter issues of childcare. While there exists noteworthy efforts to further the science in this area, there are limitations of the data to date. Lacking in the literature are strategies to support proposed change to the family lifestyle or strategies to support optimal family routines to prevent or treat a diagnosis of OW/OB. It is still unclear what effects these interventions have on the treatment of childhood obesity and clinical implications. The studies included in the reviews were heterogeneous in nature with a myriad of outcomes, limiting the ability for pooled analyses (Small, Lane, et al., 2012). More rigorous and well-designed evidence is needed to guide clinicians with regards to parent-focused interventions in young children.

Therefore, this study employed strategies that facilitate relationships with the primary care site, providers, and staff that have an established, trusting relationship with parents. Building on the science and recommendations of the AHA scientific statement, the TEXT2COPE program incorporated new technologies (tailored and static text

messaging). Additionally, this study used parents as agents of change to treat childhood obesity through a tailored intervention with face-to-face meetings and individualized text messages.

Healthy lifestyle behavior interventions in preschool populations. There are significant gaps in the published literature on the treatment of OW/OB in preschool-aged children. In 2010, a review for the U.S. Preventive Services Task Force found no randomized trials that targeted OW/OB children younger than 4 years of age (Whitlock et al., 2010). Due to the limitations of published literature, population-based evidence was examined critically to better understand healthy lifestyle choices in families with preschool-aged children.

Previously, Bond, Wyatt, Lloyd, Welch, and Taylor (2009) conducted a review to determine the effectiveness and cost-effectiveness of weight management schemes for children less than 5 years of age. From three dissimilar studies, the authors concluded that no controlled trials addressing treating obesity in children less than 5 years old were found. Furthermore, of the three studies reviewed, the findings were disparate, making firm conclusions difficult and highlighting the urgent need for well-designed studies aimed at the prevention and treatment of obesity targeted at preschool children (Bond, Wyatt, Lloyd, Welch, & Taylor, 2009).

Oude Luttikhuis and colleagues (2009) reviewed 64 RCTs to assess the efficacy of lifestyle, drug, and surgical interventions for treating childhood obesity in children with a mean age less than 18 years. A majority of the studies (n=36) concentrated on behaviorally oriented treatment programs; ten studies evaluated drug interventions, and no studies looking at surgical intervention were available for review. The authors

concluded that there are limited data to recommend one treatment program to be favored over another, yet, combined behavioral lifestyle interventions compared to standard care or self-help, can significantly and clinically reduce overweight in children and adolescents (Oude Luttikhuis et al., 2009).

Although not focused on treatment of OW/OB, Hesketh and Campbell (2010) conducted a review of interventions to prevent obesity in children less than 5 years of age. Twenty-three studies, which were mostly conducted in preschool/childcare settings, highlighted interventions that were widely varied. While most interventions reported being feasible and acceptable, a common limitation was the failure to report data on cost-effectiveness of the intervention. Quality and rigor of the study designs and methodologies was difficulty to illicit, compounded by little evidence of research continuity (i.e., there was no evidence of separate studies to build on the lessons learned from previous intervention attempts) (Hesketh & Campbell, 2010). Overall, the studies reviewed provided a mixed picture of the ability of the intervention programs to change behaviors that contribute to obesity in young children; it is important to highlight the premise that parents and caregivers are receptive to make positive changes to dietary, physical activity, and sedentary behaviors of their young children (Hesketh & Campbell, 2010). Similarly, Monasta and colleagues (2011) conducted a systematic review of RCTs aimed at the prevention of OW/OB in children less than 5 years of age. In their review of seven RCTs, four trials were carried out in preschool settings, two were family-based, and one was conducted in a maternity hospital. None of the interventions were effective in preventing OW/OB (Monasta et al., 2011).

In a more recent systematic review of 12 studies implemented in preschool/ school-based settings aimed at preventing obesity in 4-to 6-year-olds, Nixon and colleagues (2012) found that successful interventions that slowed accelerated weight gain combined high levels of parental involvement and interactive learning targeting physical and dietary change. The review was of RCTs with a follow-up of 6 months or longer, and with outcome markers of weight gains, body composition, and physical activity and dietary behavior change (Nixon et al., 2012). Seven of the studies reported on health knowledge of parents and/or children, parental attitudes towards health, and parental support and role modeling (Nixon et al., 2012). Although increases in knowledge do not necessarily indicate a change in behavior, cognitive variables were primary outcomes in all but one of the studies (Nixon et al., 2012).

From the limited published literature, what is known about obesity-related interventions in preschool populations is that (a) factors of the family environment appear to be important in obesity prevention, and (b) strategies to decrease accelerated weight gain should include parental food preferences and beliefs, role modeling, and child-parent interaction around food (Campbell & Crawford, 2001; Stark et al., 2011). In the limited evidence available to treat obesity in children in children ages 3-5 years (Stark et al., 2011; Whitlock et al., 2010), short-lived (i.e., one-time 45-minute) counseling is not sufficient to reduce obesity rates. Furthermore, targeting reductions in time spent in sedentary behavior may be favorable approach to weight management in children. In a landmark study, Epstein and colleagues (1995) found reductions in sedentary behaviors were more successful at increasing children's liking for high-intensity activity and lower reported caloric intake than children in an exercise comparison group. Multimodal

interventions (i.e., clinic plus technology and/or manualized content) (Franklin, Waller, Pagliari, & Greene, 2006; Jacobson & Melnyk, 2012; Melnyk et al., 2007; Shapiro et al., 2008; Small et al., 2007); multiple face-to-face sessions (Franklin et al., 2006; Jacobson, 2009; Kelly & Melnyk, 2008; Melnyk et al., 2006, 2007); timed after the winter holiday season (Jacobson & Melnyk, 2010; Onnerfält et al., 2012); nutrition, physical activity, and portion size (Franklin et al., 2006; Jacobson & Melnyk, 2012; Melnyk et al., 2007, 2009) have demonstrated significant effects on health outcomes. Therefore, the proposed study will incorporate these elements to target parental beliefs towards food and child-parent interactions around healthy lifestyle behaviors.

Primary care settings. Policies and guidelines have surged in response to the declining health of the United States, and are redirecting the focus of health back on health promotion. As part of the Affordable Care Act, the Prevention and Public Health Fund will help to fill gaps in primary care by allotting an estimated $168 million to train 500 new primary care physicians, $32 million for the development of 600 new physician assistants (PA), and $30 million to train an additional 600 nurse practitioners (NPs) (American Association of Colleges of Nursing, 2014). The investment and attention to primary care highlights the emphasis to shift health care in the United States back to a primary care effort.

Primary care settings present an opportunity for interventions for OW/OB children, but are in need of feasible model of care with demonstrated effectiveness (Sargent, Pilotto, & Baur, 2011). Interventions originating in pediatric primary care offer certain advantages: (a) aside from teachers, primary care providers have the most professional contact with the families of preschoolers; (b) parents tend to trust

pediatricians' recommendations; and (c) primary care providers are the best predictor of help-seeking for preschoolers' behavior problems (Lavigne et al., 2007). Counseling in obesity clinics demonstrated a 7% to 26% sustained decrease in overweight children (Moyer et al., 2005), yet evidence for effective interventions delivered in pediatric primary care settings are lacking (Lavigne et al., 2007; Moyer et al., 2005; Stark et al., 2011). Sargent et al. (2011) conducted a review to determine components of primary care interventions aimed to treat childhood OW/OB. Comparisons from 12 studies that had at least one intervention effect led the authors to highlight evidence supporting (a) training for health professionals before intervention delivery; (b) behavior change options (e.g., healthy diet, activity, sedentary behavior); and (c) effecting behavior change with a combination of counseling, education, written materials, support, and motivation, and tailoring intensity based on outcome priorities (e.g., behavioral versus anthropometric) (Sargent et al., 2011).

In the published literature through January 2014, there were only seven intervention studies implemented in a primary care setting that focus on obesity prevention or treatment in preschool children (Ariza, Laslo, Thomson, Seshadri, & Binns, 2009; McKee, Maher, Deen, & Blank, 2010; Quattrin et al., 2012; Ray, Lim, & Ling, 1994; Schwartz et al., 2007; Small, Bonds-McClain, Melnyk, Vaughan, & Gannon, 2013; Taveras et al., 2011). Two studies were RCTs (Quattrin et al., 2012; Taveras et al., 2011) and two were randomized controlled feasibility trials (McKee et al., 2010; Small, Bonds-McClain et al., 2013). The other studies lacked randomization (Ariza et al., 2009, Ray et al., 1994; Schwartz et al., 2007), thus limiting internal validity. The interventions were multifaceted. Intervention content and implementation included (a) cueing providers

with a self-inking stamp with prompts for nutritional status and BMI percentile; (b) training providers, registered dieticians, or research assistants to counsel families with preschoolers on healthy lifestyle behaviors using motivational interviewing techniques, implementing a lifestyle counselor as an adjunct to a preschool health supervision visit to enhance goal-setting in families at risk (i.e., parents are OW/OW, low parental education levels, families of low socioeconomic status) for obesity; (c) individual parent or group; and (d) phone education or by person on dietary and physical activity/sedentary activity with a behavioral modification component. Across the studies, counseling sessions ranged from 1-4 office visits, with documented counseling on BMI percentile, diet, and physical activity. The sessions ranged in duration from a median of 4 minutes for obese children/families, to 25-60-minute in-person motivational interviewing chronic disease management visits and 15-minute telephone calls (see Appendix B for studies reviewed in this analysis).

Overall, a critical analysis of the seven studies reveals the following strengths: (a) interventions targeting the prevention of OW/OB preschoolers are feasible and acceptable in a primary care settings, (b) both parents and providers expressed a strong desire to have more resources available to help families with preschoolers engage in healthy lifestyle behaviors, (c) family-centered interventions that are tailored to the family appear to be very important, (d) studies used theoretical frameworks to guide the interventions and selection of outcome variables, (e) problem-solving and goal-setting are important intervention components, and (f) accounting for individualized practice setting needs was important to study implementation. The proposed feasibility and acceptability study addressed these limitations by (a) facilitating primary care settings by providing the

TEXT2COPE program as a resource for families with OW/OB preschoolers, (b) piloting the 7-week program to determine effective dosage for both the four face-to-face sessions and three self-study plus text messaging for behavior change, and (c) using the information obtained to inform future studies. Successful intervention studies with preschool-aged children should (a) include parents, (b) use strategies to develop skills and behavioral capacity in families, (c) educate parents and children about the benefits of healthy eating and engaging in routine physical activity, and (d) have parents model healthy eating and be physically active (Nixon et al., 2012). The proposed study focused on these strategies and other recommendations that addressed (a) weight management in children, (b) behavioral interventions in children ≤ 5 years, (c) behavioral interventions that include children who are OW/OB, and (d) inclusion of primary care settings (Summerbell et al., 2005; Whitlock, O'Connor, & Williams, 2010). The goal was to strengthen parental beliefs and subsequent attitudes and behaviors in their ability to engage in healthy lifestyle behaviors for their families. By strengthening parental beliefs about their ability to engage in healthy lifestyle behaviors, it was anticipated that positive parental attitudes and behaviors would result. In turn, parental choices and role modeling for their children should be more positive, encouraging an atmosphere where children are more likely to adapt positive beliefs about their ability to engage in healthy lifestyle behaviors.

Mobile technology in health. To date, mobile technology research has occurred with little communication among disciplines, researchers, and clinicians. In recognition, the Foundation for the National Institutes of Health and mHealth Alliance (2014) emphasized cross-sector dialogue between research, technology, and policy with an

annual summit. Mobile technologies have the potential to expand care and reduce costs, and are poised to reinvent healthcare delivery superior to other technologies due to high demographic penetration, omnipresent nature, fluidity of use, and broad range of capabilities (Fjeldsoe et al., 2009; Fogg et al., 2007; Kraft & Yardley, 2009; Swendeman & Rotheram-Borus, 2010). "Nothing is better positioned to intervene at the opportune moment" (Fogg et al., 2007, p. 6). Feedback messages may have a more pivotal role towards goal attainment consistent with behavioral principles that document feedback, either reinforcing or corrective, as a compass enabling an individual to stay on course with goal attainment (Burke et al., 2012). This review will highlight both gray (i.e., annual reports, fact sheets, consumer brochures, presentation slides, technical reports, policy briefs, and white papers) and empirical areas of publication to demonstrate the opportunity for meaningful interactions as the wave of mobile health usage grows.

Gray literature. On the commercial side, applications such as Habit Changer (HC, 2009) offer a series of a CBT-based intervention to facilitate positive changes in one's life. One of six programs (weight loss, smoking, feeling better, money, stress, and feeding kids) can be delivered through a 42-day digital program to encompass email, text, and web support. Most of the HC programs range in costs from $12.95 to $19.95. Daily challenges are designed to cognitively restructure participants' views to change a targeted behavior. Participants (44 treatment, 31 control) who completed 21 or more days of the Quit Smoking HC program were significantly ($p<0.01$) more successful in reducing the number of cigarettes they smoked, or entirely quit smoking. Pretest, respondents smoked an average of 18.63 cigarettes/day (SD = 12.86). Posttest, HC respondents reduced their smoking by 13 cigarettes/day, while the control group reduced by eight cigarettes/day

($t(1,69)=5.99$, $p<0.05$). The HC entitled Feeding Your Kids (HC-FYK, developed in partnership with the Clinton Global Initiative and the First Lady's Apps for Healthy Kids competition) targets caregivers with children ages 2-12 years to use the free downloadable iPhone app (HC, 2009). The logic model for the HC-FYK program suggests that when parents gain awareness, knowledge, and skills, changes will also take place in their children. It is anticipated that children will make more informed food choices, eat a wider variety of more healthful foods, and have a healthy weight (Petersen, Brigham, & Rouspil, 2010). To date, no published research was available on the HC-FYK program. One of the largest and more widely recognized text-messaging efforts by the National Healthy Mothers, Healthy Babies Coalition (HMHB) launched a public-privately funded program, Text4Baby, in 2010 (HMHB, 2012). The Coalition partnered with Johnson & Johnson through a multi-year, multi-million funding partnership (CDC, 2013b; HMHB, 2012; Stone, 2010). Text4Baby is designed to promote mother and child health through a free mobile education/information service. Women are able to sign up for the service by texting "baby" or "bebe" (for Spanish users), to a number and receive free weekly texts, timed to the due date of their baby. The initiative expanded outreach efforts through Medicaid and WIC, with HRSA and the Department of Defense conducting evaluations to understand the value of Text4Baby families and underserved populations (HMHB, 2012; Stone, 2010). By the end of January 2012, over 281,000 participants enrolled, with 96% of enrollees reporting that they would recommend the service to a friend (Centers for Disease Control and Prevention (CDC)., 2013a, CDC, 2013b).

Empirical literature on text messaging in pediatric health. Mobile-based interventions studies are difficult to summarize because they have been published in a wide range of databases and incorporate disparate methods. Thus, our understanding of mobile-based, natural setting, real-time interventions in psychosocial and health behavior treatment is limited (Heron & Smyth, 2010). Ecological momentary interventions (EMIs) and ecological momentary assessments (EMAs) hold unique promise to advance the science of behavior change by shedding light on experience and behavior in real-world, real-time settings (Heron & Smyth, 2010; Shiffman, Stone, & Hufford, 2008). The ubiquitous nature of mobile technologies has the potential to transform this arena of research using real-time interventions and assessments. In 2013, Schnall and colleagues used text messaging to assess adolescents' health information needs through EMA. Over the course of 30 days, 60 adolescents ages 13-18 years were sent three SMS weekly asking questions related to how information needs of adolescents was obtained (i.e., What questions do you have about your health?, Where did you look for an answer?, Anything else?). The phones were additionally preinstalled with applications related to asthma, obesity, diet, and human immunodeficiency virus. There was a 90% response rate to the EMA questions, resulting in a response of 421 SMS related to health needs and 516 text messages related to where the teens looked for the answers. The authors concluded that text messaging is a useful tool for assessing adolescents' health behavior in real-time (Schnall et al., 2013).

Stockwell, Kharbanda, and colleagues are well-known for their extensive research using text messages as reminder related to vaccinations rates (Kharbanda, Stockwell, Fox, & Rickert, 2009; Stockwell, Kharbanda, Martinez, Lara et al., 2012; Stockwell,

Kharbanda, Martinez, Vargas et al., 2012; Stockwell et al., 2014). Collectively, the evidence by these authors suggests that text-messaging reminders improves immunizations coverage rates (versus usual care) in low-income urban populations.

A systematic review of text-messaging interventions to promote healthy behaviors in pediatric and adolescent populations appraised the evidence on the use of text messaging as a tool to deliver healthy lifestyle behavior programs in pediatric and adolescent populations (Militello, Kelly, & Melnyk, 2012). From seven experimental studies, the authors found the mean age of study participants ranged from 8.7 to 17.9 years of age. Intervention length ranged from 2 to 52 weeks (mean =23.14, SD 20.8). Frequency of text messaging varied from daily in five studies and weekly in two studies. Two-way messages (sent, received) were provided in five of the studies, with four studies allowing participants to set either the frequency and/or timing of the messaging. All studies were designed to have participants meet either regularly for scheduled clinic visits or supplemented with face-to-face sessions. Overall the authors concluded that interventions using SMS can be successful as reminders in disease management behaviors (i.e., medication adherence, blood glucose monitoring) and that tailored, interactive, and family-centered interventions could be supplemented with mobile technology to facilitate behavior change. Limitations of the existing literature include small sample sizes and power, brief intervention duration without long-term follow-up, and lack of adequate attention control groups.

Appendix C outlines three published studies conducted in pediatrics that utilized text messaging to improve healthy lifestyle behaviors (outside of chronic disease management: i.e., diabetes and EMAs). Two studies were quantitative (Bauer, de Niet,

Timman, & Kordy, 2010; Shapiro et al., 2008) and one was qualitative (Sharifi et al., 2013). Patient compliance to strategies using CBT and social CT with text messaging was supported in the literature (Bauer et al., 2010; Shapiro et al., 2008). Bauer et al. (2010) found that in a sample of school-aged children (n=40, mean age=10.05, SD=1.28), BMI was reduced through a 12-week cognitive behavioral group treatment (by 0.20 BMI-SDS [SD score] SD-0.23; $t(36)=5.20$, $p<0.001$). A maintenance arm, following the intervention with a 36-week text-messaging maintenance treatment, did not reach statistical significance. Although nonsignificant, there was slight further decrease by 0.07 BMI-SDS between the end of the intervention and the end of the text message maintenance portion (t(36)=1.70, n.s.). Students completed 67% of the text message homework and further reduced their BMI an additional 0.07 BMI-SDS. The efficacy of the text message portion of the program needs to be demonstrated in an RCT, but the initial results support the feasibility and acceptability of text messaging in the treatment of childhood overweight (Bauer et al., 2010).

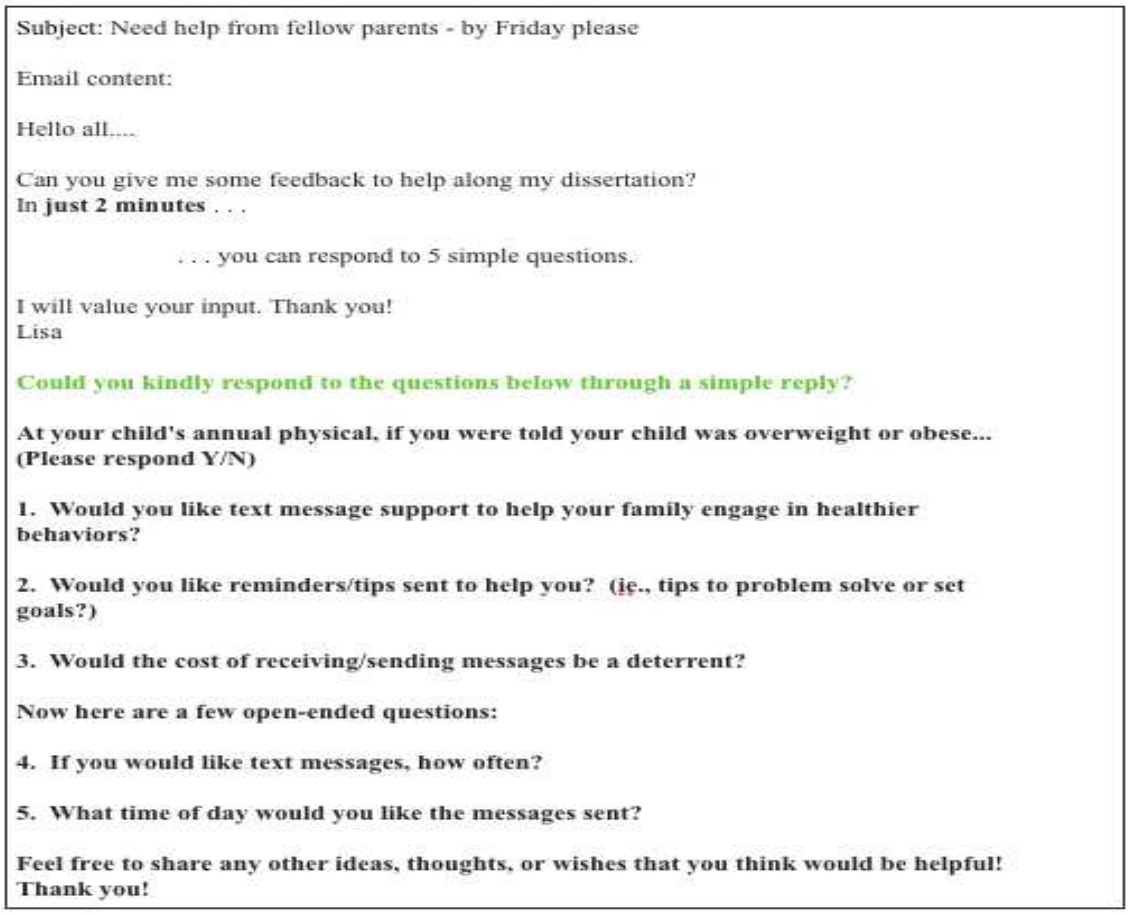
Shapiro and colleagues (2008) examined the acceptability, attrition, adherence, and preliminary efficacy of a text message theory-based intervention monitoring healthy behaviors in 58 families with children ages 5-13 years. Healthy behaviors included increasing physical activity and reducing screen time and sugar sweetened beverage intake. The intervention consisted of children and parents participating in three group education sessions (weekly for 3 weeks). Main outcome measures were treatment acceptability, attrition, and adherence to self-monitoring. Self-monitoring was done either by paper diaries (n=8), text messaging (n=13), or no monitoring (n=11). Adherence to self-monitoring was significantly different with compliance in 43% text

messaging versus 19% paper diary ($p<0.02$). Retention rates were also higher for the text message monitoring group (72%) versus the paper (39%) and control groups (50%). The text-messaging group was the only group to show a decrease in screen time in children compared to paper or control groups receiving daily text messages.

Sharifi and colleagues (2013) examined parental acceptability and preference for text messaging to support obesity-related behavior change. While the results are summarized in Appendix C, it is noteworthy to state that parents were enthusiastic about receiving text messages endorsed by their child's primary care provider (Sharifi et al., 2013).

Text messaging (SMS) has advantages for use in clinical practice, including: (a) SMS is accessible at most times, (b) SMS is a quick and interactive technology, (c) SMS can be nearly effortless to use, and (d) communication is inexpensive (Bauer et al., 2010). Text messaging is versatile in use and can be supplemental to clinical care. The key strengths of research utilizing mobile technology are the desirability expressed by parents, the ability to capture behavior in real-time, naturally occurring situations (i.e., their daily routines), and the potential to promote behavior change through quick, cost-effective, tailored messages. Limitations of mobile-based interventions to date are the small number of RCTs, the paucity of theory-based interventions, and dearth of substantiated evidence to support families and caregivers of young children. Theory-based intervention testing is consistent with prior healthy lifestyles behavior research (Melnyk et al., 2006, 2009) and has yet to be fully understood with technology-based interventions.

Iterative support for text messaging. Since no study to date has been conducted with parents of OW/OB preschoolers testing a CBSB intervention in a primary care setting with mobile support, it is difficult to generalize previous research to the particulars of this study. A gap exists within the literature on the topic of promoting healthy lifestyle behaviors in parents of OW/OB preschoolers using a cognitive-behavioral intervention synergized with mobile technology. Therefore, when designing this study (in 2012), a convenient sample survey was conducted to inform the implementation of the intervention. Non-experimental designs (i.e., descriptive, qualitative) are useful when constructs need to be described (Melnyk & Morrison-Beedy, 2012). Mimicking the initial survey design of B. J. Fogg's (2010) 3 Tiny Habits, a five-question survey was sent via email to 27 parents of preschoolers (see Figure 3 for email content). The intent of the survey was to inform the design of and implementation of the intervention, therefore, with the opt-in survey, Institutional Review Board (IRB) consent was not obtained. Eleven parents volunteered or opted-in with their responses, yielding an approximate response rate of 41%. To additionally obtain data, a one-day Facebook status post requested similar information from parents. The request yielded an additional 13 responses, for a total of 24 participants.



Subject: Need help from fellow parents - by Friday please

Email content:

Hello all....

Can you give me some feedback to help along my dissertation?
In **just 2 minutes** . . .

. . . you can respond to 5 simple questions.

I will value your input. Thank you!
Lisa

Could you kindly respond to the questions below through a simple reply?

At your child's annual physical, if you were told your child was overweight or obese... (Please respond Y/N)

1. Would you like text message support to help your family engage in healthier behaviors?

2. Would you like reminders/tips sent to help you? (ie., tips to problem solve or set goals?)

3. Would the cost of receiving/sending messages be a deterrent?

Now here are a few open-ended questions:

4. If you would like text messages, how often?

5. What time of day would you like the messages sent?

Feel free to share any other ideas, thoughts, or wishes that you think would be helpful! Thank you!

Figure 3. Sample email survey.

Although the sample size was small, the data collected were rich with information. One hundred percent of participants stated that they would like their healthcare provider to send reminders or tips to support their engagement in healthy lifestyle choices. Ninety-two percent stated that they would like the support in the form of a text message. The costs of receiving/sending a text message would not be an issue to 82% of those parents sampled. When asked about the frequency of the text messaging, 63% of parents opted for a weekly text message, followed by 13% requesting twice a week messaging. Daily or monthly text messaging was requested 10% of the time.

Approximately 64% of parents stated that the messages would be most beneficial if sent during the morning hours.

Two open-ended questions provided qualitative feedback. Several of the responses highlighted parents' lack of *time* to seek out answers related to their child's health and *get frustrated*. Within the data, themes for the type of support from the primary care provider emerged. A *strong message*, that was *short* and *easy to read* was recommended. These findings parallel aspects of Fogg's (2011) work suggesting simplicity changes behavior. Fogg (2011) contended that asking people to perform too complicated a behavior or putting too much into a trigger will not lead to success. Therefore, the TEXT2COPE intervention did not rely solely on the trigger, but supplemented behavior change through goal setting and skills building intended to facilitate problem-solving and overcome barriers discussed in face-to-face sessions and enhanced with self-study manualized content.

Additionally, participants in the iterative phase welcomed additional *links*, or *resources*, and *variety* to help support behavior change. This allowed participants to seek out information that they are ready to absorb and tailor the intervention to their level. Interestingly and contrary to multiple previous studies, the participants stated that daily text messaging would be *too much* and may lead to alert fatigue or the messages being ignored. Using Fogg's (2012) behavior grid and focusing on the trigger aspect to increase behavior intensity or duration of a familiar behavior help to enhance one's ability to do the behavior or increase the number of triggers leading to the behavior.

The data may be limited, as the sample represented parent volunteers. Social desirability could have also influenced responses, although respondents were encouraged

to be realistic and forthright with their answers. Furthermore, responses may have been limited due to the time constriction mentioned in the subject heading of the email, providing only 3 days for the parents to respond. The small parent sample was representative of parents of preschoolers, but may not be generalizable to parents of OW/OB preschoolers, or parents accessing clinics in more economically challenged or culturally diverse communities.

With the current climate of healthcare reform compounded with the rapid advances in technology, it is difficult to steadfastly plan without considering the needs of consumers. People are not static—there is much uncertainty; therefore, it may be fatal to have a *just do it* approach (Ries, 2011). Therefore, data from existing research were triangulated with the results of this survey. The data from the literature and the results of the survey were weighed based on rigor and empirical support. To avoid committing a type III error (wherein there lies a discrepancy between the research focus and research questions [Schwartz & Carpenter, 1999]), information gathered quantitatively and qualitatively validates the learning cycle (Ries, 2011). The inherent strengths of gathering information lacking in the literature outweigh the limitations and help to inform the science.

Summary and synthesis of text-messaging evidence. When considering the dosage of the text portion of the intervention, programs like Text4baby send approximately 36-40 messages to users (weekly SMS for 9-10 months=36-40 SMS). The HC programs send daily messages for 42 consecutive days. From the review of literature on the use of text messaging in pediatric literature (Militello et al., 2012), daily text messaging was used more frequently as medication reminders or for self-monitoring

purposes. Behavior change interventions in the empirical literature tended to utilize text messaging once weekly in conjunction with other face-to-face intervention components. Attrition ranged from 0% in a 3-month intervention study assessing feasibility of telemedicine support on glycemic control in adolescents (Rami, Popow, Horn, Waldhoer, & Schober, 2006) to 37% attrition at 4 months for an intervention study to improve immunosuppressant adherence for pediatric patients (Miloh et al., 2009).

Extending the Science with this Pilot Study

A variety of dietary and physical activity interventions have been somewhat effective in slowing the obesity epidemic; however, cost-effective promotion methods to prevent and sustain healthy lifestyles across diverse populations are not yet established. When reflecting on the value of intervention research, the *so what* factor must be considered. Melnyk and Morrison-Beedy (2012) refer to the *so what* factor as a term to describe the development and conduct of research with high-impact potential to improve outcomes. First, principles of effective teaching (i.e., knowledge, facilitation and prompting of an action, creating an environment conducive to learning [Billings & Halstead, 2004]) were built into the proposed research. Secondly, this research provided a theoretical basis for testing a mobile-based intervention tailored to individual families to promote healthy lifestyle behaviors in parents of preschoolers. The program incorporated messages that utilized principles of CT to create new perspectives on healthy behaviors, thus creating an opportunity for positive behavior change. This study was designed with the intent to improve health, healthcare quality, and patient/family outcomes. Given the lack of evidence available on text messaging in primary care in preschool populations and in families with an OW/OB child, this pilot study will provide

insight into *so what* outcomes needed to guide clinical practice. By synergizing the TEXT2COPE program with mobile technology, skills, and related messages, the program can easily be replicated and implemented in a primary care setting.

In summary, by using CT to guide the intervention, CBSB was enhanced by the ease and timeliness of mobile technology to strengthen parental beliefs in their ability to engage in healthy lifestyle choices. Cognitive behavioral skills-building sessions focused on empowering parents to engage in healthy lifestyle behaviors (i.e., healthy nutrition and physical activity) through positive strategies to problem-solve and enhance goal setting. To successfully problem-solve, the participant must be able to recognize, understand, and change irrational patterns of thought. The intent is to interrupt the cycle of negative cognitions. CBSB was used as a strategy to reframe potential parental beliefs that act as barriers to their ability to actively engage in healthy lifestyle behaviors. Using CBSB to provide parents with the skills needed to reframe negative cognitions, it is anticipated that parents will be able to actively engage in healthy lifestyle behaviors.

Mobile technology was designed to reinforce and support manualized cognitive behavioral skills building materials taught to parents of preschoolers after a well child visit. The intervention is designed for implementation into a primary care setting, and can be carried out by providers and support staff (e.g., medical technicians and registered nurses). There is adequate evidence that the harms of behavioral interventions are no greater than small (Whitlock et al., 2010). There are no published studies evaluating the use of CBSB in conjunction with clinical and mobile technology to promote healthy lifestyle behaviors in families with preschoolers. By creating the TEXT2COPE program with the *so-what* factors in mind, the likelihood of a successful intervention study and

program of research is increased to positively impact outcomes (Melnyk & Morrison-Beedy, 2012). This study sought to fill gaps in the literature by targeting barriers of perceived lack of information, perceived difficulty, lack of practice resources, and patient accessibility through CBSB and text message communication. Through this innovative primary care effort, the goal was to reframe parents' negative cognitions and perceived difficulties into rational, strengthened beliefs in their ability to adapt and maintain healthy lifestyle behaviors. The program is the first in a trajectory of research aimed at improving healthy lifestyle behaviors through a replicable, evidence-based intervention appropriate for primary care settings.

CHAPTER 3. METHODOLOGY

The overall purpose of the educational/cognitive behavioral skills building intervention was to (a) increase parent nutrition and activity knowledge, (b) strengthen parental cognitive beliefs about living a healthy lifestyle and engaging in healthy behaviors, (c) decrease perceived difficulty/attitude in leading a healthy lifestyle, and (d) increase healthy lifestyle behaviors in parents with OW/OB preschool children who use a mobile phone. The primary aim of this study was to examine the feasibility and acceptability of a theory-based TEXT2COPE intervention with parents of OW/OB preschool-aged children. Secondary aims of this pilot included evaluating the preliminary short-term effects of the TEXT2COPE intervention on the study's variables (i.e., knowledge, healthy lifestyle beliefs, perceived difficulty, healthy lifestyle behaviors) and to assess the relationships among study variables.

Design

The pilot study was a pre-experimental (lacking a control group and randomization) study using a one-group pre- and posttest design for the purpose of evaluating the feasibility, acceptability, and preliminary effects of a theory-based intervention (i.e., TEXT2COPE) as shown in Table 1

Table 1

Study Design

	Baseline	Intervention	Post-intervention
TEXT2COPE Intervention Group	O1	X1	O2

Phase I clinical trials focus on testing the feasibility, acceptability, and safety of a new intervention with a small sample (Whittemore & Grey, 2002). Performing a feasibility study may be indicated when there are few published studies or existing data using a specific intervention technique, and findings from feasibility studies are relied on to help determine whether an intervention should be recommended for efficacy testing (Bowen et al., 2009). In this case, no published studies have evaluated the use of text messaging in conjunction with a cognitive behavioral skills building intervention for parents of OW/OB preschoolers. The literature is limited when it comes to interventions implemented in a primary care setting and interventions aimed at promoting healthy lifestyle behaviors to parents of OW/OB preschoolers. The state of the science is even more limited when technology is introduced to facilitate behavior change in the proposed population and setting. Prior to a full-scale clinical trial, small-scale studies that more closely represent the clinical context can be used to test aspects of the intervention feasibility such as safety, optimal dose (treatment intensity, frequency, duration), and sequencing of the treatment (Bowen et al., 2009). Furthermore, feasibility studies help to determine if further testing of an intervention is appropriate, and, if changes in the research protocol are needed, how the changes may occur (Bowen et al., 2009). A feasibility intervention study is the first step in this program of research to develop an efficacious theory-based intervention to improve healthy lifestyle behaviors in families with preschoolers, which should ultimately prevent and reduce childhood obesity and its related comorbidities.

Setting

Participants were recruited from four primary care practices (three in the Denver-Boulder, CO metro area, one in the Grand Rapids, MI metro area). All of the clinics provide comprehensive well and sick care for pediatric patients from birth through 21 years of age. Two of the clinics were affiliated with academic institutions and one was part of a network. Interventions took place either in a private conference room or in an examination room. The clinics were geographically varied and represented a range of sociodemographic differences. Staff at each of the sites attended an educational in-service class provided by the investigator on childhood obesity and the goals and implementation of the TEXT2COPE program. All of the offices adopted electronic health records (EHRs), which calculated and plotted BMIs. The PI for this study was also the interventionist, but was not a healthcare provider at any of the clinics. However, prior to obtaining consent, the PI verbally emphasized that participation in the TEXT2COPE would not affect the child's or family's care at the primary care clinic and this information was also part of the written consent. Staff members (e.g., medical assistants, nurses, NPs, and medical doctors) were willing to facilitate identification and recruitment for the study. The PI worked diligently to develop and maintain positive relationships with clinics (e.g., phone calls and emails updating a point of contact and/or the office manager about the program progress, establishing scheduled clinic days for the TEXT2COPE program, providing occasional light refreshments such as bagels and coffee to promote discussions about the program with staff, writing thank-you cards).

The text-messaging portion of the intervention occurred in the participants' real-world settings.

Recruitment

Quasi-experimental and experimental studies are often able to use smaller sample sizes than non-experimental studies because of increased control (Burns & Grove, 2009).

Because of the pre-experimental study design, specific sampling criteria will decrease the effects of extraneous variables on study outcomes (Burns & Groves, 2009). The protocol for the study and all materials were granted approval by the IRB of Arizona State University (ASU).

Inclusion Criteria

To be included in this study, the primary caretaker, parent, or legal guardian (hereafter referred to as *parent*) of an OW/OB preschooler aged 3 through 5 years had to (a) have a preschooler who has a medical diagnosis of OW/OB as defined by a BMI percentile of 85% or above, (b) possess an active cell phone with text-messaging capability, (c) be between the ages of 18 and 45 years, and (d) give consent for participation. Parents of any gender, ethnicity/race, marital status, and socioeconomic status were included. Additionally, the PI ensured that all participants were capable of using the text-messaging feature on their phone prior to the intervention implementation. The TEXT2COPE program was designed to provide those parents who needed assistance with the text message function with a brief training on how to use the text message feature on their mobile phone, but training was not required as every parent verbalized having experience using the text message function on a daily basis.

Exclusion Criteria

Exclusion criteria for parents and preschoolers with an OW/OB diagnosis included (a) dietary or physical activity restrictions due to a comorbid condition;

(b) OW/OB related to an underlying genetic disorder; (c) parent unable to speak English; (d) parent unable to read English at a 4th grade level (less than 20-30 words, less than 140 characters, abbreviated thoughts); and (e) parent without a cell phone or those unable to use the text message function after the brief training. Parents or children with significant activity limitations that have been medically imposed (e.g., unable to walk, genetic etiology), and impinge upon their ability to carry out activities of daily living will also be excluded from participation in this study because program information will encourage participating parents and their children to engage in physical activity.

Prior to enrollment, primary care offices provided fliers and consent to contact forms about the TEXT2COPE program to identified parents of an OW/OB preschooler. Initially, it was anticipated that recruitment would be limited due to availability of a single interventionist (the PI) and logistical issues with scheduling. However, the clinics preferred a combination of burst and serial recruitment efforts. In all of the offices, a support staff member (e.g., medical assistant, receptionist) was identified to serve as a recruitment facilitator. While serial recruitment (i.e., recruit families as the patients are seen/identified) occurred during the duration of the program implementation, typically burst recruitment efforts would happen over the course of roughly 1 month at the beginning of the TEXT2COPE program. The clinic staff member assigned to help the TEXT2COPE program identified and called all of the potential candidates based on chart reviews, EHR billing codes, and personal knowledge. Providers were also able to recall potential candidates, validated by a chart review to ensure the patient met inclusion criteria. If recruitment efforts slowed or stalled at any point, another attempt at burst recruiting occurred. The study contacted only those families who granted permission to

be contacted. Recruitment occurred from March 2013 through November 2013. Figure 4 depicts a flow diagram of participant recruitment.

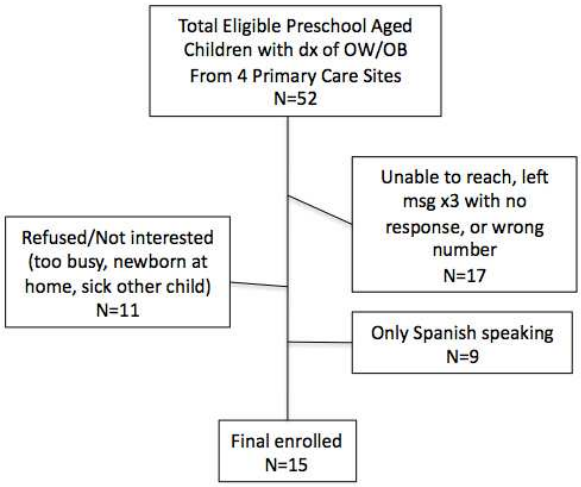


Figure 4. Flow diagram of participant recruitment.

Sample

A convenience sample of 15 parent-preschooler dyads (13 parents, 15 preschoolers), where the child had a diagnosis of OW/OB, was enrolled. The sample size was small as this was a pilot study with the purpose of testing the feasibility, acceptability, and preliminary effects of a theoretically driven CBSB mobile-based intervention program on parental beliefs, healthy lifestyle behaviors, and parental satisfaction. A pilot or feasibility study is a trial run of a full-scale study to test logistics and gather information to improve the overall research design and assess whether the research protocol is realistic, keeping the main goal or focus of conducting the pilot

studies to assess the feasibility so as to avoid unfortunate consequences when embarking on a full-scale study (Fain, 2010). Therefore, the study author sought to determine whether the TEXT2COPE program was appropriate for further testing by addressing (a) acceptability, (b) practicality, (c) implementation, and (d) limited efficacy (Bowen et al., 2009). This sample size allowed for preliminary analysis and after an 8-month recruitment period reflected a 100% retention rate.

Confidentiality

Only assigned identification numbers were used on study measures. Participant questionnaire data were linked by use of codes. The master list linking the participant's identification number to the participant's identifying information was maintained in a separate locked file cabinet in the PI's locked office. In addition, signed consent forms will be kept in a separate, locked filing cabinet, and will only be accessible to the PI. Access to electronic data was restricted to the PI and research team members. Databases were password protected to guard against unauthorized access. Federally regulated U.S. Health Insurance Portability and Accountability Act (HIPAA) guidelines were followed.

Protection Against Risk

Participants were informed about the risk associated with the intervention on the consent form. There is potential for minimal psychological or social discomfort when discussing maladaptive thoughts. Subjects were informed that they may choose not to answer any of the questions on the measures and that they may choose to withdraw from the study at any time. It was anticipated that the benefits of participating in the study far exceeds the risks by enhancing healthy lifestyle behaviors. Participants were assured that their participation was voluntary and they may withdraw at any time. In appreciation of

participant time and associated costs of text messages, upon completion of baseline instruments, a $10 gift card to a local grocery store was given. Similarly, upon completion of the posttest, a gift card in the amount of $20 was presented. Additionally, the TEXT2COPE manual was given to the parents at the beginning of the study (after baseline data was collected) for them to keep. As qualitatively suggested by participants surveyed during the iterative process of this study design, the manual contained additional resources (i.e., a list of websites to the CDC and USDA) to further support healthy lifestyle choices. All individual data were entered into the computer using an identification number. The PI, trained in confidentiality issues and measures, had access to the data. The PI recognized the obligation to uphold these critical underpinnings to avoid potential deception leading to a lack of privacy and confidentiality and to maintain public trust in the research process. The PI adhered to the guidelines put forth by the Office for Protection of Human Subjects and carried the responsibility defined by the ASU Multiple Project Assurance.

Intervention Protocol

The TEXT2COPE program for parents of preschoolers was designed to enhance and sustain healthy lifestyle behaviors. The design of the TEXT2COPE intervention was adapted from the COPE/Healthy Lifestyles TEEN Intervention Program (Melnyk et al., 2006, 2007, 2009), and a combination of the Be Beary Healthy (Small et al., 2012) and the Parents Lead Active Youth (PLAY) programs (Small, Bonds-McClain et al., 2013).

Kreuter, Strecher, and Glassman (1999) classified message content into types: (a) generic – one size fits all, (b) tailored – designed for one particular individual, and (c) targeted – designed for a subgroup of people. Therefore, the tailored aspects of the

intervention, the face-to-face sessions and text-messages, were supplemented with targeted print material for reinforcement and self-study. To ensure the study's integrity and reproducibility, the TEXT2COPE program was manualized to standardize the intervention. "Reproducibility is critical if translation of the intervention into real-life practice settings is going to occur" (Melnyk & Fineout-Overholt, 2011, p. 266).

The manual and text-messaging content was developed using the adapted process for developing print-based tailored interventions (Kreuter et al., 1999; Norman, Kolodziejczyk, Hekler, & Ramirez, 2013). Table 2 summarizes the steps that were utilized to develop and communicate TEXT2COPE content to parents.

Content was divided into chapters to reflect the seven weekly sessions, with additional resources added for the preschoolers (e.g., USDA's choosemyplate.gov printed materials, and Just For You Mom Healthy Choices Chart sticker charts). A standardized portion plate designed for preschool aged children (i.e., Be Beary Healthy Plate with landmarks) was provided to facilitate visual estimations of food amounts (Small et al., 2012). Evidence supports the use of portion control plates to significantly decrease the average amount of calories served (Small et al., 2012) and increase the ability of adults to accurately estimate portion size following education/training (Small, Lane et al., 2013).

Table 2

Steps in the Process of Developing a Tailored Print-Based Intervention

Step	Key Questions and Tasks
1. Preliminary Steps	• What is the purpose of program? Is it to supplement or enhance a *face-to-face* program, or will this be a *stand-alone* self-help program? • Who is your target audience? Will the program target multiple phases of behavior change such as adoption, maintenance, and relapse? • In what setting will the printed materials be distributed? Possibilities include an individual's home, gym, worksite, or healthcare clinic. The setting may influence the look, content and *branding* of the print materials.
2. Intervention Content	• Will the structure of the intervention be a newsletter, a report, or a pamphlet? Will the content be based on a scientific theory and evidence? On which determinants of physical activity do you want to focus? How extensively will the content be tailored?
3. Partnering with Experts	• The decisions in steps 1 and 2 will lead you to determine who to partner with to develop the printed materials. Do you need a graphic designer, computer programmers, a printing company, copy editor, or healthcare professionals?
4. Gathering and Storing Information	• How will the determinants of physical activity be measured? Do validated survey measures exist? How will collected information be stored in a database?
5. Creating the Intervention System	• Create tailored messages that vary by levels of the measured determinants. Develop algorithms and a computer program for determining how survey responses about determinants are linked to specific tailored messages. The algorithms are rules or decisions that the computer follows to *act* like the human expert (e.g., coach, counselor, healthcare provider).
6. Other Considerations	• Consider what the appropriate reading level should be for your printed materials. It is recommended that health literature be written at a 6th grade reading level so it is accessible to lower literacy individuals. • What is the timeframe for the delivery of the intervention materials? For example, will it be weekly, monthly, or twice yearly? The time frame is an important consideration and relates to the overall structure of the printed materials and how much content will need to be developed.

Intervention Overview

The intervention implementation consisted of four key strategies: (a) discussions, (b) reminders, (c) triggers, and (d) reinforcements. The face-to-face clinic visits are where the discussions occurred. After baseline data were collected, all parents were given a hard copy and an audio compact disc (CD) of the TEXT2COPE manual. The manual served as a reminder of the CBSB and was used to keep the PI and parents on task. The SMS were designed to trigger the skill or new behavior. Lastly, the homework was designed to reinforce the skills. However, parents additionally reported that the static SMS served as reinforcements/reminders as well. The content and implementation of the seven TEXT2COPE sessions are provided in Table 3. The manual in its entirety, with accompanying homework assignments, can be found in Appendix D.

Face-to-face sessions. The face-to-face sessions were conducted with the parent in a 30-minute session. Typically, the preschooler accompanied the parent for the first visit, but thereafter the parent usually scheduled time without the child so they could *focus* more on the content and discussion. It was the parent's discretion whether or not to include the child in the clinic visit, but the parent was encouraged to practice the program skills at home with their child. Incentives such as sticker charts and fruit and vegetable games were included as part of the TEXT2COPE content to facilitate child inclusion. One parent was admitted to the hospital for observation and put on temporary bed rest, but still wanted to participate. Therefore, two of the clinic visits were conducted via telephone counseling. The duration of the visits mimicked previous research and most closely reflects the length of an office visit in primary care (Jacobson & Melnyk, 2010; Lusk & Melnyk, 2011). Direct personal counseling is also the most universal form of

nutrition education (99.5%) offered to WIC participants at all local agencies (USDA, 2012). The discussions occurred during the four face-to-face visits and targeted teaching and building the cognitive behavior skills.

Table 3

TEXT2COPE Intervention Implementation

TEXT2COPE Intervention Program CBSB Content	Session Mode
Healthy lifestyles and the thinking, feeling, behaving triangle; basic recommendations for nutrition & physical activity in preschoolers; goal setting	Week 1 Face-to-face AND text messaging;
Information on physical activity and nutrition, including appropriate portion sizes, healthy eating and food groups	Week 2 Self-study AND text messaging
Barriers to goal progression and overcoming barriers through problem solving and cue recognition	Week 3 Face-to-face AND text messaging
Positive thinking and self talk related to healthy lifestyle behaviors	Week 4 Self-study AND text messaging
Cognitive reframing - with an emphasis on the physical and emotional responses to stress and how positive beliefs can help to reframe cognitions and promote positive coping.	Week 5 Face-to-face AND text messaging
Effective communication, stress and coping.	Week 6 Self-study AND text messaging
Putting it all together; integration of knowledge and skills	Week 7 Face-to-face

For instance, during the session on problem-solving, parents were asked to apply a four-step problem-solving skills to a health-related scenario involving their preschooler.

The steps include (a) identifying the problem, (b) identifying the cause of the problem, (c) identifying possible solutions with pros and cons to each solution, and (d) choosing the best solution. Parents were encouraged to problem-solve having a family meal together. To help reshape the faulty cognitions associated with automatic thinking (negative schemas) and perceived difficulties of eating healthy, parents were encouraged to apply the four-step process of problem solving. Parents were asked to think of causes of the problem, or antecedents (e.g., time spent on other obligations such as work). Possible solutions were worked out with the parent to include preparing the meal the night before (e.g., cutting vegetables while watching television), having other family members pitch in to help prepare the meal, or not preparing and just eating whatever is most convenient. Pros and cons of each possible solution were considered. The families were guided through the problem-solving process to achieve the best solution for their family.

Text message support. The TEXT2COPE program supplemented the manualized content through one-way reminder or trigger messages following a face-to-face session. MEMOTEXT Corporation partnered with the PI to develop software specific to the TEXT2COPE program that delivered/received the SMS data. MEMOTEXT is a software company that integrates interventions into health care using scalable communications technologies through iterative system analysis and design (MEMOTEXT, 2014). MEMOTEXT is compliant with HIPAA requirements. Additional participant confidentiality will be secured by MEMOTEXT's privacy policy and used in accordance with all applicable laws and the Personal Information Protection and Electronic Documents Act (MEMOTEXT, 2014). MEMOTEXT offered to work

with the PI on this study at no additional cost with the understanding that results of this study will be presented unbiased and submitted for publication regardless if findings are significant or non-significant.

Operationally, program participants were entered onto the basic enrollment page for MEMOTEXT. Participants were given the option to *opt-out* at any time by simply texting the word *stop* to the program assigned number. A *HELP* option was made available, where the PI was notified via email with a text message if a study participant requested help. Data logs of the text messages (i.e., number of messages sent/received, SMS content) were shared with the PI via a simple Excel spreadsheet on a monthly basis. No personal health information was communicated via SMS.

Based on the combined empirical, gray, and iterative support, and similar to previous research (Militello et al., 2012), text messaging can be used to supplement face-to-face sessions. The text message portion of the program was delivered to the parents using one-way messages (140 characters or less), consistent with previous literature on interventions that have produce positive effects (Franklin et al., 2006; Franklin, Greene, Waller, Greene, & Pagliari, 2008; Hanauer, Wentzell, Laffel, & Laffel, 2009; Miloh et al., 2009; Shapiro et al., 2008).

The text message (SMS) triggers were developed at the end of each face-to-face visit. The parent and PI established mutually agreed-upon text messages of relevant CBSB for that week. The theme of the message reflected the skill being worked on during that week of the intervention, but utilized the parents' own words and parent/child names to increase the tailored effect of the message. Given the asynchronous nature, the text messages could be reviewed by program participants at their convenience.

In the face-to-face sessions, the manualized content was presented and the PI ensured that the parents were able to understand the skill and what was being asked of them. At the end of the face-to-face session, parents were asked, "How can we best use text messages to help trigger this new skill at home?" Parents were able to identify the skill they wanted to work on, but often would rely on the PI to help shape the wording to fit into the 140-character text messages. In some instances, parents would rely on examples found in the manual and use those as the content for the tailored SMS (i.e., Dream Big, the mind achieves what it sees! Just take small steps). Parents were taught the difference between hot and cold triggers and were encouraged to use the SMS to hot trigger the new behavior or skill.

To further explain the methodology behind the tailored SMS content and delivery, an example will be used to highlight the reframing of negative parental thoughts. One parent reported feeling out of control during the hours between when her kids were home from school to when they went to bed. She was a single mother of three children and felt overwhelmed trying to feed her family *a proper dinner,* get siblings to their respective activities, finish homework, and bath/bedtime activities. We progressed through the cognitive behavior skills each week. Encouraged to pick a message that would *speak to her*, the PI and parent developed a tailored SMS for that week: "Small steps to change. It takes practice. Focus on enjoying time with family. Positive thoughts = positive behavior. Breathe, laugh, DANCE!" The parent asked for the messages to be sent Monday, Wednesday, and Friday that week around 5 o'clock. When the SMS first was delivered on Monday at 5pm, the parent reported that she did not realize how helpful it would be and further found herself saying out loud, "I needed that."

Since the messages were developed and changed throughout the program as they related to the content covered in the sessions, the parents were able to improve upon the message content, timing, and frequency as they advanced through the program. Based on the iterative design, the TEXT2COPE protocol originally defaulted to send the parent one tailored message a week. However, the parent determined the frequency and timing of the messages being sent. The results will show that parents requested that the tailored messages be sent more frequently, lending support for parent acceptability of SMS in the short term.

Furthermore, initially developed as a manipulation check and data collection tool, an additional static message (message content was constant) was developed and sent bi-weekly. The use of two-way messages (sent/received) weekly is consistent with previous literature (Franklin et al., 2006, 2008; Hanauer et al., 2009; Miloh et al., 2009; Rami et al., 2006; Shapiro et al., 2008). Upon response back to the static message, parents would receive an immediate automated SMS feedback generated from a library of SMS developed from *if, then* algorithms. The content of the SMS library responses stemmed from the TEXT2COPE manual used during the face-to-face and self-study components of the intervention. Table 4 provides examples of automated feedback. The MEMOTEXT software generated the SMS at random, but was developed to ensure balanced use of the library (to avoid sending repeated or duplicate messages).

Table 4

Sample of Immediate Automated SMS Feedback Generated from TEXT2COPE SMS Library

TEXT2COPE Static SMS: "PARENT NAME — Did you give your child veggies at dinner tonight? Please reply with Y or N"	
Parent replied with N	Parent replied with Y
New habits take time stick to your goals, believe that you can do this.	Good job! Continue to help your child by setting a good example!
Keep trying, little-by-little, step-by-step.	Be proud of yourself, you're getting your child off to a healthy start!
Fear of new foods is common in children — try offering the same vegetable many times in different ways.	You're on your way. Here are some more snack ideas — vegetable sticks and fruit wedges.

Homework. Homework assignments were used to accompany and reinforce the CBSB content. Six one-page homework assignments were provided to augment the content taught in sessions 1 through 6. Homework was referenced in some of the tailored text message portion of the intervention if the parent requested, but never sent as a separate alert. Homework was reviewed at the start of each face-to-face session. It was anticipated that with practice and reinforcement, CBSB would strengthen parental beliefs, resulting in more positive feelings and positive health behaviors.

Intervention dose, strength, integrity, and rationale for timing. Although not focused on parents and their OW/OB preschool children, Dr. Diana Jacobson recently established the feasibility and acceptability of a seven-session (weekly) educational and CBSB intervention with 17 OW/OB 9- to 12-year-old school-age children and their

parents in pediatric primary care using a one group pre- and posttest pre-experimental design. The intervention consisted of four face-to-face sessions with the children and their parents alternating with three telephone interventions. Positive effects of the intervention for the children included decreased BMI percentile, increased knowledge, beliefs, choices and behaviors, and increased physical activity and self-control. Positive effects of the intervention for the parents included increased knowledge, beliefs, and healthy lifestyle behaviors (Jacobson & Melnyk, 2012). Only two dyads dropped from the study, citing lack of time and family demands as reasons for withdrawal. The 15 remaining dyads completed all seven sessions of the intervention program. Therefore, it is important to determine whether an educational and CBSB intervention, synergized with mobile messaging can be effective when delivered to parents of OW/OB preschool children in primary care over the course of a 7-week program.

Manipulation checks and fidelity. Manipulation checks ensure that subjects actually comply with prescribed exercise activities (Melnyk & Fineout-Overholt, 2011). As part of the program implementation, at the end of each session, parents were asked to develop a text message to reflect the content for that week. As part of the manualized content, review of homework from the previous session was reviewed at each face-to-face visit. To ensure reception and comprehension of the static message, parents were asked to respond to the static messages.

Fidelity of the intervention is essential for being able to explain the results obtained and to ensure internal validity of the study (Hekler et al., 2013). The PI retained a monitoring log to ensure the intervention was implemented per protocol, while the manual served to keep the content consistent. An additional log for each text message

sent, messages received, and study response was maintained throughout the study. The PI reviewed all messages and faculty mentor (EH) served as a secondary reviewer.

A subset of the text message data reflected a quality control population. Outside of the iterative testing phase of the MEMOTEXT-TEXT2COPE software, the PI included a confederate participant to receive SMS at the same time the MEMOTEXT system was *live*. This was done to explore the system's delivery and response to potential aberrant SMS from participants. For instance, when one of the tailored messages was sent, the respondent replied, "Who is this?" This message was then flagged by the MEMOTEXT staff and then emailed to the PI within 24 hours of being sent. Similarly, for the static SMS, when participant responses occurred outside of *Y* and *N*, the MEMOTEXT staff responded by forwarding an email with the response to the study PI within 24 hours. By building in a quality control, the PI was able to better understand not only how some participants could respond, but also the logistics built in by the software company to handle such situations and subsequent communication. These features are critical to explore when considering the evidence needed to implement such technology into clinical practice.

Adherence. The received dose of an intervention is key to study outcomes; therefore, reporting intervention compliance is important (Kelly & Melnyk, 2008). All sessions were delivered to all participants, with an attendance roster maintained by the PI. The PI worked with the families to schedule times conducive for clinic visits. Additionally, parents were asked to complete a one-page homework assignment at the end of each session, designed to reinforce the content of each session. Throughout the week, two static messages were sent to parents, originally intended for data collection

and manipulation checkpoints. Diligent record-keeping allowed the PI a means to evaluate acceptable and unacceptable intervention attributes. Attrition and attendance provided information about the feasible delivery of this intervention in this population. This information will contribute to intervention refinement for future studies.

Measures

Measures used in this pilot study assessed parental demographics, nutrition and physical activity knowledge, healthy lifestyle beliefs and behaviors, perceived difficulty, and child anthropometric measures (see Appendix E).

Demographic measure. This questionnaire provided general descriptive information regarding the study sample. Sample items include parent/child's age, race/ethnicity, highest level of education, and income.

Healthy lifestyles beliefs scale. The Healthy lifestyles beliefs scale is a 16-item instrument that assesses beliefs about various facets of maintaining healthy lifestyle (Melnyk & Small, 2004; Melnyk & Moldenhauer, 2006). Sample questions include: (a) I believe that myself and my family can be more active, (b) I am certain that I will make healthy food choices, and (c) I believe that I can reach the goals that I set for myself. Participants respond to each item on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Item scores are summed for a total score, with higher scores indicating stronger healthy lifestyle beliefs. This instrument has been used in healthy lifestyle intervention studies with Cronbach's alphas ranging from .73 (Jacobson & Melnyk, 2012) of .90 and above for children, adolescents, and parents (Kelly et al., 2011; Melnyk et al., 2009). Cronbach alpha for this sample was .86. The instrument can be completed in 5 minutes.

Perceived difficulty scale. The perceived difficulty scale is a 12-item Likert scale, ranging from 1 (very hard to do) to 5 (very easy to do) that was adapted from a perceived difficulty scale used with teens (Melnyk, et al., 2006). The higher the summary score, the easier the tasks were perceived. The directions ask the participants to rate how hard or easy it is to do activities such as (a) eat healthy, (b) exercise regularly, (c) buy healthy foods to eat, and (d) find a safe place to exercise. The Cronbach's alpha has consistently been above .80 for the 12-item measure for children, teens, and parents (Kelly et al., 2011; Melnyk et al., 2006, 2009) and was .92 for this sample. It is estimated to take 5 minutes to complete.

Nutrition and physical activity knowledge. Nutrition knowledge is a 20-item questionnaire that measures parental knowledge about nutrition (Melnyk & Small, 2002). Subjects answer *yes*, *no*, or *I don't know* to a series of questions related to portion sizes, nutritional information, health, and eating habits. Cronbach's alpha for this instrument ranged from .83 (in parents of school-aged children) (Jacobson & Melnyk, 2012) to .88 in adolescent populations (Melnyk et al., 2009). Cronbach's alpha for physical activity knowledge for this sample of parents was .74. This instrument takes approximately minutes to complete. Physical activity is measured by a 12-item questionnaire (e.g., exercise can help to prevent diabetes, dancing is exercise, exercise reduces stress). Respondents answer *yes*, *no*, or *I don't know*. Cronbach's alpha for this scale has ranged from .52 in parents of school-aged children to .80 and higher in previous work by Melnyk and colleagues (Jacobson & Melnyk, 2012; Melnyk et al., 2009). Similar to Jacobson and Melnyk (2012), Cronbach's alpha for physical activity knowledge for this sample was .52 for parents. Content validity for both instruments was established by a group of

experts. Face validity was established with 10 teens and parents of school-aged children. In previous studies, a group of over 400 teens completed the survey and factor analysis supported the construct validity of both instruments.

Healthy lifestyles behavior scale. This scale is used to measure healthy lifestyle behaviors (Melnyk et al., 2006). Respondents are asked to answer each of the 23 items on a Likert-scale ranging from 1 (strongly disagree) to 5 (strongly agree). Questions such as the following are used:

1. I do what is necessary to lead a healthy life and provide a healthy lifestyle for my family.
2. I make healthy food choices for my family and myself.
3. I set goals I can accomplish.
4. I say something positive to my children/family every day.

In previous studies, Cronbach's alphas have been .78 to .85; in this sample, the Cronbach's alpha was .78. This item should take 10 minutes to complete.

Acceptability/feasibility. The participant evaluation form completed at the end of the program evaluated acceptability. Sample questions included:

1. Did you find the information in the TEXT2COPE program helpful?
2. Would you recommend the TEXT2COPE program to other parents of preschoolers?

Acceptability was also determined by retention rates and was further determined by the requested frequency of text messages. In two separate questions, parents were asked to specify which topics were most and least helpful from sessions 1-7. In *yes/no* format, parents were asked if each of the respective manual, CD, SMS, and homework were

helpful. Using recommendations from Bowen et al. (2009) as a guide, feasibility for this study was determined in three focus areas: (a) implementation was evaluated by the extent to which the intervention could be implemented as planned; (b) practicality was explored when resources, time, commitment were constrained in some way; and (c) limited-efficacy testing using a convenience sample and shorter follow-up periods and limited statistical power.

Anthropometric. Anthropometric data was gathered for descriptive purposes. The child's height and weight were directly measured with conventional clinic scales. Each anthropometric measure was completed two times and the mean was calculated. BMI *z*-score was calculated from height, weight, gender, and child age in months using parameters and formulas provided by the CDC. Software from The Children's Hospital of Philadelphia Research Institute Pediatric Z-score Calculator (The Children's Hospital of Philadelphia, 2014) was used to calculate BMI score, BMI *z*-scores, and BMI percentiles. Waist circumference was measured at the umbilicus. Waist-to-height ratios (WHtR) were calculated by dividing the waist circumference by the child's height. BMI and WHtR have been shown to have significant correlations ($r=0.88$, $p<0.0001$) (Kuba, Leone, & Damiani, 2013) with similar abilities to identify children with adverse risk factors (e.g., lipids, blood pressure) (Freedman et al., 2007; Kuba et al., 2013). In other literature, overweight children with high WHtRs were more strongly associated with adverse risk-factors (i.e., elevated lipid levels and blood pressure (Freedman, Dietz, Srinivasan, & Berenson, 2009). Table 5 summarizes the outcome variables that will be measured using standardized questionnaires and procedures.

Table 5

Data Collection Summary for Families with OW/OB Preschoolers

Aim	Construct	Instrument	Validity	Reliability	Data Collection
	Demographics	Demographic Questionnaire		NA	T1
1	Parent evaluation of TEXT2COPE program	Exit Interview		NA	T2
2,3	Healthy Lifestyles Beliefs Scale	Healthy Lifestyles Beliefs Scale	Content, Construct	.86	T1, T2
2,3	Perceived Difficulty	Perceived Difficulty Scale	Content, Construct	.92	T1, T2
2,3	Knowledge	Nutrition Knowledge	Content, Construct	.74	T1, T2
2,3	Knowledge	Physical Activity Knowledge	Content, Construct	.52	T1, T2
2,3	Healthy Lifestyle Behaviors - Parent	Healthy Lifestyle Behaviors Scale	Content, Construct	.78	T1, T2

Data Analysis

Data processing and management. Files were stored in a locked cabinet in the PI's office for collected measures for all subjects. Participants were assigned an identification number that will be used for all instruments, and a master codebook was stored separately both electronically encrypted and hardcopy locked. Coded data collection forms, completed at each measurement time (T1-T2) were reviewed for missing information. Throughout the data collection process, the PI reviewed measures for missing data and clarified with the participant the reason for missing data. Participants were allowed to complete any missing questions or indicate if they preferred not answer a question. Code 999 was used for missing data. Statistic Product for Service

Solution (SPSS) 22.0 was used to analyze the data. The PI verified all data in SPSS-19. Data were forward and backward entered. The data were protected by computer virus and hacking protection, password protection for systems and files, and frequent backup and archiving of information.

Aim 1. Retention and attrition rates provided a general sense about the feasibility and acceptability of the program's design and implementation. Feasibility and acceptability were further assessed by adherence to program components, and quantitative and qualitative feedback on participant evaluation forms. Program feedback was compiled and themes were extracted. Text-messaging acceptability was assessed by amassing timing and frequency of tailored SMS and response rate to static SMS.

Aim 2. Effect sizes were calculated to determine preliminary effects using a significance level set at 0.05. Data were assessed for normal distribution prior to analysis. For normally distributed data, paired sample *t* tests were used to evaluate change over time. Cohen's d effect size (posttest mean-pretest mean divided by the pooled standard deviation) for paired sample determined the effect of the intervention (Field, 2013). Two of the outcome variables (activity knowledge, healthy lifestyle beliefs) were non-normally distributed per the Shapiro-Wilk and Kolmogrorov-Smirnov tests. Neither a reflected $\log_{10}$ nor a reflected square root transformation corrected the distribution. Wilcoxon signed-rank test for nonparametric data was used to evaluate change over time. Effect size of Wilcoxon signed-rank test was calculated using r code (r=z/sqrtN, where *N* is the total number of the observations). Determination of effect sizes was necessary to (a) obtain an estimation of sample size for future studies, and (b) determine the relative strength of the intervention (Jacobson & Melnyk, 2010).

Aim 3. Assumptions of correlation tests were first verified. Pearson's correlation assumes that (a) the variables were approximately normally distributed, (b) there is a linear relationship between the two variables, (c) the variables are at least interval level, and (d) homoscedasticity of the data (variance around the regression line is the same for all values of the predictor variable) (Field, 2013; Polit, 1996). Given the small sample size, lack of homoscedasticity, and nonparametric distribution of two outcome variables (activity knowledge, healthy lifestyle beliefs), the data better fulfilled the assumptions for Spearman's rank order correlation (Spearman's *r*). The data were monotonic (as the value of one variable increases, the other variable's value consistently increases or decreases), confirmed by scatterplot, and were at least ordinal in value (Field, 2013). Therefore, Spearman's *r* was used to determine association between study variables reported as Spearman's *r correlation coefficient (*r_s*)*. Coded data collection forms, completed at each measurement time (T1-T2) were reviewed for missing information. Throughout the data collection process, the PI reviewed measures for missing data and will clarify with the participant the reason for missing data. Participants were allowed to complete any missing questions or indicate they would prefer not answer the question. Missing data was subcoded by rationale and entered as 6666, 7777, 8888, and 9999, respectively. Statistic Product for Service Solution (SPSS) software was used to analyze the data. The PI entered and verified all data in SPSS. Every fifth entry was verified against raw data forms. The data were protected by computer virus and hacking protection, password protection was used for systems and files, and frequent backup and archiving of information occurred.

CHAPTER 4. RESULTS

Descriptive statistics and frequencies were used for many of the outcome measures. Table 6 highlights demographic data of the sample. Paired t-tests examining pretest scores to posttest scores were performed to determine preliminary short-term efficacy of the intervention on knowledge, healthy lifestyle beliefs, perceived difficulty, and healthy lifestyle behaviors. Data are mean ± SD (SD) presented in Table 7. Fifteen parent-child dyads (13 parents, 15 preschoolers [two families had two children who met inclusion criteria]) were analyzed for outcome variables. Given the small sample size, non-normal distributions occurred for two of the outcome variables (activity knowledge, healthy lifestyle beliefs). Nonparametric tests were used for these variables. Relationships between the study variables were assessed using Spearman's rank order correlation (nonparametric data). Correlations are presented in Table 8.

Sample Demographics

The mean age for the preschool children (n=15) was 54.47 months (±11.03); 66.7% of the sample was male. Anthropometric data were not obtained for 1 preschooler, as he did not attend any face-to-face visits. Half of the preschoolers met criteria for a diagnosis of overweight (n=7, 50%), and half of the sample met diagnostic criteria for obesity (n=7, 50%). Of the 7 children diagnosed with obesity 6 had BMI percentiles greater than the 99^{th} percentile.

Table 6

Baseline Demographics

Parent Characteristics at Baseline (n=13)		Child Characteristics at Baseline	
	Frequency (Percent)		Frequency (Percent)
		Mean Age (months) (n=15)	54.47
Age			
18-24 years	3 (23.1%)		
25-34 years	5 (38.5%)		
35-44 years	5 (38.5%)		
Gender		Gender (n=15)	
female	13 (100%)	female	5 (33.3%)
male	0 (0%)	male	10 (66.7%)
Race/ethnicity		WHtR (n=11)	55.45%
Caucasian	4 (30.8%)	BMI (n=14)	19.48
African American	1 (7.7%)		
Hispanic/Latino	8 (61.5%)		
Education		BMI% (n=14)	94.5%
Less than HS	1 (7.7%)	BMI *z*-score (14)	1.89
GED/HS	5 (38.5%)		
Some college	3 (23.1%)		
4-yr. college	3 (23.1%)		
Masters degree	1 (7.7%)		
Annual Household Income			
Less than $10K	5 (38.5%)		
$10K-$19K	4 (30.8%)		
$20-$29K	1 (7.7%)		
$40-$49K	1 (7.7%)		
$70K or more	2 (15.4%)		
Public Assistance			
Yes	11 (84.6%)		
No	2 (15.4%)		

Table 7

Results for the TEXT2COPE Group

Instrument	Pretest Mean (SD)	Posttest Mean (SD)	Effect Size	P Value
Nutrition Knowledge	14.60(3.46)	17.53(1.73)	1.07^{+++}	.001*
Activity Knowledge	9.93(1.58)	11.00(1.07)	.45^{xx}	.012*
Parental Healthy Beliefs	79.53(8.10)	83.00(7.63)	.61^{xxx}	.001*
Parental Healthy Behaviors	46.20(8.37)	51.00(7.83)	.59^{++}	.040*
Perceived Difficulty	38.46(11.33)	42.31(10.94)	.50^{++}	.168

Note. *p<.05
Effect size for r code= .1 small^{x}; .3 medium^{xx}; .5 large^{xxx}
Effect size for Cohen's d= .2 small^{+}; .5 medium^{++}; .8 large^{+++}

No parents were less than 18 years and no parents were greater than 44 years. Roughly 47% of the mothers identified themselves as being single, Hispanic or Latino (61.5%), and completing high school/earned graduate education diploma (GED) (38.5%). Household incomes varied from less than $10,000/annually to more $70,000 annually, yet the majority of the sample (38.5%) earned less than $10,000 a year and 84.6% were on public assistance. The majority of preschoolers were enrolled in a daycare/Head Start program (80%). Most families had two children living at home (38.5%) with the number of children living at home ranging from one to five.

Table 8

Correlations Among Study Variables (N=15)

Baseline					
Variable	Activity Knowledge	Nutrition Knowledge	Beliefs	Perceived Difficulty	Behaviors
Activity Knowledge	1.00				
Nutrition Knowledge	.509	1.00			
Parental Healthy Lifestyle Beliefs	.525*	.235	1.00		
Perceived Difficulty	.390	-.170	.598*	1.00	
Parental Healthy Lifestyle Behaviors	.622*	.237	.545*	.686**	1.00
Posttest					
Variable	Activity Knowledge	Nutrition Knowledge	Beliefs	Perceived Difficulty	Behaviors
Activity Knowledge	1.00				
Nutrition Knowledge	.574*	1.00			
Healthy Lifestyle Beliefs	.175	.025	1.00		
Perceived Difficulty	-.099	.033	.696**	1.00	
Healthy Lifestyle Behaviors	.017	.266	.653**	.722**	1.00

Note. Higher scores on Perceived Difficulty scale indicate less perceived difficulty (easier to do)
* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

Aim 1. To examine the feasibility and acceptability of the TEXT2COPE program among parents (with mobile phones) of OW/OB preschoolers between the ages 3 to 5 years.

Using recommendations from Bowen et al. (2009) as a guide, feasibility for this study was determined in three focus areas: (a) implementation was evaluated by the extent to which the intervention could be implemented as planned; (b) practicality was explored when resources, time, commitment were constrained in some way; and (c) limited-efficacy testing using a convenience sample and shorter follow-up periods and limited statistical power.

***Retention and attrition*.** Participants were defined as completing the program if all of the content in the seven TEXT2COPE sessions were covered. A total of 15 parent-child dyads (13 parents, 15 children, 2 families had siblings that met inclusion criteria) completed all sessions and finished pretest and posttest measures. This reflects a 100% retention rate.

***Program adherence*.** The TEXT2COPE program consisted of face-to-face visits, text messaging, and homework covering content laid out in a seven-session manual/audio CD. The four face-to-face visits were done on an outpatient visit at the child's primary care office. The visits lasted approximately 20-30 minutes. Over the course of the four face-to-face sessions, all parents had to reschedule at least one clinic visit. Acknowledging that 60% of the sample were single parents, reasons for rescheduling included (a) work schedule, (b) sick child, (c) forgot about the appointment/lost track of time, or (d) lack of transportation. Participants completed the face-to-face visits over the course of 3 to 7 weeks, with 5 being the median number of weeks needed to go through the course content. Most parents stated that they benefitted from a weekly or every other week clinic visit.

The variation in the number of weeks needed to complete the program stemmed from influences by external pressures. For instance, some participants completed the TEXT2COPE program during the spring of 2013 and expressed a need to finish the study before the kids went on summer vacation from school. Other participants were in the program during the months of November/December 2013, where holiday schedules and family events became more prominent in the schedules of the families. One case in point was the parent who completed the program in 3 weeks. A single mother reported being "homeless" and working with social services to secure temporary living for her and her four children. She was able to get to and from the clinic using a bus voucher provided by her oldest child's middle school. However, because summer break was coming up in a few weeks, she was on the verge of losing her transportation to the clinic. The parent expressed interest in learning more from the TEXT2COPE program, and therefore requested to be included in the study despite the time limitations. The PI would host a *make up* session that would last 40-60 minutes in duration (versus the normal 20-30 minutes) to accommodate covering the additional materials.

Four of the visits were done via telephone counseling. One parent had an automobile that broke down and requested if that week's visit could be done over the phone while her son was napping. Similarly, another parent had a work schedule that changed and she could not miss work, but was open to a phone session. Lastly, one parent (a single mother) started the TEXT2COPE program, but had medical issues requiring hospitalization and bed rest for observation and monitoring. While not acute, the participant asked to continue with the TEXT2COPE program. This required adapting the program so that 2/4 sessions (sessions 2 and 3) were completed by phone.

Homework. The TEXT2COPE manual was printed and placed in a three-ring binder for parents to keep. Homework sheets were printed on blue colored paper to differentiate them from the session content, which parents reported as being helpful. As part of the intervention protocol, review of homework from the previous session was reviewed at each face-to-face visit. From the evaluations, 85% (11/13) of the participants reported the homework as helpful. Parents stated that the homework was helpful as it reminded the parent of the content discussed in the face-to-face session or that the homework reinforced the message of positive self-talk and to "believe in myself." As an aside, two parents were returning to school as adult learners (taking college level courses part-time). It was the observation of the PI that parents were particularly similar about being task-oriented and diligent about completing homework assignments and sharing at the start of each visit. One parent responded that she did not complete the homework with her child because she felt the content would be too hard for the preschooler to understand. Yet, all parents valued the Be Beary Healthy portion plate for preschoolers and identified it as being helpful. Several parents commented on how "small" the correct portions of food looked relative to what they were used to serving.

Text messaging. As part of the program implementation, at the end of each session, parents were asked to develop a text message to reflect the content for that week. If a parent was unable to develop a general message, the PI would review of the session content until the parent was able to verbalize comprehension and collaboratively develop a related tailored message. At the time of consent, all of the parents reported being able to send and receive text messages. A total of 291 SMS were sent to the parents, for a combined 138-tailored message, 105 static messages, and 53 automated feedback

messages. Frequency (number of messages sent) of SMS varied from seven to 39, with the mean (M) number of messages sent 22.31 ±9.47. Tailored messages ranged from three to 20 (M=10.62 ± 5.45). The frequency of static messages sent to each participant ranged from 4 to 12 (M=8.00, SD=2.42). Timing (when the message was delivered) was evaluated by dividing the day into three segments: morning (6:01am-12pm), afternoon (12:01pm-6pm), and evening (6:01pm on). Overall, the bulk of messages were delivered in the evening (54% of the time). However, PI-scheduled static messages were scheduled to be delivered after dinner; therefore, this percentage reflects both tailored and static messages. When teased out, parents favored receiving tailored messages in the afternoon (58.8% of the time). Qualitatively, timing coincided with the theme of the messages (referencing hot triggers) and the parents' need for support during the hours between when the children were home from school, workday ended, and dinner/ afterschool activities coincided.

Tailored SMS. Sixty-nine percent of parents (9/13) increased the frequency of the tailored SMS from being sent once weekly to as many as five times a week. The time of day varied for each participant. Timing was tailored to the time of day the message would most likely *hot trigger* a response from the patient. Parents would request a trigger for when the kids were getting home from school or when the parent was getting off from work. One parent reported feeling a loss of control at the end of her workday. Her message, sent at 5 pm, was, "TEXT2COPE praises you! You are in control & role modeling to *child's name* POSITIVE habits & coping. Show her anything is possible when you believe!" Another parent used the message to target three behaviors. First, she wanted to remember to listen to the audio CD and had decorative jars on the kitchen

counter that she frequently would fill with *treats*. After a few sessions, the PI and the parent had come up with healthy alternatives to go into the jars such as stickers, granola bars, or creative coupons for family activities. Her message was, "*parent name*- TEXT2COPE Reminder - Listen to the CD. Don't forget to fill jars healthy & PLAN time to go to the park! Trigger your family healthy!"

It was not the original intent of the PI (nor built into the original program design) to use the SMS to trigger parents about completing actual activities related to the TEXT2COPE program or to refer back to the manual, but in addition to triggering behavior and skills building, parents would request that the SMS remind them of what to work on. One parent would forget to self-study at home or complete the homework; therefore, the PI and participant mutually agreed to incorporate it into her message. Sample tailored messages sent to parents that were related to TEXT2COPE activities include:

1. *parent name* - Listen to your healthy family CD Session 1 & 2. You are making the impossible POSSIBLE. Believe in yourself! You can do it!
2. You're near the finish line. This wk 5&6! Decrease TV time or family exercise challenge on commercials! Who will win?
3. Congrats! Onto TEXT2COPE 3 &4; make a plan; focus on family meal time and the RIGHT portion sizes; if you get stuck, set SMART goals & pblm solve.
4. This week, SOLVE THE PROBLEM (sessions 4 & 5) small steps=big rewards! Make a SMART goal, and make a plan, otherwise it's just a wish!

None of the tailored SMS were used as strictly as a reminder. All of the tailored messages incorporated an aspect of the cognitive behavior skills associated with that week's session. Parents had the manual and audio CD to refer back to, to remind them of the cognitive behavioral skill building information.

Static SMS. To ensure reception and comprehension of the text messages, parents were asked to respond to static messages sent twice weekly. The PI and mentors collectively decided the topic of the static message (vegetable consumption). The message verbiage was iteratively devised and tested with the convenience sample used during the study design. The first 58 static messages asked parents, "Hi *parent name*! Create healthy habits - How many times did you offer your child vegetables in the past 24 hrs? Reply w/a number (e.g., 2)." Based on the iterative convenience sample feedback, these messages were best received if sent during the evening hours (i.e., after 8 pm). If the static message was sent at the same time the tailored message was sent (even if on a different day), the message was not always timely and prompted irregular responses. For instance, if a parent requested to have their tailored message sent in the morning and the static message automatically defaulted to be sent in the morning, it would lead to confusion. In the iterative test group, when asked about vegetables, they would reply back, "It is breakfast, I haven't fed my child any vegetables yet." However, if this same message was sent in the evening, parents were able to more clearly reflect on the day and a numeric response was provided, generating an automatic SMS from the TEXT2COPE algorithm library. Therefore, the static messages were sent in the evening.

Despite initial testing, once the program was live, response rate was only 26% (15/58) for the static messages. While the iterative testing accounted for timing and

verbiage of the static message, parents in the actual study reported not responding to the messages because they "thought it was a reminder" or "didn't know to respond back" and that "they weren't sure what was meant by the past 24 hours –yesterday? That day? Literally past 24 hours?" From the limited responses, parents' self-reported behavior of offering their child vegetables in the past 24 hours ranged from 1-8, with a mean of 4.5.

Given this was a feasibility/acceptability study, the PI and mentors conferred, agreeing that it was logical to change the verbiage of the static SMS, but keeping the subject matter the same (vegetable consumption). The associated automated SMS feedback to the static response remained unchanged and were still generated based on if/then algorithms. Therefore, the verbiage was changed. The remaining 47 static messages asked, "*parent name* - Did you give your child veggies at dinner tonight? Please reply with Y or N." Parents were instructed to respond with a *Y* or *N*. During the initial phase when the static SMS was sent, a parent responded with "YES," but MEMOTEXT had already accommodated for a *yes* or *no* response, so automated feedback was generated. Aberrant responses outside of the *Y, N, yes* or *no* were sent to the PI via email within 24 hours. Response rate improved to 80% (38/47) with this change, ranging from 0%-100% response (M=49% ± 36.2%). The majority of parents did report offering their child vegetables at dinner (87%). One participant did not respond to any of the static messages. The PI verified that the participant received the static messages, but due to a limited data plan for her cellular phone, lost the ability to send messages (but could still receive incoming messages). It should also be noted that the 1 parent used an outside software service to send some of her text messages. Outgoing messages were altered with a tag line from that service. This tag line was not

part of the TEXT2COPE if/then algorithm and was not accounted for in the automated response. This accounted for four of the participant responses to not receiving automated feedback to static response (the exemplar below will further demonstrate the program logistics). All other study participants utilized text-messaging services through their cellular provider and the software responded as intended.

Putting it all together. The TEXT2COPE program was designed to incorporate strategies (face-to-face discussions, manual, homework, and text messages) to promote healthy beliefs and behaviors in parents with OW/OB preschoolers that could be incorporated into primary care and support parents in their real-world settings. Therefore, one participant's experience is highlighted to illustrate how the four components complement one another and can be delivered in a typical outpatient visit.

A single mother of a 3-year-old son without extended family or a support system was seen for a well-child check. Her son was diagnosed as being obese. The mother reported not knowing that her son was obese. Upon hearing the diagnosis, she reported feeling "badly" because she just thought he was a "big boy" and also wasn't "really sure of what to do." The mother believed that she was feeding her son healthy, but admitted that they did not do a lot of regular physical activity and that she would use food "treats" to reward certain behaviors. After obtaining consent/assent and establishing rapport, the parent scheduled her first face-to-face TEXT2COPE session. She was given a TEXT2COPE manual and accompanying audio CD. Session 1 was the longest of the seven sessions (30 minutes), and focused on positive thinking, how positive thinking affects how one feels and how one acts, and how becoming more aware of how you think is important so that thinking can become more positive. In the face-to-face discussion,

the mother was encouraged to think of ways to encourage her child to begin a new healthy habit (e.g., make it fun, make the child feel good, try to have it be exciting, do things with your child, repeat it again and again). For homework, she was asked to complete the first blue sheet in her binder. Her homework showed written response to "What are you thankful for today?" The parent reported being thankful for her and her son's safety, for food, and for her health. She was encouraged to say a positive statement five times every morning and night. The tailored SMS that was developed for that week was, "Believe in yourself, Role-Model for *child name* …chase that Ball!" The tailored message triggered positive thinking in addition to her homework and also built in a cue to action using her own words. "Chase that ball" was her way of exercising with her son in their apartment complex since they could not be outside due to weather and had nowhere else to exercise. In the face-to-face discussion she talked over ways to increase exercising with her son, using things they both enjoy to make it fun, and also how she could be more positive. The message was sent three times that week (M, W, Th) at times when the parent believed it would be the best times to *hot trigger* her. The messages were sent at 9:30 am on two days, and 1:00 pm one day, during the times when she had availability in her schedule to act on the behavior. She also responded to both static messages. This parent would alternate using her cellular provider and TEXTNOW.com for SMS services. When the parent used the TEXTNOW.com service, a tag line attached onto outgoing SMS was automatically added (e.g., "Y -Sent free from TextNow.com"). Unfortunately, the MEMOTEXT software did not recognize the additional characters and the automated feedback was not generated back to the parent. In this instance, the parent responses to static messages were not supported and were used solely for data collection.

However, this same parent would also respond to static messages using her cellular provider. In these cases, a *Yes* or *No* response would generate automated feedback from the TEXT2COPE program (i.e., You're on the right path! Offer vegetables or fruits that are pleasing to the eye—make it fun!"). The parent completed the TEXT2COPE program and reported that the program was helpful in teaching her how to help her son. The parent also verbalized learning techniques that she could put into place to keep practicing after the program was over.

Parent evaluation. Parents reported the program helpful 100% of the time, and would recommend the TEXT2COPE to other parents of preschoolers 100% of the time. Qualitative feedback statements about why a parent would recommend the program included, "The program doesn't just tell you to be healthy, it shows you," and included messages to "Keep trying, don't give up," and "Keep pushing towards my goals." Thematic saturation occurred for goal-setting (10/13, 77%) as the most liked content of the program. No saturation occurred for topics least liked. The audio CD was favored 46% (n=6) of the time over the hard-copy manual. The frequencies of SMS were deemed "just right" 100% of the time, while the timing of delivery was "perfect" 85% (n=11) of the time.

Aim 2. To evaluate the preliminary effects of the TEXT2COPE program on nutrition/physical activity knowledge, cognitive beliefs, and perceived difficulty towards engaging in healthy lifestyle behaviors, and healthy lifestyle behaviors in parents of OW/OB preschoolers between the ages 3 to 5 years.

Table 7 provides a summary of means, SDs, and effect sizes for key outcome variables. Paired *t* tests indicated that parents in the TEXT2COPE program significantly

improved scores on nutrition knowledge (p<.001), healthy lifestyle behaviors (p< .05), but not on perceived difficulty (p= .168). Using Wilcoxon signed ranks test for nonparametric data, beliefs about their ability to engage in healthy lifestyles significantly increased from pre- to posttest (p=.001). A Wilcoxon Signed-rank test showed significant effects for activity knowledge (Z = -2.507, p=.012, r = 0.46) and healthy lifestyle beliefs (Z= -3.317, p=.001, r=.61). Collectively, there were significant gains in four out of five outcome measures (nutrition knowledge, activity knowledge, healthy lifestyle beliefs, healthy lifestyle behaviors). Effect sizes were medium to large for all study variables.

Aim 3. To evaluate the relationship among the study variables (i.e., the intervention, cognitive beliefs, perceived difficulty, healthy lifestyle behaviors).

Using a descriptive correlational design, the relationships among study variables were determined. Table 8 presents the correlations between study variables at baseline and posttest. None of the child's anthropometric measures correlated with study outcomes. Number of weeks (duration) to complete the program was associated with one outcome, activity knowledge (r_s =.633, p<.05), but no other outcomes. Collectively, variables that were significantly correlated at baseline (beliefs, perceived difficulty, behavior) were also significantly associated at posttest. At baseline, parental beliefs towards healthy lifestyles significantly correlated with perceived difficulty ($r_{s=}$ .598, p<.05) and behavior ($r_{s=}$ .545, p<.05). This indicated that the stronger the parental belief in their ability to engage in healthy behaviors, the less perceived difficulty. Similarly at posttest, as belief scores improved after the intervention, associations with parents'

perceived less difficulty ($r_{s=}$ .696, p<.010) as well as their self-reported ability to engage in healthy lifestyle behaviors ($r_{s=}$ .653, p<.010) significantly improved.

Neither the total number of SMS sent, nor the total number of tailored SMS sent associated with study variables. However, participant response to static messages (with automatic feedback response generated) was significantly inversely associated with both belief scores (r_s = -.522, p<.05) and perceived difficulty scores (r_s = -.677, p<.01). That is, for those participants who scored higher on the belief (the higher the score, the stronger the parental beliefs) and perceived difficulty (the higher the score, the less perceived difficulty) posttest measures than those participants with lower belief and perceived difficulty posttest measures, the lower the response rate to static SMS.

CHAPTER 5. DISCUSSION

The data indicate that a cognitive behavior skills building program, synergized with mobile messaging, is feasible and acceptable in a primary care setting with parents of OW/OB preschool aged children. Furthermore, analyses support preliminary efficacy of the TEXT2COPE program in improving self-reported beliefs and behaviors towards engaging in healthy lifestyles. As posited by Beck's (Beck et al., 1979) CT, findings support the interconnections between thoughts, feelings, and actions. Parental healthy lifestyle beliefs were significantly related to their perceived difficulty and behavior skills in engaging in a healthy lifestyle. The relationship among study variables mimics previous research in OW/OB school-age children (Jacobson & Melnyk, 2011, 2012) and adolescents (Kelly et al., 2011; Melnyk et al., 2006).

Parents and adult caregivers play an important role in the development of proper eating habits (Golan, 2006). Mothers were the predominant study participants and caregivers, consistent with other family based interventions (Jacobson & Melnyk, 2012; Quattrin et al., 2012; Shapiro et al., 2008; Small et al., 2012; Small, Bonds-McClain et al., 2013). While maternal anthropometric data were not collected, maternal obesity has been identified as a significant predictor for the development of childhood obesity (James, Matsangas, & Connelly, 2013). Previous research also supports the likelihood that when children need help, parents do as well (Golan, 2006; James et al., 2013). Similar to Golan (2006), family was treated as a unit versus an approach where obese members are treated in isolation. As in other studies conducted in a primary care setting (Sargent et al., 2011; Small, Bonds-McClain et al., 2013), parents in the TEXT2COPE program attended the visits, with or without the child, but were strongly encouraged to

practice the skills at home with their child. Homework and SMS reinforced parent-child practice. For example, a homework assignment asked the parents to "name one way you can praise your family for trying to meet this goal." A sample SMS said, "BELIEVE small changes = healthy habits! and doing it as a family is stronger! Everyone in the family is key. Feeling important = Feeling good!" Based on empirical support, messages were tailored, incorporated parent names and/or child names, and provided feedback via an if/then algorithm (Bauer et al., 2010; Woolford, Clark, Strecher, & Resnicow, 2010). Parents are well-suited to become the main agents of change of the family's home environment, thus affecting the child's habits. In a sample of Mexican mothers of preschoolers, many parents indicated that childhood overweight is the responsibility of the parent (Small, Melnyk et al., 2009). Treatment of childhood obesity with parents as the main agents of change was found superior to interventions with the child as agents of change (Golan, 2006), and further supported in a scientific statement from the AHA, particularly for preschool or younger school-aged children (Faith et al., 2012).

Using recommendations from Bowen et al. (2009), feasibility for this study can further be framed in several focus areas: (a) acceptability, (b) demand, (c) implementation, (d) practicality, (e) adaptation, (f) integration, (g) expansion, and (h) limited-efficacy testing using a convenience sample and shorter follow-up periods and limited statistical power.

Acceptability

Parents reported high satisfaction with the TEXT2COPE program and expressed intent to continue using the skills learned in the program. The crux of the program aimed to simplify cognitive behavior skills to support the tailored needs of the families.

Therefore, the skills could be practiced with support from the PI, but continued at the end of the program and were honed over time. The last face-to-face session focused on *putting it all together* and setting the parent up for success after the program's end. One parent commented that she had copied (i.e., cut and paste) the content from her TEXT2COPE text messages and programmed them into her electronic calendar so her messages would continue to trigger the response she wanted to practice.

The use of static messages warrants further exploration. The static message carried a multitude of functions. First, it served as a data collection tool. Response rate varied from 26% to 80%. For parents who responded, the automated response built from the if/then algorithm served as reinforcement. Other parents viewed the messages as reminders and did not respond. It is difficult to assess if the change was a function of (a) the change in verbiage, (b) the way the PI explained this aspect of the program, or (c) the characteristics of the participants responding. The wording of the message was iteratively tested on a focus group. However, it was not developed from parent feedback. Timing of message delivery was also determined by the PI versus by the parent, which could have also contributed to the variability in response.

Demand

Demand for innovative programs in the primary care setting is twofold: one is the demand from the organization and the second is the demand from the patients. Office managers, providers, and staff welcomed the TEXT2COPE program as an innovative resource to treat OW/OB. However, despite the lack of innovative clinical resources specific to the treatment of OW/OB and provider endorsement, partnering with primary care clinics was difficult. The PI was not a clinician in any of the primary care settings

used in this study. Therefore, administrative affiliations warranted lengthy negotiations between the PI and the organizations. Administrative approval was often layered to include an array of academic IRB approval, legal review, and/or third party reviewers. In one case in point, the office manager and providers expressed interest in having the TEXT2COPE program. However, the policy of the overarching agency was to outsource all research proposals to a third-party reviewer. In addition to delaying the process, all researchers were charged a fee of $500 for proposal review. The review process and fee did not guarantee approval. Due to the additional costs and time from review to potential approval/denial, this clinic was not included as one of the clinical sites.

Additional incentives were used to build partnerships with the primary care clinics. Providers and staff were given an in-service on childhood obesity, anthropometric measures, and applicable billing codes associated with diagnosis and tracking of BMI. Office managers were given information on The Patient Protection and Affordable Care Act of 2010 (PPACA), accountable care organizations (ACOs), and The Pediatric Demonstration Project (outlined in health reform; gives merit to pediatric-specific ACOs) (American Academy of Pediatrics, 2011). Lastly, an outline of the TEXT2COPE program specifically highlighted what the program entailed, what would be asked of the patients/families, and use of clinic space and the role of staff/providers.

Parental demand for the TEXT2COPE program varied. Consistent with the literature, parents were often unaware that their preschooler was OW/OB. However, once a diagnosis was made, parents were interested in learning more about how to help their child. Prior to startup, a logo was developed to differentiate the TEXT2COPE materials from the clinic materials. The logo also served as a marketing tool for

recruitment. Dissemination about the TEXT2COPE program occurred through fliers, patient identification, and phone recruitment by a staff member. This highlighted the gap between practice and technology. Although all of the clinics used EHRs, none of the clinics were proficient at using technology as a tool to communicate with parents and families. One clinic had an established Facebook (FB) page and expressed interest in disseminating information and recruiting using that page. Yet, the clinic was unaware of how many families subscribed to their page, would receive the update in a news feed, or how many of those families actually met inclusion criteria. Although the clinic offered to administratively police the FB page and related TEXT2COPE traffic, IRB approval was not pursued due to too many uncertainties. Given the broad user base, social media is worthwhile to explore as a recruitment and communication tool in future research.

Implementation

The degree of execution was deemed a success per participant acceptability, delivery per protocol, and preliminary effects. Study findings are consistent with literature (Jacobson & Melnyk, 2012; Lusk & Melnyk, 2011; Small, Bonds-McClain et al., 2013), supporting a cognitive behavioral healthy lifestyles program delivered in a primary care outpatient setting. With the evolution of EHRs and acceptability by parents, incorporating text messaging is attainable.

There are resources necessary to implement the TEXT2COPE program in a primary care setting. The PI delivered all of the face-to-face sessions in the amount of time comparable to a traditional outpatient visit. Furthermore, the PI was able to enter and weekly change the content of the tailored text messages in less than 5 minutes per participant, per message. However, this would require additional software, either

independent or programmed into existing EHR software. Clinic support staff (i.e., medical assistants, nurses) could be trained to use such software and potentially reach more patients in a more tailored way. Monitoring for aberrant messages could be done in partnership between software companies and the trained clinic staff. Unfortunately, cost analysis was not examined in this study. However, given the minimal amount of time needed to enter and schedule the message and broad user base, cost analysis is warranted in future research.

Practicality

Practicality was explored when resources, existing means, and time were constrained in some way. The parents were asked at each face-to-face how the program was working for them. Parents reported that some habits were more difficult to change than others. However, the skills taught in the program were described as *how to* be healthy. With practice, the parents reported being able to carry out those activities that were relevant. For example, it was not relevant to tell some families to stop eating out when they rarely did it. One mother had difficulty identifying a health goal for her family. Other than "wanting to lose weight," she was unable to articulate what in particular she wanted to focus on. As a result, the PI and parent tried targeting turning the television off during family dinnertime. After 2 weeks of practicing at home, the parent said it was not helpful. After further discussion, the PI learned that the mother was having medical and financial issues that were more pressing. Altering the skills to target these areas and how they related to the family's health was better received. At subsequent visits, the parent reported practicing the skills at home. This lends support to the importance of tailoring the intervention to the needs of the participants.

Adaptation

The intervention content was adapted from previous research done with culturally diverse adolescents, OW/OB school-age children and parents, and families with preschool-aged children (Jacobson & Melnyk, 2012; Melnyk et al., 2013; Small, Bonds-McClain et al., 2013). The TEXT2COPE program implementation specifically adapted the number of weeks needed for delivery and the frequency tailored messages were requested. Adaptation to program implementation reflected the changing needs of the parents and routines around primary care use. Given the non-acute nature of healthy lifestyle behaviors, parents often requested to reschedule appointments. Reasons included unreliable transportation or no transportation, an inconvenient location that required several bus changes, lack of childcare for siblings, conflicts after school, or scheduling conflicts over the winter holidays. These findings are similar to findings in other research (DiMarco, Huff, Kinion, & Kendra, 2009; Jacobson & Melnyk, 2011).

The program also adapted to reflect the cultural aspects of the participants. Taveras and colleagues (2011) reported that African-American, Hispanic/Latino, and Asian parents rated the quality of nutrition and physical advice received from healthcare professionals as poor to fair. Cultural sensitivity is important to factor into the design of programs targeting healthy beliefs and behaviors. Hip-Hop to Health Jr. is an evidence-based healthy eating and exercise curriculum for children ages 3-7 years (Fitzgibbon et al., 2006; Stolley et al., 2003). Tested in Head Start programs, the program has had much success in parent acceptability and significantly reducing BMI (p=0.01) at 1-year post intervention and also at 2-year post intervention (p=0.02) (Fitzgibbon et al., 2005). Interestingly, when Hip-Hop to Health Jr. was conducted in predominantly black Head

Start centers, it was effective in reducing subsequent increases in BMI (Fitzgibbon et al., 2006). However, when the program was implemented in Latino centers, although well received, it was not effective (Fitzgibbon et al., 2006). Although small, the sample used in this research was diverse, with almost half identifying themselves as Hispanic/Latino. Upon referral to the TEXT2COPE program, several parents reported this being the first time they heard their child was OW/OB. This supports qualitative research in Mexican parents of preschool children lacking information regarding their child's weight (Small, Melnyk et al., 2009). The TEXT2COPE content was based on CT focused on parental beliefs. Reinforcement of the content was designed to incorporate the parent's own words and build on parental understanding and use of the skills.

Although not measured, moral justification may have factored into the lifestyle behaviors by parents. Moral reasoning refers to how we recognize and cope with conflicts and how they move us to act (Richardson, 2013). Parents in the TEXT2COPE program echoed themes similar to a 2013 Poll about Children and Weight: Crunch Time During the American Work and School Week - 3pm to Bed put forth from National Public Radio (NPR), the Robert Wood Johnson Foundation, and Harvard School of Public Health (2013). Stores were to blame for not selling enough reasonably-priced fruits/vegetables, there were not enough places nearby to get exercise, the child liked the taste of the food, there was no time to shop or prepare something different, it was easier to get food on the run, or caregivers were too tired to make something different (NPR et al., 2013). Parents in the TEXT2COPE program were task-oriented during crunch time (i.e., dinner, homework, extracurriculars, bath/bedtime routines). Because of the non-acute nature of OW/OB, long-term sequelae of their choices may not have been at the

forefront of parents' cognitions. Parents described living moment-to-moment or paycheck-to-paycheck. If a person is asked to do something that violates their intuitions, they will devote their efforts "to finding an escape hatch," and will almost always succeed (Haidt, 2013, p. 59). When addressing issues of morality, Haidt (2013) recommends first establishing trust and communicating with praise or a sincere expression of interest. The PI was committed to promoting the health of families and was honest in each encounter with the families.

Integration

Feasibility studies assess to what extent a new program or process can be integrated into an existing system (Bowen et al., 2009). In terms of perceived fit, perceived sustainability, and costs to organizations and policies (Bowen et al., 2009), the TEXT2COPE program was robust in fit. The intervention could be delivered in a typical 30-minute outpatient visit. Providers could work within practice limitations and still provide evidence-based care, analogous to findings from Lusk and Melnyk (2011). This practice could be sustained over time. More time and research is needed to evaluate the impact on cost and policy. However, with the implementation of the Affordable Care Act and subsequent ACOs, organizations have the opportunity to share in any Medicare savings created through demonstrated quality performance (Centers for Medicare & Medicaid Services, 2013). Within the context of current ACO guidelines focused on adults, TEXT2COPE facilitates the patient/caregiver experience. Areas where integration of the TEXT2COPE program can facilitate ACO goals are: (a) getting timely care and information, (b) how well your providers communicate, (c) patient ratings of

providers, (d) health promotion and education, (e) shared decision making, and (f) health status.

Expansion Intervention

To what extent can the TEXT2COPE program fit within an organization's goals and culture? The TEXT2COPE program was a free resource to clinics to fulfill a gap in service. With expansion, there may be disruption training providers and updating EHRs or other technology. However, since the program targets beliefs and is tailored to the needs of the participant, it has the potential to expand into other areas of health.

Another interesting area for potential expansion would be into employee health. Work was identified as a reason for parents to reschedule clinic appointments and was also cited as a source of stress. Since parents were the primary agents of change, it is logical to bring the program to them. Healthier employees are less likely to call in sick, companies that support workplace health have a greater percentage of employees at work every day, and cost savings can be measured against absenteeism (CDC, 2013c). Behaviors promoted in the workplace can impact both the employee and their family, and may result in less missed work caring for ill family members (CDC, 2013c).

Limited Efficacy Testing

Study findings support preliminary efficacy of the TEXT2COPE intervention in promoting healthy lifestyle beliefs and behaviors. Effective behavior change is possible through smaller, habit-changing steps (Fogg, 2010). Some research suggests that habits are goal-driven, while others denote habit formation activated by contextual cues (Neal et al., 2012). To promote success in behavior change, the TEXT2COPE program incorporated aspects of goal setting, contextual cues, and triggers. Parents reported goal

setting as the most helpful topic covered in the program. However, this skill was reinforced with strategies suggested by Neal et al. (2012) to target specific contextual triggers (i.e., hot triggering a preferred response to a situation with SMS) and stimulus control that reduced exposure to negative triggers (i.e., moving food in a pantry to take into consideration view/access of the child). In the case of triggering a preferred response, most parents timed the delivery of tailored messages during the afternoon hours. This coincided with reported high levels of stress. In the face-to-face sessions, more than one parent reported feeling stressed and having no control by the end of the workday. This often overlapped with picking up a child (or children) from daycare/school, trying to figure out what to do for dinner, managing homework for older siblings, and in some instances, balancing after-school activities. Consequently, parents resorted to getting takeout or fast food because "it was easier." The program was designed to trigger and be tailored to individual families. After discussing problem-solving skills in the face-to-face session, a mother tailored her SMS to deliver at 5:00pm three days a week to hot trigger her beliefs and actions to reframe negative automatic thoughts in an attempt to break the cycle. Her SMS said, "*parent name*, look at your triggers and think about how YOU have control. Believe that it is in your power to continue to be healthy and strong!" Additional skills were practiced as the parent progressed through the sessions, such as problem-solving, positive coping, and making a plan.

It is not surprising that the majority of messages were timed to trigger a response in the late afternoon hours. *Crunch time* is a major contributor to unhealthy habits for millions of American children (NPR et al., 2013). While 95% of parents polled believed

that it is important for their kids to eat healthy and exercise, more than half of the parents (60%) said their children ate or drank something unhealthy during *crunch time*, did not get enough physical activity, reported eating out six or seven nights in the past week (48%), and attended family functions in the past month where children accessed food that could lead to unhealthy weight gain (NPR et al., 2013).

Parents favored the tailored components of the TEXT2COPE program. The manualized content provided a comprehensive overview of cognitive behavior skills; however, the skills were applicable and applied to individual needs, further individualized with the homework and SMS. Other research using CBT combined with tailored intervention arms yielded high-quality data to address a wider variety of questions in addition to the impact of treatment duration (Almirall, Compton, Rynn, Walkup, & Murphy, 2012). Highly adaptive and tailored trials show promise as an alternative clinical trial design (Murphy, 2005). In a meta-analytic review, the sample sized weighted mean effect size of the effects of tailoring on health behavior change was found to be r=.074, noting these effects were moderated by (a) health behavior, (b) type of print material, (c) number of intervention contacts, (d) whether demographics were tailored on, and (e) number of theoretical concepts tailored on (Noar, Benac, & Harris, 2007). As early as 2000, Lavori, Dawson, and Rush (2000) introduced designs framed in terms of clinical decisions using adaptive (within-patient) threshold strategies in addition to prescribing the best initial treatment. In adaptive treatment strategies (ATS), the treatment level and type is repeatedly adjusted according to ongoing individual response (Murphy, 2005). An interesting phenomenon worthy of further exploration is that participants in the TEXT2COPE study who scored higher on healthy lifestyle beliefs and

perceived difficulty scales at posttest appeared to adjust part of their own treatments. Participants with better belief scores and perceived difficulty scores had lower response rates to static SMS (and subsequent automated feedback). However, since this was a feasibility and acceptability study, these results must be cautiously interpreted given the small sample size and adaptation to static SMS verbiage during program implementation.

Tailoring the intervention to the needs of the families was beneficial in having the parents identify with the material. Findings from recent research (Sharifi et al., 2013) support the text-messaging aspect of the TEXT2COPE program in the realms of theme, verbiage, timing, frequency, and tone. Sharifi and colleagues (2013) explored parental acceptability and preference regarding the use of text messaging to support pediatric obesity-related behavior change. Five focus groups and seven follow-up interviews were conducted in parents of school-aged children (ages 6-12 years). From their research, parents expressed a need for specific, action-oriented advice to achieve goals rather than general information on healthy behaviors (Sharifi et al., 2013). Parents recommended the messages focus on one goal at a time to avoid feeling overwhelmed, and preferred a mix of encouraging messages and messages about behaviors needing improvement. Furthermore, the majority of parents felt that receiving messages twice a week would be appropriate, but some parents preferred daily messages. No consensus was reached on the best time of day to receive the message. However, there was consensus that there should be an option to increase or decrease the frequency of the messages. Parents felt the more relevant the message to their child (i.e., tailored to the child's age, gender, preferred goals), the more effective they will be in supporting behavior change. Lastly, parents noted that a text from a healthcare provider would have a voice of authority, with

some parents preferring the provider eventually discuss text responses with them (Sharifi et al., 2013). The TEXT2COPE program was designed and able to easily incorporate all of these aspects into the text-message portion of the program.

During the face-to-face sessions and in subsequent messaging, some parents would focus on the actual habit (i.e., exercise), while some would focus on the actual skill (i.e., problem-solving, goal-setting). Research interventions may be more effective if the process of behavior change is emphasized versus the health-related outcomes are emphasized (Hekler, Gardner, & Robinson, 2010). Inadvertently, the TEXT2COPE program incorporated such strategies for parts of the program. For instance, either the PI or parent gave the preschoolers five jelly bracelets to represent five servings of fruits and vegetables. The children were instructed to start the day with all of the bracelets on one arm. For every serving of fruit or vegetable consumed, a bracelet moved to the other arm. The goal was to get all of the bracelets from one arm to the other by the end of the day. The process of behavior change was targeted, and as a side effect, the health outcome to eat more fruits and vegetables was influenced (Hekler et al., 2010). Perhaps the combination of techniques (those that focus on health outcomes supplemented with those that focus on behavior change process) is optimal in health promotion research.

Text messaging was not used to trigger actions related to the doing the actual intervention. For instance, parents were not sent messages reminding them to do the homework or answer the static messages. The messages were delivered and designed to support program materials, not contribute to alert fatigue or participant burden. The tailored messages only referenced program materials to foster parental skills building, and were only sent upon request.

Nutrition and physical activity knowledge correlated with one another and significantly improved pretest to posttest. Although, as with previous research (Melnyk et al., 2009), nutrition and activity knowledge did not correlate with beliefs, perceived difficulty, or healthy lifestyle behaviors. One explanation is that despite needing and having knowledge of what to do, having the skills necessary to implement the knowledge may be lacking. When taken in context of a typical pediatric outpatient visit, pediatricians are expected to counsel parents and patients on an unrealistic 162 different directives throughout childhood based on the American Academy of Pediatrics policy statements (Belamarich, Gandica, Stein, & Racine, 2006). Furthermore, in only 20% of the policies were aids to delivering advice referenced, and in no policy statement was there reference that office-based counseling was an effective method to achieve the desired health or health behavior outcome (Belamarich et al., 2006). This underscores the need for innovative programs that are evidence-based to support clinical practice.

Strengths

The TEXT2COPE program featured several strengths, as evidenced by demonstrated feasibility, acceptability, and preliminary effects. Despite the small sample size, retention was 100%. The sample size was adequate for a feasibility pilot study, allowing for adequate program implementation and experimentation with the technology, timing, and practice considerations. The study findings supported existing literature using a cognitive behavioral skills-building program, while being novel in its approach. The program shed light on programs aimed at families with OW/OB preschoolers in a primary care setting, both of which have been sparse in the literature to date. Lastly, the

incorporation of text messaging in pediatric primary care is innovative and worthy of future investigation.

Limitations

The small sample size of only mothers does limit the generalizability of the study findings. Internal validity may have been weakened due to the lack of an attention control group. The short implementation time does not speak to long-term use of the cognitive behavior skills and program outcomes. It would have been difficult to adequately assess BMI, waist circumference, or WHtR change over time due to the short duration of the program. Parent anthropometric measures would have been interesting to explore in relation to the study variables. As with most research, measures were self-reported, wherein bias or human error can be introduced. The reliability of the Physical Activity measure was lower than the other measures. In future research, obtaining two forms of assessment on a particular variable may enhance the credibility as different scores converge (Melnyk & Fineout-Overholt, 2011). Also, an objective measure of behavior (i.e., pedometer or photo diary) may have helped to further validate the data. Given the novelty of mHealth and its integration with EHRs, pricing and initial software costs are variable and still being determined. As industry and clinical practice merge, a cost analysis of mobile messaging, staffing issues, and clinical cost analysis would be recommended in a future study.

Implications for Clinical Practice

Incongruity between research and practice can occur from interventions derived from highly controlled efficacy trials (Bowen et al., 2009). However, relating research to the real world (Bowen et al., 2009) and consideration of the *so what* outcomes (Melnyk

& Fineout-Overholt, 2011) can facilitate translation of research into practice. The findings from this study support further exploration of a cognitive behavior skills-building program implemented in a primary care setting synergized with text messaging. The face-to-face sessions lend empirical support to treating families with a diagnosed OW/OB preschooler in a primary care setting during a routine 30-minute visit. Additional analysis is needed to determine outcomes on anthropometric data and potential cost-effectiveness in reducing associated comorbidities of childhood obesity. Further research is also warranted on the effectiveness and cost-to-benefit of text messaging as an adjunct to clinical practice.

Future Recommendations

Prior to full-scale implementation, Bowen and colleagues (2009) recommend consideration to *can it work, does it work*, and *will it work* questions. The findings from this work supported acceptability, demand, implementation, and adaptation areas of focus in the *can it work* realm put forth by Bowen et al. (2009). Furthermore, the key areas of focus for feasibility studies were all addressed. Next steps include considering if the intervention works in a pilot randomized controlled trial (*does it work*), and subsequent exploration into real-life contexts if clinicians and parents adopt the intervention as practice (*will it work*). A larger sample size in the future will permit mediation and prediction models. This will help to inform the effects of study components as they relate to health outcomes. A longitudinal design will also help to assess alert fatigue, feasibility and acceptability, behavior change, and anthropometric change over time.

Murphy and colleagues (Lei, Nahum-Shani, Lynch, Oslin, & Murphy, 2012; Murphy, 2005; Murphy, Collins, & Rush, 2007; Nahum-Shani et al., 2012) employ

Sequential Multiple Assignment-Randomized Trials (SMART) that use individual variables (i.e., severity, preference) to adapt an intervention and then dynamically utilize individual outcomes (i.e., response to treatment, adherence) to readapt the intervention. It would be interesting to further tailor and explore the effects of the TEXT2COPE program utilizing SMART techniques and individualizing treatment strategies based on decision rules recommending when and how the treatment should change based on patient characteristics and outcomes collected during the treatment phase (i.e., response and adherence) (Murphy, Lynch, Oslin, McKay, & TenHave, 2007). In some cases, modifying existing intervention implementation techniques using a SMART technique has the potential to be more efficient and less costly (Almirall et al., 2012). In developing an adaptive treatment strategy, questions that often need to be addressed include the best sequencing of treatments when individuals are not responding and the best timing of transition from more intensive therapies to less intensive therapies or maintenance therapy and vice versa (Murphy, Lynch et al., 2007).

CHAPTER 6. CONCLUSION

Findings are promising that the TEXT2COPE program was feasible and acceptable with parents of OW/OB preschoolers. The intervention had positive effects on parental healthy lifestyle beliefs and behaviors. This pattern mimics earlier work conducted in adolescent and school-age populations (Jacobson & Melnyk, 2012; Lusk & Melnyk, 2011; Melnyk et al., 2009, 2013). Concordant with other literature (Shapiro et al., 2008; Sharifi et al., 2013), short-term SMS use appears feasible and acceptable for use in promoting healthy lifestyle behaviors. However, alert fatigue could become a factor over time. Therefore, it is critical to teach parents, as agents of change, the skills and cues/stimulus control needed to enable continuation after the program is over. Tailoring the program to the needs of the individual families appeared to be a fundamental component in the acceptability of the program. Routine implementation of the TEXT2COPE program in a primary care setting to parents of OW/OB preschoolers shows promise as a strategy for the promotion of healthy lifestyle beliefs and behaviors and reduction in obesogenic behaviors associated with childhood obesity.

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APPENDIX A

PREVIOUS LITERATURE OF PARENT-FOCUSED INTERVENTIONS ON PRESCHOOL-AGED CHILD OUTCOMES

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
Davison, K., Jurkowski, J. M., Li, K., Kranz, S., & Lawson, H. A. (2013). A childhood obesity intervention developed by families for families: results from a pilot study. *International Journal of Behavioral Nutrition and Physical Activity, 10*(3).	**Purpose:** To test the initial efficacy of an parent-centered community-based participatory research intervention (Family-centered Action Model of Intervention Layout and Implementation-FAMILI) for improving food, physical activity and media-related parenting and children's behavioral weight outcomes **Sample:** 154 parents completed survey at baseline, 119 at follow-up **Setting**: Five Head Start centers in upstate New York	**Intervention**: Four key components included: (a) health communication campaign, (b) letters mailed home to families reporting BMI and other health indicators, (c) informational nutritional counseling sessions were integrated into Head Start family activities, and (d) a 6-week, onsite, parent-led program to promote parent social networking/advocacy/ communication skills/ media literacy/conflict resolution **Outcomes**: Child weight status, child dietary intake (24-hour dietary recall), child physical activity (accelerometer for 7 days), child TV viewing (parent record), activity support scale, 3 items assessing parent self-efficacy to provide healthy foods	**Findings:** significantly lower rates of obesity ($p<.01$), parents reported greater self-efficacy to provide healthy foods ($p<.01$); significantly fewer mins/day of TV viewing ($p<.01$), significantly greater min/hour in light physical activity ($p<.05$); higher intervention dose predicted greater pre-post intervention improvements in the outcomes	**Strengths**: utilization of both community and parent input to develop and implement the intervention; positive intervention effects were identified across all child outcome domains and two out of three parenting domains **Limitations**: study design lacked a control group and randomization; self-report relying on parent response is subject to response bias; sample was predominantly white and more likely to speak English at home limiting generalizability

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
Evans, W. D., Christoffel, K. K., Necheles, J., Becker, A. B., & Snider, J. (2011). Outcomes of the 5-4-3-2-1 Go! Childhood Obesity Community Trial. *American Journal of Health Behavior, 35*(2), 189-198. Ecological approach Chicago, IL Randomized controlled trial	**Purpose:** To evaluate the effectiveness of the 5-4-3-2-1 Go! Campaign in promoting positive change in obesity risk factors (5-4-3-2-1 Go! counseling vs no counseling) **Sample:** 524 Parents of children aged 3-7 years at baseline, 249 completed posttest **Setting**: In-home counseling; concurrent community efforts to promote the campaign were also being conducted (in schools, PSA)	**Intervention**: 5-4-3-2-1 Go! Brief counseling session on program components, with educational pamphlets and promotional items (water bottle, refrigerator magnet with the website address) **Outcomes**: Community Healthy Living Awareness Survey (CHLAS) – physical activity and exercise knowledge- attitudes-behaviors, parent nutrition –KAB, parent reports of child nutrition and physical activity KAB; parent and child media habits, and social environmental (safety, crime) variables	**Findings**: The intervention had significant effect on parents' F&V consumption (p=0.49); parents exposed to the 5-4-3-2-1 Go! Campaign through their children's school in addition to the counseling were nearly 7 times more likely to increase water consumption vs those not exposed to the program (p=0.0027)	**Strengths**: One-time in-home visits feasible for families, easy to understand and promotable campaign **Limitations**: Due to difficulty with follow-up, attrition may have affected study findings; attrition due to challenges in tracking study participants of low-income, urban communities; Data was analyzed pre-posttest, but between group findings are not reported, instead put into a regression model; Concurrent community efforts to promote 5-4-3-2-1 Go! Program increasing the threats to internal validity
Holmes, B., & Silver, M. (2010). Managing behavior with attachment in mind. *Adoption & Fostering, 34*(1), 65-76. Attachment Theory,	**Purpose:** To help adoptive and foster parents better manage the behavior of their children by promoting an environment of greater empathy and attachment between the	**Intervention**: group intervention sessions to provide a parenting program that considered the importance of attachment relationships and its impact on behavior; five separate	**Findings**: Significant improvements in parent-child relationships Career Questionnaire score; significant reductions in 3 behaviors parents perceived to be the most	**Strengths**: minimum attrition; qualitative/ open-ended data also collected; well-received program by participants. **Limitations**: Sample size reporting is highly

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
social learning theory, and principles of playfulness, acceptance, curiosity, and empathy (PACE) Quasi experimental	child and adult **Sample**: Adults who made a commitment to a caring for a child (child <10 years; specific range not specified) who was not a blood relative and who had been removed from their family of origin following early abuse and neglect; 14 adults attended group 1 session (focus group); 44 adults attended sessions 2-5; 42/44 completed baseline; 22, and 27 participants completing forms at the end of the sessions **Setting:** Group setting	sessions were run, with a 6th optional **Outcomes**: parenting stress index; Carer questionnaire (assess adult-child relationships); managing behavior with attachment in mind questionnaire	problematic; reductions in perceived severity and impact of the problems or concerns about their child's behavior.	variable between groups, as well as pre/post data; lack of control group; IRB approval was not reported
McIntyre, L. L. (2008). Adapting Webster-Stratton's incredible years parent training for children with developmental delay: findings from a treatment only study. *Journal of Intellectual Disability Research,*	**Purpose:** To assess the feasibility of implementing a modified parent training program in families with children with developmental delay **Sample**: 25 families with children 2-5 years	**Intervention**: IYPT-DD, a 12-week (2.5 hours) sessions with topics covering developmentally appropriate play, praise, rewards, limit setting, and handling challenging behavior	**Findings**: Significant reductions in inappropriate parental behaviors ($p<0.001$); significant increase in perceived positive impact of the child on the family ($p<0.05$); negative parent and child behavior and	**Strengths**: Piloted information gathered before the study with input from community-stakeholders; clinical significance was evaluated – with 56% of parents clinically increasing their use of positive/praise behavior

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
52(12), 1176-1192. Syracuse, NY Behavioral Theory Pre-experimental	old with developmental delay **Setting**: Either Monday or Tuesday session at one of 2 community early education locations; (free childcare and dinner provided); Assessments were conducted in-home	**Outcomes**: Child developmental functioning; child behavior problems; family impact of the child; parent depression; parent-child observed behavior; satisfaction survey	increased parent perception of child positive impact; the intervention was feasible in parents with children with mild-mod delay	post intervention **Limitations**: Lack of control group; small sample size; results may not generalize to families with more severe intellectual disability
Sanders, R., & Roach, G. (2006). Closing the gap? The effectiveness of referred access family support services. *Child and Family Social Work, 12*, 161-171. Swansea, Wales Theory not identified Quasi experimental vs case study approach (non-equivalent group design- quantitative and qualitative)	**Purpose:** To examine the effectiveness of family support services on family functioning and child well-being **Sample**: Service users (n=45) vs non-service users (n=32); (93% of participants were female parents, children's mean age was 44.66 months vs 39.62 months respectively) **Setting**: 2 Family Centers (provide a range of services to support families – referred or open access such as parenting skills, daycare, play group	**Intervention**: Family support service use **Outcomes**: Family functioning and the well-being of the child <u>Child:</u> Child Behavior Checklist (CBCL); Maternal Social Support Index (MSSI) <u>Parent:</u> Strength & Difficulties Questionnaire (SDQ); Parenting Daily Hassles (PDH)	**Findings**: Child well-being and family functioning did improve; parent well-being not related directly to the child did not improve; PDH significantly improved from t1-t2 ($p<0.01$), CBCL significantly improved from t1-t2 ($p<0.05$), significant better scores for users vs non-users ($p<0.01$) on MSSI and SDQ	**Strengths**: Qualitative data collected supported quantitative findings; Accurately and ethically did not randomize or classify comparison (non-users) as control group, but rather comparison group (could not allocate families to receive vs not receive services); Theory-based research was not identified **Limitations**: Difficulty matching the intervention vs comparison group; limitations of a "one-size fits all" program relevant to group

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
	sessions, & counseling)			delivered services – request for more tailored services
Stark, L. J., Spear, S., Boles, R., Kuhl, E., Ratcliff, M., Scharf, C., . . . Rausch, J. (2011). A pilot randomized controlled trial of a clinic and home-based behavioral intervention to decrease obesity in preschoolers. Cincinnati, OH Social Cognitive Theory Randomized Controlled Pilot Trial	**Purpose:** To evaluate the efficacy of a 6-month clinic and home based behavioral intervention (LAUNCH – Learning about Activity and Understanding Nutrition for Child Health) **Sample:** Eighteen parents of preschoolers (ages 2-5 years) with an average BMI% of 98 and an OW parent were randomized to either the LAUNCH intervention group (*n*=8) or a one-time 45-minute pediatric counseling (PC) comparison group (*n*=10). **Setting:** clinic and home based	**Intervention**: Phase I consisted of 12 weekly sessions that alternated between 90 minute group-based clinic sessions (parent and child concurrent groups) and individual home visits that focused on dietary education, physical activity, and parenting skills. Phase II was maintenance, alternating between clinic and home sessions every other week. **Outcomes**: (Baseline, 6 months, 12 months); Parent and child BMI; 24 h recall; home food environment assessment; children's physical activity (measured by actigraph); Parenting Styles and Dimensions; About Your Child's Eating- Revised; Child	**Findings**: The intervention had a significantly greater decrease in standardized BMI *z* scores and BMI percentiles, and gained significantly less weight than children in the comparison group at six months posttest, and remained significant at 12 months. However, time spent in moderate and vigorous activity did not change, although both groups were at the recommended levels for preschoolers at baseline.	**Strengths**: the LAUNCH program was more effective in reducing obesity in preschoolers than a one-time office visit; additional study strengths include the sample (OB preschooler + OW parent), intensity of the intervention, the home component for each family, and the sustained positive outcomes over a 12-month period **Limitations**: the small sample size, low retention rate (18 out of a possible 109; 32%), associated costs ($1,100 more than the cost of a detailed office visit with a pediatrician), and the reported increase in parental stressors (addressing difficult child behaviors like tantrums and food

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
		Feeding Questionnaire; PedsQL Generic Core Scales; Parent Motivation Inventory; Barrier to Treatment Participation Scale; Treatment Satisfaction Scale		refusal
Stewart-Brown, S., Patterson, J., Mockford, C., Barlow, J., Klimes, I., & Pyper, C. (2004). Impact of a general practice based group-parenting programme: quantitative and qualitative results from a controlled trial at 12 months. *Archives of Disease in Childhood, 89,* 519-525. Coventry, UK Social Learning Theory; Patterson's coercion hypothesis of negative reinforcement developing & maintaining deviant behavior; Piaget's developmental	**Purpose:** To test the effectiveness at 1 year of the Webster Stratton Parents and Children Series group parenting programme in a population sample of parents. **Sample**: 116 parents of 2-8 (mean 4.6 years) year old children registered with 3 general practices (n=60 intervention, n=56 control) **Setting**: General practice setting/ local medical center and local community center	**Intervention**: Webster-Stratton's 10 week parenting program, the Incredible Years program from the Parent and Child series (behavioral intervention) **Outcomes**: Eyberg Child Behavior Inventory; Goodman Strengths and Difficulties Questionnaire, General Health Questionnaire (GHQ), Parenting Stress Index (PSI), Rosenberg Self Esteem Scale (RSE).	**Findings**: No significant differences between the control and intervention group on any of the scales measuring children's emotional and behavioral adjustment at 12 months (from 6-12 months with no intervention, the treatment group stayed the same, while the control group showed improvement); however, the intervention group had significantly ($p<0.05$) greater change over time for mean scores on ECBI, SDQ, and GHQ; behavior and mental health improvements in the intervention group were largely maintained over	**Strengths**: Intent to treat rigorous analysis, with matched pairs; longitudinal data collection; mixed methods allowed for the study to be informed in 2 ways; Qualitatively parents felt the program would have been more effective if both parents were in attendance; difficulty sustaining behavior change without support at home **Limitations**: 57% of participants attended at least half of the sessions (attrition was higher in parents with older children); Attrition at 12 months – 28% in the treatment group; 23% in the control group

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
Randomized controlled experiment; qualitative interviewing			time.	
Welterlin, A., Turner-Brown, L. M., Harris, S., Mesibov, G., & Delmolino, L. (2012). The home TEACCHing program for toddlers with autism. *Journal of Autism Developmental Disorders, 42,* 1827-1835. North Carolina Structured Teaching methodological framework Randomized-waitlist control design	**Purpose:** To evaluate the efficacy of a comprehensive home-based early intervention program for young children with autism based on the TEACCH method **Sample**: 20 families with children less than 42 months and clinical diagnosis of asthma **Setting**: home-based	**Intervention**: TEACCH, outreach model designed to serve the early intervention needs of 2-3 year old children with autism and their families. 12, 90-min sessions **Outcomes**: Child: Mullen Scales of Early Learning (MSEL), Scales of Independent Behavior Revised (SIB-R) Parent: Parenting Stress Index (PSI)	**Findings**: No significant findings on repeated measure analysis for the MSEL, SIB, AND PSI. Within group effect sizes demonstrate medium to large effect size gains in the treatment group over a 3 month period on the MSEL and SIB suggesting improvements in child developmental and adaptive skills	**Strengths**: Tailored and home-based for families; first study of its kind to implement in children 3 years of age and younger and manualized protocol; in-home study is feasible **Limitations**: Small sample size (likely underpowered) and short duration of the program
Wilson, S. R., Yamada, E. G., Sudhakar, R., Roberto, L., Mannino, D., Mejia, C., et al. (2001). A controlled trial of an environmental tobacco smoke reduction intervention in low-income children with asthma. *Chest, 120,*	**Purpose:** To determine the effectiveness of a continuing-feedback, behaviorally based education intervention in reducing environmental tobacco smoke (ETS) exposure and health-care utilization in low-income, minority	**Intervention**: 3 nurse-led sessions employing behavior change strategies that incorporated feedback on the child's urinary cotinine level and basic asthma education vs usual care **Outcomes**: Baseline, 6	**Findings**: Significantly lower (p=0.03) odds ratio for more than one acute asthma medical visit in the follow-up year; effect of the intervention on families allowing smoking in the home is large, but not statistically significant after the intervention	**Strengths**: Statistical and clinical implications, particularly for low-income, minority children with asthma **Limitations**: guiding theory/framework not stated; small sample and young age of

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
1709-1722. Fresno, CA Theory not stated RCT	children with asthma **Sample**: Children 3-12 years of age seen for asthma in the hospital's emergency room, inpatient, and outpatient departments (n=87); intervention group (n=44) **Setting**: Pediatric pulmonary service of a regional pediatric hospital	month, and 12 month data collection; Urinary cotinine/creatinine ratio (CCR); number of acute asthma medical visits, number of asthma-related hospitalizations; smoking restrictions in home, amount smoked, reported exposures of children, asthma control	(p=0.11); the change in CCR favored the intervention group with a moderate effect size (-0.34), but not statistically significant (p=0.26).	participants limited accurate performance of pulmonary function tests; medication adherence was not concurrently gathered which could have contributed to some of the positive findings, as well as other environmental control practices were not assessed
Zuwala, R., & Barber, K. R. (2001). Reducing anxiety in parents before and during pediatric anesthesia induction. *American Association of Nurse Anesthetists, 69*(1), 21-25. Michigan Theory not stated RCT	**Purpose:** To determine whether viewing a video of the actual pediatric inhalation induction would reduce the level of parental anxiety **Sample**: Convenience sample of 80 parent-child dyads; pediatric patients (ages 10 months to 10 years) requiring inhalation anesthetic induction (pediatric patients were undergoing a myringotomy or tonsillectomy)	**Intervention**: Video and pamphlet (intervention) vs pamphlet (control) **Outcomes**: Parents: State-Trait Anxiety Inventory (STAI); blood pressure; pulse rate; child behavior scores Children: STAI; blood pressure; pulse rate	**Findings**: Anxiety was measured perioperatively in the parents and their children. Mean arterial pressure for children in treatment was significantly lower during preoperative holding and following induction ($p < .05$). The level of anxiety postoperatively of children and parents in the treatment group was significantly lower than that of children and parents in group 2 (p <	**Strengths**: experimental design; study findings suggest decreasing parental anxiety during their child's operative experience benefits the child; the intervention was not resource intensive **Limitations**: anxiety was measured in the hospital, while behavioral scores were measured 2-weeks postoperatively;

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
	Setting: Hospital		.05). Parental anxiety measures did not significantly decrease	

APPENDIX B

PRIOR INTERVENTION STUDIES TARGETING HEALTHY LIFESTYLES IN FAMILIES WITH PRESCHOOLERS IN A PRIMARY CARE SETTING

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
Ariza, Laslo, Thomson, Seshadri, & Binns. (2009). Chicago, IL Adult learning theory Feasibility study- 2 group design	**Purpose:** To pilot a practice-directed intervention to promote growth interpretation and lifestyle counseling during health supervision visits. **Sample**: The sample was divided into a Survey Sample (n=275, birth -17 years), which evaluated parental of care content and responses to health supervision visits, and an Observation Sample (n=253, 2-10 years), which evaluated observed care delivery. **Setting**: 4 diverse primary care practices	**Intervention**: The practice-directed intervention (Systematic Nutritional Assessment in Pediatric Practice [SNAPP] consisted of education, practice-change leadership teams, and guidance from the study team.	**Findings**: Documentation of growth (BMI) was higher after intervention; however, parental report of adoption of a healthier behavior for themselves or their child at 1-month posttest did not significantly change. BMI%, diet, and physical activity lasting a median of 4 minutes for obese children/families	**Strengths**: The SNAPP program demonstrated feasibility, attention to methodological detail, and multifaceted intervention. **Limitations**: Selection bias, as sites reported an interest in obesity-related care. Strikingly, although discussions were highest for obese children, the longest discussion on diet only averaged 2 minutes 11 seconds.
McKee, Deen, Maher, Fletcher, Fornari, & Blank. (2010) Bronx, NY Socio-ecological model Randomized controlled	**Purpose:** To evaluate the feasibility of a primary care-based intervention to decrease behaviors that place urban children at risk for obesity **Sample:** Low-income	**Intervention:** The Family Lifestyle Assessment of Initial Risk (FLAIR) intervention consisted of primary care providers (n=15) who attended a training to provide evidence-based	**Findings:** Goal setting with referral to more intensive lifestyle counseling for obesity prevention in high-risk families is feasible and acceptable in a primary care setting. Small improvements in child	**Strengths:** 14/17 clinicians adopted FLAIR intervention. Parents welcomed primary care efforts to address family lifestyle change and felt empowered when working with the

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
feasibility study	minority parents and children between 24-59 months old Control group n=91 Treatment group n=34 **Setting:** Six primary care practice settings that conducted preventive visits for 2-5 year old children.	guidelines for targeting key behavioral risks and to acquire skills in brief change counseling. Parents of 2-5 year olds were engaged in brief goal setting and referred to a lifestyle counselor trained in culturally sensitive care and principles of motivational interviewing. **Control:** Baseline and post-test telephone survey	and adult diets were noted in the treatment group. However, there was no difference in reported average behavior change between intervention and control groups.	lifestyle counselors. Study design strengthened internal validity. **Limitations:** the full intervention was limited to implementation of the intervention just one half day a week due to FLAIR staffing availability. As a result, sample sizes dramatically differed between the control group and the intervention group.
Quattrin, T., Roemmich, J., Paluch, R., Yu, J., Epstein, L. H., Ecker, M. A. (2012). Buffalo, NY Randomized controlled trial	**Purpose:** To test the efficacy of a family-based intervention designed for treating OW/OB children and an overweight parent **Sample:** Child between the ages of 2-5 years with a BMI% at the 85% or greater, with an overweight parent with a BMI ≥27. Control group n=50 children 39 mothers; 11 fathers	**Intervention:** 10- 60 minute sessions over 6 months (4 weekly, 2 bimonthly, and 4 monthly) consisting of dietary, physical/sedentary activity education; Parents received 8 phone calls between meetings; Behavioral change strategies were emphasized parenting-related techniques (praise, reward, selective ignoring, time out,	**Findings:** Children in the intervention group had greater decreases in BMI percentile and BMI z-score reductions at 3 and 6 months compared to the control ($p<.0021$); a greater BMI reduction over time was also observed in parents in the intervention compared to the control ($p<.0001$); parent and child BMI changes correlated (r-.31;	**Strengths:** Significant findings documented reductions in child and parent BMI scores; demonstrated parental BMI as a moderator of child weight changes; **Limitations:** Some activities such as self-monitoring require much behavioral effort, which can be a challenge for some parents; time and cost effectiveness were not evaluated over the

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
	Treatment group n=46 33 mothers; 13 fathers **Setting:** Primary care pediatric offices	contracting) and strategies to facilitate parent-child change (pre-planning, stimulus control, modeling, self-monitoring, social support); 1:1 meeting with a coach to assist parents shape behavioral goals **Control:** Information control group -- 10- 60 minute sessions over 6 months (4 weekly, 2 bimonthly, and 4 monthly) consisting of dietary, physical/sedentary activity education; Parents received 8 phone calls between meetings	p=.003); children with greater baseline BMI percentiles were more likely to have greater BMI percentile over time (p=.02).	course of the 6-month intervention
Schwartz, Hamre, Dietz, Wasserman, Slora, Myers, Sullivan, Rockett, Thoma, Dumitru, & Resnicow. (2007). U.S. Motivational interviewing	**Purpose:** To determine whether pediatricians and dieticians can implement an office-based obesity prevention program using motivational interviewing as the primary intervention. **Sample:** Child between	**Intervention:** Five practice sites were assigned to one of 3 arms through nonrandom assignment. Parents of children were assigned to the: a) n=21/19 control group (standard treatment), b) n=40/27 minimal intervention group	**Findings:** Changes in eating behaviors and television viewing did not correlate with BMI changes. However 94% (n=15) of the parents reported that the intervention helped them to think about changing their family eating habits. Dropout	**Strengths:** 94% of parents reported that the intervention helped them to think about changing family's eating habits. **Limitations:** Nonrandom assignment and logistic issues were encountered such as recruitment of practices

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
Nonrandomized clinical trial	the ages of 3-7 years being seen for a well-child visit with a BMI% at the 85% or greater, but below the 95%, or at the 50% or greater but below the 85% with at least 1 parent's BMI ≥30, n=61. **Setting:** Primary care pediatric offices	receiving one motivation interviewing session from a pediatrician only, or c) n=30/15 intensive intervention group receiving two motivational interviewing sessions from a pediatrician and a registered dietician. **Control:** standard treatment	rates were 10%, 32%, and 50% for the control, minimal, and intensive groups respectively.	and patients, training for providers, retention of participants, and data collection. Suggestions for future research include: eliminating inclusion criteria of parental BMI greater than 30, broadening the child's BMI up to the 97%, and increasing the age range from 2 to 8 years, implementing the intervention-counseling visit as soon as possible after enrollment, offering better incentives, incorporating telephone counseling sessions to decrease no-show rates, and identifying an on-site study coordinator to help coordinate study efforts.

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
Small, L., Bonds-McClain, D., Melynk, B.M., Vaughan, L., & Gannon, A. (2013) Phoenix, AZ Randomized control pilot study Motivational interviewing	**Purpose:** To determine the feasibility and preliminary effects of a theoretically based, intervention on the physical outcomes of OW/OB preschool/early school-aged children **Sample:** 60 OW/OB 4-8 year old children **Setting:** 14 primary care offices	**Intervention:** Four face-to-face sessions utilizing principles of motivational interviewing to collaborate with parents on identifying healthy lifestyle goals; skill-building information/practice **Control:** Health and safety goals via face-to-face sessions and education	**Findings:** experimental group had reduced waist circumference and waist-by-height ratio immediately after the intervention that persisted for 3 and 6 months; BMI percentile was not affected	**Strengths:** Changes in anthropometric measures after low-intensity primary care intervention; despite sample size, findings were robust **Limitations:** No intervention effects were recognized on BMI percentile; small sample size limited generalizability
Ray, R., Lim, Ling. (1994). Singapore Non-randomized clinical trial	**Purpose:** To reduce the prevalence of obesity among Singapore children from 10.9% in 1990 to 7% in 1995 **Sample:** 1128 children 3 -6 y.o. who qualified to enter the obesity register using the defined criteria of obesity as 2 s.d. above the normal ht, wt, age using WHO growth charts (1988) **Setting:** 17	**Intervention:** Programme on Prevention & Management of Obesity in Preschool Children; included: distribution of pamphlets on healthy eating and exercise during routine clinic visits; teaching parents how to monitor child's growth on a growth chart; health education talks on proper/healthy feeding of infants/preschoolers; how to prepare health	**Findings:** FMHx of obesity and HTN were significantly related to obese children; Obesity was classified into mild, mod, severe; after 1 year 20.2% of children returned to normal weight & 40.4% of children statistically significantly improved their wt; Indian children showed statistical improvement over one year, while Malay children were	**Strengths:** Large sample size; first of it's kind to target obese preschoolers through primary care **Limitations:** limits to internal validity due to lack of randomization & wide range of different classes of health professionals that participated in the program (potential for variability); lack of accurate growth charts representative of the

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
	Government Primary Health Care Clinics in 1991	meals for preschool children; videos on healthy diet **Control:** none	more obese and slower to respond to the intervention;	local population; inter-ethnic group variations; cannot identify theory/framework to guide the intervention process
Tavers, E., Gortmaker, S., Hohman, K., Horan, C., Kleinman, K., Mitchell, K., Price, S., Prosser, L., Rifas-Shiman, S., & Gillman, M. (2011). Randomized controlled trial U.S. Chronic Care Model Randomized controlled trial	**Purpose:** To examine the effectiveness of a primary-care based obesity intervention (reporting the first year of a 2-year intervention here) **Sample:** 475 children, ages 2-6 y.o. with BMI in the 95th% or higher or 85th%-95th% if at least 1 parent was overweight; 445 had 1 year outcomes, 253 tx, 192 control **Setting:** 10 primary care practices, 5 intervention, 5 usual care	**Intervention:** High Five for Kids – all members of practice team were active in intervention; enhanced electronic medical records to facilitate decision support, patient tracking, follow-up, scheduling, billing; MI visits targeting television viewing, fast food intake, and sugar-sweetened beverage intake; components include: de-emphasizing labeling, problem identification, resolve ambivalence towards behavior change, goal setting.	**Findings:** Changes from baseline to 1-year = intervention participants had smaller, non-significant change in BMI (BMI mean increase in intervention group=0.31; BMI mean increase in control =0.49); overall adjusted mean difference (tx vs control) was small (-0.21). no change in television in child's room; adjusted models reported decreased television/video viewing and decreases in fast food intake; Parents chose: 68% to work on	**Strengths:** complex, multi-factorial randomized controlled trial; implemented with primary care staff & included parents in intervention **Limitations:** Unequal participant characteristics at baseline; Adherence to intervention activity was low (little more than half of participants completed at least 2/6 of visits/phone calls); parent chose the behavior to work on, and may have had a lower-impact on BMI; due to type of EMR used, not

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention/Outcomes	Significant Findings	Strengths/Limitations
		Control: usual care (well-child care visits and follow-up visits for weight checks)	decreasing their child's sugar-sweetened beverage intake, 63% decr TV viewing; 62% decr child's fast food intake; only 9% work on removing TV from room where child sleeps; stronger effects among female participants and those living in lower-income households	may be generalizable to all primary care settings.

APPENDIX C

STUDIES SPECIFICALLY TARGETING HEALTHY LIFESTYLE BEHAVIORS USING TEXT MESSAGES IN PEDIATRIC AND ADOLESCENT POPULATIONS (OUTSIDE OF CHRONIC DISEASE MANAGEMENT)

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention	Significant Findings	Strengths/Limitations
Bauer, deNiet, Timman, Kordy (2010). Germany Cognitive behavioral group therapy (CBGT) *Subset of a larger RCT; the SMSMT sample lacked a control group	**Purpose:** data reported to date from the Big Friends Club (BFC) intervention that targeted overweight and obese children; Due to 33% attrition at follow up (at 12 months), a text message (SMSMT)-based maintenance treatment was implemented. The SMS portion of the program (reported here) lasted for 36 weeks after the BFC intervention was implemented for a minimum of 3 months aimed at enhancing the treatment of childhood overweight **Sample**: children aged 7-12 years (n=40); **Setting:** Hospital setting - Erasmus University Medical Centre	**Intervention:** After a 12-week cognitive behavioral group treatment (CBGT), 40 children were assigned to the SMSMT for a period of 36 weeks. Children were asked to send weekly self-monitoring data on eating behavior, exercise behavior, and emotions and received tailored feedback.	**Findings:** Children (mean age = 10.05, SD = 1.28) submitted 67% of the weekly SMS that they were expected to send in. During CBGT a significant reduction by 0.20 BMI-SDS was observed. The reduction by 0.07 BMI-SDS during the SMSMT did not reach statistical significance.	**Strengths**: The results support the feasibility of SMSMT in the treatment of childhood overweight. **Limitations:** lack of control group and method of interventions delivery. It is unclear whether study findings are reflective of the BFC intervention or the SMS maintenance

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention	Significant Findings	Strengths/Limitations
Shapiro, Bauer, Hamer, Kordy, Ward, & Bulik (2008). North Carolina Social Cognitive Learning Theory Randomized feasibility study	**Purpose:** To examine the acceptability, attrition, adherence, and preliminary efficacy of a mobile phone SMS for monitoring healthful behaviors in children; Exploratory analysis of the preliminary efficacy of SMS in effecting behavior change in children **Sample:** N=58 families with children ages 5-13 years; Randomized into SMS self-reporting diary (n=13/18), paper self-reporting diary (n=7/18), or control (n=11/22). **Setting:** Academic setting –University of North Carolina at Chapel Hill	**Intervention:** Children and parents participated in total of 3-group education session (1 weekly for 3 weeks) to encourage increasing physical activity and decreasing screen time and sugar-sweetened beverage consumption. The SMS group was instructed to send 2 SMS (one from parent, one from child), daily for 8 weeks; for each message sent an automated SMS feedback message from the program secure server would be sent; Families in the paper diary used forms to record behaviors daily for both child and parent and turned in their forms at the end of each session; Families in the control condition participated in the intervention sessions, but were not asked to self-monitor.	**Findings:** Retention rates were higher for the SMS group (72%) versus the paper (39%) and control groups (50%). Families in the SMS group completed 43% of requested self-monitoring versus 19% in the paper group. The SMS group was the only group to show a decrease in screen time in children compared to paper or control groups.	**Strengths:** randomized feasibility study; strong desire by families to be in the SMS group **Limitations:** small sample size; self-reported serving size and screen time; sample came from listserv recruitment, which severely limits generalizability

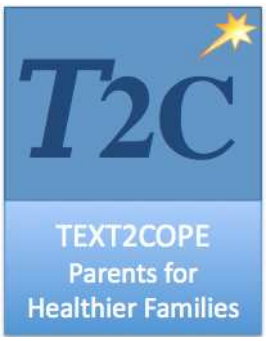
Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention	Significant Findings	Strengths/Limitations
Sharifi, M., Dryden, E. M., Horan, C. M., Price, S., Marshall, R., Hacker, K., . . . Taveras, E. A. (2013). Eastern Massachusetts Focus group	**Purpose:** To explore parental acceptability and preference regarding the use of text messaging and other mobile technologies to support pediatric obesity-related behavior change **Sample:** Five focus groups (28 mothers, 3 fathers) and seven follow-up interviews with parents of OW/OB children, aged 6-12 years **Setting:** Two pediatric practices	**Intervention:** 3-week mock text messaging intervention and follow up for 7 completed interviews;	**Findings:** 77% participants had unlimited text messaging cell phone plans; 71% texted at least once a day; 100% reported that they would like to receive text messages from their pediatrician's office with advice about their child's health; convenience and "ease of use" were most commonly cited as advantages of text messaging; other advantages included brevity, asynchronous communication, and "hard to ignore" qualities; parent preferences for content included "how to" advice/resources and different weekly themes targeting one health behavior; the majority of parents felt receiving messages twice per week would be appropriate, with no consensus on the best	**Strengths:** parental review of sample texts provided during focus groups; themes recurred in multiple groups supporting salience **Limitations:** despite moderator guidelines to encourage frank discussion, social desirability is possible; information lacking from parents who did not participate

Author/Location/ Theory/Design	Purpose/Sample/Setting	Intervention	Significant Findings	Strengths/Limitations
			time of day to receive messages; content was encouraged indefinitely as long as novel and relevant; parents noted that a text from a health care provider would have a “voice of authority;” the more relevant the message to their child, the more effect they will be in supporting behavior change – some even imagined with the child’s name to make personal and direct; parents suggested supplementing SMS with email links, websites, mobile apps – and integration of a website that could record and track progress and serve as a “one-stop shop” for supportive advice, local resources, and access to forums and support groups	

APPENDIX D

TEXT2COPE MANUAL





TEXT2COPE

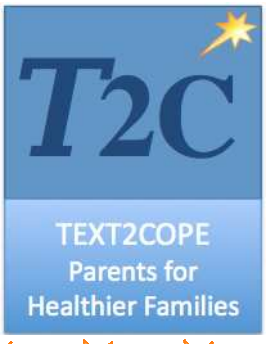
"T2C –Parents for Healthier Families"

Parent

Creating Opportunities for
Personal Empowerment

Cognitive Behavioral Skills Building
7 Sessions Manual

(You can also LISTEN to this information on the CD)





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Welcome

Welcome to TEXT2COPE, or T2C, ***parents for healthier families***. Parents traditionally want what is best for their children. You may have heard the saying, "it takes a village." This means that even parents can use help from time to time. This program was made to help you and your child continue to make progress toward your family's health goals. Few people talk about family health beliefs and goals; however, this is very important to you and your preschool-age child.

Why is health so important?

- Did you know that the United States is in a state of emergency when it comes to obesity? Yet, this is one illness that we can actually influence just by changing some of our daily choices.
- Did you know that an obese person is estimated to have medical costs that were $1,429 higher than someone of a healthy weight
- Did you know that a child who has a diagnosis of overweight or obesity is at risk for heart disease, high cholesterol, diabetes, and high blood pressure?
- Did you know that a child who is overweight or obese is at risk for psychological illnesses like depression and low self-esteem?
- Children with parents who struggle with food and weight issues often develop these same struggles

Many adults struggle with weight and food and exercise. These struggles can affect children. Many parents may not even realize that young kids can be overweight. Hearing about BMI (body mass index) may not mean much, but picturing a young child as a struggling overweight adult may spur parents to act now.

- Small changes can lead to big results!

- Choices, such as decreasing soda and being physically active, can make healthier minds and bodies!
- Eating more fruits & vegetables can lower a person's risk for cancer!
- Your child looks up to you and your choices!

What is the TEXT2COPE Program?
The program uses a form of CBT (cognitive behavior therapy). This technique shows us that while situations cannot always be changed, how we react to a situation can be changed. COPE teaches skills to help people think more realistically and more positively (with practice).

Purpose:
The TEXT2COPE (Creating Opportunities for Parent Empowerment) Program is specially developed to encourage and strengthen parents (of 3-5 year old children) in their beliefs and abilities to make the healthiest choices. This program has been designed for preschool-aged children and their parents because this is an especially important time in your children's development of healthy lifestyle habits. Being healthy is not just for the child; being healthy choices is a family effort. The purpose of this program is to help you and your child to develop the mindset and skills needed to create lifelong healthy habits.

TEXT2COPE Program Goals - *Little by little, step by step…*

1. Understand the relationship between thoughts, feelings, and actions.
2. Discuss goal setting, problem solving, and positive thinking.
3. Recognize unhealthy habits and thoughts.
4. Identify key elements to changing habits.
5. Have a basic understanding of nutrition and physical activity needs for your preschooler.
6. Recognize stress and positive coping techniques.
7. Discuss positive parent-child communication and role-modeling.

8. Believe that you are creating a healthier family!

Anything is possible when you believe!
Just take one step at a time!



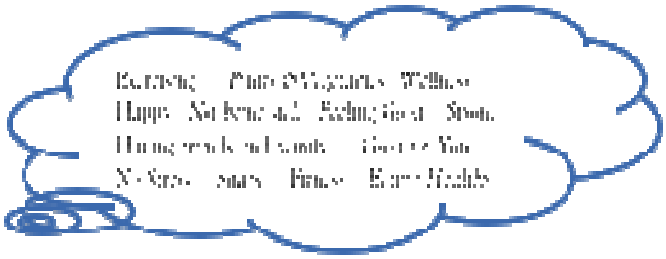
Session One Goals

1. Discuss the purpose of the TEXT2COPE Program
2. Begin to understand how thoughts, feelings, and behavior are connected
3. Begin to understand the power of positive self-talk
4. Discuss goal setting and how habits begin



Health & Healthy Living:
People have a variety of definitions regarding health and healthy lifestyles.

What do you think health or being healthy means?

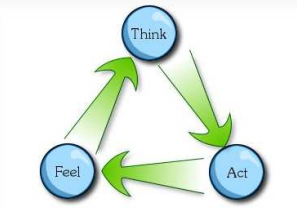


For this program:
HEALTH means being in a state of well-being or feeling good about yourself and being happy. Focus on promoting healthy activity & healthy eating patterns and having a healthy mindset.

Thinking, Feeling, Behaving:
Everyone has a certain amount of stress and has to deal with difficult times in their life, but making a choice to deal with these things in a positive way will help you to feel good about yourself. When you think positively, you will be happier and have less stress.

How you THINK affects how you FEEL and how you BEHAVE.

Example:
Maria believes she cannot get her child to eat vegetables (negative thinking). She feels frustrated (negative emotion) trying to always introduce vegetables and having her child refuse. As a result, she gives in (negative behavior) to her child, and offers junk food that she knows he'll eat.



The trigger event here was Maria's feelings of frustration trying to feed her child vegetables. That reinforced her believing that she can't do anything to help her child eat vegetables and led to her feeding him unhealthy food.

Becoming more "aware" of how you THINK is important so that you can help your THINKING to be more POSITIVE.



Many child experts suggest that doing things with your child, or helping your child to think of things that they could do are very important. When parents do things with their child or help their child to think of things to do (problem solve), they are modeling behavior or showing the child ways that the child could do or think of things. Additionally, becoming involved with these activities or thinking through these things shows your child you believe that this is important and that they are important (feeling important = feeling good).

The brain is like a computer.



If negative thoughts go into it every day, it will store only negative thoughts and the output will be negative as well.

Know your ABCs:

A = the **A**ntecedent event that triggers your thinking

B = the **B**eliefs or thoughts about the event or situation

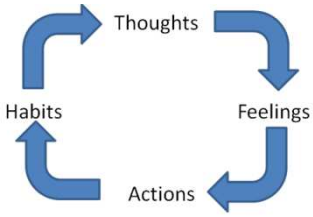
C = the **C**onsequence of your beliefs or thinking, for example, how you feel (your emotions) and how you behave

Your thoughts about certain situations may have become automatic
(happen without you're your realizing it). Therefore, try programming your brain with positive input (reading and saying positive things). We can reprogram our negative thinking like we can reprogram computers.





Let's practice….
Think about something you say to yourself on a regular basis that is negative. For example, turn this negative statement, "I can't get my child to eat healthy" *Turn that statement into a positive one.* Positive statement, "I know I can help my child to eat healthy. I'm a good parent."





This program will help you to <u>STOP</u> automatic negative thoughts and turn them around so that your emotions are more positive.

One way to do this is to practice POSITIVE SELF-TALK.





Let's Try….

Negative Statement	Changed to a Positive Statement

Positive self-talk is one way to begin to change your negative thinking. Positive self-talk helps you to focus on your thought on words of encouragement, praise, and support. Examples of positive-self include:

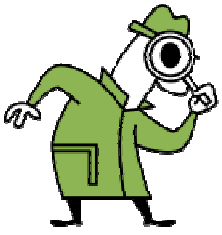
- I am a good friend.
- I did that well.
- I'm not going to give up.
- I'm going to stay calm.
- This won't last forever.



Try saying these words out loud to yourself.
How do you feel when you say these positive self-talk statements?
Now, let's do a little detective work…

Think of something this week that led to negative thinking.

- What happened?
- What did you think?
- How did you feel?



- How did you behave?
- How could you have changed your thinking in each situation to see it more positively?

Many times, there is a ***trigger*** event that starts the negative thinking.

Triggers or ***cues*** prompt or call a person to action.



Think about walking into a dark room, the darkness will likely *trigger* you to reach for a light switch. Top researchers refer to this as a "hot" trigger. Hot triggers occur when a person can take action, and the type of triggers we hope to focus on in this program. When you walk in a dark room, you can reach for a light switch.



For this program, we will be using text messaging to help trigger whatever behavior YOU want to work on changing to make your family healthier. We will talk more about what the message will say and when will be the best time (hot trigger) for us to send the message to you!



HABITS

Your thoughts about certain situations may have become automatic (happen without you're realizing it). Habits are the things that we all do often. They usually make us feel good or secure. A pattern or chain of behavior develops into habits…..

Can you think of some habits that you have?

If you think back you may be able to remember how these habits began.

- Do you remember how it felt when you first did these things?
- Do you remember why you did these things in the beginning?
- Do you know how these things became a habit for you?



The preschool and early school age years are the time when many health habits begin – unfortunately; this is usually the time when children are not able to make the healthiest choices and need parents to help guide them.

Sometimes parents might help some unhealthy habits to start; although this may not happen on purpose. One example might be those times that parents let their children watch a long period of TV so that the parent can get work, like household chores, done without interruptions.

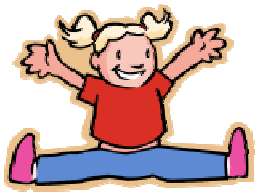
Doing these things rarely will likely NOT cause your child to form habits – however, children are likely to ask for these things at other times and if repeated often could become habits.
Many times habits begin in childhood because doing that thing makes children "feel good."

For example,

1) It feels good to relax and watch TV or play computer games.

2) Having sugary foods and drinks taste good.

3) It feels good to have parents give you compliments or praise.



Can you all think of 2 things that you would like your child or your family to change and create a new Health Habit?

Goal Health Habit 1

_____

Goal Health Habit 2

_____

For example, you may want to limit how often your child or your family eats fast food from restaurants to twice a week. Or perhaps you would like your child to watch less TV everyday…

GOAL-SETTING



One method found to help people change habits is goal setting. While most everyone would all like to accomplish BIG goals right away people often meet with more success if they work on smaller steps that will lead to the successful completion of larger goals!

For example, instead of saying, *"No more junkfood. We are eating healthy from now on." Try instead saying, "I'm going to offer my child/family vegetables at least once today."*



Inch by inch, it's a cinch!

To make a plan to start a new healthy habit, careful thought needs to be given to the old habit you are trying to change… You should consider how the habit came to be and what triggered the old habit. Knowing this will allow you to think through a plan of how to reduce the trigger(s) for the old habit and may help you think about how to start a trigger for a new habit.



It is likely that your child will not be ready to work toward these goals alone. There has been some very interesting research suggesting that children will work hard toward healthy goals when they are positively rewarded with the targeted behavior (i.e., you can play on the computer for a half hour once we go for a walk) rather than approaching the targeted behavior in a negative way (i.e., you have been

watching TV for two hours, you need to turn it off and go outside and play).

Make a plan that will help your child make <u>small steps</u> toward a health habit goal everyday.

Can you find positive ways to involve your children in healthy eating and activities? *Often parents and children can have fun working through this process.*







When parents do things with their child or help their child to think of things to do (problem solve being bored with them) they are modeling behavior or showing the child ways that the child could do or think of things. Additionally, this shows your child that you believe that they are important.

You can encourage new habits to take the place of old habits - but it will feel odd at first – for you and your child. Your child will likely <u>resist</u> any changes! Young children like patterns and habits because they can anticipate what will happen. They need a parent to show them the way. He or she will need your help.





Remember that habits are things that we do:



1. Without thinking about them AND
2. Often we begin doing them because they feel good

Changing habits:

1. Needs to be done on purpose and so it needs thinking and doing.
2. Requires planning ahead to think of something else to do instead of the old habit or chain of events that used to happen.
3. Feels weird or odd to stop.

Scientists have found that children may need 10 to 15 opportunities to try a new food before they will regularly accept it. This may mean that we need to model eating that food for them or help them to think of ways to try the new food (i.e., try the new food with a food your child already likes – e.g. macaroni and cheese and broccoli).

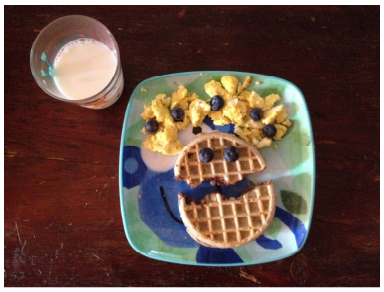
Young children usually don't like to try new foods. Remember, they like doing things over and over again.

Let's Practice…

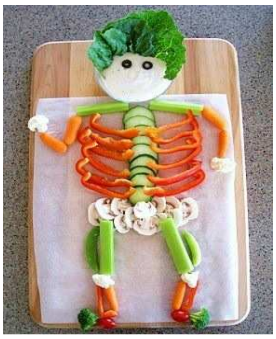
To get your family to try new foods, you need to plan ahead. Try – for ***one*** meal (smaller, simpler goal), offering something they normally eat and adding something that is new. Or try making it fun!



Monkey plates w/ Seaweed spinach rolls peppers



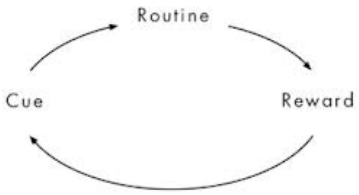
Multigrain waffle man w/ eggs & blueberries



Veggie Man Celery, carrots,

Be sure to point out when feelings change… This emphasizes the importance of thinking or doing something and letting feelings follow; rather than feeling low or bored and letting feelings drive what we do and how we think.





What are ways that you can think of to encourage your child to want to begin new healthy habit?

Here are a few ideas:

1. Make it Fun
2. Make the child feel good when you are doing new things
3. Try to have it be exciting
4. Try to praise behavior (be specific)
5. Do things with your child
6. Things need to be repeated again and again!

Some people call this positive parenting – there are books written that give parents ideas how to do these things.

7. However, in some cases it just needs to be a rule (You will need to decide). It is often easy for parents to make rules about safety issues (i.e., crossing the road) but it may be more difficult to make rules about healthy habits. Model the rule and it will be better received!



Can you identify a situation in which you have used or could use positive parenting with your child to help him/her feel better about himself/herself while you are trying to make or

Healthy Habits
Healthy Kids,
Healthy Families

strengthen a health habit?

These are some ideas that other parents have shared…

1. Model healthy choices for their child
2. Surround your child and your family with healthy foods
3. Surround your family with healthy activities that they can do
4. Have everyone eat healthy foods
5. Have everyone do some activities together (i.e., dancing, walking, or riding bikes)

6. Decrease temptations around the house (i.e., take the TV out of the bedrooms, have healthy snacks ready)
7. Decrease TV time for the whole family
8. Be positive about successes at any healthy behaviors (i.e., eating a new food, taking a walk together)
9. Be encouraging and talk about positive things especially at the beginning & end of every day
10. Encourage children to try new foods several times before deciding that they will not accept that food
11. Find positive things to say about your child's behaviors or characteristics
12. Offer healthy choices (foods and activities)

As part of the TEXT2COPE program, you are able to create text messages to *trigger* you and support your decisions about your new family health goals. The messages will also remind you about the new healthy habits you are trying to encourage.



My Message is:

This is *your* message that can be sent during a time of day that you choose. Perhaps you would like the message sent during your lunch break so you can think about a healthy snack or dinner that you could plan for prepare rather than stopping for some fast food. Another time that you might want to the message is after dinner when you would normally watch TV. Perhaps you'll want a reminder to have a family dance party before turning on the TV…

Also, this manual with tips, reminders, and areas to write down your thoughts and goals is yours to keep. Refer back to it at any time.

Remember these Key Points:

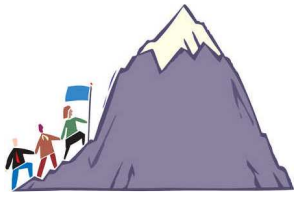
- What we think affects how we feel and how we act

- Grow the habit of positive thinking!

- Try to recognize triggers or cues that influence how we act

- Set a goal!

What mountain do you want to climb? Get started step by step….



Session 1
Strategies to Be Positive!
Homework



Often our negative thoughts lead to negative or upset feelings that then leads to the negative behaviors….or rather, THE BEHAVIORS WE ARE TRYING TO CHANGE!

Stay tuned for those <u>positive thoughts</u> that will help turn the behaviors around. Let's start here….

What are you thankful for today?

1. _____

2. _____

What are 2-3 good things about you?

_____

**Write down another positive self-statement about how you keep your family healthy** (be sure to put it on your index card or let us know and we'll text it to you!).

_____

Say this new positive self-statement
at least 5 times every morning and at night.

SESSION 2 GOALS

1. Describe the importance of mealtime to your family and ways that make this an extra special time for your young child.
2. Begin to understand the basic nutrition needs of your child.
3. Identify different types of foods that are essential to a child's diet
4. Discuss why too much soda, sports drinks or other sweetened drinks are not good for your child.

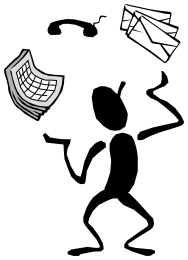


Parents often work a lot of hours and many times are tired. This can make mealtime feel more like a chore rather than a time of family celebration together. What is more difficult, parents struggle to find time to be able to plan healthy meals ahead and do the grocery shopping ahead for the meals that they plan.

Can you think of some ways you can plan *JUST ONE MEAL* for tomorrow?

_____

_____



Because mealtime is a special time, the whole family should be involved with preparing for the meal. The findings of some research indicate that children who have chores when they are young are more responsible later in life.

These jobs or chores may include setting the table, folding or decorating the napkins, planning a healthy meal, or clearing things from the eating area when everyone is done. Assign jobs

to each person because in some cases the adult may do the whole job. The idea is to give each person something that they can do all by themselves and be proud of.



Preschool children usually like to help by doing their job and they usually like positive comments about the great job they have done.

You will be able to tell them a specific thing that they did well - "I really like it when you help me clean up after dinner and take the plates to the kitchen sink."

From research that has been done, it appears that **family mealtime is very important for children and the whole family**. This is a special time during which the whole family, or most of the family, can be together and everyone can share a story about what happened to them that day.



FUN FAMILY ACTIVITY:

"Highs and Lows" - This is a great game and way to start conversation at dinner. Try going around the table and each person shares at least:

- One “high” or something that made them happy that day.
- One “low” or something that made them sad that day



This is just one idea; do whatever feels natural for your family. The main idea is that dinnertime is a perfect time to give special attention to your children and have them focuses on the “table talk” rather than having the television (TV) on during the meal.



***One* healthy habit could be to have family mealtime be a special family time and one during which the TV is turned off.**

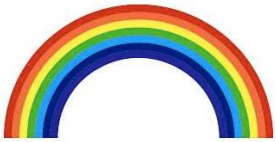
The television is a wonderful way to relax during the day and in the evening; however, there is more and more information that suggests that people eat more food than they may need when the TV is on. Some experts believe that advertisements are related in some way to people eating more.

Other experts think that eating and watching TV become linked because the two are often done together. Doing both together, eating and watching TV, becomes a habit of sorts.



Turn off TV During Meals!

Rainbows and Food



A rainbow is complete and finished when all of the colors are there… when some of the colors are missing a rainbow doesn't look right!

NUTRITION



Children and adults have a healthy diet when they eat 6 main types of food:

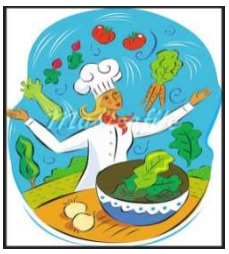
1. Dairy
2. Protein (meat and beans)
3. Breads/Grains (carbohydrates)
4. Fruits
5. Vegetables
6. Some Fats

If we give our bodies all of the 6 main types of food everyday, our bodies are more likely to be healthier than if we only provide one or two types of nutrients or food types. This is true for small children too.



Some parents are quite upset that their preschool child is a picky eater – this is common for children this age. Researchers have found that most children between the ages of 4-7 years are picky eaters. This is normal. Often young preschool children like to eat the same foods over and over again. Some times this is referred to as having "food fads!" **This is normal.**

While we <u>should not</u> and <u>cannot</u> make a child eat, we can change things at home so that children have healthy food to <u>choose</u> from when they are hungry. This means that parents need to have all of the 6 types of foods in the house.





It may mean that we need to look in the cupboards and refrigerator to see what is there; especially what the children can see (at their eye level) when they look!



We can always change what kind of food we keep, where we keep the food, and what the children see. THINK about what your child sees when he/she opens a cupboard or refrigerator

Dairy: Building stronger bones!
Most preschoolers only need to **drink 2 glasses of milk** a day to live well. **But whole milk is NOT better than low fat or skim milk.** Calcium and Vitamin D are found in milk. Calcium helps prevent osteoporosis (weak bones). Vitamin D increases bone density. Dairy is important for stronger bones.

Protein (meat and beans)
Protein is important for our body because it helps to build muscle.

Breads/Grains (carbohydrates)
Carbohydrates provide our body with readily available energy. Complex carbohydrates (noodles) are better for our body than simple carbohydrates (sugar).

Fruits & Vegetables:
The USDA Food Guide Pyramid recommends 5-9 servings of fruits and vegetables every day. Research continues to support the relationship between eating more fruits and vegetables and a reduced risk of cancer, heart disease, hypertension, diabetes, and other chronic illness. Of all the dietary factors thought to be related to cancer, the evidence for eating more fruits and vegetables to prevent cancer is strongest.

The bottom line is "the more fruits and vegetables you eat, the better."
And getting 5 to 9 servings is easier than you may think!

FUN KID ACTIVITY: Start the day with 5 bracelets on your child's left arm. As he/she eats a fruit or veggie switch one of them over to the right arm. The bracelets will help you to keep track…Try to eat 5 or more everyday!

It All Counts



While nothing beats the taste of a fresh, juicy strawberry, there are many other great alternatives to fresh fruits and vegetables. Frozen, canned, dried, and juiced varieties of fruits and vegetables can be just as nutritious and delicious, but will often cost less.
So, experiment with different forms of fruits and vegetables.

Some Fats



Dietary fat helps a kid's body grow and develop like it should. Fats fuel the body and help absorb some vitamins.

Good Fat! Yes, there is good fat!
Unsaturated fats: These may be good for heart health. These are found in plant foods and fish. The best of the unsaturated fats are found in olive oil, peanut oil, canola oil, albacore tuna, and salmon.

Bad Fat -- **Saturated fats:** These fats are found in meat and other animal products, such as butter, cheese, and all milk except skim. **Trans fats:** These fats are found in margarine, especially the sticks. When you see "hydrogenated" or "partially hydrogenated" oils on an ingredient list, the food contains trans fats. Eating too much saturated fat and trans can raise cholesterol and increase the risk of heart disease.

What about Sugar?

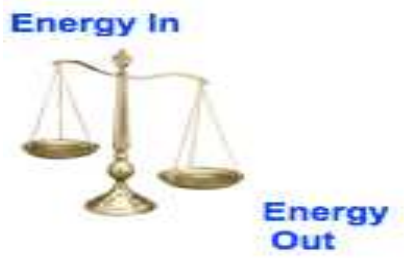


Children usually like foods that have a fair amount of sugar in them. This is not to say that children shouldn't ever have cookies or snacks with sugar in them. However, children who are risk for weight gain and health problems should have less sugary foods available to them. It is better for these foods to not be in the house at all.

Think about this situation that happens quite often. Parents offer high sugar rewards for good behavior and completing chores.

Remember to *think* back to what *triggered* the habit. It is important to *think* about what rewards you offer your children.

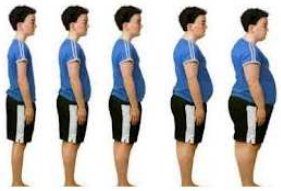
But sugary foods tip the energy scales – there is a high energy in these foods – and these foods often have very little other nutrients.



Rewarding behavior with food has a hidden message that the child is getting a "special" food – and this may make the food more desirable to the child (i.e., they want to have this special food or "treat").

This is not what people may mean, but it sends a message and also can be the start of a habit.

Secrets about Sugary Foods – when people eat foods with more energy than they need, the extra energy is stored as body fat. Some people feel that causes the brain to work in a way that the person/child eating a lot of sugary foods wants even more sugary foods (or more extra energy)!



If a child cuts out ONE soda or ONE large glass of sweetened drink/juice a day and replaces that with **water,** they may be well on the way to tipping the energy balance scales away from storing extra body fat to a healthier weight.



That can be one small step to take –
deciding what drinks and snacks are in the home!

Remember that the body **stores extra energy** that is not used as **fat**.
Also, fat and sodium (SALT), do NOT help to build muscle, so THINK before act (eat). Try to NOT add salt, you may just like it!



Bonus – Fiber!
Foods that are high in fiber are more filling and are less energy dense. There are a lot of foods that have fiber in them. Some experts have suggested that shoppers try to choose foods that have 2 or more grams of fiber for each serving.
The following foods tend to have high amounts of fiber in them:

- Beans (not refried – too much fat)
- Bran & oat cereals, oatmeal
- Brown rice or pasta, pasta with added fiber
- Whole grain breads
- Fruits and vegetables (these are the best)

"WHOA"(slow down)	*"GO" (enjoy!)*
fat, sugary drinks and foods, miss meals	fiber, watch the portion size, try not to
fast food, junk food to curb	water or zero calorie drinks, small snacks







Remember these Key Points:

- Reduce bad fats (saturated and trans fats)
Broil or bake it! Don't fry it!

- Decrease soda, excess juice, and sweetened drink intake

- Try not to add extra salt to your food

- Decrease overall sugar intake

- Increase fiber

- Increase water intake

- Increase attention to the amount that is eaten of any one thing

Session 2
Health habit!
Homework



Habits are things we do automatically that make us feel good or secure. Can you think of a habit your child has about eating sweets?

_____

_____

What are 2-3 things you can do to change this habit into something more positive?

_____

- **Think** about what *triggers* this habit and how your child feels.
- Remember to think about what your child sees at his/her eye level
- Remember to think about what cues your family to act
- Get kids involved – it will help you and they will feel proud
- Remember to NOT use food to reward/punish behavior
- Turn the TV off for mealtime and ENJOY one another
- Model healthy choices.

Strive for **5** servings of **fruits and vegetables** a day!!!
I am going to keep track by_____(bracelets, stickers, etc.)

SESSION 3 GOALS

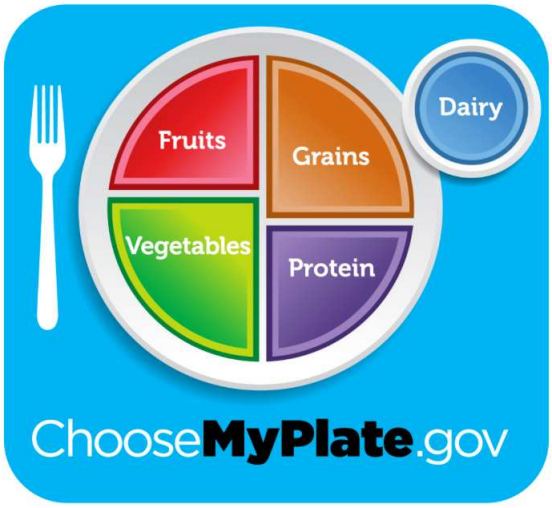
1. Understand the importance of meal planning.
2. Recognize and discuss what normal portion sizes are for your child. 3. Discus the role of triggers and habits as it relates to meal planning

PORTION SIZE

People eat more food if they are offered larger portion sizes. A portion size is how much a person should for that type of food. For example, for an adult, a portion of meat should be about the size of a deck of cards.

Remember we talked about different food types in the last session,
here is a way to understand what portion sizes should look like – you can either use your hand as a guide or divide up the plate into different types of foods.

Hand Symbol	Equivalent	Foods	Calories
	Fist 1 cup	Rice, pasta Fruit Veggies	200 75 40
	Palm 3 ounces	Meat Fish Poultry	160 160 160
	Handful 1 ounce	Nuts Raisins	170 85
	2 Handfuls 1 ounce	Chips Popcorn Pretzels	150 120 100
	Thumb 1 ounce	Peanut butter Hard cheese	170 100
	Thumb tip 1 teaspoon	Cooking oil Mayonnaise, butter Sugar	40 35 15



The plate with the different colors shows the different type of foods and about how much of each food that you should serve. For example, look at the red and green sections, fruits and vegetables:

Children (2-6 years) typically need:
5 servings: 2 fruits and 3 vegetables

A serving size is:

- One medium-size fruit
- 1/2 cup raw, cooked, frozen or canned fruits (in 100% juice) or vegetables
- 3/4 cup (6 oz.) 100% fruit or vegetable juice
- 1/2 cup cooked, canned or frozen legumes (beans and peas)
- 1 cup raw, leafy vegetables
- 1/4 cup dried fruit

Try this at home. It is not easy at first, but with more practice, see if you can serve fruits, vegetables, grains, protein and dairy all at one meal?

WHAT ABOUT EATING OUT??



'**Fast' Food** – Currently, it is estimated that the average American family eats 'fast' food three or more times each week. 'Fast' Food has a large amount of high fat foods (i.e., fried food, greasy foods) and these are energy dense foods.

These foods tip the scales and provide your child with <u>too</u> much energy for one meal/day. Sometimes, only 1 fast food meal can provide enough energy for a whole day.





The meals served in restaurants have very large portion sizes now, even the "child" meals!

Think about how you may change eating food out of the house or at fast food restaurants. Or think about how you can choose differently to be healthier.

Current recommendations are for children and families to eat out a maximum of 2 times a week

What does your child usually choose from fast food restaurants?



Is this a food habit?

What triggers your child to order this? (e.g. TOY).

What other choices might they make?

How can you change your child's fast food eating habits?

What can you do to reduce the number of times your family eats at 'fast' food restaurants?



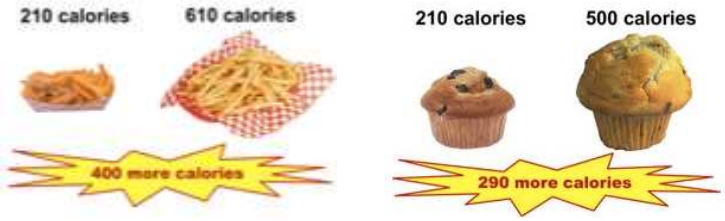
Maybe you can purchase the food before you are with your child and then give them what has been purchased.

Or you and your child might decide on a meal that you can share if you go out to eat.

Instead of a toy, you could offer to do something special with your child.
Think about what triggers your order? Is it the person working there *asking* you if you would like to supersize? Is it the cost?

Do you believe you are making good choices?
How do you feel after the meal?

You may choose to NOT supersize meals for your child or NOT order French fries (or share a small order). If you decrease the energy your child is offered, you can easily cause your child to maintain a healthier weight.



"Many 'fast' foods don't cost much"....HOWEVER





It may cost a few cents more to "supersize" a meal at a 'fast' food restaurant rather than order a simple, regular sized hamburger and a small soda. It seems like a bargain to get a "supersized" meal – but the extra energy has a big price tag, including health problems that are caused by being overweight:

- Type II diabetes
- Increased asthma symptoms
- High blood pressure

You can see that the few extra cents it cost for more high fat food will really cost your child much more if they have extra weight and weight-related health problems…

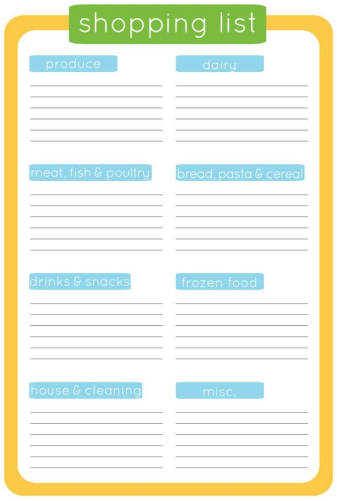
***You are helping to build healthy habits*.**
It is helpful to make a plan.
Making a plan helps you to think about how you can take action.

Take a look at the meal planner and grocery list.
Would this be helpful to you?



MEAL PLANNER –
Try to plan one meal.
Write it down.

You may want to start small and pick one day you plan on cooking and what meal you want to cook that day.
Example, Wednesday Dinner.
Broiled chicken, broccoli, and noodles.



Using a SHOPPING OR GROCERY LIST can also help you to plan. Buying healthy food and ingredients that you need to make the meals you planned.

Often, you can look and see what fruits and vegetables different stores have on sale that week and add them to your list! Or cut coupons and paper clip them to your list!

Plus- if you have it all written down, it can be a time saver!

A common challenge for parents with young children is getting them to try new food. It is normal for young children to like to eat the same food over and over again. So, if you want to introduce something new, you really want it to be good. But, then the questions become:
What new food should we try? How do I know if it is good for them? How much should I serve them?

Have you tried to read a food label? It can be a bit overwhelming at first. But, again, with a little practice, it will seem easier!

Reading Labels for Fun

Looking at the "Nutrition Facts" on food products can help you to determine if a product is healthy and part of a well-balanced diet.

Important things to look for on the label:

Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

Calories 260 — Calories from Fat 120

	% Daily Value*
Total Fat 13g	**20%**
Saturated Fat 5g	**25%**
Trans Fat 2g	
Cholesterol 30mg	**10%**
Sodium 660mg	**28%**
Total Carbohydrate 31g	**10%**
Dietary Fiber 0g	**0%**
Sugars 5g	
Protein 5g	

Vitamin A 4% • Vitamin C 2%
Calcium 15% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Serving Size: Serving size is the first thing to check on the label. All other information based on that particular serving size.

Servings per Container: The number of servings indicates how many servings are in the package based on the serving size.

Calories: A child needs a certain number of calories per day. Use the "Healthy Eating Guide" for the appropriate amount of calories.

Total Fat: Choose foods that are low fat or fat free with less than 3 grams of fat per serving.

Trans Fat: Avoid foods with Trans fat.

Cholesterol: Less than 300 mg per day is recommended. Choose products with less than 20 mg per serving

Sodium: 1500 - 2300 mg per day is recommended. Limit products with more than 400 mg per serving.

Dietary Fiber: Choose foods with at least 3 g or more per serving.

Sugar: Choose products with less than 5 grams of sugar/serving. Every 4 grams = 1 Tsp of Sugar.

Ingredients: Ingredients are listed from the highest amount to the lowest amount in the product. Check the first three or four ingredients to learn more about what you are buying.

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Many times families make fast food choices because they are hungry after a long workday and they don't have meals ready at home –

But, the lines of cars at the drive-up windows are very long…and many times you can go into the grocery store and choose healthier food rather than wait in line (and that is more exercise).

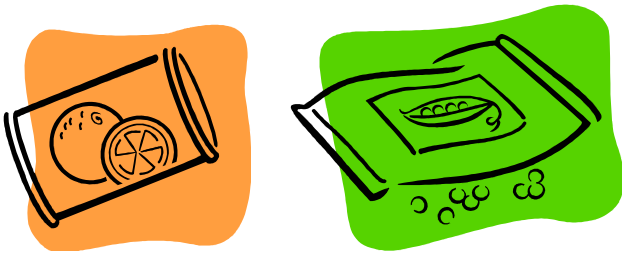


Now, there are some healthier, quick frozen or dry foods that you can keep in the refrigerator, freezer, or cupboards to be ready for these times…

These foods may require no or very little preparation!

Can you find any of these when you grocery shop?





We know a few other things specific to young children and their eating…

Boost with **BREAKFAST!**

Many studies have shown that breakfast eaters tend to weigh less than breakfast skippers. Try to build a healthy breakfast (not doughnuts) with cereals, fruits, dairy, and meat/bean/nuts. Eating a healthy breakfast can help give your child:

- improved concentration and performance in school
- more strength to be physically active
- have better problem-solving skills



Boost with BREAKFAST! Breakfast helps to increase concentration and school performance!

It is important to NOT become really, really hungry – people sometimes make less healthy food choices if they are very hungry.

Hunger takes the body approximately 20 minutes to be satisfied (go away) – regardless of what is being eaten.



Children are generally hungry for a snack when they get home after a long day. Think about how you can make a plan to be ready with some fresh fruit or veggies as a snack.

A body can eat an awful lot of extra energy in 20 minutes if the food is energy dense (e.g., soda, candy, chips) compared with eating foods that have more fiber and are less energy dense (e.g., apples, pears, carrots, celery, light popcorn).

Snacks your kids can grow on

Remember these Key Points:

- We know that young children eat less food if the TV is off during meals and snacks
- Serve snacks in the eating area, not the TV area
- Young children will usually stop eating when they are full

- Parents should not encourage children to eat when children slow down or stop eating
- It is better to not tell children to "clean your plate"
- Think about what is triggering your meal choices
- Think about how you serve food, think portion sizes
- Offer plenty of water or low-calorie drinks with snacks
- Don't forget to start your day with a healthy breakfast!

This is a great time to talk with your child (maybe while preparing dinner) and savor the food and the moment!



Now let's come up with your message to *trigger* those healthy habits.
This is ***your*** message that can be sent during a time of day that you choose. Think about how your last message worked. What can we do to make it better? The message itself? The timing? It's all up to you!

My Message is:

Session 3
Make a Plan!
Homework



Make a plan to help your child eat fruits and vegetables this

week.

Think about what you can do to plan ahead.

- Plan a menu for the week
- Get children involved in planning and cooking
- Keep fresh fruit in a bowl within your child's reach to grab as a quick snack
- Over the weekend, spend some time cutting up the week's vegetables and store in Tupperware for quick grab and snack
- Make it fun!

I can limit my family's fast food to _____times per week/month

When feeding my family (meals or snacks):

- I will serve healthy, not "biggie" portion sizes
- I will turn off the TV
- I will offer water or low calorie drinks with snacks

How you THINK affects how you FEEL and how you BEHAVE.

THINK POSITIVELY!

SESSION 4 GOALS

1. Begin to understand the basic physical activity needs of your child.
2. Review how to set realistic goals
3. Begin to understand how to problem solve

PHYSICAL ACTIVITY (PLAY!)

The best way to increase physical activity in your family life is for you to be a part of it. Activities should be fun and something that the whole family can do together. Kids need at least 60 minutes of physical activity a day, but it doesn't have to be all at one time.

A little activity is better than no activity. The best way to begin is to ***schedule time*** for physical activity (PLAY). For example, start by identifying at least three, 30 minute time slots this week for activities like short walks, active chores, walking the dog, or playing sports. On the next page, from the Let's Move initiative, there is a sample family health calendar to help get you started!

- Be flexible – if you cannot do the activity during the scheduled time, find a new time for the activity you missed.
- Don't forget to share your new activities or tips with your friends and neighbors. Invite them to join you – friends and families are great "triggers" to keep you going
- Set goals that you and your family can come up with together. Make it fun!

 *Set goals that your family can achieve. It us usually easiest to take small steps and repeat them for long periods of time for them to become healthy habits.*

LET'S MOVE!

America's Move to Raise a Healthier Generation of Kids

NAME .....

DATE .....

KEY
= Your Fun Activity
= Your Healthy Food

LET'S MOVE! HEALTHY FAMILY CALENDAR

Day of the Week	Type of Activity	What Time of the Day	Who Will Participate	Did We Do It?
(For Example) MONDAY	walk 15 minutes	7am & 5pm	Mom & Sally	☆
	eat 1 fruit	Lunch	Sally & John	☆
MONDAY				
TUESDAY				
WEDNESDAY				
THURSDAY				
FRIDAY				
SATURDAY				
SUNDAY				

HOW MANY STARS DID YOU GIVE YOURSELF?

www.LetsMove.gov

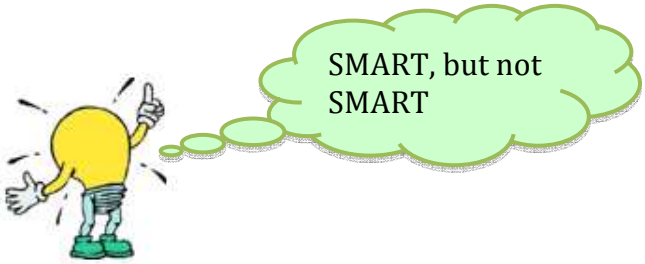
In the first few weeks, you may not achieve every goal, but if you stick with it, physical activity will become part of your family's routine.

Have you heard of a "S.M.A.R.T" goal?



This is a **S.M.A.R.T**. tool to help us set specific goals.
Look at this example:

Instead of saying, "I am going to exercise with my family."



Can you see how this goal might work better?



"I am going to walk 30 minutes a day at least three times this week"

Try this goal for a few weeks. Don't forget to put a few triggers in place to help remind you (a sticky note or alarm on your phone).

Once you reach this goal, you can increase it ***little by little.*** Writing down your goals and making good plans helps you to accomplish your goals. Think of the road map.

You need a plan to get from here to there….





But what if the road is closed?
Would you stay home? Or would you find another way to get there?

Finding ways to overcome the barriers is very difficult, but finding ways to overcome barriers is very important. Working though ways to overcome barriers is part of learning to solve a problem.

Problem Solving

Think of solving problems as a 4-step process:

1. What is the problem?
2. What is the cause of the problem?
3. What are ALL the possible solutions to the problem?

   What are pros and cons of each?
4. What is the best solution?

Making progress toward a goal is difficult.
Changing habits and routines is difficult work.
Taking small steps is important.



Remember, **"THINK, FEEL, ACT"?**

Think about what things are working (the pros) and what things are not working (the cons).



Let's try an example:

Maria believes she does not have time to exercise and cannot even imagine having time to get her family to exercise. So, up until now, they just didn't exercise. Maria decided she wanted to set a new goal for her family's health. She remembered her S.M.A.R.T goal and said it, "Our family is going to get up and move 30 minutes 2 days this week." But she had no plan, no idea when, what or how they were going to do that.

She tried the 4 step problem solving process.

1. What is the problem – our family is not exercising
2. What is the cause of the problem – we have no time
3. What are all possible solutions – we can continue to not exercise, we can exercise on our own when we have time, we can create time together to exercise
4. What is the best solution – we can create time to exercise together. This will help it to be more fun and we can support one another.

Later that week, Maria made a plan and decided to turn the TV off for meal time starting on Monday and to have the family "get moving!" Once the meal was done, she kept the TV off and turned on some music. The whole family danced in the living room for a half hour. The kids asked to do it again the next day.

She met her goal to exercise (PLAY) for 30 minutes, 2 days that week, had fun, and felt better!

Identifying the things that are not working, the barriers (things that get in the way), is important so that you can begin to find new ways to work toward your goals.



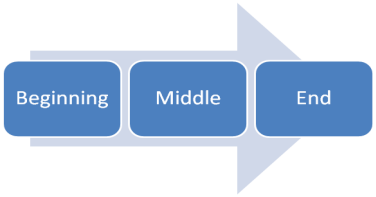
Remember the chain of events... think about:

1) What could have been different so that the situation could have a positive outcome or good result?

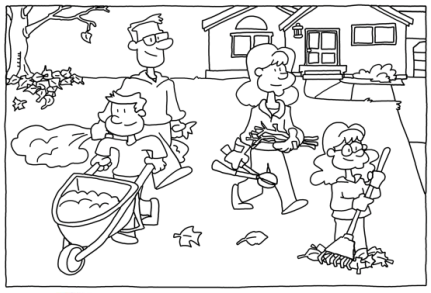
2) What happened first – before things began to go wrong?

3) Write it down. What happened beforehand? Think about what the problem is and write out some causes of the problem.

4) Can you think of different ways to deal with the situations that occurred before things began to go wrong.



Families can work together & often can be part of the solution!





Practice Problem:

How often do you exercise with your child? (Circle one)

Once a year	Once a month	Once a week	Once a day
Never	Rarely	Occasionally	Frequently

How often would you like to exercise with your child? (Circle one)

Once a year	Once a month	Once a week	Once a day
Never	Rarely	Occasionally	Frequently

Is there anything that gets in your way of exercising?

_____

_____

_____

Okay, let's use the problem solving approach:

1. What's the problem?

_____

2. What's the cause?

_____

3. What are the possible solutions? (and pros and cons)

_____

4. What is the best solution?

_____

Here is a review of simple steps that you may choose to work on with your child and family:

1) Decrease the availability of soda or sugary juice and drinks
2) Decrease your child's access to or ability to get less healthy foods that are high in fat.
3) Don't supersize meals and try to stay away from fried foods (French fries)
4) Eat home-cooked (prepared at home) food most of the time and only eat at a restaurant 2x a week.
5) Keep foods that are higher in fiber around the house
6) See if you can eat five servings of fruits and veggies each day (Strive for Five)
7) Plan meals for the family to eat together without the TV on
8) Have your child help with meal time (e.g., table setting or food washing and preparation)

 Remember these Key Points:

Success happens when:

- You start achieving your goal by taking small steps.
- You overcome barriers to your goals by problem solving.
- You build on your strengths and **BELIEVE** in yourself.



You hold the key to your family's health.
All you have to do is believe….
and take small steps!

Session 4
Strategies to Overcome Barriers
Homework



Set one short-term "real-time" goal for your family's health for the next week of the program.

My S.M.A.R.T. goal for my family (this week) is:

_____

Identify barriers in achieving that goal:

_____

_____

Identify strategies for dealing with those barriers:

_____

_____

Use the 4-step problem solving method to solve a problem that you have today or this week.

1. What is the problem?
2. What is the cause of the problem?
3. What are the possible solutions with consequences?
4. What is your best solution to the problem?

Now, go with the best solution and do it!

SESSION 5 GOALS

1. Discuss how beliefs can affect goals
2. Understand the importance of decreasing screen time
3. Talk about how parents can role-model behavior
4. Discuss effective communication techniques

Do you dream about what you want for your children?

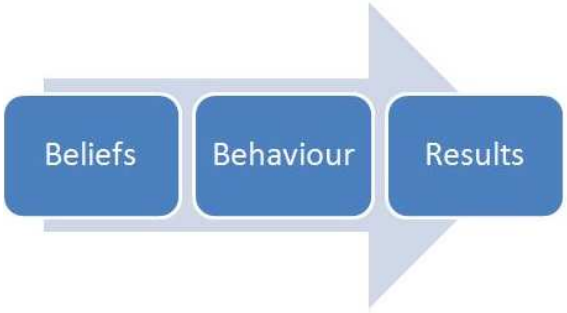


For people to succeed, they have to first picture in their mind what it is they would like to be or do and keep that picture in their mind a lot of the time.

Belief is a very important thing in helping people to reach their goals

Picture yourself being successful at what you want to do!

"What the mind can see and believe, it can achieve!"



- Do you have goals and a plan for how make your family healthier?
- Write your goals or plans here:

_____

_____

We believe that people need to have hopes and dreams and then plan how they will get there. You can help your child to realize their dreams by starting building a firm foundation with them – starting to create healthy habits.



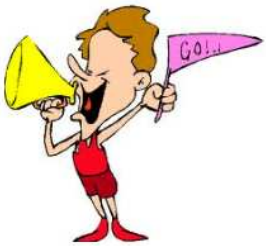
In a recent poll, 82% of parents said it was very important to make sure their child was **eating** in a way that helped them be a healthy weight.

In that same poll, 76% of parents said it was very important to make sure their child was **exercising** in a way that helped them be a healthy weight

So, how do we DO what we THINK is important?



One way is to help your child be a *Problem Solver*.



Example: Some people think that many children are very inactive – they watch a lot of TV and spend a lot of time playing video games or using the computer. This is called "screen time."

"Screen time" means television screens, computer monitors, and even the handheld devices we use for checking email, listening to music, watching TV, and playing video games on the go.

How much time does your child spend watching TV and playing video games every day?



If you were to plan less TV/screen time for your child, what things would you encourage your child to do instead?

_____

_____



It can be very hard for parents to stay true to this because their lives are busy. When children are watching TV or computers, parents can use this time to catch-up with other things that need to be done. And so it is hard to discourage TV use because parents use that time to get things done.

Can you make a plan to decrease TV/screen time for your child?

_____

_____

Use the 4 problem solving steps to help you:

1. What is the problem?
2. What is the cause of the problem?
3. What are the possible solutions with consequences?
4. What is your best solution to the problem?



Here are some other suggestions to help you:

1. Talk to your family – explain to your family why it is important to sit less and move more in order to stay a healthy weight
2. Set a good example & Set screen time limits – make a rule that limits screen time to 2 hours every day. More importantly, enforce it. Also, be a good role model. Follow your own rules.
3. Make a journal of screen time vs active time – track how much time your family spends in front of a screen
4. Make screen time = active time (challenge the family to see who can do the most push ups or jumping jacks during commercial breaks)
5. Create screen-free bedrooms – don't put a TV or computer in your child's bedroom.

Role Modeling

Even though it may be hard for you, children usually like to help with things or play games, especially between 4-7 years of age.

They look up to people they love and often imitate their behavior. Having several ideas about things you could do to be active with your child may be helpful.

Remember to make it fun and offer positive praise!





We believe that this is important for parents to think about their behavior. Research tells us that what parents feel, think, and do directly affect what the children feel, think, and do.

Encouraging your children to become active is related to children choosing to be active later. Offering positive feedback to children may be one way of beginning or helping them keep healthy behaviors until they become healthy habits.





Communication



Your child looks up to you even though they don't say it.

Show your children how you want them to act.

What are effective components of communication?



Active listening -- always look at the person you are talking with; think about what is being said; wait your turn, and then say what you would like to say. Sometimes for children this can mean kneeling down to their eye level.

Tone of voice -- people listen more when you speak in a quiet tone instead of a loud, angry tone



Facial expression -- scowling decreases acceptance of what the other person is saying

Body language -- it should communicate that you are interested in what the other person is saying



Physical closeness -- standing too near the person you are speaking with can decrease effective communication

When we get stressed out or upset, we tend to blame others, saying such things, as "You NEVER listen."

Instead, tell the person how you feel with "I" statements.

Using "I" statements doesn't put people on the defensive. They remain more open to listening to your comments.

Example: "I really like it when you set the table for the family."

Now your turn: Can you think of positive ways to tell your child that they did a good job? Try using 'I' statements.

- Try to use 'I' statements when you talk to your child about their choices.
- Try to say what specifically that you are feeling good about – and not say the child is a good girl or boy.
- Try to complement their choice or their behavior.

Remember it is especially important to never praise children with food or snacks.

Some people offer sticker charts, maybe special reading time together, or perhaps going on a walk together. Children can sense when parents don't mean what they say, so we really need to look for behaviors or things about them to complement them for.



Remember these Key Points:

- Make a plan to reduce screen time
- Achieve your goals through problem solving
- Role model (show) your child how you want them to behave
- Use positive communication with your child ("I" statements)
- Praise your child

Over time, the small changes you are making now, will become habit. Be patient with yourself and with your family. Believe that you can do this and are taking the steps to make your *dreams* for your child come true…

Dreams Come True

I am proud of the steps you have taken to create a healthier family!
Believe in yourself!

Now let's come up with your message to *trigger* those healthy habits.
This is ***your*** message that can be sent during a time of day that you choose. Think about how your last message worked. What can we do to make it better? The message itself? The timing? It's all up to you!



My Message is:

Session 5
Role Modeling and Communicating
Homework



With your family, set a goal to reduce screen time this week.

Our family goal to reduce screen time this week is:

Name 1 ways you can ROLE MODEL behavior to reach your goal:

Name 1 ways you can COMMUNICATE your goal to your family:

Name 1 ways you can PRAISE your family for trying to meet this goal:

Be Proud of the Steps You are Taking Together as a Family!

SESSION 6 GOALS

After reading over your materials, you should be able to:

1. Identify sources of stress
2. Understand healthy vs unhealthy coping
3. Review the connection between thoughts, feelings, and actions



Stress is when you do not have the ability or skills to deal with things that you see as frightening or unpleasant. Being a parent can be stressful because parents often worry about doing what is best for their child. Parents also tend to be stressed by their child's behavior and emotions because they may not always know how to best help their child.

 Remember, as your child's parent, you are the best person to provide him or her with love, comfort, and support.



Since young children look up to their parents, it is important for parents to be aware of stress and how they, as parents, deal with stress. For instance, there are times when stress can be good:

- Helping your child to learn right from wrong



However, too much stress, especially if not handled in healthy ways,
can be harmful to both you and your child. Children are often more anxious when their parents are upset, so it is important for you to control your own anxiety and stress when you are with your child. Being "mindful" or aware of how stress can affects you, can actually help you to deal with stress in a more positive way, and you will be helping your child by role-modeling more healthy choices.

Remember the connection? THINK-FEEL-ACT applies here as well…

Think of what happens to you **PHYSICALLY** when you are stressed

Here are some common responses to stress:

- Heart beating fast
- Headache
- High blood pressure
- Difficulty sleeping



Think of how you feel **EMOTIONALLY** when you are stressed

Here are some emotional responses to stress:

- Anxiety
- Depression
- Irritable
- Angry

Think of some **BEHAVIORS** that show you are stressed



- Yelling or being short tempered
- Overeating
- Using drugs, alcohol, or smoking

When you feel any of these symptoms, it can serve as a trigger that you are experiencing stress and remind you to try to deal with the situation in more positive way. The goal is to practice role-modeling healthy behavior and to best frame stressful situations to your child. Your child is less stressed when they feel safe and secure.
COPING SKILLS is a way to deal with stress in a more positive way.

Healthy Coping is when you deal with stressor (the causes of the stress) in ways that will help you to decrease stress without harming yourself or other people. Remember your positive communication? During times of stress, don't forget to practice using "I" statements.



COPING TOOLS

Remember, your child looks up to you and your choices. It is important to become aware and start to recognize how you usually deal with or cope with being stressed and upset, so that you can encourage your child to have healthy coping skills also!

Signs of Healthy Coping:

- Talking/expressing feelings
- Exercising
- Seeking out friends or family for support
- Writing thoughts and feelings in a journal
- Turn a negative response into a positive one



Stress → Positive Thought → Positive Emotion and Behavior

Once you have practiced managing your own stress, you can encourage your children to handle their stress in more positive ways. Children are not usually taught ways to handle stress and extreme emotional responses.

For example, it takes approximately 20-30 minutes for anger to settle down, but tempers can get really heated during that time. If you get angry or frustrated, it may mean that you need to take some quiet time to "cool down." You can encourage your child to take some quiet time as well whenever they are feeling stressed, upset, or angry. Offering your child healthy ways to deal with stress can help your child's self esteem and help them to deal with stress more positively as they grow up.

Now that's a win-win situation!

Example:

Kristen was stressed trying to cook her family a healthy dinner – using a new recipe. She was overwhelmed trying to do too much and not planning. As a result, the food didn't taste that great and part of it even burned a little. She believed she was stupid for even trying. The consequence of her believing that she is stupid is feeling depressed. She gives up and decides next time to just go out for fast food.

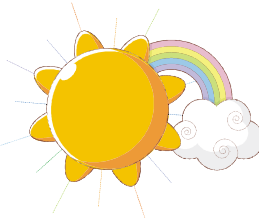
However- she can turn the negative experience into a positive one. First, she changed her negative thought into a positive thought, "I messed up this time, but I'll do better next time. I'll ask Karen to teach me some recipes." She talked to some friends about easy healthy recipes that their families liked. She picked an easier, healthy recipe, made a plan and wrote down all the ingredients. Her daughter helped her shop and prepare the meal. The result of her more positive thought and use of friends and family for support is that she feels better and has more energy! Hooray for healthy coping!



Remember these Key Points:

- Encourage your child to handle stress in positive ways
- Positive, healthy coping (such as - talking to others, exercising, writing) helps to decrease stress without harming others

Session 6
Stress and Coping
Homework



List some things you see as stressful in your life right now.

_____

_____

Can you think of some things you did to decrease your stress and coping with these stressful situations (include both healthy and not healthy things)?

_____

_____

Describe one situation this past week in which you may not have coped in a healthy way?

_____

_____

What can you do the next time these situations happen to cope in a healthy way?

_____

_____

Excellent work! Keep it up!

SESSION 7 GOALS

1. Review the connection between thoughts, feelings, and actions
2. Identify ways to change negative thoughts into positive thoughts
3. Recognize how habits are formed and can be changed
4. Be able to role model and communicate effectively
5. Discuss basic nutrition and activity needs for my child
6. Recognize stress and different coping techniques
7. Be able to set goals and apply problem solving techniques

CHANGE AHEAD

The first steps in change involve:

- Making a decision to change

- Setting the goal

- Believing you can do it "Anything is possible when you believe" and making a commitment to do it

- Taking action – one step at a time

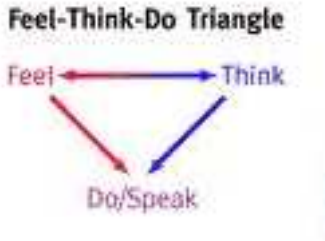


Break down a plan into daily goals. It will make it seem easier to do! Inch by inch – it's a cinch! Yard by yard, things are hard.

- Making healthy choices & helping your children is up to YOU!



- How you think affects how you feel and how you behave.



- When you talk positively, you will feel happier. Remember your positive self-statements every day!



- You can change a habit or reach a goal through:
  - Making a decision to change
  - Setting a goal and picturing yourself reaching it
  - Believing you can do it
  - Taking action one step at a time



- You can solve problems by asking:

  - What is the problem?
  - What is the cause of the problem?
  - What are all of the possible solutions with pros and cons?
  - What is the best solution?
  - ACT on the best solution

- When you are faced with something stressful and start to think negative, turn the negative thought into a positive one to feel better and act in a positive way

- To deal with stress, practice things that help you like writing in a journal or talking to someone

- Communicate effectively

- Remember healthy nutrition choices, like Strive for 5 and replacing one juice or soda with water

- Remember to serve and eat healthy size, not biggie size, portions

- Set goals every week for your thinking, emotions, exercise, and nutrition

- Limit "screen time" and increase physical activity



ANYTHING the mind can see, you can achieve!

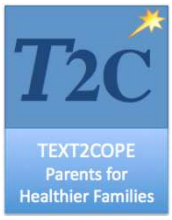
You CAN make healthy choices for a healthier you and healthier family!



Thank you for your participation!!!

APPENDIX E

MEASURES



Parent Demographic Form

We value the information that you provide.
It is helpful to have some information about you and your family.
All information will remain confidential.

We would greatly appreciate if you could answer the following questions by placing an "X" next to the category that best identifies you. Thank you.

1. What is your age?
   - ___ 18-24 years old
   - ___ 25-34 years old
   - ___ 35-44 years old
   - ___ 45-54 years old
   - ___ 55-64 years old
   - ___ 65-74 years old

2. What is your (the parent) gender?
   - ___ Male
   - ___ Female

3. What is your child's age in years?
   - _____3 years old
   - _____4 years old
   - _____5 years old

4. What is your child's gender?
   - ___ Male
   - ___ Female

5. What is your current marital status?
   - ___ Single, never married
   - ___ Single, separated/divorced
   - ___ Engaged
   - ___ Married
   - ___ Widowed
   - ___ In a committed relationship/significant other

6. What is the highest level of education you have completed?
   - ___ less than high school
   - ___ high school/GED
   - ___ some college
   - ___ 2 year college degree (associate)
   - ___ 4 year college degree (BA, BS)
   - ___ Master's degree
   - ___ Doctoral/Professional degree (MD, JD, PhD)

7. How do you identify yourself (race/ethnicity)?
   ___ White
   ___ Hispanic, Latino, or Spanish origin
   ___ Black, African American
   ___ American Indian or Alaska Native
   ___ Asian/Pacific Islander
   ___ Other _____

8. Is your 3-5 year old child in preschool, childcare, or daycare outside of the home?
   Yes _____
   No _____

9. What is your total household income, including all earners in your household?
   ___ Less than $10,000 annually
   ___ $10,000 - $19,000
   ___ $20,000 - $29,000
   ___ $30,000 - $39,000
   ___ $40,000 - $49,000
   ___ $50,000 - $59,000
   ___ $60,000 - $69,000
   ___ Greater than $70,000

10. What is the number of hours you work outside of the home?
   ___ Unemployed
   ___ Employed <20 hours/week
   ___ Employed 20-29 hours/week
   ___ Employed 40 hours/week
   ___ Employed >40 hours/week

11. Do you receive public assistance (e.g. Medicaid?)? _____Yes _____ No

12. Including your preschooler in the study, how many children (20 years or younger) are living in your household? _____

Thank you for your responses!

FOR OFFICE USE ONLY

Child's Age _____ Child's Gender _____

Ht #1 _____ Ht #2 _____ BMI #1 _____ z-Score _____

Wt #1 _____ Wt #2 _____ BMI #2 _____ z-Score _____

Waist Circumference _____ Waist:Ht Ratio _____

Code number _____
Date _____

Nutrition Questions for Parents

	Directions: Please answer the following questions to the best of your ability	**Yes**	**No**	**Don't Know**
1	Preschoolers need to drink 3 large glasses of whole milk per day (8 ounce glass).	1	0	2
2	It is a good idea to have fruit juice at every meal.	1	0	2
3	Whole milk is healthier than skim milk.	1	0	2
4	Ice cream is healthier for you than low fat frozen yogurt.	1	0	2
5	Pretzels are higher in fat than potato chips.	1	0	2
6	French fries are a good vegetable choice.	1	0	2
7	It is better to broil foods than to fry them.	1	0	2
8	Eating chicken with skin on it is healthier than eating chicken without skin.	1	0	2
9	A fruit rollup is a good fruit choice.	1	0	2
10	It is a good thing to add salt to food.	1	0	2
11	Consuming a lot of fruit juice can lead to cavities in your teeth.	1	0	2
12	White bread has as much fiber in it as wheat bread.	1	0	2
13	Pop is just as good of a drink as carbonated bottled water.	1	0	2
14	The amount of salty food someone eats can cause high blood pressure.	1	0	2
15	Fruit loops are just as healthy as Raisin Bran cereal.	1	0	2
16	Canned soups have a healthy amount of salt in them.	1	0	2
17	Dried soups (for example, Ramen noodles) are a healthy choice for lunch or snack.	1	0	2
18	Packaged peanut butter crackers are a better snack than yogurt.	1	0	2
19	One serving size of meat should be the size of a deck of cards.	1	0	2
20	People eat more when they are bored than when they are busy.	1	0	2

Thank you!

Code number _____
Date _____

Activity Questions for Parents

	Directions: Please answer the following questions to the best of your ability	**Yes**	**No**	**Don't Know**
1	Exercise helps to reduce stress.	1	0	2
2	People who are very active are healthier than people who are not.	1	0	2
3	Being active can give you more energy.	1	0	2
4	Being active can lower your blood pressure.	1	0	2
5	Exercise can help to prevent diabetes.	1	0	2
6	Regular exercise can make you feel happy.	1	0	2
7	Running is better for you than walking.	1	0	2
8	Dancing is exercise.	1	0	2
9	Being out of breath and dizzy when you exercise is a sign of a good workout.	1	0	2
10	People who exercise each day burn more calories every day than people who do not.	1	0	2
11	Children with parents who exercise tend to be more active than children with parents that do not exercise.	1	0	2
12	It is good to stretch out and do some slow activities before exercise.	1	0	2

Thank you!

Code Number_____
Date_____

Healthy Lifestyles Belief Scale for Parents
(Melnyk & Small, 2003) ©

	Directions: Please answer the following questions to the best of your ability.	**Strongly Disagree**	**Disagree**	**Don't Care**	**Agree**	**Strongly Agree**
1	I believe that I can help my child to lead a healthy life.	**1**	**2**	**3**	**4**	**5**
2	I believe that being active helps people to feel better.	**1**	**2**	**3**	**4**	**5**
3	I believe that making careful food choices will help a person to be healthy.	**1**	**2**	**3**	**4**	**5**
4	I believe that I and my child can cope/manage in healthy ways with things that are stressful.	**1**	**2**	**3**	**4**	**5**
5	I believe that I can reach the health goals that I set for myself.	**1**	**2**	**3**	**4**	**5**
6	I believe that my child can maintain a healthy weight throughout his/her life.	**1**	**2**	**3**	**4**	**5**
7	I believe that I can help my child to handle things that are stressful.	**1**	**2**	**3**	**4**	**5**
8	I believe that I can be more active.	**1**	**2**	**3**	**4**	**5**
9	I am sure that I can do what is best to keep myself healthy.	**1**	**2**	**3**	**4**	**5**
10	I am sure that I can spend less time watching TV.	**1**	**2**	**3**	**4**	**5**
11	I know that I can make healthy snack choices regularly.	**1**	**2**	**3**	**4**	**5**
12	I believe that it is best for my child to choose how much TV that he/she wants to watch.	**1**	**2**	**3**	**4**	**5**
13	I can deal with pressure from other people in positive ways.	**1**	**2**	**3**	**4**	**5**
14	I am confident that I know what to do when things bother or upset me.	**1**	**2**	**3**	**4**	**5**
15	I believe that my family will help each other to reach our health goals.	**1**	**2**	**3**	**4**	**5**
16	I believe that my child will feel better about him/herself if he/she is regularly active.	**1**	**2**	**3**	**4**	**5**
17	I believe that being active is fun.	**1**	**2**	**3**	**4**	**5**
18	I am able to talk to my family about things that bother or upset me.	**1**	**2**	**3**	**4**	**5**

Code Number_____
Date_____

Behavior Scale
(Parent) Melnyk & Small, 2003 ©

Using the scale below, indicate the number which best describes how often you behaved this way during the past week.

	Directions: Please answer the following to the best of your ability. **In the past week did you:**	Rarely or none of the time **(1 day or less)**	Some or a little of the time **(1-2 days)**	Occasionally or an average amount of time **(3-4 days)**	Most or all of the time **(5-7 days)**
1	…help your child to make healthy food choices?	**0**	**1**	**2**	**3**
2	…encourage your child to be active (exercise) regularly?	**0**	**1**	**2**	**3**
3	…limit your child's television viewing and video game playing to 2 hours per day?	**0**	**1**	**2**	**3**
4	…have fresh fruits and vegetable snacks in your home?	**0**	**1**	**2**	**3**
5	…say something positive to your child every day?	**0**	**1**	**2**	**3**
6	…pay attention to the salt and fat in your diet?	**0**	**1**	**2**	**3**
7	…allow your child to drink only two sugared drinks a day (for example, regular soda or juice)?	**0**	**1**	**2**	**3**
8	…chose water instead of a sugared drink at least once a day?	**0**	**1**	**2**	**3**
9	…set goals (activity and eating) with my child that he/she can accomplish?	**0**	**1**	**2**	**3**
10	…eat potato chips, corn chips, cheese puffs, pork rinds, or other fried snack foods?	**0**	**1**	**2**	**3**
11	…sit down and eat meals with my family?	**0**	**1**	**2**	**3**
12	…not add salt to your foods?	**0**	**1**	**2**	**3**
13	…broiled or baked foods instead of frying?	**0**	**1**	**2**	**3**
14	…talk to my child about his/her worries or stress?	**0**	**1**	**2**	**3**
15	…do what you are asking your child to do to have a healthy life?	**0**	**1**	**2**	**3**
16	…suggest to your child healthy ways to cope when he/she was worried or	**0**	**1**	**2**	**3**

	Directions: Please answer the following to the best of your ability. **In the past week did you:**	Rarely or none of the time **(1 day or less)**	Some or a little of the time **(1-2 days)**	Occasionally or an average amount of time **(3-4 days)**	Most or all of the time **(5-7 days)**
	stressed?				
17	…do activities regularly with your child?	**0**	**1**	**2**	**3**
18	…prepare a breakfast for your child?	**0**	**1**	**2**	**3**
19	…have dessert ready for your child after meals?	**0**	**1**	**2**	**3**
20	…choose healthy foods at the food store?	**0**	**1**	**2**	**3**
21	…feed your family meals 'family style'	**0**	**1**	**2**	**3**
22	…encourage your child to engage in physical activity or think of some fun things to do when he/she was feeling low, sad, or bored?	**0**	**1**	**2**	**3**
23	… eat food with your child from a fast food restaurant	**0**	**1**	**2**	**3**

Code number _____
Date _____

Perceived Difficulty Scale for Parents

	Directions: Please answer the following questions. How hard or easy is it to do the following things?	Very hard to do	Fairly hard to do	Neither hard nor easy to do	Fairly easy to do	Very easy to do
1	Eat healthy.	1	2	3	4	5
2	Not eat unhealthy foods that I like.	1	2	3	4	5
3	Exercise regularly.	1	2	3	4	5
4	Exercise instead of watching TV, relaxing, or using the computer.	1	2	3	4	5
5	Buy healthy foods to eat.	1	2	3	4	5
6	Find a safe place for my family to exercise.	1	2	3	4	5
7	Have exercise equipment at home (for example, jump rope, weights, shoes).	1	2	3	4	5
8	Take the time to buy healthy foods for my family.	1	2	3	4	5
9	Take the time to help plan and prepare healthy meals for my family.	1	2	3	4	5
10	Take the time to exercise regularly with my family.	1	2	3	4	5
11	Take the time to plan an exercise schedule for my family.	1	2	3	4	5
12	Cope/deal with stress.	1	2	3	4	5

Thank you!

Parent Evaluation of the TEXT2COPE Program

1. Did you find information from the TEXT2COPE program helpful? (circle one)
A. No B. Yes

If yes, what did you find the most helpful?

_____

_____

2. What are three things that you learned from the TEXT2COPE program?

A. _____

B. _____

C. _____

3. Would you recommend the TEXT2COPE program to other parents of preschoolers?
A. No B. Yes

If yes, why would your recommend the program?

_____

_____

4. Did you find the **MANUAL** portion of the TEXT2COPE program helpful?
A. No B. Yes

Please comment on what was or was not helpful about the MANUAL (suggestions welcome)

_____

_____

5. Did you find the **AUDIO CD** portion of the TEXT2COPE program helpful?
A. No B. Yes

Please comment on what was or was not helpful about the AUDIO CD (suggestions welcome)

_____

_____

6. Did you find the **HOMEWORK** portion of the TEXT2COPE program helpful?
A. No B. Yes

Please comment on what was or was not helpful about the HOMEWORK (suggestions welcome)

_____

_____

Parent Evaluation of the TEXT2COPE Program

7. Did you find the **TEXTING** portion of the TEXT2COPE program helpful?
A. No B. Yes

Please comment on what was or was not helpful about the TEXTING (suggestions welcome)

_____

_____

8. Was the frequency (number of messages sent) –
   A. Too much
   B. Too little
   C. Just right

9. Was the time of day the messages were delivered –
   A. Helpful
   B. Not helpful
   C. Timed perfectly

10. What topics from the TEXT2COPE program did you find **the MOST helpful? (Please circle all that apply).**
   a) Habits and cue recognition "triggers"
   b) Thinking-Feeling-Behavior Connection
   c) Over coming barriers to a healthy lifestyle
   d) Goal setting
   e) Problem solving
   f) Effective communication styles
   g) Nutrition basics
   h) Understanding food labels
   i) Portion sizes
   j) Social eating and snacking

11. What topics from the TEXT2COPE program did you find **the LEAST helpful? (Please circle all that apply)**
   a) Habits and cue recognition "triggers"
   b) Thinking-Feeling-Behavior Connection
   c) Over coming barriers to a healthy lifestyle
   d) Goal setting
   e) Problem solving
   f) Effective communication styles
   g) Nutrition basics
   h) Understanding food labels
   i) Portion sizes

Thank you for your feedback!