Informing the Parent Component of an Acceptance-Based Behavioral Weight Loss Treatment Program Tailored for Hispanic Adolescents in the El Paso Region

Patrick Vaughn Hopkins
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INFORMING THE PARENT COMPONENT OF AN ACCEPTANCE-BASED BEHAVIORAL WEIGHT LOSS TREATMENT PROGRAM TAILORED FOR HISPANIC ADOLESCENTS IN THE PASO DEL NORTE REGION

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DEDICATION

Dedicated to my parents: my need to explore science would not be fulfilled if it were not for you.
INFORMING THE PARENT COMPONENT OF AN ACCEPTANCE-BASED
BEHAVIORAL WEIGHT LOSS TREATMENT PROGRAM TAILORED FOR
HISPANIC ADOLESCENTS IN THE PASO DEL NORTE REGION

By

PATRICK HOPKINS, MPH, MCHES

DISSERTATION

Presented to the Faculty of the Graduate School of
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of the Requirements
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CHAPTER 1. INTRODUCTION

1.1 OBESITY

Obesity is a serious, complex, and costly disease caused by the inability of the body to regulate energy balance, leading to an excessive amount of body fat. Obesity is associated with higher rates of death driven by comorbidities including heart disease, type 2 diabetes, stroke, high blood pressure, and some types of cancer. It is also associated with poorer mental health outcomes and reduced quality of life. Childhood overweight and obesity are associated with higher chance of premature death and disability in adulthood. Children who have obesity are more likely to have obesity as adults and their obesity and disease risk factors are likely to be more severe in adulthood (Centers for Disease Control & Prevention [CDC], 2020a).

Overweight and obesity (OW/OB) have been defined largely by measures of height and weight using body mass index (BMI, calculated as weight in kilograms divided by height in meters squared, or kg/m²), which is an indirect measure of body fat. BMI has limitations because it cannot distinguish between lean and fat tissue and can be especially inaccurate in pediatric populations during development. The age-adjusted prevalence for adults 20 and older in the U.S. (2017-2018) was 30.7% overweight (Fryer et al., 2020a) and 42% obesity (2017-18; Hales et al., 2020). For U.S. adolescents aged 12-19, the age-adjusted prevalence (2017-2018) was 16.6% overweight (Fryer et al., 2020b) and 20.6% obesity (Hales et al., 2017).

1.2 BEHAVIOR THERAPY

Behavior therapy for OW/OB treatment uses a multitude of cognitive behavioral therapy (CBT) and standard behavior therapy (SBT) strategies to promote behavior change and the subsequent continuance of such behaviors into maintenance. Behavior strategies work by promoting small changes in weight loss and weight maintenance via successive changes in
healthy behavior. The most efficacious behavior interventions for adults, children, and adolescents (aka cognitive behavioral, behavior modification, basic behavioral, and stimulus control) (Snetthen et al., 2006) share several common factors. These factors include the use of multicomponent behavioral approaches, which entail dietary modification, physical activity, and a variety of behavior therapies as behavior strategies. Additionally, specific to pediatric OW/OB treatment, the factor of parent and family involvement is used to model and facilitate such behaviors to increase efficacy of weight-loss treatment.

1.3 ADULT OBESITY TREATMENT OPTIONS

Adult obesity treatment programs use a multi-pronged approach: lifestyle/behavior modification and medical management of obesity, which includes diagnosis and identification of medical contributors, along with pharmacology and surgical treatment options. The multicomponent lifestyle modification approach includes three main behavior change components: dietary modification, physical activity, and behavior therapy. Also known as lifestyle interventions, such interventions have been extensively studied and are supported by the American Heart Association (AHA), American College of Cardiology (ACC), and The Obesity Society (TOS), as outlined in the 2013 AHA/ACC/TOS Guideline for the Management of Overweight and Obesity in Adults (hereafter, Obesity Guidelines) (Jensen et al., 2014). The Obesity Guidelines recommend dietary modification aimed to achieve a deficit of 500-750 Kcal/day. Typically, this equates to a prescribed dietary intake of 1,200–1,500 kcal/day for women and 1,500–1,800 kcal/day for men (Jensen et al., 2014). The physical activity approach to lifestyle/behavior modification programs typically includes a recommendation for ≥150 minutes/week of moderately vigorous physical activity, such as brisk walking or cycling (Jakicic et al., 2019, Jensen et al., 2014). Behavior therapy in lifestyle modifications aims to assist
individuals in establishing skills to overcome weight loss barriers (Mauro et al., 2008) and to modify their behaviors to be conducive to weight loss (Burges et al., 2017). Current behavior strategies for obesity treatment have moved beyond the traditional gold standard of standard behavior treatment (SBT) and now also employ a more advanced realm of third-wave cognitive behavior therapy where both behavioral and psychological skills are reinforced. Anti-obesity pharmacotherapy falls under three mechanistic classes: those that suppress appetite, those that alter nutrient absorption, and those that increase energy expenditure. To date however, the FDA has not approved any drug that increases energy expenditure. Finally, surgical approaches to weight loss encompass a group of surgical procedures that alter the digestive system in order to facilitate weight loss. These surgeries can reduce the size of the stomach, thus reducing the capacity to consume food, or they can alter the small intestine thus reducing the body’s capacity to absorb calories and nutrients (Niddk.nih.gov, 2020).

1.4 ADOLESCENT OBESITY TREATMENT OPTIONS

Weight loss treatment options for adolescents with obesity parallel the same intervention strategies found in adult treatment, including multicomponent behavioral interventions, pharmacological interventions, and surgery and device interventions (Cardel et al., 2020). However, multicomponent behavioral interventions for adolescents are comprised of four components – dietary modifications, physical activity modifications, behavioral strategies, and parent/family involvement. The principal focus of dietary modification centers on daily calorie restriction (Cardel et al., 2020; Gow et al., 2014; Ho et al., 2013; Steinbeck et al., 2018) and improving nutrition quality of consumed foods (Cardel et al., 2020). Recommendations for physical activity in adolescents advocate for increased physical activity and exercise (Foster et al., 2018; O’Malley et al., 2017), while simultaneously reducing sedentarism, such as screen
time. Behavior strategies are used to promote behavior change and the subsequent continuance of the learned healthy behaviors applied to diet and physical activity obtained during treatment. Recommendations for pharmacotherapy for adolescents with obesity should be offered only after intensive lifestyle modification has failed to curb weight gain or improve comorbidities. Currently there are two FDA approved medications available for the treatment of obesity in children and adolescents, orlistat and setmelanotide. Data support that metabolic and bariatric surgery (MBS) in adolescents is at least as safe and effective as in adult populations (Pratt et al., 2018), with two MBS procedures being most prominent: Vertical sleeve gastrectomy (VSG) and the Roux-en-Y gastric bypass (RYGB). Lastly, support for the involvement of parent and family interaction to facilitate multicomponent behavioral child and adolescent weigh loss interventions is substantial (Altman and Wilfley, 2015; Barlow, 2007; Cardel et al., 2020; Foster et al., 2018; Grossman et al., 2017; Styne et al., 2017). Parent and family involvement help facilitate and foster the use of strategies for diet, physical activity, and behavior change.

Other behavior treatments of pediatric OW/OB have proven efficacious. These include school-based, family-based, and clinic-based programs, as well as adjunct treatments such as motivational interviewing (MI) and social facilitation maintenance treatment. Finally, treatment settings, such as live-in clinical settings, and modes of treatment delivery, such as internet, social media, and gaming are important considerations in pediatric obesity programming.

1.5 PARENTS/FAMILY INVOLVEMENT IN PEDIATRIC OBESITY MANAGEMENT

Pediatric obesity treatments are more robust and efficacious when treatment is parent/family-centered (Altman and Wilfley, 2015; Barlow, 2007; Cardel et al., 2020; Foster et al., 2018; Grossman et al., 2017; Styne et al., 2017). A task force commissioned meta-analysis of randomized controlled trials of pediatric lifestyle interventions showed modest but significant
decrease in BMI when interventions targeted family involvement. Conversely, the effect on weight loss was not significant when parents were not specifically included in pediatric treatment (Styne et al., 2017). Parents and family have the capacity to influence healthy behaviors for children due to shared environmental and biological influences (Grossman et al., 2017). Treatment interventions vary however in the level of parent and family involvement, such as in family-based behavioral treatment, where parents are robustly engaged in treatment with their child either simultaneously or concurrently or in family-based behavioral treatment – Parent Only, where only the parent is in treatment, acting as the agent of change for both the adolescent and the parent treatment.

Parents’ sense of self (self-confidence/body satisfaction) (Cromley et al., 2010; Neumark-Sztainer, 2005), their lifestyle behaviors, their parenting types (Maccoby & Martin, 1983) and styles (Baker et al., 2005; Shrewsbury et al., 2011;), and the family climate (Cromley et al., 2010; Dalen et al., 2015) can impact or predict the weight loss outcomes, behavior, and beliefs of adolescents. Finally, weight bias and social stigmatization within the household can induce an unintended unhealthy environment for the adolescent that is manifested by parent feeding practices (Ek et al., 2016; Loth et al., 2014; Kaur et al., 2016), parent weight-control behaviors, (Cromley et al., 2017), parent weight-based communication (Armstrong & Janicke, 2012; Fulkerson et al., 2002), parent health- and weight-focused communication (Berge et al., 2013; Berge et al., 2015; Gillison et al., 2016), and parent/family negative weight-based communication (Berge et al., 2016).

1.6 STATEMENT OF THE RESEARCH PROBLEM

The prevalence of obesity among U.S. children and adolescents aged 2-19 years has increased over 255% since 1971 (Fryer et al., 2018a). Children who have obesity are more likely
to have obesity as adults and their obesity and disease risk factors are likely to be more severe in adulthood (CDC, 2020a). In adolescent development, the normative process of adolescents’ growth in self has implications in adolescent weight loss interventions and therefore must be considered in the design of adolescent behavior change strategies (Kagitcibasi, 2013). Regarding the clinical efficacy of adolescent weight loss interventions, no agreed-upon definitions or standards for weight loss success exist among pediatric populations, nor do they exist for weight regain or weight maintenance (Steinbeck et al., 2018). For treatment strategies to be efficacious, they need to fit the lifestyle and culture of the patient (Sacks et al., 2009). Despite the alarming reality of pediatric obesity, there are currently no safe, efficacious, long-term treatment options for Hispanic adolescents with overweight or obesity (Grandone et al., 2018; Hagman et al., 2020; Styne et al., 2017).

1.7 CONCEPTUAL FRAMEWORK

The design of an efficacious weight loss treatment program for Hispanic adolescents requires the understanding and incorporation of multiple factors that present within this population. Three main factors are depicted here (Adolescent Development, Parent and Family Role, Hispanic Culture/Ethnic Identity) in a conceptual framework to help inform interventionists of the behaviors, culture, norms, and scientifically evidenced patterns and expectations of both parents and adolescents engaging in weight management strategies. The association between the treatment outcome (i.e., efficacy of a Hispanic adolescent obesity treatment program) and the factors presented in Figure 1 are bidirectional since it is expected that these relationships will be in constant flux, being dynamic and progressive. The relationships are evolving largely because the effects of this conceptual framework’s relationships are centered in behavior change. The change is created by the evolving behavioral transactions between parents and adolescents in
their attempt to navigate the components of this conceptual framework. For example, in a weight loss treatment program for adolescents, both parents and adolescents will be given lessons that increase their awareness of the harmful effects of negative parent communication. Provided that open communication and program investment are maintained by the parent and adolescent, these lessons will empower both parties to develop communication and behavior strategies that can lead to better health outcomes for the adolescent.

The factors depicted in this conceptual framework, parent and family role; adolescent development; and Hispanic culture/ethnic identification, are expected to give researchers and interventionists a starting point and direction for developing efficacious, culturally appropriate adolescent weight loss treatment programs. In some respects, the efficacy of this program underlies an understanding of how the behavior change concepts and their evolution toward adolescent weight loss outcomes work within the dynamics of this conceptual framework.

**Figure 1**

*Conceptual Framework of Hispanic Adolescent Weight Loss Treatment Program*
1.8 PURPOSE OF THE STUDY

The purpose of this study was to gather data to inform development of an acceptance-based behavior therapy (ABT) intervention for adolescents with overweight or obesity (OW/OB) in the Paso del Norte region. I conducted interviews and surveys with adolescents with OW/OB and their parents to identify perceived barriers to weight loss and modifications needed to adapt the adult ABT curriculum for adolescents. Our colleagues at University of Florida have adapted adult ABT for adolescents based on input from adolescents in central Florida (Cardel et al., 2020; Cardel et al., 2021; Lee et al., 2021). The primary goal of this research study is to inform the parent component of this adapted intervention. A secondary goal is to inform the University of Florida adolescent modifications to ensure an ethnically and culturally suitable ABT adolescent weight loss program for the Paso del Norte region.

1.9 DEFINITION OF TERMS

ABT – Acceptance-based behavioral therapy

BRFSS – Behavioral Risk Factor Surveillance System

OW/OB – Overweight and obesity

CPG – Clinical practice guideline

BMI – Body mass index

CDC – Centers for Disease Control and Prevention

SES – Socioeconomic status

FBT – Family-based therapy

NIH – National institutes for health

NIDDK – National Institute of Diabetes and Digestive and Kidney Diseases
1.10 RESEARCH QUESTIONS

1. Is there an association between parent’s BMI and their negative weight-based talk with their adolescent?

2. Is there an association between parental dietary restrictions and their adolescent’s unhealthy weight control behaviors?

3. Is there an association between parent’s health-focused talk with their adolescent and parent’s healthy weight control behaviors?

4. Is there an association between the adolescent’s perception of their body weight and the parent’s perception of their adolescents’ body weight?

5. To what extent is parent report of their negative weight-based talk aligned with adolescent report of parent’s negative weight-based talk?

6. What are the barriers to adolescent weight loss as reported by adolescents and parents?

7. What are the facilitators to adolescent weight loss as reported by adolescents and parents?

8. What are the desired programmatic components of an adolescent weight loss program, as reported by adolescents and parents?

1.11 SIGNIFICANCE OF THE PROBLEM

Roughly 19.3% of U.S. children and adolescents aged 2-19 were diagnosed with from obesity in 2017-2018 (Fryar et al., 2020b), an increase from 13.9% (1999-2000) and 16.9% (2011-12) in the last two decades (Fryar et al., 2020b. Among Mexican American children and adolescents aged 2-19, 29.2% boys and 24.9% girls suffered from obesity in 2017-2018, an increase from 23.5% and 16.8% (1999-2000) and 24.2% and 21.1% (2011-12) respectively (Fryar et al., 2020b). The complexity of treatment of adolescent obesity is a combination of the complexity of the disease itself coupled with the physiological and psychological developmental
changes of adolescence. Research surrounding adolescent obesity interventions is limited, so too is empirical evidence supporting efficacious treatment options. The consequences of pediatric OW/OB into adulthood are well established (CDC, 2020a; CDC.gov, 2020b; World Helath Organization [WHO] 2021). Together with the rising prevalence of obesity, especially in Mexican American youth, we urgently need treatment options.
CHAPTER 2. REVIEW OF THE LITERATURE

2.1 OBESITY AND OBESITY DEFINITIONS

Obesity is a global public health crisis. It is a complex and costly disease characterized as an excessive amount of body fat that increases the risk of health problems. The contributors/influencers to excess energy storage among those with overweight or obesity (OW/OB) often include environmental, biological/medical, maternal/developmental, economic, food and beverage behavior/environment, psychological, and social factors (Dhurandhar N. TOS opening session, 2015). Obesity is serious because it is associated with poorer mental health outcomes and reduced quality of life. Pediatric obesity is associated with a higher chance of obesity, disability, obesity into adulthood, and premature death in adulthood (WHO.int, 2021).

Definitions for adult and child normal, overweight and obesity ranges are as follows: for adults, BMI of 18.5 to <25 falls within normal weight range; BMI of 25.0 to <30 falls within an overweight range; BMI ≥30 to <35 falls within a class 1 obesity range; BMI 35 to <40 falls within a class 2 obesity range; and BMI of ≥40 falls within a class 3 (sometimes referred to as extreme or severe) obesity range (CDC, 2021a). For youth ≥2 years, BMI is expressed relative to other youth as a percentage of sex and age: BMI percentile range from 5th percentile to <85th percentile falls within a normal or health weight; BMI percentile range from 85th to <95th percentile falls within an overweight range; BMI percentile range from ≥95th to <120% of the 95th percentile falls within class I obesity range; BMI percentile range from ≥120% to <140% of the 95th percentile falls within class II obesity range; BMI percentile range from ≥140% of the 95th percentile falls within class III obesity range. (CDC.gov, 2021b; Pratt et al., 2018).
2.2 ADULT PREVALENCE OF OW/OB

No current objective data exist for state and regional prevalence for adult overweight or obesity, rather self-report height and weight exists. However, according to BRFSS data as reported by the Texas Department of State Health Services, the prevalence of overweight among adults in Texas in 2018 was 35.0% (Texas Department of State Health Services [DSHS], 2020), while the prevalence of obesity among adults in Texas was 34.8%. In the county of El Paso, TX (Health Service Region 9/10), the prevalence of overweight among adults aged 18 and over is 37.9% (Healthy Paso Del Norte, 2020b). In the county of El Paso, Tx, the prevalence of obesity among adults aged 18 and over was 35.6% (Healthy Paso Del Norte, 2020a).

2.3 CHILD PREVALENCE OF OW/OB

The prevalence of overweight among 8th and 11th grade adolescents in Texas is 16.5% and 19.5% respectively. The prevalence of obesity among 8th and 11th grade adolescents in Texas is 24.2% and 20.2% respectively (UTH, 2017a). In the county of El Paso, TX (HSR 9/10), the prevalence of overweight among 8th and 11th grade adolescents were 18.1% and 20.6% respectively, while the prevalence of obesity among 8th and 11th grade adolescents was 20.5% and 23.1% respectively (UTH, 2017b)

2.4 MORBIDITY OF CHILD OW/OB

Evidence surrounding the consequences of childhood and adolescent OW/OB into adulthood are vast and confusing. This is largely due to morbidity being measured both objectively and/or by self-report in many review studies (Park et al., 2012), as recall of youth weight status in adult life is difficult (Reilly and Kelly, 2011). Additionally, it has been suggested that the long-term impact of child and adolescent obesity is undervalued because so many eligible review studies considered overweight rather than obesity as the exposure (Reilly and Kelly, 2011). Also, most
reviews offer associations between obesity and morbidity rather than providing definitive
evidence for causation or its direction (Reilly et al., 2003) – often suggesting ‘risk’ of adult
morbidity from overweight and obesity in childhood and adolescence (Reilly and Kelly, 2011).
For example, one review could not correlate long-term health effects of childhood obesity acting
independently of its effects on adult BMI because the study’s statistical analyses could not detect
them, a limitation in study design. (Park et al., 2012).

Notwithstanding confusing pediatric OW/OB morbidity evidence, systematic reviews of long
term consequences of pediatric obesity into adulthood range from social and economic effects
such as income and educational attainment (Reilly et al., 2003); adult obesity persistence (Reilly
et al., 2003); adult miscellaneous morbidity (risk of cancer, including colorectal cancer); (Park et
al., 2012); asthma (Park et al., 2012, Reilly & Kelly, 2011); dyslipidemia (Styne et al., 2017);
and polycystic ovary syndrome (Reilly and Kelly, 2011); risk of premature adult mortality
(Reilly et al., 2003; Reilly & Kelly, 2011), particularly cardiometabolic morbidity (Reilly &
Kelly, 2011); obesity mediated cardiovascular morbidity (Reilly et al., 2003); and type 2
diabetes, hypertension, coronary heart disease, and stroke (Park et al., 2012).

2.5 ADULT OBESITY TREATMENT OPTIONS

Adult obesity treatment programs typically use a multi-pronged approach of
lifestyle/behavior modification, pharmacotherapy, and bariatric surgery (Jensen et al., 2014).
Lifestyle modification, also known as multicomponent behavioral interventions, include three
main behavior change components: diet modification, physical activity, and behavior therapy.
Supported by extensive evidence, these components employ self-monitoring of food intake,
physical activity, and intensive instruction in behavior change strategies to help enforce and
facilitate diet and activity. Typically, pharmacotherapeutic and surgical approaches to obesity are used to both enhance initial weight loss and to improve longer-term weight loss maintenance.

### 2.5.1 COMPREHENSIVE LIFESTYLE MODIFICATION

Multicomponent behavioral interventions for the treatment of OW/OB are recommended and have been extensively studied. Known also as lifestyle interventions, these recommendations are outlined in the 2013 AHA/ACC/TOS *Guideline for the Management of Overweight and Obesity in adults* (hereafter, *Obesity Guidelines*) (Jensen et al., 2014). Such lifestyle modification includes the general components of diet, physical activity, and behavior therapy. The *Obesity Guidelines* recommend a high-intensity program that includes 14 or more counseling sessions with a trained interventionist over the course of 6 months. When individual or group treatment is provided face-to-face, participants lose up to 8 kg (8% of weight) in 6 months, while experiencing other health benefit outcomes like improvements in cardiovascular disease (CVD) risk factors and increased quality of life (Jensen et al., 2014). Of note, comprehensive digitally delivered approaches are quickly complementing or replacing traditional intervention methods from which the large evidence base was used to support the above guidelines.

The Canadian Adult Obesity Clinical Practice Guidelines (CPGs) represent perhaps the most extensive review of published obesity evidence to date and outlines the arc of the patient journey in the clinical approach to obesity management (Wharton et al., 2020). The full recommendations and supporting evidence are presented in 19 chapters of the complete guidelines (Wharton et al., 2020).

Regarding weight loss maintenance, the *Obesity Guidelines* suggest in-person or telephone sessions with a trained interventionist for ≥1 year after the initial 6-month program (Jensen et al.,
The Obesity Guidelines include the following three components: diet, physical activity, and behavior therapy (Jensen et al., 2014)

2.5.1a DIETARY MODIFICATION

Obesity Guidelines recommend a dietary intake aimed to achieve a deficit of 500–750 Kcal/day, with an ideal mean loss of 0.5–0.75 kg/wk (1.0–1.5 lb) per week. Therefore, the typically prescribed dietary intake for women is 1,200–1,500 kcal/day and men is 1,500–1,800 kcal/day (Jensen et al., 2014). Another option for daily caloric intake account for individual body weight with cut points at <113 kg (250 lb) and >113 kg (1,200–1,500 kcal/day and 1,500–1,800 kcal/day respectively) (The Look AHEAD Research Group, 2006; Wadden et al., 2020). The Dietary Guidelines for Americans: 2020-2025 suggest that nutritional needs be met primarily from nutrient-dense foods and beverages customized to individual needs and preferences. Foods and beverages include vegetables of all types, fruits (especially whole fruit), grains (at least half of which are whole grain), dairy (including fat-free or low-fat versions of milk, cheese, and yogurt), protein foods (including lean meats, poultry, and eggs, seafood, and legumes), and oils (including vegetable oils and oils in food from seafood and nuts). Additional recommendations for a healthy dietary pattern include: little or no added sugars (less than 10% of daily calories starting at age 2), saturated fat (less that 10% of daily calories starting at age 2), sodium (less than 2,300 milligrams per day – even less for children under age 14), and alcohol in moderation or less (2 drinks or less per day from men and 1 drink or less per day for women) (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020). The Canadian Adult Obesity Clinical Practice Guidelines (CPGs) (Wharton et al., 2020) conclude that there is no one-size-fits-all dietary pattern for obesity management. Instead, a number of nutrition options are available for those with obesity – options that induce long-term
adherence because they are client-centered and flexible (Brown et al., 2020). Another key message of the CPGs suggest that calorie restriction may result in increased food intake and weight gain via affected neurobiological pathways that control hunger, appetite, cravings, and body weight regulation (Brown et al., 2020). Accordingly, for adults living with obesity, the CPGs recommend numerous food-based approaches, including a non-dieting approach, that promote their best long-term adherence and health outcomes (Brown et al., 2020). The CPGs conclude that the focus of all nutrition interventions should center on nutrition approaches that the patient/client can integrate that is culturally acceptable, nutritionally adequate, enjoyable, affordable, and effective for long term health enhancements (Brown et al., 2020).

Regarding weight loss maintenance, the Obesity Guidelines suggest a reduced-calorie diet consistent with reduced body weight and the macronutrient profile relative to the patient’s health status (e.g., type 2 diabetes) and preferences (Jensen et al., 2020). Similarly, the CPGs suggest that weight-loss maintenance require long term calorie reduction that coincides with the individuals personalized treatment goals, values and preferences (Brown et al., 2020).

2.5.1b Physical activity

Lifestyle modification programs typically recommend ≥150 minutes/week of moderately vigorous physical activity, such as brisk walking or cycling (Jakicic et al., 2019; Jensen et al., 2014). CPGs recommend moderate to vigorous aerobic activity for 30-60 minutes most days of the week to achieve small amounts of body weight or fat loss, preserve weight maintenance after weight loss, and increase cardiorespiratory fitness (Boulé & Prud’homme, 2020). Additionally, the CPGs recommend the inclusion of resistance training in physical activity programming for obesity management, stating that it may promote weight maintenance and modest increases in fat-free mass and mobility. Similarly, Rosenbaum and colleagues (2018) found that resistance
training could be an effective aide to reduced-weight maintenance for individuals experiencing recent weight loss (Rosenbaum et al., 2018). Also recommended is the notion of increasing exercise intensity, including high-intensity interval training (HIIT), for reducing the amount of time required to achieve the same benefits from moderate-intensity aerobic activity and achieving greater cardiorespiratory fitness (Boulé & Prud’homme, 2020). Regarding weight loss maintenance, the *Obesity Guidelines* suggest 200–300 minutes/week of aerobic activity (e.g., brisk walking). Of note, the *Obesity Guidelines* presented here do not address the benefits of strength training in conjunction with aerobic activity for obesity management.

### 2.5.1c Behavioral Therapy

Lifestyle interventions that aim to treat obesity employ behavior treatment strategies to assist individuals in establishing skills to overcome weight loss barriers (Mauro et al., 2008) and to modify their behaviors to be conducive to weight loss outcomes (Burgees et al., 2017). Details of behavioral therapy are described below. The *Obesity Guidelines* suggest the following behavior therapy: daily monitoring of food intake and physical activity using paper logs/diaries or apps; weekly monitoring of weight; a structured behavior change curriculum including goal setting, problem solving and stimulus control, and finally regular support and feedback from a trained interventionist (Wadden et al., 2020).

### 2.5.2 Pharmacological

Obesity is a complex disease with over 100 potential contributing factors including environmental, maternal, biological, dietary, psychological, economic, and social to name a few (Dhurandhar N. TOS opening session, 2015). Such factors affect behavioral and metabolic factors that influence the regulatory mechanisms of weight homeostasis. For many patients with obesity, medical management of the causes and consequences warrant pharmacological
treatments. Weight loss pharmacotherapy is considered for patients with a BMI > 30 kg/m², or those with a BMI of 27-30 kg/m² with obesity-related comorbidities (Lee & Dixon, 2017; Khalil et al., 2020; Saunders et al., 2018). Anti-obesity pharmacotherapy falls under three mechanistic classes: those that suppress appetite, alter nutrient absorption, and increase energy expenditure. However, the FDA to date has not approved any drug that increases energy expenditure. Ephedrine, which is known to increase metabolic processes, is sold over the counter as an herbal supplement known as ephedra.

The NIH outlines the FDA approved medications for weight loss. These 5 drugs – orlistat (Xenical, Alli), phentermine-topiramate (Qsymia), naltrexone-bupropion (Contrave), liraglutide (Saxenda, and semaglutide (Wegovy) – can be used long term as long as the patient is benefiting from treatment and not experiencing unwanted side-effects (NIH, NIDDK, 2016). Liraglutide is a glucagon-like peptide-1 (GLP-1) agonist that acts as an appetite suppressant for weight loss and improves glycemic control (Lee & Dixon, 2017; Saunders et al., 2018). Orlistat decreases the absorption of fat from the gastrointestinal tract by reducing pancreatic and gastric lipases (Lee & Dixon, 2017; Saunders et al., 2018). Phentermine is a sympathomimetic appetite suppressant, shown to induce weight loss (Lee & Dixon, 2017; Saunders et al., 2018). Topiramate is used to treat seizures or migraine headaches but is used off-label to treat obesity due to its side effect of weight loss (Lee & Dixon, 2017; NIH, NIDDK, 2016). The combination phentermine/topiramate, FDA approved in 2012, is said to target appetite regulation from different mechanistic pathways simultaneously (Saunders et al., 2018). Naltrexone is an opioid antagonist approved for the treatment of opioid dependence and later for alcohol use disorder. Bupropion was initially approved as an antidepressant and later as a smoking cessation aide. Together, Naltrexone-Bupropion act on both appetite and food craving control by stimulating
hypothalamic POMC neurons while simultaneously influencing the dopamine reward circuit (Saunders et al., 2018). Semaglutide is a GLP-1 agonist that increases the production of insulin by the pancreas, therefore aiding in glucose metabolism (Alder, 2021). The efficacy of these anti-obesity medications ranged from 5%-10.6% weight loss greater than placebo (Khalil, et al., 2020; Rubino et al., 2021; Saunders et al. 2018; Yanovski & Yanovski, 2014). As with all medications, contraindications should be considered before prescribing to patients with OW/OB. Available long-term safety data for these pharmacotherapies varies (Khalil et al. 2020), but with development of new drugs and additional data from existing treatment options, this field is advancing, providing new options for people with the disease of obesity.

2.5.3 SURGERY

Weight-loss surgery encompasses a group of surgical procedures, known as bariatric surgery (“bariatric” means “related to treatment for heavy weight”), that alter the digestive system in order to facilitate weight loss (NIDDK, 2020). Strong evidence of efficacy and safety from observational studies and randomized control trials (RCTs) suggest that bariatric surgery results in greater long-term weight loss than the best available nonsurgical obesity interventions (Arterburn et al., 2020). As a result, over 250,000 bariatric surgeries are performed each year for the control of obesity and diabetes (Arterburn et al., 2020). Considerations for bariatric surgery, according to the 1991 NIH guidelines, include those patients with a BMI of 40 or higher or 35 or higher with serious obesity-related comorbidities. Bariatric procedures are now considered for patients suffering from type 2 diabetes, where diabetes medical treatment is inadequately controlling hyperglycemia, and patient BMI is 30 to 35 (Arterburn et al., 2020)

Today, the two most commonly used adult bariatric surgical procedures include the sleeve-gastrectomy and the Roux-en-Y gastric bypass (RYGB), accounting for 61% and 17% of
bariatric procedures performed, respectively (Arterburn et al., 2020). Two other procedures, the adjustable gastric band (AGB) and the biliopancreatic diversion account for less than 2% of additional procedures, while the balance of bariatric procedures are revisions of other rarely performed bariatric procedures (Arterburn et al., 2020). The focus of this discussion however will detail only the sleeve-gastrectomy and RYGB surgeries. Effectiveness of weight loss varies among bariatric procedures, while the best procedure for weight loss remains unclear. RCTs comparing both procedures report similar weight loss, yet observational studies offer greater weight loss effectiveness among RYGB patients. Weight regain post bariatric surgery is expected among typical patients, which usually begins in the second postoperative year but rarely within a margin of 5% or less of the patient’s preoperative weight (such rarity occurring in 3.3% of RYGB patients and 12.5% undergoing sleeve gastrectomy at 5-year follow-up) (Arterburn et al., 2020). Currently, the greatest risk for short- and long-term adverse events (e.g., additional operations, interventions, and hospitalizations) favor RYGB than sleeve gastrectomy; however, findings from RCTs and observational studies beyond the 5-year follow-up are needed (Arterburn et al., 2020).

2.6 BEHAVIOR CHANGE THEORY IN WEIGHT MANAGEMENT.

Weight-loss interventions focusing on behavior modification are the gold-standard treatment for pediatric and adult obesity (Whitlock et al., 2010). However, programs for adolescents, especially ethnic minorities, are less efficacious (Jelalian et al., 2008), with limited weight loss and post-treatment weight regain (Emes et al., 1990; Melin et al., 1987).

The behavior modification strategies used in today’s adult and adolescent weight loss treatment interventions employ the principals of a new generation (“third-wave”) of cognitive
behavior therapies. Acceptance-Based Behavioral Therapy (ABT) is a third-wave behavior therapy and is the primary focus in this research study.

2.7 HISTORY OF COGNITIVE BEHAVIOR THERAPY

The first wave of behavior therapy is aptly called traditional behavior therapy and is referred by some initial behavior therapists as a rebellion therapy against the existing clinical principals (Hayes, 2004). Initial behavior therapists thought that theory was the foundation of scientifically applied principals and that such principals should stand the rigors of repeated scientific testing. Conversely, the clinical traditions of the time were poorly linked to scientific principals and offered weak evidentiary support for the clinical interventions in use (Hayes, 2004).

The second wave of behavior therapy, called cognitive behavior therapy (CBT), pressed the infusion of cognitive therapy with behavior therapy because behavior therapists realized the need to employ a more direct and central way to deal with thoughts and feelings (Hayes, 2004). Despite the general successes of CBT protocol outcomes, the implication that direct cognitive change is needed for clinical improvement is still scantly supported (Hayes et al., 2006). It has been argued that CBT offers little evidence that it can merge basic and applied analyses into a scientifically lucid and suitable discipline (Hayes, 2006). As such, a commotion among behavioral and cognitive therapies has surfaced, due in part by the addition of a third wave effort to modernize behavior analysis by including cognitive principals from functional contextual and behavior analytic points of view.

Third-wave CBT employs the understanding that behavior therapy needs to assimilate cognition more effectively and that cognition from a contextualistic standpoint is likely the most effective way to meet the practical goals and base scientific commitments of the behavior therapy tradition (Hayes, 2006).
Somewhere along the line, within the context of obesity management and in the interest of behavior change as applied to weight control, CBT has morphed into seemingly separate therapies – cognitive-behavioral – such that standard behavior therapies (SBT) for weight control programs frequently include both behavioral and cognitive elements as strategies to induce behavior change (Fabricatore, 2007). A review of literature by Fabricatore (2007) suggests that differences between CBT and SBT for obesity rest more in their underlying theories than in their implementation (Fabricatore, 2007). Nevertheless, this somewhat blurred relationship between these therapies forces more explanation and understanding for the therapeutic forces that become obesity therapy, namely SBT.

2.8 STANDARD BEHAVIOR THERAPY (SBT) – THE INTERSECT BETWEEN CBT AND BEHAVIOR CHANGE IN OBESITY LIFESTYLE MODIFICATION

During the “cognitive revolution” in psychology during the 1960s and 1970s, many behavior therapists of the time were influenced by the movement and began to call their therapy CBT (Micallef-Trigona, 2018). Simultaneously during the 1960s, initial behavioral interventions for weight control were being developed (Cooper and Fairburn, 2001) at a rate “verging on faddism” (Jeffery et al., 1978). Early behavioral treatments for obesity, known also as standard behavior therapy (SBT) for obesity, were synonymous to behavior treatments for psychological disorders, applying the principles of classical and operant conditioning (Fabricatore, 2007). These early SBTs for obesity were studies of small sample size and short temporal intervals, with inconsistent follow-up data (Jeffery et al., 1978), often crude in detailing calorie intake and physical activity, and often producing weigh losses of about 10% of initial body weight (Wing, 1998). These early SBTs also reported weight regain from initial weight loss of approximately
40% over the first year of treatment, with nearly all weight loss regained over the course of the next three years (Graham et al., 1983; Wadden et al., 1989).

Through the many derivative approaches of SBT for obesity from the 1970s to 1990s, what emerged was a set of principles and techniques that aimed to modify eating and activity habits using two primary criteria: 1) SBT aims to alter both the cognitive and behavioral foundations for eating and physical activity habits, and 2) SBT uses both cognitive and behavioral strategies to achieve those aims (Fabricatore, 2007). Additionally, SBT has developed several distinguishing characteristics: 1) it is goal oriented, which means the treatment employs clear goals that can be easily measured and allow a clear assessment of progress; 2) treatment is process-oriented, which means it helps to not only identify what the patient needs to accomplish but also how to accomplish them – it is a skill-building philosophy that promotes learning weight management skills rather than the enhancement of willpower; and 3) treatment advocates small rather than large steps, where small changes give patients successful experiences upon which to build continued success (Wadden & Butryn, 2003; Wadden et al. 2005b).

Finally, SBT recognizes that the problem of obesity is behavioral in nature and not simply the product of dysfunctional thoughts or erroneous beliefs (Fabricatore, 2007). By the early 2000s, the principal components of SBT for obesity (diet, exercise, and behavior therapy) remain but were expanded to recognize that body weight is affected by factors other than simply behavior (Wadden and Butryn, 2003). These factors include genetic, hormonal, and metabolic influences (though many additional factors have been added since, including environmental, economic, and social to name a few) of which helped to usher in a new set of ideals and constructs that help define today’s SBT principles.
2.9 MODERN STANDARD BEHAVIOR THERAPY (SBT)

Today’s modern SBT is interchangeably known as “behavior treatment,” “lifestyle modification,” and “behavior weight control” (Wadden et al., 2005b,) but more recently termed comprehensive lifestyle interventions (CLI) among obesity interventionists (Jensen et al., 2014) Modern SBT maintains the same principal components of past SBT, a moderate reduced-calorie diet, a program of increased physical activity, and the use of behavior therapy to help facilitate adherence to both diet and exercise recommendations (Jensen et al., 2014). However, modern SBT has evolved to include several different components among a “package” of behavior therapies of obesity (Wadden & Butryn, 2003). The most common components are self-monitoring, stimulus control (Butryn et al., 2011; Cardel et al., 2020; Fabricatore, 2007; Jacob & Isaac, 2012; Wadden & Butryn, 2003), and goal setting (Butryn et al., 2011; Cardel, 2020; Fabricatore, 2007; Jacob & Isaac, et al., 2012;). These components encompass the very purpose surrounding behavior therapy for obesity, which is to provide a set of skills and techniques with which to modify eating and activity habits. The following skills serve not to treat or eliminate a psychiatric disorder, but to change eating and exercise behaviors and to teach the skills for changing such behaviors (Fabricatore, 2007).

2.9.1 SELF-MONITORING

Self-monitoring of energy intake and physical activity is perhaps the most important skill taught in SBT and is considered the cornerstone of behavior treatment (Wing, 1998). Persons often underestimate their calorie intake, sometimes by as much as 50%, and can be mistaken about their actual energy expenditure in walking. Self-monitoring in the form of food and exercise record keeping gives patients clear and immediate feedback regarding their energy intake and expenditure. In a placebo versus pharmaceutical agent trial, those who successfully
maintained a dietary intake record lost twice as much weight as those who did not (Wadden et al., 2005a)

2.9.2 GOAL SETTING

Goal setting is another skill that employs having the patient develop specific (quantifiable) time-limited (typically 1 week since treatment sessions are every week), realistic yet challenging behavioral goals. Patients set target goals for daily calorie intake, minutes of weekly physical activity and intensity level, and the number of days which food and exercise records will be kept. Patients are encouraged to define and set observable behavioral objectives that they will implement to promote healthier outcomes. For example, if skipping lunch is causing overeating during dinner, the goal could be to bring to work, and eat, a healthy favorite snack for lunch each day for the next week. During weekly group meetings patients are asked to share their successes in meeting their weekly goals. Often, patients report appreciating the accountability that results from weekly group check-ins (Butryn et al., 2011). Though amount of weight change is often not shared among the group, group leaders often direct patients to expect weight losses of 0.5 to 1.0kg per week, with an eventual goal of 10% loss of initial body weight (Butryn et al., 2011).

2.9.3 STIMULUS CONTROL

The SBT component of stimulus control follows the principals of operant conditioning where the strength of a behavior can be modified by either reinforcement or punishment. Examples of stimuli that can reinforce healthy eating and activity behaviors are weight loss itself and the cascade of resulting improvements such as body image, quality of life, and increased physical health. Operant conditioning principles are also applicable to behavioral weight control strategies where the attempt is to break associations with eating and nonfood cues. For example, the patient who repeatedly snacks on the couch after dinner while watching the evening news might find
that the acts of sitting on the couch (at any time), watching the news, or even the feelings of fullness from dinner be cues that help to reinforce future snacking. In this case, participants of standard behavior therapy might be encouraged to restrict eating to the kitchen or dining room, or away from environments that restrict cues associated with eating (Fabricatore, 2007).

2.9.4 OTHER SBT COMPONENTS

Many other behavior strategies have been introduced into comprehensive lifestyle interventions to help simplify the decision-making for the patient. Table 1 outlines additional SBT components not previously mentioned. Of particular mention is cognitive restructuring, which is the ability to identify, challenge, and correct irrational thoughts that contradict weight loss efforts, while identifying distortions in those thoughts and learning to replace the dysfunctional thoughts with more rational ones. For example, a common distortion involves catastrophizing or all-or-nothing thinking, as shown by the statement, “I’ve blown my diet so I might as well eat whatever I want.” Cognitive restructuring posits that the patient must first challenge the rationality that they have “blown” their diet and then counter the maladaptive thinking with an alternative thought “Well, my diet is completely blown, I could eat a little less in the following meals to get back on track” (Fabricatore, 2007; Foreman et al., 2016; Jacob & Isaac, 2012; Wadden & Butryn, 2003).
2.9.5 STRUCTURE AND EFFICACY OF SBT

Consensus among obesity interventionists suggest that comprehensive lifestyle interventions consist of bi-weekly sessions of 60-90 minutes for 4-6 months in group (10-15 persons) or individual settings (Butryn et al., 2011; Fabricatore, 2007; Jacob and Isaac, 2012; Wadden &
Group settings are reported as more cost effective while yielding greater weight loss than individual treatment (Renjilian et al., 2001). Sessions are instructed by trained professionals, such as registered dietitians, behavioral psychologists, or related field (Butryn et al., 2011; Wadden & Butryn, 2003), exercise specialists (Wadden et al., 2007), or by clinical professionals with experience in conducting behavioral weight-loss interventions (Foreman et al., 2013).

Data indicates that patients treated with comprehensive lifestyle approaches lose 8–10% of initial weight (Wadden et al., 2007; Wing, 2002). However, weight loss often peaks and weight regain often begins at approximately 6-months, with participants, on average, regaining one-third of weight lost within 1-year of treatment end and nearly half of participants returning to their pretreatment weight within 5-years (Wadden et al., 2007; Wing, 2002). Therefore, every-other-week group “maintenance” sessions, for up to 1 year after initial treatment, seem to provide patients the support and motivation needed to continue to effectively practice their previously learned weight loss behavior skills (Butryn et al., 2011; Wadden & Butryn, 2003). A review of studies found that participants who attended long-term weight maintenance sessions for the year following initial treatment maintained an average 10.3 kg of their initial 10.7 kg loss (Perri & Corsica, 2002). In fact, Wing and colleagues found that on-site group counseling was more effective at preventing weight regain after 18-months of treatment than either an internet-based intervention or an education-control group (Wing et al., 2006).

While SBT remains central to comprehensive lifestyle interventions, it has recently been suggested that existing behavioral interventions might lack the effectiveness to initiate and maintain participants’ weight-control behaviors in the face of powerful, intrinsic opposing drives. Interestingly, “third wave” CBT surfaced around the time of SBT and has established a
footing in treatments surrounding personality disorders, maladaptive behaviors, and psychological problems. These therapies employ the teachings of problem-solving techniques, mindfulness (learning to be nonjudgmental of thought experiences), psychological flexibility, and committing to freely chosen life values in the face of aversive experiences. Most notably however, while also corroborating this research project, third wave CBT has become central to some of the most promising and efficacious obesity management interventions to date, namely acceptance-based behavioral therapy (ABT).

2.10 NEW GENERATION OF THERAPIES IN ADULT OBESITY MANAGEMENT

There are several examples of third wave CBT interventions, some include behavioral activism, metacognitive therapy, compassion-focused therapy, and schema therapy to name a few. For the purpose here, only therapies having functional ties with ABT, within the context of behavior weight loss strategies, will be discussed here. These therapies include: dialectical behavior therapy (DBT; Linehan, 1993), mindfulness-based cognitive therapy (MBCT; Segal et al., 2002), and acceptance and commitment therapy (ACT; Hayes et al., 1999),

2.10.1 DIALECTICAL BEHAVIOR THERAPY (DBT)

DBT surfaced out of a series of failed attempts to treat chronically suicidal clients using CBT protocols of the 1970s (Dimeff et al., 2001). DBT developed its foundation in treating patients with borderline personality disorder (BPD). DBT enhances the emotional regulation capabilities of patients by teaching them adaptive skills of emotion regulation (Telch et al., 2001). The central dialectic of DBT is between the simultaneous use of acceptance and validation of the patient during the process of helping them change. DBT employs the change strategies of behavior analysis of maladaptive behaviors and problem-solving techniques, which include cognitive modification, exposure-based strategies, and contingency management (Dimeff et al.,
DBT is designed to treat patients at all levels of complexity and severity of disorders by increasing skills in emotional regulation, interpersonal effectiveness, distress tolerance, mindfulness, and self-management. To date, DBT has been modified to effectively target binge eating disorder (BED) and has been effective in significantly reducing weight in patients with obesity suffering from emotional eating (Roosen et al., 2012).

2.10.2 MINDFULNESS-BASED COGNITIVE THERAPY (MCBT)

Unlike CBT that offer strategies to change dysfunctional thoughts and beliefs, mindfulness-based approaches aim to constructively and accurately witness thoughts from a nonjudgmental experience, as thoughts are not always grounded in fact or reality but rather can be viewed as dynamic and transient events (Segal et al., 2002). MCBT considers the neural witnessing of life’s events as an awareness of one’s experiences, which originate from thoughts, feelings, and body sensations. “Mindfulness is awareness that arises through paying attention, on purpose, in the present moment, nonjudgmentally” (Black, 2011). The psychological mechanisms of action of MBCT may be applied by increasing acceptance, present-moment awareness, self-compassion and the ability to selectively choose which features of awareness deserve attention (Sipe et al., 2012). Increased mindfulness gives one the ability to modify behavior patterns that may be more consistent with personal goals and needs. For example, recognizing bodily signals of hunger and fullness to avert overeating in response to negative emotions or psychosocial cues (Olsen & Emery, 2015).

2.10.3 ACCEPTANCE AND COMMITMENT THERAPY (ACT)

Developed by Steven Hayes, ACT supports the notion that despite being faced with aversive private experiences, there is commitment to freely chosen life values that are supported by acceptance (McHugh, 2011). Likely, the most powerful feature of ACT is its roots in basic
behavior science. Specifically, ACT is founded in Relational Frame Theory (RFT), which is a behavior analytic approach to cognition and language. According to RFT, we learn to relate things in our environment (relationally frame) such that this relational activity can change the psychological functions of those things (McHugh, 2011). For example, if a person was shocked by object B and then learns that object C is larger than object B, the person will show greater emotional response in the presence of object C, despite the shock being paired with object B (Dougher, 2007). From an ACT/RFT standpoint, psychological problems can arise when a person lacks relational talents. ACT spearheads these problems by positioning its primary goal around increasing psychological flexibility, as shown in figure 2, because it asserts that psychological flexibility is at the center of positive psychological processes (Hayes et al., 2006).

According to ACT, psychological flexibility is defined as “the ability to contact the present moment more fully as a conscious human being, and to change or persist in the behavior when doing so serves valued ends” (Hayes et al., 2006). Simply, psychological flexibility allows one to behave according to their values, despite unpleasant thoughts or feelings. ACT employs six core processes, shown in Figure 2, which are conceptualized as psychological skills to produce psychological flexibility (Hayes, 2006). ACT is the first acceptance behavioral strategy that has been used in a variety of diverse populations and problems, including weight control, depression, chronic pain, and social anxiety, among others (Cullen, 2008). Acceptance-based behavior therapy (ABT) is an innovative behavior treatment for obesity that has heavy focus on ACT strategies and has the potential to provide patients with the psychological tools necessary to succeed within an obesogenic environment.
Figure 2

A Model of the Positive Psychological Processes ACT Seeks to Strengthen (Hayes et al., 2006)
2.11 ACCEPTANCE-BASED BEHAVIORAL THERAPY (ABT)

ABT is behavioral at its core but focuses heavily on facilitating day-to-day dietary and physical activity adherence, using strategically chosen self-regulation skills from the ACT strategies of acceptance and commitment and from chosen SBT components (Hayes, 1999). Structure of ABT treatment is group-based, consisting of a total of 30, 75-minute sessions – held weekly during weeks 1-20 and bi-weekly during weeks 21-40. Instruction is given by both novice personnel (e.g., advanced doctoral students with specific training in both ABT and SBT, but limited experience as interventionists) and expert personnel (e.g., clinical psychologists with experience in comprehensive lifestyle modification interventions) (Foreman et al., 2013). The ABT treatment group shared components of SBT which included: nutrition and physical activity education, setting specific eating and activity goals, self-monitoring of calorie intake and physical activity, stimulus control, relapse prevention, problem solving, and social support (Foreman et al., 2016).

ABT weight maintenance treatment extends 1 year after the initial weight loss phase above and consists of 25 small group (10-14 participants) sessions total – held weekly during weeks 1-16, bi-weekly during weeks 17-21, monthly for 2 sessions, and bi-monthly for 2 sessions.

2.11.1 COMPONENTS CENTRAL TO ABT

Strategies central to ABT are designed to function on three key factors of patient noncompliance: mindless eating, distress intolerance, and erosion of commitment (Foreman et al., 2013). ABT emphasizes that participants operate under four primary components: 1) they identify weight-related goals based on freely chosen life values; 2) they recognize that experiential acceptance can overturn distress intolerance; 3) they employ the skill of defusion to
distance themselves from trivial thoughts or feelings; and 4) they incorporate mindfulness to be more present-centered and aware to reduce “mindless” behaviors (Foreman et al., 2013).

2.11.1a Freely chosen life values

ABT participants are encouraged to choose weight-related goals that align with freely chosen personal life values (Forman et al., 2013). Participants are taught that commitment to difficult weight-related behavioral goals may be tested while being exposed to sustained unpleasant experiential states (e.g., exercise or dietary constraints) but that a participant’s strong psychological connection with his/her important life values are meaningful enough to prove that such experiential states, behavioral efforts, and sacrifices are worthwhile (Forman et al., 2013).

2.11.1b Experiential acceptance

ABT posits that in the circumstance of obesogenic environments, weight management behaviors will assuredly produce discomfort (e.g., feelings of deprivation, desire to eat, hunger, negative emotions) and a reduction in pleasure states (e.g., choosing piece of fruit over a donut, exercising instead of watching TV). These uncomfortable and less pleasurable states are countered with skills that promote “tolerance” or “acceptance” and a “willingness” to experience such states while not engaging in the unhealthy behavior. Participants are helped to realize that attempts to avoid unfavorable states (e.g., experiential avoidance) are likely associated with food intake and avoidance or cessation of physical activity, since these behaviors are typically methods used to alter the internal experience of distress. (Forman et al, 2015). Therefore, participants learn skills to be mindfully aware of the positive sensations generated by healthy states deemed unpleasant, along with experiential acceptance, as adaptive alternatives to experiential avoidance of unpleasant states.
2.11.1c Defusion

Defusion is a crucial ABT skill that involves distancing oneself from unhealthy thoughts and feelings to aid in the belief that they need not be acted on, believed in, controlled, or suppressed (Forman et al., 2013). ABT emphasizes defusing and detaching internal experiences from externalized behaviors in order to help participants distance themselves from the thoughts and feeling of overpowering unhealthy experiences and the resulting need to act on them. For example, an overpowering thought might transpire like, “That will taste amazing, I can always make up for the calories later”, while feeling a powerful urge to eat the food, eventually resulting in eating the food. Participants practice distancing themselves from these thoughts and feelings and instead are helped to realize that such thoughts and feelings are merely transient psychological experiences that need not be acted on (Foreman et al., 2013).

2.11.1d Mindfulness

ABT has put major focus on helping participants steadily make “mindful” and deliberate behavioral choices. Mindfulness decision making training is designed to help individuals increase awareness of their cognitive, perceptual, and affective experiences by making them more present-centered and experientially aware. Such trainings reduce the likelihood that participants’ “mindless” behaviors surface and persist and enforce choices that have roots in longer-term goals and chosen life values (Forman et al., 2013; Forman et al., 2015).

2.11.2 Efficacy of ABT Weight-Loss Treatment Interventions

The efficacy of adult ABT research has been studied and confirmed in the last decade. Foreman and Butryn conducted two randomized control trials (RCTs) that demonstrated that ABT is significantly more successful at producing greater weight losses than the gold standard traditional form of standard behavioral treatment (SBT) (Cardel et al., 2020). The Mind Your
Health Project (2013) is a 40-week RCT that revealed that ABT, when administered by weight-control experts, showed significantly higher weight loss than SBT at post-treatment (13.17% vs. 7.54) and at 6-month follow-up (10.98% vs. 4.93%) (Cardel et al., 2020; Formal et al., 2013). The Mind Your Health II (MYH II) (2016), a larger and longer cohort study, revealed that ABT, when conducted by experienced clinicians, produced greater 12-month weight loss (13.3% ± 0.83%) than did the SBT treatment (9.8% ± 0.87%; $p = 0.005$) (Forman et al., 2016).

Additionally, 12-month weight loss was shown to be strongly mediated by ABT over SBT. Specifically, both autonomous motivation and the psychological acceptance of food cravings and urges were mediated by ABT relative to SBT (Forman et al., 2016).

Consistent with the outcomes of the MYH II (0-12 months), the changes in autonomous motivation (as measured by the 15-item Treatment Self-Regulation Questionnaire) due to treatment mediated the percent weight loss at both 24 and 36 months. Also, the psychological acceptance of food-based changes (as measured by the 10-item Food Craving Acceptance and Action Questionnaire) due to treatment (0-12 months) mediated the percent of weight loss at 24 months, but not at 36 months. Similarly, food-based acceptance was a significant mediator of weight regain after treatment (12-36 months) (Foreman et al., 2016). Finally, when controlling for baseline quality of life, ABT participants revealed significantly greater quality of life, over those in SBT, at 24 and 36 months. Similar effect remained when controlling for weight loss, as quality of life was again greater in the ABT condition at 24 and 36 months. None of the moderating effects of baseline depressive symptoms, such as internal disinhibition or susceptibility of food cues, were significant on weight loss at 24 and 36 months (Foreman et al., 2016).
Recently, studies targeting individuals with high internal disinhibition (ID), or unwanted psychological emotional states, have been used to determine if weight loss programs that use ABTs are more effective at producing greater weight losses and weight maintenance than SBT conditions. Lillis and colleagues randomly assigned 162 overweight and obese participants to ABT or SBT. They hypothesized that the ABT condition would have larger 24-month weight losses over the SBT condition, that weight loss maintenance would be superior in the ABT, and that greater reductions in ID would be found in the ABT condition. Results indicate mean weight losses among ABT and SBT groups were not significant. However, the ABT condition regained less weight at 24-month follow-up than the SBT condition (4.6 vs 7.1 kg; \( p = 0.005 \)). Also, the percentage of ABT participants that achieved 5% weight loss at 24 months was significantly higher than the SBT condition (38% vs. 25%; \( p = 0.038 \)). Mean changes in ID decreased significantly over time (\( p < 0.001 \)) but did not differ by group. Changes in ID were significantly correlated to weight change in both conditions at 6- and 12-months. Changes in ID at 18 and 24 months were significantly correlated with weight change in the ABT group (\( r = 0.25, r = 0.28 \) respectively, \( p \)’s < 0.05) but was not significantly correlated with weight change in the SBT condition (Lillis et al., 2016).

A secondary analysis study evolving from the above Lillis, 2016 RCT proposed to examine the process variables of ABT and their contribution to weight change differences to SBT (Lillis et al., 2017). Specifically, that the ABT condition would show great change in flexible control of eating, values-consistent behavior, and acceptance, and that these process variable changes would be associated with the ABT group weight loss outcomes. Furthermore, the changes in process variables among the ABT condition would mediate, to some degree, the differences in weight loss maintenance between ABT and SBT. Changes in process measures were assessed
using; 1) eating inventory, with three subscales; ID, flexible control, and rigid control; 2) 22-item Acceptance and Action Questionnaire-Weight; 3) Bull’s Eye (identifies personal values and goals); and 4) 30-item weight control strategy scale. Results indicate that among the changes in process measures over time, only the Bull’s Eye showed between group differences (time x condition interaction; \( t = 2.45, p = 0.016 \)), indicating that the ABT group had greater increases in values consistent behavior at 12, 18, and 24 months over the SBT group (Lillis et al., 2017).

In 2012, Niemeier and colleagues piloted a single group design study to develop an acceptance-based behavioral weight-loss study for overweight and obese individuals that report high levels of internal disinhibition (Niemeier et al., 2012). Internal disinhibition is the tendency to lose control of eating or overeat in response to negative emotional or cognitive cues (Stunkhard and Messick, 1985). Primary measures were change in weight and psychological variables with assessments conducted by non-interventionist staff at baseline, after 6-months of treatment, and at 3-months post-treatment. Psychological variables were measured using; 1) eating inventory (Stunkard & Messick, 1985) with three subscales; cognitive restraint, disinhibition, and hunger; 2) Acceptance and Action Questionnaire for Weight-Related Difficulties (measuring experiential avoidance and inflexibility: weight focused (Lillis & Hayes, 2007); and 3) Distress Tolerance Scale (Simons and Gaher, 2005). Results indicate that ABT was linked to significant weight-loss outcomes between baseline and 6-months and at 3-month follow-up (LSMD estimate = -12.0 kg, \( SE = 1.4 \), adjusted 95% CI [-15.5, -8.5]). Participants maintained their weight at 3-month follow-up (LSMD estimate = -0.1 kg, \( SE = 1.4 \), adjusted 95% CI [-16.9, -7.4]). The effects across time of ABT on the psychological variables from baseline to 3-month follow-up difference were significant for total disinhibition, internal disinhibition, external disinhibition, restraint, hunger, and experiential avoidance and
inflexibility ($P<0.001$). Distress tolerance difficulties from baseline to 3-month follow-up and all post-treatment to 3-month follow-up psychological variable differences were not significant (Niemeier et al., 2012).

### 2.11.3 LONG-TERM ABT INTERVENTION RESULTS

The long-term effects of ABT and SBT are depicted in the 2-year post-treatment follow-up from the Mind Your Health II (2019). Participants were assessed 24 and 36 months after treatment started for weight loss, mediators, such as acceptance of food-related internal experiences, and moderators, such as depression and quality of life. Results of this study indicate that weight loss at follow-up was moderate (Foreman et al., 2019). Weight losses at 24-months were $5.6\% \pm 8.2\%$ for SBT and $7.5\% \pm 9.0\%$ for ABT ($F(2,189) = 2.21; p = 0.15$) and at 36 months $3.3\% \pm 8.2\%$ for SBT and $4.7\% \pm 10.1\%$ for ABT ($F(2,189) = 1.05; p = 0.31$). The percent of 12-month weight loss regained (weight regain) was insignificant between conditions at 24 months. Of particular note is among ABT treatment completers, participants who received ABT treatment attained 10% weight loss at 36-months at higher rates than those receiving SBT treatment (SBT = 17.1% vs. ABT 31.6%; Wald $\chi^2(1) = 4.08$; OR = 2.24; $p = 0.04$ (Foreman et al., 2019)

### 2.12 ADOLESCENT OBESITY TREATMENT OPTIONS

As with obesity treatment options among adults, adolescent weight loss treatment options for obesity parallel the same intervention strategies and include multicomponent behavioral interventions, pharmacological interventions, and surgery and device interventions (Cardel et al., 2020a). However, due to limitations in pharmacological options and the scarcity of data addressing the safety and effectiveness of surgical and device interventions, as compared with behavioral interventions, multicomponent intensive lifestyle modification programs have become
the foundation of adolescent obesity treatment (Steinbeck et al., 2018). Still, regarding the clinical efficacy of adolescent weight loss interventions, no agreed-upon definitions or standards for weight success exist among pediatric populations, nor do they exist for weight regain or weight maintenance (Steinbeck et al., 2018). Success in adolescent weight loss interventions is defined as at least a 5% BMI reduction after 6 to 12 months of intervention by The Pediatric Obesity Weight Evaluation Registry, a prospective study that collects data from 31 pediatric weight management programs across the U.S. (Gross et al., 2019). Similarly, the Endocrine Society suggests a modest decline of 1.5 BMI points to have significant effects on adolescents with obesity, while also recommending that youths with severe obesity attain at least a 7% weight loss from baseline (Styne et al., 2017).

2.12.1 MULTICOMPONENT BEHAVIORAL INTERVENTIONS

There are four primary components of weight loss programs – dietary adjustments, physical activity adjustments, behavioral strategies, and parent/family involvement. A meta-analysis found that use of these four components (known as behavioral lifestyle interventions) result in average percent decrease in weight by 8.9 percentage points compared to an average increase of 2.7 percentage points in education-only interventions (Wilfley et al., 2007). Alternately, single component treatments such as those focusing on only diet or physical activity lack evidentiary support (Ho et al., 2012).

2.12.1a DIETARY MODIFICATION

The central focus in dietary modification in adolescent OW/OB weight loss treatment focuses on calorie restriction (Cardel et al., 2020a; Gow et al., 2014; Ho et al., 2013; Steinbeck et al., 2018) and improving nutrition quality of consumed foods (Cardel et al., 2020a). And, though no dietary intervention has been shown to be optimal, compliance to prescribed dietary protocols
remains the most effective predictor of loss among adolescents (Gow et al., 2016; Steinbeck et al., 2018). Notwithstanding, the Stop/Traffic Light approach is a commonly reported calorie-controlled intervention that demonstrated relative effective weight loss across different age groups with influence on weight maintenance for up to one year from baseline (Cardel et al., 2020a; Ho et al., 2012; Ho et al., 2013; Steinbeck et al., 2018). The approach uses color coding to indicate the caloric density of foods. For example, foods labelled ‘green’ are low in calories and can be eaten freely, while foods labelled ‘yellow’ are moderate in calories and should be eaten with good judgement. Conversely, foods labelled ‘red’ are high in calories and should be eaten rarely. Other dietary interventions frequently studied include calorie-restricted diets comprised of differing macronutrient composition, such as low-fat (typically defined as <35% daily energy from fat), low-carbohydrate (typically defined as <50% daily energy from carbohydrates), and increased-protein diets (20-40% of daily energy from protein compared up from 15% of conventional diets) (Steinbeck et al., 2018). Diets of varying macronutrient composition, according to the current evidence, do not support any particular diet strategy as being more effective for long-term weight loss in adolescents (Gow et al., 2014). Even so, low-carbohydrate diets, irrespective of dietary strategy, may be more beneficial at improving type 2 diabetes risk factors while also providing some benefit to short-term weight loss (BMI losses from baseline ranging from 1.2 to 5.2 kg/m²) (Gow et al., 2016).

2.12.1b PHYSICAL ACTIVITY

Adolescent obesity is associated with low levels of physical activity, excessive sedentary behavior (Foster et al., 2018; Grossman et al., 2017; O’Malley et al., 2017), and poor fitness (O’Malley et al., 2017). A review of expert recommendations for physical activity in youth advocate for increased physical activity and exercise, aiming for a minimum of 60-minutes a day
of moderate to vigorous physical activity (Foster et al., 2018; O’Malley et al., 2017) and optimally 60-minutes of vigorous physical activity 5-days a week (Styne et al., 2017). Similarly, sedentary guidelines suggest a maximum of 2-hours screen time per day in children over the age of five (O’Malley et al., 2017).

The contributions of energy deficit via physical activity are far more understood than the weight-reducing effect of the physical activity component in lifestyle interventions for adolescents with obesity (Steinbeck et al., 2018). However, a review of a small number of short-term trials involving children under 18 years with obesity suggest that both diet-only and diet plus exercise interventions yield weight loss and metabolic profile improvements. (Ho et al., 2013). Still, the health benefits of regular physical activity among adolescents with obesity, such as improved body composition, psychological functioning, and functional capacity, impart their vital role within the realm of adolescent obesity treatment (Steinbeck et al., 2018). Physical activity is also instrumental in increased cardiometabolic profile. A systematic review and meta-analysis of randomized trials among children and adolescents with obesity revealed that the addition of exercise to dietary interventions led to greater short-term (greater than 6-months) improvements in fasting glucose, fasting insulin, and high-density lipoprotein levels (Ho et al., 2013). Of particular note are the observations from a meta-analysis conducted by Ho et al., (2013), that help explain the effects of resistance training exercise on BMI. Ho and colleagues report that children and adolescents in the diet plus resistance training intervention group experienced increases in both BMI and lean body mass (LBM), which led them to conclude that increases in BMI may be due to gains in LBM. This observation expands on a systematic review from Benson et al., (2008) that found resistance training did not favorably affect BMI relative to no treatment or diet-only controls (Benson et al., 2008). However, Ho and colleagues were able
to show that, despite the diet-only group showing greater reductions in BMI than the diet plus resistance training group, subgroup analysis revealed that participants in the diet plus resistance group achieved greater percent body fat (BF) loss and greater muscle gain than the diet-only group (Ho et al., 2013). These results are suggestive of long-term weight loss benefits and more effective weight maintenance (Ho et al., 2013) which have recently been supported by Rosenbaum and colleagues (2018) (Rosenbaum et al., 2018).

Certainly, the observations made by Ho and colleagues reiterate that BMI is a less sensitive indicator of weight change and body composition. Future lifestyle interventions should consider including other outcome measures of body change, such as %BF and LBM (Ho et al., 2013). Furthermore, the inclusion of resistance training activity in lifestyle interventions among adolescents with OW/Ob should be considered.

2.12.1c Behavior Therapy

While dietary modification and physical activity are core components of adolescent lifestyle interventions, behavior therapy describes the specific behavioral strategies employed with these components to facilitate the small yet successive changes in behavior needed to promote changes in body weight. Behavior strategies are used to promote behavior change and the subsequent continuance of such behaviors into maintenance. Commonly employed behavioral strategies include: self-monitoring (Altman & Wilfley, 2015; Grossman et al., 2017; Steinbeck et al., 2018), goal setting (Altman & Wilfley, 2015; Grossman et al., 2017) (performance goals and outcome goals (Steinbeck et al., 2018)), reinforcement of goal achievement (Altman & Wilfley, 2015), stimulus control (Altman & Wilfley, 2015; Grossman et al., 2017; Steinbeck et al., 2018; Styne et al., 2017), social support (Altman & Wilfley, 2015; Styne et al., 2017), problem solving
(Altman and Wilfley, 2015; Grossman et al., 2017), teaching of coping skills (Grossman et al., 2017), and motivational techniques (Altman & Wilfley, 2015; Grossman et al., 2017).

2.12.1d Parents/family involvement

Support for the involvement of parent and family interaction to facilitate multicomponent behavioral child and adolescent weight loss interventions is substantial (Altman & Wilfley, 2015; Barlow, 2007; Cardel et al., 2020a; Foster et al., 2018; Grossman et al., 2017; Styne et al., 2017). The family involvement strategy assists in employing the previously mentioned three behavioral management strategies: diet, physical activity, and behavior change. Several rationales verify the inclusion of both parents and children together in obesity treatment. First, parent obesity is a risk factor for childhood obesity, which might be explained by the unity of shared environmental and biological influences that promote the maintenance of OW/OB across the family, further suggesting that parents have the potential to evoke strong influences on the healthy behaviors and weight status and of their children (Grossman et al., 2017). Next, children’s weight-related behaviors, existing largely in the context of the home and family environment, and facilitated by parent modeling efforts, can therefore be influenced positively, thus reinforcing the importance of parent involvement in treatment (Altman & Wilfley, 2015). Despite these rationales, the level of parent involvement among treatment protocols varies widely, making it difficult to separate treatments into discrete categories or types. For example, in many treatments, parents’ involvement is limited to simply facilitating the behaviors that the child is learning (Altman & Wilfley, 2015), unlike those found with family-based behavioral treatment.

Family-based behavioral treatment (FBT) is a very specific multicomponent behavioral treatment type where parents are robustly engaged in treatment with their children concurrently or simultaneously. FBT helps to facilitate goals that are set for both the parent and child.
separately. In FBT, parents are directly targeted to make changes for themselves using lifestyle behavior changes to facilitate their own behavioral and weigh loss goals, while assuming the role of ‘agent of change’ (Boutelle et al., 2020) for their children (Altman & Wifley, 2015), all of which is important for the treatment success of the parent-child dyad (Boutelle et al., 2015). The emphasis here is that parents have the opportunity to influence healthy outcomes for both themselves and their child by circumventing healthy behaviors in and outside the household and by using praise and positive reinforcement and positive communication to facilitate behavior change. In FBT, parent weight loss is the most significant predictor of weight loss in children (Boutelle et al., 2012; Boutelle et al., 2020; Wrotniak et al., 2004). Both the Endocrine Society Clinical Practice Guidelines (Styne et al., 2017) and Expert Committee Recommendations (Barlow et al., 2007) suggest that family-based approaches to child and adolescent weight management interventions are gold-standard treatment (Barlow, 2007; Boutelle et al., 2015; Styne et al., 2017;).

Though research strongly supports the inclusion of both child and parent simultaneously in treatment, the optimum level of parent involvement remains questionable. This is especially true considering the developmental and social changes occurring among adolescent populations that might suggest levels of independence and isolation not found in children, as such changes often pose barriers to the influences of parent modeling. It has been suggested that involving only parents (FBT – Parent Only (Altman & Wifley, 2015)) in the intervention could bolster outcomes for the parent and adolescent, while reducing costs and intervention staff. (Altman & Wifley, 2015). This parent-only version also reinforces parent modeling and authority over the home environment while still maintaining the parent as the agent of change (Altman & Wilfley, 2015).
In summary, the efficacy for the versions of parent involvement listed above are as follows: FBT and FBT – Parent Only are well-established in children and FBT – Parent Only and family involvement are considered possibly efficacious for adolescents (Altman & Wilfley, 2015). As mentioned previously, behavior treatment programs that target both the parent and the adolescent, but treat only the parent, offer promising potential to adolescents because of their favorable preliminary data and possibility for scalability, their inherent appropriateness for the developing adolescent, and their decreased treatment costs (Boutelle et al., 2015). Albeit, despite best practices for the adolescent population, all efficacious child and adolescent weight loss treatment programs find at their core a commonality in behavioral treatment theory and methodologies.

**2.12.1 Works from Dr. Michelle Cardel and Colleagues**

In 2020, Cardel and colleagues published the first of three studies to help inform the design of weight management interventions for adolescents. In this qualitative study, adolescents ages 14-19 (n = 41; 28 females, 13 males) with a BMI ≥ 85th percentile and with racially/ethnically diverse backgrounds were recruited for focus groups. Aimed to assess the barriers and facilitators to weight loss and healthy lifestyles, 11 adolescent focus groups lasting 60–90 minutes were conducted, 10 of which were sex-stratified and used sex-concordant moderators. Results indicated a series of themes surrounding barriers and facilitators to weight loss and healthy living, such as food and eating behavior, motivation, and parents and family. Two additional themes revealed that sex differences exist between male and female adolescents regarding lived experiences of having OW/OB and the barriers and facilitators that accompany such experiences. Also, that considerable overlap exists between barriers and facilitators to weight loss and healthy living (Cardel et al., 2020).
Later in 2020, Cardel and colleagues released their findings of a feasibility study assessing the acceptability of a 6-month acceptance-based therapy intervention for 13 cisgender adolescent girls ages 14-19 with OW/OB and mixed racial/ethnic diversity (Cardel et al., 2021). In this single-arm intervention, participants met for 15 group-sessions, each lasting about 90 minutes for a total of 22.5 contact hours. Sessions were scheduled weekly for two months, biweekly for 2-months, and monthly for 2-months. Two clinic visits to collect anthropometry, vitals, and to conduct a nutritional consultation were administered prior to the first group meeting, while phone check-ins were conducted between the last three sessions, due to the extended length of time between these latter sessions. The intervention curriculum, called Wellness Achieved Through Changing Habits (WATCH©), was developed using an adolescent-engaged mixed methods approach guided from adult ABT intervention concepts. These intervention concepts were incorporated from ACT and SBT weight management treatments.

Primary outcomes for this study were those of recruitment and retention. Physiological measures of height/weight, body composition using BodPod (Life Measurement, Inc.), and blood pressure were assessed. Health-related behavioral measures were also assessed and included three 24-h dietary recalls (one weekend recall and two weekday recalls), diet quality using the Healthy Eating Index (HEI), accelerometry for a 7-day period to objectively assess physical activity, and sleep hours/day. Psychological factors assessed were quality of life (QOL), psychological flexibility, depression, and perceived stress. Results from this study indicate that primary and secondary outcomes of recruitment, retention, and BMI Z-score matched or exceeded a priori benchmarks (80% vs 81.3%, >50% vs 84.6%, ≥−0.15 vs -0.15 ± 0.34, respectively). Obesity related biomarkers also showed improvements in reduced percentage in the 95th BMI percentile and percent body fat (mean, SD, 95% CI), −2.46 (7.02), (−7.18, 2.26) and
Medium to large improvements were also identified in psychological factors including perceived QOL, depression, and psychological flexibility. Analysis exploring the relationship between health-related behaviors and the ABT intervention showed no improvements related to dietary patterns, as evidenced in results from HEI, moderate to vigorous physical activity (MVPA), sleep, or sedentary time. In fact, results indicate that modest changes opposing the projected direction of some of these variables were observed. These seemingly paradoxical results were frugally explained in the discussion of this research study as either encountering an error in health-related behaviors assessment or validity of measures was reduced by an unrecognized factor.

In 2021 Cardel and colleagues reported additional qualitative results from a previous study. This work aimed to identify the preferences of adolescents with OW/OB to create an acceptable and effective behavioral weight loss intervention (Lee et al. 2021). Researchers here enforced the understanding that incorporating patient input during the intervention development process can increase study feasibility and fidelity. This is especially true with adolescent interventions since adolescence is marked by a unique developmental period of increased autonomy and independence and decreased self-regulatory skills. Data from this study evolved from the same adolescent population previously reported; 60–90-minute focus groups from adolescents ages 14–19 (n = 41; 28 females, 13 males) with OW/OB. The purpose of this study analysis was to report adolescent preferences for components of a behavioral weigh loss intervention, identified a priori, which included assessing (1) adolescent preferences regarding who should lead the intervention, (2) who should be involved, (3) where the program should take place, (4) what the messaging of the program should be, (5) how to make the program engaging and maintain participation, and (6) how best to measure nutrition intake and activity.
Participant responses were arranged into five emergent themes, including: instructor involvement and parental involvement preferences, intervention messaging, intervention engagement, and concerns with attending a weight loss intervention. In short, adolescents preferred their intervention instructor to have prior weight loss experience, be relatable and for some, be sex concordant. They viewed parent participation as being both helpful but also a hinderance and therefore elected that parent involvement be optional. Intervention messaging should emphasize “health” or “lifestyle” and should not be focused on weight loss. Intervention engagement related to incentives, activities, and electronic communication were preferred. Lastly, adolescent concerns for attending a weight loss intervention were centered around embarrassment to discuss weight, time constraints, and female concerns for unrealistic intervention expectations and judgmental ideals (Lee et al. 2021).

2.12.2 PHARMACOLOGICAL

According to the Endocrine Society’s Clinical Practice Guidelines, recommendations for pharmacotherapy for adolescents with obesity should be offered only after intensive lifestyle modification has failed to curb weight gain or improve comorbidities. Further, obesity medication should be avoided for adolescents <16 years who are overweight and not having obesity, except in the context of clinical trials (Styne et al., 2017). The guidelines also recommend that only Food and Drug Administration (FDA)-approved anti-obesity agents be used by only clinicians experienced in both their use and their adverse reactions and that cessation of treatment be considered if the patient does not have >4% decrease in BMI/BMI z score after 12 weeks of the medication’s full dosage (Styne et al., 2017).

Three medications are approved by the FDA to treat child and adolescent OW/OB, orlistat, phentermine, and setmelanotide. Orlistat, which is a gastrointestinal lipase that reduces
adolescent’s fat absorption by ~30%, was the only FDA approved obesity treatment ≥ 12 years of age (Srivastrava et al., 2019; Styne et al., 2017). Adverse reactions to Orlistat include flatus with discharge, abdominal pain and cramping, and fatty and oily stool (Grossman et al., 2017; Srivastrava et al., 2019). Also, Orlistat must be taken with each meal, which reduces its utility in adolescents attending school. Finally, given its limited efficacy (BMI reductions <1 compared with placebo) (Grossman et al., 2017; Steinbeck et al., 2018; Styne et al., 2017), adverse reactions, and low long-term use (~50% of pediatric patients discontinue within 1-month and 75% within 3-months), Orlistat provides small or limited benefit to health outcomes (Grossman et al., 2017; Styne et al., 2017) and is not considered a first-line drug for the treatment of pediatric obesity as monotherapy (Srivastava et al., 2019).

Phentermine is another FDA-approved short-term (interpreted as 12-weeks but unspecified based on 1959 labelling that has not been updated) pediatric obesity medication for ages >16 years (Cardel et al., 2020a; Srivastrava et al., 2019), while its off-label drug use is recommended for obesity when used in age <16 years or long term as monotherapy (Srivastrava et al., 2019). Phentermine works as an appetite suppressant by acting as a sympathomimetic amine, which can increase heart rate, blood pressure, nervousness, and/or insomnia (Srivastrava et al., 2019). Results from a retrospective chart review suggest that phentermine plus lifestyle modification therapy among adolescents with obesity, compared with lifestyle modification alone, resulted in statistically significant weight loss at 1-month, 3-month, and 6-months, with a higher proportion of patients on phentermine achieving clinically meaningful weight loss of ≥5% BMI reduction at 3-and 6-months (Ryder et al., 2017).

In November 2020, setmelanotide (IMCIVREE™) was approved by the FDA to treat adults and pediatric patients 6-years of age and older with obesity. Setmelanotide works by reducing
bodyweight and hunger in individuals with genetic variants that disrupt bodyweight regulation pathways. Specifically, ultra-rare diseases arising from deficiencies in leptin receptor (LEPR), pro-opiomelanocortin (POMC), and proprotein convertase subtilisin and kexin type 1 (PCSK1) disrupt the melanocortin pathway of the hypothalamus (Clément et al., 2020). This pathway in the hypothalamus is responsible for regulating hunger, energy expenditure, and consequently body weight. People living with obesity due to deficiencies in LEPR, POMC, or PCSK1 struggle, at a very early age, with insatiable hunger (hyperphagia), resulting in early onset, severe obesity (Rhythm Pharmaceuticals, 2020). Clément and colleagues (2020) investigated setmelanotide treatment in individuals with severe obesity, which included individuals aged 6-years or older. Results indicate setmelanotide is associated with significant weight loss (at least 10%) and reduction in hunger scores among individuals with POMC or LEPR deficiency obesity after 1 year of treatment (Clément et al., 2020).

2.12.3 SURGERY

Data supporting the use of metabolic and bariatric surgery (MBS) in adolescents has strengthened significantly in the past decade (Pratt et al., 2018). According to The American Society for Metabolic and Bariatric Surgery (ASMBS) pediatric metabolic and bariatric surgery guidelines for 2018, adolescents having class II obesity (defined as ≥120% to <140% of the 95th percentile for sex and age [BMI of ≥35 kg/m²]) and a co-morbidity, or with class III obesity (defined as ≥140% of the 95th percentile for sex and age [BMI ≥40 kg/m²]) should be considered for MBS (Cardel et al., 2019; Pratt et al., 2018). Today, data supporting MBS in adolescents is at least as safe and effective as in adult populations (Pratt et al., 2019), with two MBS procedures being most prominent: Vertical sleeve gastrectomy (VSG) and the Roux-en-Y gastric bypass (RYGB). The Teen-Longitudinal Assessment of Bariatric Surgery (Teen-LABS) reported 3-year
mean BMI reductions from baseline of 26% for VSG and 28% for RYGB among individuals aged ≤19 years (Ingle et al., 2016). A recent study followed adolescents for 5 years who underwent RYGB and reported significant sustained BMI loss of 13 kg/m² compared with weight gain in controls (Olbers et al., 2017). There is a significantly higher risk of complication after RYGB surgery for adolescents who smoke or live with persons who smoke (Pratt et al., 2018). Also, adolescents who have issues with medication compliance should take caution due to the dependence of vitamin supplementation after RYGB surgery (Pratt et al., 2018). Finally, in adolescent patients suffering from gastroesophageal reflux disease (GERD), RYGB surgery is superior to VSG in the treatment of reflux (Pratt et al., 2018). However, according to the ASMBS 2018 guidelines, given a slightly lower co-morbidity resolution rate, similar weight loss, and significantly lower complication rate compared to RYGB, VSG has become the most used and most recommended operation among adolescents with severe obesity (Pratt et al., 2018). Nonetheless, the 2018 guidelines also stipulate that given the long-term data supporting RYGB, they recommend the use of either RYGB or VSG in adolescents – especially considering the long-term outcomes of GERD after VSG are still not well understood (Pratt et al., 2018).

2.13 ADDITIONAL BEHAVIOR APPROACHES FOR WEIGHT LOSS IN ADOLESCENTS

Adolescent weight-loss interventions that focus on behavior modification are the gold-standard treatment for pediatric obesity (Whitlock et al., 2010). Two review articles report on the efficacy of interventions that include behavior therapy (BT) with dietary and physical activity as being clinically important to decreasing overweight in children (Oude et al., 2009). The second article from Tsiros and colleagues highlights the potential of BT and cognitive behavior therapy (CBT) to promote long-term maintenance of behavior change and weight loss in adolescents.
Studies addressing adolescent obesity are scant at best. Another review presenting evidence of overweight and obesity treatments in children and adolescents highlighted adolescent studies in only five of the 53 studies reviewed (Altman & Wilfley, 2015), attesting to the shortage of adolescent weight loss research. Danielsson and colleagues (2012) reported that a child had a 47% greater chance of significant reductions in BMI for each year younger, and that significant reductions in weight are seen more frequently among children than adolescents (Danielsson et al., 2012). Evidence-based behavioral treatments for adolescents are vital and therefore impose attention from all areas of pediatric obesity research. The following describe additional behavior approaches, settings, and modes of treatment that fall outside the realm of multicomponent behavioral interventions but can be instrumental in informing adolescent OW/OB treatments.

### 2.13.1 SCHOOL, FAMILY, AND CLINIC-BASED PROGRAMS

A systematic review assessing family, school, and clinic interventions to control childhood obesity among 2-18-year-old children yielded 105 relevant papers, 70 of them were conducted as high-quality clinical trials (Kelishadi & Azizi-Soleiman, 2014).

#### 2.13.1a SCHOOL-BASED PROGRAMS

School programs for the prevention and control of pediatric obesity are rooted in the understanding that children spend a considerable part of their time in school as students, a fact that often produces long-term intervention effects in the target populations. Often these programs deliver nutrition education, offer changes in dietary habits and increase physical activity via structured activity time. However, school-based interventions remain controversial due to their limitations in self-reported data, short-term duration of studies, non-randomized selection of schools, and non-masking of the interventional groups. Additionally, a reported negative effect
of school-based pediatric weight loss programs is discrimination resulted from stigmatization (Kelishadi & Azizi-Soleiman, 2014).

2.13.1b Family-based programs

Parent/family involvement is considered one of the most successful modes for obesity treatment in children. Children’s efforts toward healthy weight is not successful unless children are supported in their healthy behavior choices – ideally a support system that is naturally built in by parents and family. Limitations of family-based studies are small sample size, high attrition, no follow-up data, and participant bias related to motivated family recruitment (Kelishadi & Azizi-Soleiman, 2014).

2.13.1c Clinic-based programs

Clinic-based programs have typically employed nutrition, physical activity, and education and/or counseling together to promote healthy weight loss results, and long-term results have been validated (Latzer et al., 2009). The inclusion of these behavioral components within the clinical setting seem commonplace since researchers appreciate the controls of such an environment, especially when interventions are inclusive of inpatient clinical settings. Similarly, knowing these levels of control, researchers in this setting attempt alternatives in diet and physical activity to expand the knowledge of weight loss efficacy. For example, interventions of low calorie-low fat or high protein diets, and combinations of aerobic and strength training are tested for approach effectiveness. Limitations of these studies include short-term follow-up of participants, uncertain sustainability of interventions, and lack of comparison group with the control group (Kelishadi and Azizi-Soleiman, 2014).
2.13.2 TREATMENT SETTING, MODES OF TREATMENT, ADJUNCT TREATMENT

Treatment settings are important considerations in pediatric obesity programs. Most programs presented here are conducted within a clinical research setting, however, the need to create novel ways to incorporate treatment are vital. Inpatient settings have proven effective for children who do not respond to traditional therapies and/or have advanced degrees of obesity. Common features of this treatment setting include a highly-structured intervention while living in an inpatient setting with a school attached. One such study reported participant body weight losses of 49% with 14-month follow-up losses of 31.7% (Altman & Wilfley, 2015). Another study of children with severe obesity (ages 8-15) received the first 6-weeks of inpatient treatment followed by 10.5 months of home-based outpatient treatment. Results demonstrated significant decreases in BMI z-score compared to control (Altman & Wilfley, 2015).

Treatment delivery has advanced in the advent of internet, cellphone, and gaming technology. Such delivery treatments open creative avenues for broader dissemination of weight loss program components that can be tailored to participant needs while adhering to technologies of rampant use among adolescents. The 2018 release of Weight Watcher’s (WW) new weight loss app, Kurbo, is an example of technological advancements in the delivery of pediatric obesity management programs. Kurbo uses the “traffic light system” to categorize foods according to calorie and nutrient content. For example, “green category foods” can be eaten freely, while “red category foods” should be limited (Cardel & Tarveras, 2020). The system has been given the highest grade of effectiveness for managing energy and food intake in children by the Academy of Nutrition and Dietetics Evidence Analysis Library (Academy of Nutrition and Dietetics, 2015). While using a Snapchat-inspired interface, Kurbo offers breathing exercises, the ability
for parents and youth to log their health-related goals, and weekly video coaching for a fee (Cardel & Tarveras, 2020).

Adjunct treatments such as motivational interviewing (MI) has been effective in adult weight loss programs (Dunn et al., 2006). MI is manifested through specific therapeutic strategies, such as reflective listening, summarization, and agenda setting for the purpose of enhancing participants’ intrinsic motivation to change by redirecting ambivalence (Dunn et al., 2006). In a model designed for adolescent weight loss, MI is used to increase self-efficacy to adhere to healthy behaviors (Walpole et al., 2011). Although little is known about the effectiveness of MI in treating OW/OB youth, enough support exists to warrant its consideration. Social facilitation maintenance treatment (SFM) added to FBT has the potential to increase maintenance of weight loss by expanding the reach of behavior change across social contexts (e.g., individual, home, peer and community (Coppock et al., 2014). This approach uses the span of these social contexts to target learning and practicing new behaviors to firmly cement new healthy habits across the adolescent social environment.

2.14 MECHANISMS OF PARENT/FAMILY INVOLVEMENT THAT INFLUENCE ADOLESCENT WEIGHT LOSS PROGRAMS AND STRATEGIES

Evidence has emerged linking the positive relationships between parents and children and adolescents in the successful treatment of obesity (Draper et al., 2015; Jelalian et al., 2008; Niemeier et al., 2012; Shrewsbury et al., 2010; Shrewsbury et al., 2011; Skelton et al., 2012). Many interventions suggest that changes in the parents’ dietary and physical activity behaviors influence changes in their child’s health behaviors. Other research centers on aspects of child attachment security, where such security has been shown to predict functioning across multiple domains in children, adolescents, and adults and predict obesogenic conditions for children.
Children with lower attachment security for the caregiver were more likely to have obesity than children with higher security attachment (Anderson et al., 2011). Regardless of the type of research, consensus among adolescent obesity researchers suggest that parent and family involvement in the treatment of adolescent obesity is central to treatment success. The objective of this paper is to outline the factors of parent and family involvement in influencing weight loss in adolescents with obesity.

There are two distinct mechanisms that describe how parent and family involvement influence adolescent weight loss programs and strategies. First is the parents’ sense of self (self-confidence/body satisfaction) and their lifestyle behaviors toward their personal weight management attempts that influence adolescent behaviors. Second are the parenting types, styles, and family practices that can impact or predict the weight loss outcomes, behavior, and beliefs of adolescents.

2.14.1 PARENTS SENSE OF SELF (CONFIDENCE/BODY SATISFACTION)

The self-confidence and self-esteem associated with parents’ personal health behaviors are predictors of health behaviors not only for the parent themselves but also for adolescents in the household. From a theoretical perspective, parent social norms and social support (inadvertent or not) are supported by behavior theory such as social cognitive theory (SCT) and theory of planned behavior (TPB). These theories help support the reflection of parent health behaviors on the health beliefs, and thus health behaviors of adolescents in the same household. For example, TPB posits that subjective norms can promote perceived social pressure to perform or not perform a behavior. SCT theory posits that social interactions, experiences, and outside media interactions help directly affect portions of an individual’s knowledge acquisition.
Studies on parent associations with weight-related behaviors among overweight adolescents support these theories. For example, studies report that parent weight control behaviors are predictive of adolescent weight control behavior (Cromley et al., 2010; Draper et al., 2015; Neumark-Sztainer, 2005). Similarly, maternal (Pott et al., 2009) and parent BMI are predictors of adolescent BMI (Andrews et al., 2010) and adolescent attrition in weight loss programs. These studies report adolescents of heavier parents being 4.6 times more likely to drop from weight loss treatment than less heavy parents (Jelalian et al., 2007). But not all weight control factors/behaviors reported by parents are shared weight control factors/behaviors of adolescents. For example, parent use of other dietary changes (ODC, such as eating less meat, eating fewer carbohydrates, using liquid diet supplements, eating more protein, following contemporary fad diets such as Atkins or South diet) corresponded to adolescent unhealthy weight control behaviors (UWCB) (Cromley et al., 2010). Parent use of UWCB and lower body satisfaction were predictive of lower body satisfaction for adolescent, and parents with greater self-esteem equated to adolescents reporting less importance placed on thinness (Cromley et al., 2010). Yet parent use of healthy weight control behaviors (HWCB) and lower self-esteem were predictive of adolescents being more concerned with thinness (Cromley et al., 2010). Similarly, overweight adolescents are more likely to use extreme measures to lose weight after observing their parents being dissatisfied with their bodies despite their weight control attempts (Cromley et al., 2010). Interestingly, parents reporting UWCB was predictive of adolescent reports of levels of body satisfaction that rated higher than parent use of HWCB and ODC. This suggest the possibility that overweight adolescents may be more positively influenced by parents’ use of UWCB (Cromley et al., 2010). The above research suggests that associations between parent and
adolescents are not always similar and can possibly go against the grain of conventional thinking.

Another area of study was associated with parents’ encouragement for their own weight control behaviors. One study found that parents’ encouragement to lose weight was a better predictor of daughter’s weight loss attempts (Benedikt et al., 1998). Similarly, parents’ encouragement of their own behaviors was a far more powerful influence on daughter’s dietary restraint and exercise than the effect of dietary restraint for the parents themselves (Wertheim et al., 1999). These studies lend support to the importance of direct encouragement of parents’ weight loss behaviors and the indirect support that such encouragement has on adolescent weight loss behaviors. In fact, a clinical practice guideline (CPG) from the National Institutes for Health and Clinical Excellence suggests that parents of OW/OB adolescents should be encouraged to lose weight if they are also overweight or have obesity (National Clinical Guideline Centre [UK], 2014).

2.14.2 PARENT TYPES, STYLES AND FAMILY PRACTICES

The second mechanism of parent and family involvement on adolescent weight loss interventions center on parent types, styles, and family practices. These include the variants of responsiveness or demandingness in parenting behavior and parents use of emotional support and sensitivity. Family practices include factors of cohesion and adaptability, family dining, and family-based physical activity.

2.14.2a PARENTING TYPES: AUTHORITATIVE, AUTHORITARIAN, PERMISSIVE, AND UNINVOLVED PARENTING

Parent typography (as opposed to parenting styles; see below) is grounded in work conducted by Maccoby and Martin (Maccoby & Martin, 1983). Maccoby and Martin describe parenting
type as a function of two dimensions of parenting behavior. Parents are both responsive to their child’s needs (responsiveness) and they are controlling of their child’s behaviors (demandingness). Crossing these two dimensions leads to 4 different parenting types: authoritative (parents who are both responsive and demanding), authoritarian (parents who are less responsive but are highly demanding), indulgent or permissive (parents who offer a high level of responsiveness but are less demanding), and neglectful or uninvolved (parents who show low levels of both responsiveness and demandingness) (Maccoby & Martin, 1983).

An authoritative parent type is often defined as parents who are responsive to their child’s needs, expressing warmth with emotional support, while also using clear, bi-directional communication (Maccoby & Martin, 1983). Children raised in authoritative homes were found to have lower BMI (Gerards et al., 2011, Sleddens et al., 2011), eat more healthily, and be more physical activity (Sleddens et al., 2011). Authoritative parenting is considered part of gold standard practices of pediatric obesity treatment, management, and prevention (Draper et al., 2015; Shrewsbury et al., 2011; Skelton et al., 2012).

2.14.2b EMOTIONAL SUPPORT

Giving emotional support is a parenting style that is a critical psychosocial aspect of parent/family involvement in successful pediatric OW/OB treatment (Shrewsbury et al., 2011). Baker and colleagues (2005) suggest that parents can increase a child’s self-esteem by giving then positive, supportive messages that promote learning, decision making, and self-confidence (Baker et al., 2005). Similarly, one review on the topic showed overwhelming consensus that parents should be positive and supportive and reinforcing of the child’s desired weight management behaviors. It suggests against the idea of using food as a reward, while instead suggesting verbal praise, empowerment sticky notes, extra privileges, and special family
activities as more suitable. This review further stresses the importance of parents focusing on successes over failures and never shaming or humiliating adolescent behaviors, thoughts, or feeling toward weight management (Shrewsbury et al., 2011). In a 10-year follow-up of children treated for obesity, social support and encouragement from the family for adolescent changes in diet and physical activity was a significant predictor of adolescent weight loss (Epstein et al., 1994). One qualitative study asked adolescents about supportive and helpful ways to discuss overweight at home; encouragement and sensitivity from parents were considered important (Shrewsbury et al., 2010).

2.14.2c **Family dining**

Family practices such as dining, family cohesion, adaptability, and family involvement in healthy behaviors are variables of the family social emotional climate that are shown to be important factors in successful adolescent weight loss practices. Prioritizing family meals and creating a positive family mealtime environment (Neumark-Strainer, 2005; Shrewsbury et al., 2011) has been inversely related with UWCB, self-esteem, and body satisfaction in overweight youth (Cromley et al., 2010).

2.14.2d **Family cohesion**

Family cohesion is another family climate variable that has been significantly associated with disordered eating and weight control behaviors in adolescents (Dalen et al., 2015); with low cohesion and adaptability predictive of binge eating (Cromley et al., 2010). Lastly, family-based physical activity and parent involvement are integral to behavioral interventions for adolescent obesity (Dalen et al., 2015; Nuemark-Sztainer, 2005) and have been shown to be more effective than interventions that do not include the family (Draper et al., 2015).
In summary, parent and familial influences on adolescent weight loss strategies have been studied extensively. This paper focused on two primary mechanisms by which the family unit is exacting in healthy or unhealthy behaviors for adolescents with obesity: 1) the lifestyle behaviors and practices of parents in their attention to health practices and 2) the parenting styles and family practices within the home environment. However, there are other communications, behaviors, and practices among parents and family members that are contributors to unhealthy parent/family involvement within the context of adolescent weight management practices.

2.15 CONTRIBUTORS TO UNHEALTHY PARENT/FAMILY INVOLVEMENT IN CHILD OW/OB MANAGEMENT

There is growing literature demonstrating that adolescents with OW/OB are the targets of weight bias and social stigmatization (Puhl & Latner, 2007). Weight-based teasing and bullying, negative comments about appearance, critical comments about one’s size or shape, and conversations about dieting are associated with negative weight-related health outcomes (Berge et al., 2016; Berge et al., 2013), with long-term implications that may persist into adulthood (Puhl et al., 2017). Current findings report the clinical implications for adolescents and families engaging in weight loss treatment and seek to clarify the role that parent weight communication may have on adolescent’s internalization of weight-related health (Puhl & Himmelstein, 2018). In fact, critics argue that health professional must be diligent in considering the unintended consequences of promoting parent involvement with child weight management activities, as failing to do so could put them at risk for failing to meet their obligations to ‘do no harm’ (O’Dea, 2005).

Accordingly, the following outlines some parent interactions that could impart an unintended unhealthy environment for their adolescent, these include: parent feeding practices, parent
weight-control behaviors, parent weight-based communication, parental health-focused communication, and parent/family negative weight-based communication. The following is a detailed explanation of each.

2.15.1 PARENT FEEDING PRACTICES

Among obesity related parenting practices, three feeding behaviors have been studied most often: restriction (the extent to which parents control the child’s consumption of sugary and high-fat foods), pressure to eat (the extent to which parents encourage the child to eat), and monitoring (the extent to which parents direct the child toward healthy eating) (Kaur et al., 2006). Cross sectional studies have found positive associations between parental restriction, food approach, and child weight status (Birch & Fisher, 2000). Studies suggest that parents seem to adapt their feeding practices to child behavior and child weight (Birch and Fisher, 2000). Other studies have examined parental cognitions, such as concern for child weight, as mediators for feeding practices (Kaur et al., 2006). It has been theorized that exposure to a highly-controlled food environment results in children losing the ability to self-regulate their food intake and also internalizing feelings regarding the “goodness” and “badness” of foods consumed, resulting in guilt or shame if they strayed from parental control (Loth et al., 2014). Finally, to sum up the findings, a paradox exists: some level of parental concern is needed to reflect on and change their child’s feeding behaviors; however, too much concern may lead to counterproductive feeding practices (Ek et al., 2016).

2.15.2 PARENT WEIGHT-CONTROL BEHAVIORS

Parent weight-control behaviors may potentially influence adolescents’ weight-control behaviors, eating, and body image. Parents can influence child behaviors in several ways, such as parental modeling of behaviors and expression of attitudes toward eating and body image. Initial
evidence suggests that parent weight-control behaviors and body perception may influence adolescent weight-control behavior, with parents’ body dissatisfaction and engagement in extreme weight-loss behaviors, such as fasting, skipping meals, and crash dieting, being predictive of these same behaviors among their adolescent daughters (Benedikt et al., 1998; Wertheim & Paxton, 1999). Additionally, the adolescent’s perception of maternal concern for healthful eating is positively associated with adolescent fruit and vegetable intake (Cromley et al., 2010).

2.15.3 PARENT WEIGHT-BASED COMMUNICATION

A large body of work exists surrounding the potential roles of parents’ behavior and their child’s interactions around weight, body size and shape, and dieting. Such studies have suggested that excessive talk about weight by families is correlated to destructive behaviors in youth and adolescents. Specifically, comments directed toward adolescents regarding their weight or direct weight talk in general, have been associated with preoccupation with weight, UWCBs, and depressive symptoms in studies among adolescent girls (Armstrong and Janicke, 2012; Fulkerton et al., 2002). Results from Bauer and colleagues (2013) state that parental weight talk as reported by mothers was associated with destructive weight control methods and poor psychological health in adolescent girls (Bauer et al., 2013). Conversely, hypotheses have been made regarding indirect weight talk, for which the child is not the focus, but instead, the mother is perhaps discussing her own weight. These assumptions suggest indirect weight talk has less of an association with adolescents’ negative health outcomes; however, the literature on such talk is scant and has delivered inconsistent findings (Neumark-Sztainer et al., 2010).
2.15.4 PARENT HEALTH-AND WEIGHT-FOCUSED COMMUNICATION

Research indicates that one-way parents may be addressing adolescent obesity, dieting, and their children’s unhealthy weight control behaviors is by having conversations with their children about healthy eating, physical activity, weight, and dieting (Winkler et al., 2018). However not all these conversations are helpful, in fact, some might be harmful. For example, health-focused conversations about healthy eating and physical activity without reference to a child's weight have been found to be associated with more optimal child behaviors and outcomes (Berge et al., 2013; Berge et al., 2015). Conversely, parent-child conversations that focus on the child weight and weight loss appear harmful, as greater dieting, dysfunctional eating, sedentary screen time, and weight gain have all been associated with these weight-focused conversations even in the absence of parent teasing or criticism (Berge et al., 2015; Gillison et al., 2016).

2.15.5 PARENT/FAMILY NEGATIVE WEIGHT-BASED COMMUNICATION

Negative weight-based talk by family members is associated with child and adolescent body dissatisfaction, unhealthy weight control behaviors, and depression, regardless of whether the child is overweight or normal weight (Berge et al., 2016). Additionally, such weight talk, also referred to as “fat talk” has been found to be associated with multiple negative health outcomes such as low self-esteem, depressive symptoms, thinking about or attempting suicide loneliness, poor self-perception of one’s physical appearance, a preference for sedentary activities, overweight and obesity, unhealthy weight control behaviors, and disordered eating behaviors (Berge et al., 2016; MacDonald et al., 2015).
2.16 ADDITIONAL FACTORS THAT CAN INFLUENCE THE EFFICACY OF AN OBESITY TREATMENT PROGRAM FOR HISPANIC ADOLESCENTS

2.16.1 ADOLESCENT DEVELOPMENT

The scientific study of adolescent development has often been portrayed as a period of dramatics, “normative disturbance”, and significant social, emotional, and behavioral difficulty as a consequence of the adolescents’ search for self (Steinberg and Morris, 2001). Accumulating evidence also suggest that the majority of teenagers weather the challenges of adolescents comfortably and that their development is less about the avoidance of problems and more about the growth of competencies (Steinberg, 1999). Despite varying explanations regarding adolescent development, the normative process of adolescents’ growth in self have implications in adolescent weight loss interventions and therefore must be considered in the design of adolescent behavior change strategies. Specifically, the parent-adolescent relationship, where family and parenting mediate between societal conceptions of adolescence and adolescent developmental outcomes (Kagitcibasi, 2013). As discussed earlier, parent/family influences such as parenting style, parent sense of self, parent weight control behaviors and their communication can impart disparities in the adolescent growth, especially when presented in the foreground of weight bias. Thus, it is important to understand the complexities of adolescent growth within the setting of weight management.

2.16.1a AUTONOMY

Autonomy is a highly debated construct but it has commonality in two main meanings. The first is volitional agency, that is, the control of choosing or determining one’s own actions in the world, or being self-governing. The second reflects an individualistic stance, having to do with distancing one’s self from others, being unique and separate (Kagitcibasi, 2013). Interestingly,
this stance assumes that autonomy is reduced in the face of being connected with other
(Kagitcibasi, 2013). This connectedness, called relatedness, is often considered to conflict with
autonomy when the main meaning of autonomy takes the individualistic stance, rather than the
meaning of self-governance (Kagitcibasi, 2013). For example, just as autonomy-exhibiting
behaviors are related to self-determination in social settings and differentiating a person from
others, relatedness-exhibiting behaviors were related to lending interest, validation, and
involvement in another person’s feeling and thoughts (Allen et al., 1994). Relatedness, in this
instance, is not incompatible with autonomy (Kagitcibasi, 2013). However, the opposite of
relatedness, which is separation, defines the second meaning of autonomy as listed above. Figure
3 illustrates the underlying dimensions and four types of self (Kagitcibasi, 2013) and suggests
that the autonomous-related self is the optimal actualization of both needs.

Figure 3

*Underlying Dimensions of Self in Adolescent Development (Kagitcibasi, 2013)*
Among parent-adolescent relationships, a parent’s handling of adolescent strivings for autonomy has been linked to the numerous aspects of adolescent adjustment and to the quality of the parent-adolescent relationships (Allen et al., 1994; Collins, 1990). Regardless of the context in which autonomy is defined: cognitively, such as encouraging the expression of individual viewpoints, or behaviorally, such as participating in family decision making, adolescents seem to benefit in a number of ways from approaches to autonomy that lie within the context of positive parent-adolescent relationships that support them asserting a moderate degree of influence on their environment while also supporting interactions via relatedness (Allen et al., 1994; McElhaney & Allen, 2001). In fact, adolescent ego development and adolescent self-esteem are indices intimately connected to adolescent psychosocial development. These indices are important because of their relation to numerous adolescent functional outcomes and because of their relation to aspects of social-cognitive and self-concept development, which are likely influenced by autonomy and relatedness in the face of parent-adolescent interaction (Allen et al., 1994). Logically, adolescent development, in the context of autonomy and relatedness, bear the importance of parent-adolescent relationships that support positive affirmations of the growing adolescent self.

2.16.1b Independence

Adolescent autonomy is an umbrella term comprising a variety of constructs, including agency, self-governance, relatedness (Kagitcibasi, 2013), connectedness, separation, detachment, and independence (Beyers et al., 2003). Relating the above two meanings of autonomy, where one meaning resides in volitional agency and the other resides in separation, separation-individuation theory suggests that adolescents should develop their own opinions and attempt to articulate them, despite their opinions being in opposition, namely from their parents. The theory
suggests that this development is considered a sign of psychological maturity and therefore should be associated with positive adjustment (Soenens et al., 2007). Congruent with adolescent autonomy being a process of becoming either more independent or more volitionally functional, studies have researched autonomy support as a function of each process. In a study assessing adolescent perceptions of promotion of independence versus promotion of volitional functioning, Soenens and colleagues (2007) hypothesized, on the basis of self-determination theory (SDT), that parents’ promotion of volitional functioning (PVF) would be more strongly related to adolescent well-being than their promotion of independence (PI). Secondly, they suggested that this effect would occur because adolescents who perceive their parents as endorsing volitional functioning would operate in a more self-determined manner (Soenens et al., 2007). Results indicate that both PVF and PI are distinct but positively correlated types of autonomy support. However, PVF was found to be a stronger predictor of well-being that PI (Soenens et al., 2007), an idea grounded in SDT’s assumption that PVF equips children with self-determined functioning, an asset considered to be crucial in determining individuals’ adjustment and mental health (Ryan & Deci, 2000; Ryan, 1993). These results are consistent with both the assertion that fostering parent-adolescent relationships yield greater adolescent well-being while simultaneously highlighting the importance of adolescents’ action being directed by their personal interests and integrated values – components critical to efficacious weight loss behavior strategies.

2.16.1c Social Connectedness

Adolescence marks a profound period of physical, emotional, and social transition from childhood to adulthood (Blakemore, 2012; Burnett & Blakemore, 2009). A major feature during this transformation is the adolescent’s growing investment in social relations outside the family
unit, as fostering such relations form a critical foundation for the development of the adolescent’s independent sense of identity (Larson et al., 1996). This transition compels adolescents to engage in more complex social interactions, as teens use the actions and influences of their peers to model their own behaviors, while also learning how their own actions affect others (Burnett & Blakemore, 2009). Social connectedness is essential to everyday life of adolescents, being key to positive personal development and general health (Stoddard et al., 2011). Social connectedness among adolescents contributes to protective factors against an array of risk behaviors that also foster positive mental health outcomes that can diminish feelings of loneliness, anxiety, and depression (DuBois & Silverthorn, 2005).

Within adolescents’ social environment, social connectedness is primarily found in two distinct arenas: direct interactions, (e.g., the home environment and the physical presence of peers in school or sporting settings) and the digital landscape (e.g., internet technology) (Wu et al., 2016). While the internet is the primary outlet for adolescent socialism, online social networks can overlap with real-world connections to varying degrees (Lamlin et al., 2017). For example, while 57% of teens report meeting a new friend online, most relationships remain online, with only 20% of teens reporting that they met their online friend in person (Lenhart et al., 2015)

As discussed previously, adolescent development is marked by a distinct social growth away from parents and family connections and toward peer and community connections. Within adolescent weight loss interventions, this development has led to adjustments by altering the level of involvement of parents and family within the intervention process. Previously mentioned, behavior treatment programs that target both the parent and the adolescent but treat only the parent (e.g., FBT – parent only) have shown to be favorable due to the inherent appropriateness for adolescent development. In the context of adolescent social connectedness,
perhaps future weight loss intervention research should heed to the importance of adolescent participants’ engagement in peer and community social connections. For example, FBT – parent only interventions could also offer avenues for adolescent social connectedness that are rooted in peer intra-and internet platforms that replace the abandoned social ties of parent-family interactions.

2.16.1d TECHNOLOGY

Adolescents are using the internet and various social media platforms as mediums to view, compare, and relate to their peers (Lamblin et al., 2017). Results from a national survey of adolescents aged 13 to 17 report that approximately 92% go online daily, with 71% reporting membership to more than one social network site (Lenhart et al., 2015). Internet technology allows for friendships to start digitally, as 57% of teens have met a new friend online, with 60% of older teens ages 15 to 17 being more likely to make friend online compared with 51% of younger teens aged 13 to 14 years (Lenhart et al., 2015). Teenagers who engage regularly in online social media report positive social experiences, which makes them feel closer to people and thus making them feel good about themselves (Australian Communications and Media Authority, 2013).

The implications for adolescent health and development regarding online social relationships is still being examined. Since access to online social platforms can be both un-restricted and un-regulated, the experiences can breed a toxic environment for negative social interactions such as cyber-bullying (Lamblin et al., 2017) and delinquent peers (Wu et al., 2016). Similarly, in a study of Swiss youth, heavy internet use (greater than 2 h a day, every day) was associated with insufficient sleep in females, excessive weight in males, and higher reported rates of depression (Bélanger et al., 2011).
Despite the negative health consequences of internet technology, the adolescent digital generation is likely steadfast in recognizing cyberspace as a pervasive domain for their socialization process. The advantages of internet technology in promoting adolescents’ sense of connection not only increases their accessibility of networks of friends (Wu et al., 2016), but online tools can also be harnessed to provide social support, advocacy, and intervention (Lamblin et al., 2017). Conveniently, adolescent weight loss interventions of the future have the capacity to tailor smart phone apps, behavior treatment, and social media engagement to not only enhance program development but also expand these opportunities to socially and geographically isolated participants (Lamblin et al., 2017).

2.16.2 HISPANIC CULTURE/ETHNIC IDENTIFICATION

It is well known that treatments of any kind are more effective when they are tailored to the needs and context of the individuals. Much progress has been made in the methodology of adapting interventions to be culturally relevant (Parra Cardona et al., 2012). In the field of weight-loss interventions, developing effective culturally sensitive interventions must begin by identifying the target population, learning their customs and preferences, their views on weight and body shape, and their beliefs that determine their food intake (Karanja et al., 2002). First-hand account of these cultural components can be found in focus groups or interviews, which helps to dispel preconceived notions about the group being researched.

Hispanics represent the largest minority group, accounting for 18.5% of the U.S. population (U.S. Census Bureau, 2020b). However, given the complexity of ethnic identity and the involved detail of its culture and origin, describing a group as Hispanic is likely as precise as defining a group as “American”. When relating cultural relevance to this dissertation research study, “Hispanic culture” and its ethnic identity will be attached to Mexican-Americans of the Paso del
Norte Border Region. In attempt to understand the intricacies of Hispanic culture in designing culturally appropriate weight loss interventions for adolescents with OW/OB, a number of factors need to be considered: Hispanic culture related to pride, body image, weight loss, nutrition, and physical activity; Hispanic normative beliefs from family and peers regarding body size; Hispanic parenting style; Mexican cuisine and concepts of food pride and food is love; familismo; and the generational influence of body size and food behavior.

2.16.2a Hispanic culture in food and food behaviors

It is unfitting to discuss Hispanic culture in relation to food and health without first addressing the presence and function of acculturation and its impact on the health behaviors of Hispanics. As such, acculturation is the process by which an immigrant ethnic group, usually a minority, adopt the attitudes, values, customs, beliefs, and behaviors of a new culture (e.g., the dominant/host group. (Satia-Abouta et al., 2002). Relating to this research study, Hispanic acculturation will be associated mainly through the context of food and food behavior, therefore, dietary acculturation is defined as the process of immigrant ethnic group adopting the foods and eating patterns of the host country (Satia-Abouta et al., 2002).

A large body of evidence supports an association of Hispanic acculturation with poor dietary quality and eating behaviors (Satia-Abouta et al., 2002; Van Hook et al., 2016), obesity, and chronic disease (Pérez-Escamilla, 2011; Van Hook et al., 2016). However, dietary acculturation can result in both unhealthful and healthful dietary changes. For example, among Hispanic immigrants, the consumption of fewer highly saturated fats (e.g., lard) is healthful, whereas drinking soda instead of traditional fruit-based drinks could be construed as unhealthful (Satia-Abouta et al., 2002).
There is also a body of research that supports the notion that Hispanics view their Mexican food traditions as unhealthy and perceive traditional American foods as healthier (Ramirez et al., 2018). In fact, in a study of Mexican-American women assessing the relationship between food and ethnic identity, a key finding was that many participants, in their attempt to eat healthfully, realized the need to reject Mexican ways of eating to support a healthier dietary intake (Ramirez et al., 2018). Similarly, this study reported that although Mexican foods were identified as traditional and important in supporting ethnic identity, these foods were also characterized as unhealthy (Ramirez et al., 2018). Participants also described Mexican eating negatively in terms of portion sizes, citing “lots’ of meat and greasy foods, “big” meals, and “too much” as common descriptors (Ramirez et al., 2018). Another study asked Latino teens aged 18 and 19 about their racial/ethnic tendency to be overweight. Most participants felt that ‘cultural eating’, denoting “palatable high fat foods”, were primarily responsible for many Latino youth to be full-figured or overweight (Barroso et al., 2010). Such a discrepancy might suggest that Hispanic culture and the need to maintain their ethnic identity are more important than the unhealthy effects of Hispanic eating. Perhaps there exists a level of cultural pride among Hispanic’s that can override their attention to healthy food behaviors.

In a study examining the cultural influence on mindful eating, Mexican-American parents showed pride in serving traditional foods to their children, citing their pride in their rich food culture and their eagerness to pass this culture on to the next generation (Mendez et al., 2020). Hispanic cultural pride resonates in Teresa’s, a 28-year-old Mexican-American, description of her desire to eat healthfully as being in direct conflict with family values:
I try to stay healthy, I try but it doesn’t go–when you come from a Hispanic family it’s difficult because they’re used to eating big meals. Your rice, your beans, your tortillas, your tamales. It’s your heritage, it’s what you do and it’s difficult (Ramirez et al., 2018).

In developing weight loss treatment programs for adolescent, it may be necessary to offer readiness techniques that help participants overcome prideful parent and family projections of traditional Mexican eating practices. Such techniques are grounded in asserting their freely chosen life’s values and weight loss goals under the umbrella of enhanced self-efficacy and empowerment.

2.16.2b Hispanic family normative beliefs in body size and body type

Studies assessing beliefs and perceived norms concerning body image reveal that among Latino and Mexican-American participants, ‘cultural eating’ is attributed to wide-spread occurrence and acceptance of overweight (Barroso et al., 2010). Beliefs of many Latino-American males suggest that overweight or full-figured females have more self-esteem, are better communicators, and are less arrogant/unpretentious than normal weight girls (Barroso et al., 2010). Latino-American elders, parents, and grandparents share a largely different view regarding their preference for overweight or full-figured shapes. Though they perceive large body size to be healthy, their rationale stems from food history of food insecurity and food scarcity, which motivates parents and grandparents to overfeed children and grandchildren, respectively (Barroso et al., 2010). Accordingly, it is hypothesized that the grandparents’ childhood experiences of limited resources, which was perceived to produce underweight and sickly states, are recollections that support overfeeding to ensure that children do not suffer the same challenges (Barroso et al., 2010). A review by Caballero and Tenzer (2007) show that body
image views held by Hispanics/Latinos support the acceptance or even celebration of persons that are plump or slightly overweight. This body type is said to signify a state of being “well cared for and healthy”, a classification often voiced favorably in children and adolescents by the Spanish term gordito (Caballero & Tenzer, 2007). Ceballos and Czyzewska (2010) assessed differences in body image cultural perceptions between Hispanic/Latino vs. European American adolescents and found that Hispanic/Latino participants identified larger ideal body sizes than European Americans (Ceballos & Czyzewska, 2010). However, not all research is consistent with the above finding, as one review could not show that Hispanics had a greater preference for larger body size over other ethnicities (Ricciardelli et al., 2007), highlighting the complexities and variability that culture may play within and across Hispanic populations.

Normative beliefs surrounding body size and body image support that Hispanics show a preference for overweight or full-figured body shapes. Such preferences could promote conflicting ideals regarding adolescents’ weight loss strategies and weight loss attempts, especially in family settings where parents assert control over adolescent’s prepared meals. Future adolescent weight loss treatment programs should include provisions to help offset such competing beliefs.

2.16.2c Hispanic parenting type in healthy eating and physical activity

As discussed previously, an authoritative parenting type offers the greatest positive impact on children’s health behaviors and yields the best in child health outcomes (Gerards et al., 2011, Sleddens et al., 2011). Authoritative parenting is considered part of gold standard practices of pediatric obesity treatment, management, and prevention (Draper et al., 2015; Shrewsbury et al., 2011; Skelton et al., 2012). In contrast to authoritative parenting type, parents of authoritarian type (e.g., highly directive, demanding, and strict) can increase their children’s risk for
overweight (Arrendono et al., 2006). Hispanic/Latino parents may exercise greater control over their adolescent offspring in attempt to emphasize interdependence, importance of family ties and obligations, and responsibilities among family members. Such emphasis from traditional Hispanic/Latino culture often equates to the fostering of authoritarian parenting, where the key element is control over the child (Bulcroft et al., 1996). Regarding children’s eating, parents who attempt controlling parenting types had children that ate more unhealthy foods and who also consumed less fruits and vegetables (Driscoll et al., 2008).

Research suggests that Hispanic parents’ use of authoritarian types may be related to variables of either sociodemographic factors related to minority status in the U.S. or of aspects of Hispanic culture (Arrendondo et al., 2006). Younger parents who were less acculturated and unemployed reported using controlling or authoritarian types regarding children’s eating, but were more likely to promote physical activity using authoritarian types, independent of other sociodemographic features. These results evidence that Hispanic culture may play more a role in parenting type than acculturation or sociodemographic factors. Similarly, Varela and colleagues (2004) suggest the use of authoritarian types by Mexican-American parents may be directed by socioeconomic factors associated with minority status (e.g., low education and low income) rather than affiliation to Mexican culture (Varela et al., 2004).

Findings from another study assessing parenting types and youth well-being across immigrant generations found that parents’ own acculturation plays a crucial role in their children’s well-being. Specifically, U.S.-born Mexican parents are more likely to use parenting types that grant greater autonomy to their adolescents and less likely to be authoritative in typology than those parents born in Mexico (Driscoll et al., 2008).
Due to the complex and variable influences that culture may play within any given family, weight loss treatment programs for Hispanic adolescents need to be tailored to identify and address the intersecting influences of culture and the role parents (and other family members) play.

2.16.2d Familism (Familismo)

Familismo is a core cultural value among Hispanics that means *importance of family* (Davila et al., 2011) and signifies a set of attitudes regarding the family and the nature of relationships within the family (Kataria Perez & Cruess, 2014). One who embraces familism believes that family members are primarily responsible for enhancing and supporting the welfare of their kin and that the needs of any single family member falls secondary to the interests of the family (Burgess & Locke, 1945; Heller, 1970). Marin and Marin (1991) describe this emphasis on ‘family above all’ as a Hispanic cultural value of *collectivism*, which imparts the prioritization of group goals and needs over those of the individual (Marin & Marin, 1991). Values of loyalty, solidarity, and reciprocity are strong among the concept of familismo. These values are reflected in three ways: 1) viewing the family as a role model of behaviors and attitudes; feeling obliged to provide for the material and emotional support of family members; and 3) relying on family for help and support (Marin & Marin, 1991).

In dissecting the meaning of familism, it can be assumed that this core family value has the potential to exert large levels of control and influence on the behaviors of family members. In light of the constructs already mentioned regarding Hispanic culture, such as Hispanic beliefs about body size and Hispanic parenting types, familism may well be a central family value that can drive family members to deviate from the ideals and behaviors that often foster better health outcomes. Adolescent weight loss treatment programs can design program instruction that
highlights the importance of supporting adolescents’ life values and weight loss goals while simultaneously supporting the expectations of familismo within the Hispanic unit.

2.17 CONCLUSION

Prevalence of adolescent obesity and the associated short-term and long-term complications emphasize the need for effective treatments. This project aims to develop an acceptance-based behavior therapy (ABT) intervention targeted to Hispanic adolescents with overweight or obesity (OW/OB). The identification of perceived barriers to weight loss and the correlations and dichotomous responses between parent and adolescent survey and interview data will offer data necessary to inform modifications needed to adapt the adult ABT curriculum for adolescents. The primary goal of this research study is to inform the parent component of this multicomponent behavioral ABT intervention. A secondary goal is to inform the modifications of this ABT adolescent weight loss program for the Hispanic population in the Paso del Norte region.
CHAPTER 3. METHODS

3.1 RESEARCH DESIGN

This mixed-methods approach recruited adolescents ages 14-19 years with overweight and obesity (OW/OB), and their parents, for surveys and interviews. The focus of this dissertation was to use online survey and web-based interview data from parents and their adolescents to inform the parent component of a modified adult acceptance-based behavior therapy (ABT) weight loss treatment program for adolescents. A tiered recruitment strategy started with online recruitment of parents to fill in an anonymous survey (no financial incentive), followed by an option for the parent to participate in an interview (non-anonymous) and an invitation for their adolescent to also do a survey and interview. All interviews were conducted by online video conference, lasted 1-1.5 hours, and were audio/video recorded. Surveys were administered using an online survey tool and were offered in both English and Spanish versions for parents and only in English for adolescents. A $20 gift card incentive was given to parents for interviews and to adolescents for a survey and interview.

3.2 STUDY SITE

The city of El Paso, Texas is located on the U.S.-Mexico border and within the greater metropolitan area of the Paso del Norte region. With a population of approximately 2.5 million, this binational, tri-state region includes El Paso and Hudspeth counties in west Texas, Doña Ana, Otero, and Luna counties in southern New Mexico, and Ciudad Juaréz, Chihuahua, Mexico (Paso del Norte Health Foundation, 2016). The city of El Paso has an estimated 681,729 residents, with 82% classified as Hispanic or Latino decent, 51% are female, and 30% are under age 20 (U.S. Census Bureau, 2019a).
3.3 STUDY POPULATION

The convenience sample for this study included adolescent and adult participants living in the Paso del Norte Region who were primarily Hispanic. Eligibility criteria for parent and adolescent participants are as follows:

3.3.1 PARENTS INCLUSION CRITERIA

Must be parent or guardian of adolescent who meets criteria below.

English speaking for interviews

3.3.2 ADOLESCENT INCLUSION CRITERIA

- Adolescents must be aged 14-19 years
- Adolescent with OW/OB (at or above the 85th percentile for sex and age as determined by CDC growth charts)
- English speaking for interviews

3.3.3 ADOLESCENT EXCLUSION CRITERIA

- Clinical depression
- Diagnosis of diabetes
- Any condition prohibiting physical activity, an eating disorder or substance abuse disorder
- Autism, or an intellectual disability
- Eating disorders
- Recent or ongoing problem with substance use or addiction
- Regular consumption of more than 4-5 alcoholic drinks per occasion
3.4 SAMPLING PROCEDURES

Phase 1 of participant recruitment was advertised primarily via social media platforms (Facebook, Instagram, and Twitter) and other electronic venues (e.g. appropriate newsletters or listservs), flyers, recruitment cards, and posters in the Paso del Norte region targeted to parents with adolescents between the age of 14-19 years old, in general or who are likely to have overweight or obesity.

Interested parents followed the link in the study advertisement that directed them to an online survey tool, where parents were first shown a letter of information to take part in research. On this first page, parents confirmed their eligibility and agreed to participate in the study by checking the appropriate eligibility boxes before being able to proceed to the anonymous survey on page two. Of note, parents who “perceived” their teen to have overweight or obesity were permitted to take the survey. Parent eligibility by way of teen body weight status was determined by survey questions regarding teen weight, height, sex, and age. Parent surveys were assessed for eligibility upon receipt by calculating adolescent BMI percentile by age and gender. Ineligible parent surveys were kept and analyzed separately from eligible parent surveys. Parents were notified via email if they did not qualify for the parent interview and adolescent interview and survey.

Eligible parents advancing to the survey on page two were allowed to ‘submit’ the survey once all questions were answered. Following survey submission, parents were asked a number of follow-up questions beginning with if they would like to continue participation in the study by consenting to an online web-based interview and informed that if they completed the interview, they would be eligible for a gift card. If they agreed, they were asked to give their name, email address and phone number to be contacted for the interview. Parents were also asked if they
would consent to their adolescent participating in a similar survey and interview. Parents consenting to their adolescent’s involvement were asked their adolescent’s name and contact information.

Phase 2 consisted of scheduling an interview with eligible, interested parents. A confirmation email was sent to the parent indicating the day, time, and video conference link for the online interview. Additionally, the consent/assent form was attached to the email. Adolescents whose parents consented to their participation were contacted via email or by phone and asked if they would like to participate. Adolescents agreeing to participate were screened for eligibility via email or by phone. Those eligible were scheduled for a survey and interview. Once scheduled, a confirmation email was sent to the adolescent confirming the day, time, and video conference link and included the survey link and attached copy of the consent/assent form.

3.5 INSTRUMENTATION

3.5.1 SURVEYS

Parent and adolescent surveys (appendix 1 & 2) were created and administered by Qualtrics survey management tool and offered in both English and Spanish versions for parents. Both parent and adolescent surveys were designed and arranged to compare parent/adolescent dyad responses. Both share nearly identical questions of a mixed-methods approach that were drawn from the following eight topic areas discussed below: demographics; MacArthur Subjective Scale of Social Status; Figure Rating Scale; Modified Child Feeding Questionnaire for Adolescents; weight control behaviors; parent weight-based talk; parent-child health- and weight-focused talk; and parent negative weight-based talk. Survey questions are Likert-type, YES/NO, multiple choice, fill-in, rating-scale, and short-answer. The adolescent survey consists of 86 questions, while the parent survey consists of 93 questions, each having four and five
qualitative questions respectively (of the 86 adolescent and 93 parent questions, both surveys contain four and five qualitative questions respectively). Differences in survey questions are due to additional parent questions related to parent perception of adolescent weight and body, their adolescent’s anthropometrics and gender, and their relationship to the adolescent.

3.5.1a Demographics

The demographic section of the survey included race, ethnicity, health status, height/weight, age, education level, political affiliation, weight loss history, sex, and gender identity. Demographics and health descriptive questions were asked in parent and adolescent surveys. See parent and adolescent surveys in appendix 1 and 2 respectively.

3.5.1b MacArthur Subjective Scale of Social Status

The MacArthur Scale of Subjective Social Status (Alder et al., 2000) and its Youth Version (Goodman et al., 2001) reflect the influence of socioeconomic status (SES) variables on social status and health. It has been suggested that traditional measures of SES (income, education, and occupation) may be less predictive of health than the inequality of one’s relative standing related to their SES; thus, subjective social status (SSS). The difference between the adult and adolescent instrument is found in the second ladder that assess personal placement, which is relative to community placement in adults and school placement in adolescents. In this scale, participants are shown a drawing of a ladder with 10 rungs. The ladder represents where people stand in society with the top of the ladder representing the those who are best off, have the most education and money, and the best jobs. Participants are asked to place an X on the rung that best represents where they think their family stands and also where they personally stand in their community.
3.5.1c Figure Rating Scale

The scale (Stunkard, et al., 1983) evaluates body image, where body image is the culmination of at least two elements: perception of current body size and shape, and attitudes toward the body. Individuals with body image disturbances can manifest perpetual distortions of themselves by under- or overestimating their body size. Independent of this, body dissatisfaction represents another possible form of body image disturbance. According to Gleaves and colleagues (2000), body dissatisfaction can be summed as the discrepancy between current body size and ideal body size (Gleaves et al., 2000). In the figure ratings scale, participants are shown a series of gender specific figures ranging from those that are very thin to those having obesity and asked to pick two figures: one that best represents their current body size and the other their ideal body size. Child figures are similar in form to adult figures, but rendered age appropriate for 9- to 10-year-olds (Tiggemann & Pennington, 1990). Additionally, in the parent survey, we asked parents to assess both their own body (adult figure rating scale) and their adolescent’s body (adolescent figure rating scale). For example, in assessing their adolescent’s body image, parents were asked to “Write the number here that best describes how you see your teen” and “Write the number here that you want your teen to be.” We also included an open-ended question after each parent and adolescent figure rating scale that asked, “Please describe how you feel about your body and your weight.” Additionally, after parents were asked to assess their adolescent’s body, they were asked the similar open-ended question “Please describe how you feel about your teen’s body and your teen’s weight” (see Appendix 1).

3.5.1d Modified Child Feeding Questionnaire for Adolescents

The child feeding questionnaire (Birch et al., 2001), adapted for parents with adolescents (Kaur et al., 2006), is a self-report measure that assesses parent beliefs, attitudes, and practices
among parents with adolescents who have obesity. The questionnaire focuses on 7 factors: Perceived responsibility; Perceived parent weight; Perceived teen weight; Concerns about teen weight; Restrictions; Pressure to eat; and Monitoring.

The following explains our child Feeding questionnaire modifications from Kaur et al., 2006. All factors presented in Kaur et al., 2006 were utilized here with the exception of items pertaining to perceived parent weight and perceived teen weight. Parents were asked about weight at present (“What is your perceived self-weight at present?”) and about their teen’s weight at present (“How do you perceive your teen’s weight at present?”). Teen weight questions were modified to ask teen only about their weight at present.

Response options were modified for several factors to be consistent with response options commonly used in existing regional surveys of adolescent health behavior (e.g., the New Mexico Youth Risk & Resilience Survey [NM YRRS]), to remove a neutral midpoint response, and/or to align with our approach to analyses:

Perceived responsibility responses were modified from the original options of “Never, Seldom, Half of the time, Most of the time, Always” to “Never, Rarely, Sometimes, Mostly, Always” to be more consistent with common terms (e.g., “seldom” and “half of the time” are rarely used by adolescents). Concern about teens weight response options were modified from the original options of “unconcerned, slightly unconcerned, neutral, slightly concerned, concerned” to “not at all concerned, slightly concerned, somewhat concerned, moderately concerned, extremely concerned” to avoid having a neutral midpoint response. Restrictions and Pressure to eat were modified from the original response options of “Disagree, Slightly disagree, Neutral, Slightly agree, Agree” to a 4-point response “Not at all true, A little true, Pretty much true, Very much true” to remove a midpoint option, to be consistent with NM YRRS response
options for statements (as opposed to questions), and to align with our approach to analyses (see appendix 1 for modified questions).

All questions containing pronouns “his/her” and “he/she” were altered to use non-gender specific wording such as “their/them/they.” Lastly, all child Feeding questionnaire items were adapted to adolescents. For example, “How concerned are you about your teen eating too much when you are not around them?” adapted to “How concerned do you think your parent(s) are that you eat too much when they are not around you?” (see appendix 1 for the complete adolescent survey).

3.5.1E WEIGHT CONTROL BEHAVIORS

Adolescent weight control behaviors, eating, and body image may be influenced by parent weight-control behaviors. Parents’ influence over child behaviors can manifest in many ways, such as behavior modeling and expressing attitudes toward eating, exercise, and body image. Initial evidence suggest that parents’ weight-control behaviors can influence adolescents at both ends of the health-behavior spectrum. For example, parent unhealthy weight-control behaviors, such as skipping meals, fasting, crash dieting, and parent body dissatisfaction can be predictive of like behaviors in adolescent daughters. Conversely, adolescents who perceive a maternal concern for healthful eating find it positively associated with their fruit and vegetable intake (Cromley et al., 2010).

Weight-control behaviors were assessed in the past year by using survey items from Project Eat (eating among teens) (Neumark-Sztainer et al., 2002). Survey items were Adapted by Boutelle et al., 2009 to include a 32-item survey with 4 factors: healthy weight control behaviors (HWCB); unhealthy weight control behaviors (UWCB); extreme weight control behaviors
(EWCB); and behavior change (BC). Respondents were asked to answer “Yes” or “No” to the question: “During the past year, did you do any of the following things in order to lose weight or keep from gaining weight?” (Boutelle et al., 2009). We further adapted this survey to include 31 items using the same factors. For example, item “take liquid diet supplements” was removed because the prevalence of liquid meal replacements and protein supplementation is now mainstream and is not necessarily indicative of a weight control measure as much as it could be considered an easy carry of a nutritious meal in this fast-paced time. Items referencing eating or counting “energy” were adapted by replacing “energy” with “calories” to reduce respondent confusion. For example, “eat less energy”, “eat a certain amount of energy per day”, and “count amount of energy or fat” were adapted to “eat fewer calories”, “eat a certain number of calories each day”, and “count amount of calories or fat.” The item “smoke cigarettes” was adapted to “smoke cigarettes to help control my weight” to qualify the item back to the primary question. The items “follow the Atkins diet” and “follow the South Beach diet” were adapted to “follow a ‘keto’ diet” and “follow the paleo diet” respectively, due to this study’s regional popularity of these adapted meal plans. Also, we altered the items with respect to how they placed beneath the factors. For example, we concluded that “Take laxatives”, “Take diuretics”, and “Vomit after eating would fall under EWCBs rather than UWCBs. Similarly, we decided that “Smoke cigarettes to help control my weight”, “Take diet pills or appetite suppressants”, “Skip meals”, and “Fasting for 24 hours or more” were the only items that fell under UWCBs. The remaining items were nested under BC. This survey was administered to both the parent and the adolescent with no alterations made for each group (see appendices for complete surveys)
3.5.1f Parent weight-based talk

Studies of parental behavior and interactions between parent-child talk about dieting, weight, and body shape and size, generally find that excessive weight talk by parents and family members yields harmful behaviors and unhealthy body-weight concerns in youth (Armstrong & Janicke, 2012; Fulkerson et al., 2002). In assessing this type of weight talk, we asked parents three targeted questions (Neumark-Sztainer et al., 2009), adapted by Bauer et al., 2013, which were originally tailored to the maternal-daughter relationship. Our team adapted the original question one to target parents with adolescents while using non-gender specific wording: “How often do either you or your spouse/significant other make comments to your daughter about her weight?” to “How often do either you or your spouse/significant other make comments to your adolescent about their weight?” The remaining two questions were unchanged: “How often do you talk about your own weight, shape, or size?” and “How often do you make comments about other people’s weight, shape, or size?” All parent questions were adapted to adolescents (see appendix 2 for the complete adolescent survey).

3.5.1g Parent-child health- and weight-focused talk

The prevalence of obesity among youth, their unhealthy weight control behaviors, concerns for body shape and size, and dieting have left parents scrambling to understand and intervene to reduce these outcomes. Research indicates that parents are intervening by engaging their children in discussions about physical activity, healthy eating, unhealthy weight control behaviors, and weight (Bauer et al., 2013; Berge et al., 2015; Gillison et al., 2016; Puhl & Himmelstein, 2018). Not all conversations are the same, however; in fact, some might be damaging. For example, parent-child conversations about healthy eating and activity, in the absence of child weight references, have been associated with more optimal child health behavior and outcomes and
greater child wellness. Conversely, parent-child conversations that center on weight, encouraging weight loss, and conveying weight criticisms were associated with greater child dysfunctional eating and dieting and poorer physical self-perceptions (Berge et al., 2013, Berge et al., 2015; Gillison et al., 2016; Puhl & Himmelstein, 2018; Winkler et al., 2018). Interestingly Berge and colleagues (2015) found that parent-adolescent conversations that included both healthful eating and weight focused topics were found to have both positive and negative outcomes related to adolescent weight and weight-related behaviors (Berge et al., 2015). The following parent health-focused talk questions were modeled after the Parental Energy Index (Lytle et al., 1999) and adapted by Winkler et al., 2018. Questions include: “How often in the past year have you talked with [selected child] about healthy eating habits?”; “How often in the past year have you talked with [selected child] about being physically active?”; and “How often in the past year have you talked with [selected child] about his/her weight or size?” Our adaptations to Winkler and colleagues include replacing “selected child” with “adolescent” and using the non-gender “their” to replace “his/her.” We also modified the original frequency responses from “Never or rarely” to “Almost every day” to “Never, A few times, About once a month, About once a week, Every day” for analysis clarity. Also, we excluded the question “To what extent do you encourage [selected child] to diet to control his/her weight?” We did this because such questions that address parents’ concern for their adolescent to diet to maintain desired weight or concerns for their adolescent becoming overweight, needing to diet, or to become thinner have already been addressed within this survey. Lastly, we added two questions to probe the type of talk parents are conducting when discussing healthy eating habits and physical activity with their adolescent. For example, “If you have had a conversation about healthy eating habits with your adolescent, please describe the conversation.” and “If you have had a conversation about being
physically active with your adolescent, please describe the conversation.” Finally, the five questions described above were adapted to adolescents (see appendix 2 for the complete adolescent survey).

**3.5.1h PARENT NEGATIVE WEIGHT-BASED TALK**

Societal weight bias and stigma about weight are components that drive weight-based victimization in adolescents by parents and family members. Such experiences for adolescents are noted as “fat talk” (Nichter, 2000), which was originally described as negative body-related conversations among adolescent females to increase interpersonal relationships by disparaging themselves, only to have the comments negated or correlated by a peer (e.g., “I’m so fat”…, “No, you’re not!” or “No, I’m fat”). Fat talk has morphed considerably since it was coined and is now associated with weight teasing, bullying, stereotyping, discrimination, conversations about dieting and critical and negative comments about one’s body shape, size and appearance, among others (Bauer et al., 2013; Berge et al., 2013; Berge et al., 2016; Winkler et al., 2018). The effects of such negative talk in adolescence can alter social, emotional, and academic development, promote poor mental health outcomes and the incidence of suicidal ideations, exacerbate already exhibited adverse medical outcomes, such as dyslipidemia, insulin resistance, and impaired glucose tolerance; further one’s preoccupation with weight loss and promote unhealthy and extreme weight control behaviors (Pearl & Puhl, 2018). Identifying which family members are engaging in negative weight-based talk is essential to designing interventions tailored to these family members to reduce the prevalence of such talk. We assessed negative weight-based talk using questions adapted from the Inventory of Peer Influence on Eating Concerns (I-PIEC) (Oliver & Thelen, 1996) and adapted by Berge et al., 2016. We altered all five adapted I-PIEC questions from “Has your [mother, father, older and younger brother, older
and younger sister, and non-family members] ever said…” to include only parents or another family member negative talk. For example, “Have [either your parent(s) or another family member] ever.” Accordingly, the five adolescent questions are: 1) “Have… ever said you were fat?”; 2) “Have… ever teased you or made fun of you about the size or shape of your body?”; 3) “Have… ever said that you should go on a diet?”; 4) “Have… ever said that you eat food that will make you fat?”; and 5) “Have… ever said that you would look better if you were thinner?”. Response options were adapted from original: “Yes,” “No,” or “I do not have a [mother, father, younger/older brother, younger/older sister].” to “Yes parent(s)”, “Yes, a family member”, or “Neither parents nor family member.” We also adapted these five questions to be included in the parent survey using a “Yes”, “No” response: “Have you ever said to your adolescent that you think they are fat?”; “Have you ever teased or made fun of your adolescent about the size or shape of their body?”; “Have you ever said to your adolescent that they should go on a diet?”; “Have you ever told your adolescent that the foods they eat will make them fat?”; and “Have you ever told your adolescent that they would look better if they were thinner?” (see appendix 1 for complete parent and adolescent surveys).

3.5.2 INTERVIEWS

Personal interviews were conducted with parents and adolescents separately. The adolescent interview moderator guide was adapted from work being done in 2020 by Cardel and colleagues at the University of Florida, College of Medicine. The parent interview moderator guide was modeled after our adolescent guide adaptations. Components of each interview moderator guide are as follows.
3.5.2a Parent Interview Moderator Guide

Parents were asked questions from three main topic areas: General feedback about their adolescent’s weight, support and barriers to their adolescent’s weight loss and input about the delivery of an adolescent weight loss program. Topic areas were supported by multiple probing questions to help guide the direction of responses. Some examples are: “Has your adolescent ever struggled with their weight?” was probed with “What was that experience like for them?”, “For you?”, “What do you think contributes to your adolescent’s weight struggles?”, “What do you think makes it hard for your adolescent to lose weight?”, and “What do you think helps your adolescent to lose weight?” Questions regarding program delivery centered on parent support for their adolescent to participate, parent willingness to participate in a program, and their concerns and ways to overcome such concerns for both their own and their adolescent’s participation. Probing questions for concerns for participation include “Being embarrassed to discuss your weight or your adolescent’s weight?”, “… time to participate or fitting it into your schedule?”, “Those around you, such as friends, not being supportive?”, and “What would it to overcome that?” for each of those probing responses.

3.5.2b Adolescent Interview Moderator Guide

Adolescents were asked questions from six main topic areas: General feedback about their friends, family, and their personal struggles with weight; details about barriers and facilitators to weight loss; concerns for attending a weight loss program; details about the person and/or type of person they feel comfortable with leading such a program; experiences with cultural implications that are barriers or benefits to leading a healthier lifestyle; food diaries, experiences with food diaries, and considerations for using them. Again, probing questions are key to helping to motivate the discussion and keep it centered toward the research areas of concern.
3.6 RECRUITMENT

Participant recruitment was conducted in-person via local retail establishments, clinics, gyms, and health fairs, using flyers and handouts. Social media recruitment was conducted using both open and privately posted groups (e.g., Facebook, Twitter, Instagram, LinkedIn, and private regional Facebook group (MOB – families for El Paso). Openly posted recruitment efforts often resulted in large numbers of suspicious or fraudulent survey submissions while privately posted recruitment efforts resulted in a more secure method of data collection with less concern for fraud. Most of this study’s participants (~65%) were recruited by via access to a patient portal from a local dietetics clinical setting. Participants were selected based on study inclusion/exclusion criteria while also being flagged as “Spanish speaking”, since research personnel were not bilingual and had no capacity to communicate with this population.
3.6.1 SURVEY SUBMISSION SELECTION

In recent years, online survey research has increased significantly, especially in light of COVID-19 restrictions for research data collection (Laylor et al., 2021; Levi et al., 2021). As a
result, there has been an equal increase in online fraudulent survey submissions that researchers now have to suspiciously navigate by implementing specific frameworks and processes for addressing survey fraud and aiding in determinations about the inclusion or exclusion of submissions. Such concerns created challenges for this study’s initial online data collection process.

Despite the implementation of CAPTCHA (completely automated Turing test to tell computers and humans apart) in our parent survey, suspicious and fraudulent submissions were numerous. Of the 1,135 parent submissions received, we concluded that 1,077 (95%) are suspicious or fraudulent, considered untrustworthy, and excluded from the data set. We uncovered a number of conditions alerting to suspicion or fraud submissions including: 1) receiving hundreds of submissions only seconds apart over 24-hours; 2) while also having the same area code and often the same internet service provider (e.g., Yahoo); 3) consecutive surveys having 100% completion progress yet completed in an unusually short duration (e.g., 38 to 300 seconds); 4) phone numbers containing only 9-digits; 5) invalid or gibberish email addresses or those returned ‘delivery failed’; 6) erroneous body height measures (e.g., height = 3’ 3” or 7’ 8”); 7) consecutive surveys using varied contact and geolocation meta-data (IP address and latitude/longitude location) yet using verbatim wording to answer the qualitative questions; and 8) consecutive surveys that follow an email address pattern, for example, first name, last name, three digits, @ yahoo.com (e.g. BirdTessa192@yahoo.com).

The procedure for determining submissions credibility was as follows. First, incoming submissions were tallied by number and quickly scanned for completion. It was found that most fraudulent submissions were completed in their entirety. Second, IP address and latitude/longitude location were assessed. Geolocation meta-data that revealed submissions
outside the Paso del Norte region were immediately flagged as suspicious, while submissions from other countries such as China or Europe were immediately deemed invalid submissions.

Third, contact information from phone and email were checked for validity and patterns of similarity. For example, consecutive submissions using the same area code, phone number, email address or email address pattern were flagged as suspicious. Fourth, survey answers were reviewed for patterns of similarity, duplicity, and/or statistical improbability (for example, verbatim qualitative responses and multiple consecutive submissions describing themselves as transgender). Lastly, attempts to contact flagged submissions often resulted in phones being disconnected or out of service and email addresses returned due to failed delivery.

Surveys that were deemed credible, though having unanswered questions, were accepted if the research team was able to connect with respondents via phone or email to answer missing data.

3.7 PROCEDURE FOR DATA COLLECTION

Phase 1 of data collection commenced by interested parents clicking on a link from a study advertisement that directed them to an online survey tool built by Qualtrics survey software. Parents who “perceive” their teen to have overweight or obesity were permitted to take the survey. Parents were informed of any unanswered survey questions before permitting them to ‘submit’ the survey. Completed surveys were reviewed for eligibility (including calculation of adolescent’s BMI percentile) and those not meeting adolescent eligibility were analyzed separately and were notified that they do not qualify for the parent interview and adolescent interview and survey. After submitting the survey, parents were asked a number of follow-up questions beginning with if they would like to continue participation in the study by consenting to an online web-based interview. If they agreed, they were asked to give their name, email
address and phone number to be contacted for the interview. Parents were also asked if they would consent to their adolescent participating in a similar survey and interview. Parents consenting to their adolescent’s involvement were asked their child’s name and contact information.

Phase 2 of data collection consisted of scheduling an interview with interested parents. A confirmation email was sent to the parent indicating the day, time, and video conference link. The consent/assent form was attached to the email. Adolescents whose parents consented to their participation were contacted via email or phone and asked if they would like to participate. Adolescents agreeing to participate were screened for eligibility via email or by phone and scheduled for a survey and interview if they were eligible. Once scheduled, a confirmation email was sent to the adolescent confirming the day, time, and video conference link with the consent/assent attached. Parent online interviews commenced after a review of the consent/assent form, audio/video recording had begun, and parent consent had been given. Adolescent online interview commenced after a review of the consent/assent form and consent/assent had been captured via audio/video recording. At that time, adolescents were asked to take a break from the current interview process to take the survey but to remain in the video conference software. Once completed, adolescents were instructed to unmute and resume video to inform the interviewer. At that time, audio/video recording resumed with the start of the interview.

3.8 PROCEDURES FOR DATA ANALYSIS

3.8.1 QUANTITATIVE ANALYSIS

All data were analyzed using SPSS version 28. Data analyses entailed univariate and bivariate procedures. Survey data and research questions were analyzed by descriptive and
correlation statistics using Spearman correlation and Fisher’s Exact Test, since these data are not normally distributed.

### 3.8.2a Research Question Analyses

**Research Question 1: Is there an association between parent’s BMI and their negative weight-based talk with their adolescent?**

Parent BMI was assessed for normality using Shapiro-Wilk test for normality. Parent report of negative weight-based talk variables were recoded from 1 = yes, 2 = no to 0 = no 1 = yes. These variables were then computed into a composite score variable. Adolescent report of parent(s) or family member negative weight-based talk variables were recoded from 1 = yes parent(s), 2 = yes family member, 3 = neither parents nor family member to 1 = 1, 1,2 = 1, 2 = 0, 3 = 0. This recoding removed the family member talk, so the research question could be addressed solely based on adolescent report of parent talk and not inclusive of family member talk. Negative weight-based talk variables were computed into a composite score variable with score range of 0 to 5 and. Family member talk was later deduced by compiling the balance of adolescent responses for this n = 17 database. Descriptive statistics were used to calculate the percentage of negative weight-based talk by parents and family members as reported by parent and adolescents. Spearman correlation was used to assess the association between parent BMI and parent and adolescent report of negative weight-based talk.

**Research Question 2: Is there an association between parental dietary restrictions and their adolescent’s unhealthy weight control behaviors?**

Parent restriction variables were recoded from 1 = “not at all true,” 2 = “a little true,” 3 = “pretty much true to,” 4 = “very much true” to a binary variable 0 = no, 1 = yes. Parent restriction variables (8 items) were computed into a composite score variable with a score range
of 0 to 8. Adolescent reported unhealthy weight control behavior variables were recoded from 1 = yes, 2 = no to 0 = no, 1 = yes. Adolescent unhealthy weight control variables (4 items) were computed into a composite score variable with a score range of 0 to 4. Descriptive statistics were used to calculate the percentage of parent dietary restrictions and the percentage of unhealthy weight control behaviors by adolescents. Composite scores for parent dietary restrictions and adolescent unhealthy with control behaviors were assessed for normality using Shapiro-Wilk test for normality. Spearman correlation was used to assess the association between composite scores for parent dietary restrictions and adolescent unhealthy weight control behaviors.

**Research Question 3: Is there an association between parent’s health-focused talk with their adolescent and the parent’s healthy weight control behaviors?**

Parent report of health- and weight-focused talk variables were recoded from 1 = “never,” 2 = “a few times,” 3 = “about once a month,” 4 = “about once a week,” 5 = “every day,” to 0 = “never,” 1 = “a few times,” 2 = “about once a month,” 3 = “about once a week,” 4 = “every day,” Parent report of health- and weight-focused talk variables were divided by health-focused talk and weight-focused talk and only health-focused talk (2 items) were computed into a composite score variable with a score range of 0 to 8. Parent healthy weight control behavior variables were recoded from 1 = yes, 2 = no to 0 = no, 1 = yes. Parent weight control behavior variables (13 items) were computed into a composite score variable with a score range of 0-13. Descriptive statistics were used to calculate the percent frequency of parent health- and weight-focused talk and the percent of parent healthy weight control behaviors. Composite scores for parent health-focused talk and healthy weight control behaviors were assessed for normality using Shapiro-Wilk test for normality. Spearman correlation was used to assess the association between
parent’s use of health-focused talk with their adolescent and parent healthy weight control behaviors.

**Research Question 4:** *Is there an association between the adolescent’s perception of their weight and the parent’s perception of their adolescents’ weight?*

Parent and adolescent perceptions of adolescent weight status were treated as binary categorical variables. Descriptive statistics were used to determine the percent of each level of adolescent weight status as report by parents and adolescents. Percent of parent-adolescent dyad alignment of adolescent weight status was manually calculated. Crosstabulations were used to determine cell counts, where Fisher’s Exact Test was used to assess the association between adolescent’s perception of their weight and their parent’s perception of their adolescents’ weight.

**Research Question 5:** *To what extent is parent report of their negative weight-based talk aligned with adolescent report of parent’s negative weight-based talk?*

Details surrounding data manipulation and tests for normality of parent negative weight-based talk variables, as reported by parents and adolescents, were discussed in research question 1 above. Parent and adolescent alignment reporting of parent negative weight-based talk was manually determined. Spearman correlation was used to assess the correlation between parent and adolescent report of parent negative weight-based talk.

### 3.8.2 Qualitative Analysis

Qualitative interview data, in the form of open-ended questions, were analyzed via thematic analysis to determine where textual coding of data determined patterns of common words, phrases, and ideas to reveal commonalities among participant responses. Qualitative survey data, in the form of open-ended questions, were analyzed via thematic analysis. We developed inductive and deductive coding trees to sort textual data from parent and teen interviews. These
four coding trees were labelled as follows: 1) Facilitators and barriers for healthy weight; 2) Supporters/detractors to making healthy choices/weight; 3) Weight experience; and 4) Program. Trustworthiness in this qualitative analysis was achieved by following criteria established by Lincoln and Guba (Lincoln & Guba, 1985) as presented by Nowell and colleagues (2017) in a five-phase process of thematic analysis (Nowell et al., 2017). Themes were developed inductively by identifying recurring textual data, researcher comments, and code frequencies that manifested like or same experiences. Individual themes were often collapsed due to likeness to form an expanded theme.

3.9 PROTECTION OF RESEARCH PARTICIPANTS AND SUBJECTS

Parent participants who agree to an interview or have their survey data identified and linked with their adolescent’s survey data gave their name and contact information. Similarly, parents who agree to have their adolescent participate in the survey and interview were asked to give their adolescent’s name and contact information so they may be contacted for screening. Participants were assigned a study ID number. All survey and interview data were identified with this study ID. Personal identifiers linking to study IDs were stored in a separate file.

Interview participants were asked to verbally consent and assent their participation to the interview while being audio/video recorded. However, these identifiers were not transcribed. Audio/video recordings from the interviews were transcribed. Personal identifiers were not included in the transcripts and confidentiality will be strictly maintained. Study data, including audio recordings and paper documents, were stored in locked filing cabinets/password protected files and kept for at least 3 years.

Only research team members assigned by the PI were allowed to view data collected. Handwritten interview notes were transferred to digital files kept in password-protected folders.
Other nondescript forms were discarded. No hard copies of data files were created once all data have been input digitally. No names or identifying information were included in research reports and presentations. Participants’ names did not appear on questionnaires or components of the evaluation. Code numbers and contact information was accessible only to authorized research team members.
CHAPTER 4. RESULTS

4.1 QUANTITATIVE DATA

Quantitative data from parent and adolescent survey results are presented as participant demographics, health descriptive data, and bivariate statistical analysis from each of five research questions.

4.1.1 PARTICIPANT DEMOGRAPHICS AND HEALTH DESCRIPTIVE DATA

Surveys were completed by parents and their adolescents. Parent survey demographics and health descriptive data are reported here as valid total parent surveys received \((n = 40)\). Parent survey respondents were mostly female (70.0%) and consisted of 27 mothers, 12 fathers, and 1 aunt parent/guardian with a mean age of 42.3 ± 6.9 years. The majority of parents were Hispanic/Latino (77.5%), transgender (7.7%), and had an education level higher than high school (90.0%). Parents political affiliation was reported as Democrat (48.7%), Republican (15.4%), Independent (25.6%), and other (10.3%). For additional details, see Appendix 4, Table 2.

Based on self-reported height and weight, mean parent BMI was 36.6 ± 12.5 with 95% having tried to lose weight by incorporating lifestyle change (for details of weight loss efforts, see Appendix 4, Table 3). The majority of parents reported their own perceived health as very good or good (62.5%) and their own perceived weight as a little or very overweight (88.2%). All parents reported their child’s weight as a little or very overweight (100%). Subjective social status was assessed, which asked participants to describe the social status of their family and themselves according to the rungs on a ladder – where the top of the 10-rung ladder represents those who are best off. Parents reported subjective social status for family and self of 5.6 ± 2.1 and 5.9 ± 2.4, respectively. On the Figure Rating Scale (scale ranging from 1 to 10), parents reported their body now and the body they want as 7.0 ± 1.4 and 4.6 ± 1.5, respectively. Parents
were also asked to assess their adolescents body using the Figure Rating Scale. Parents reported
their perception of their adolescent’s body and how they wanted their adolescent’s body to be as
7.2 ± 1.6 and 5.4 ± 1.1, respectively. Full details of parent and adolescent demographics and
health descriptives from survey/interview dyads (n = 17) are presented in Appendix 4 (Tables 4–
7).

4.1.2 RESEARCH QUESTIONS

These research questions seek to inform the development of a parent component for an ABT
intervention for adolescents with OW/OB. Questions were developed using components of this
study’s survey while also employing population characteristics that make the Paso del Norte
Region unique. In this mixed-methods design three qualitative and five quantitative questions
will be addressed; the latter are outlined here.

Research Question 1: Is there an association between parent’s BMI and their negative weight-
based talk with their adolescent?

Parents and adolescents (n = 17) were asked to report on five types of negative weight-based
talk (Figure 5. Parents reported on their own negative weight-based talk (blue), and adolescents
reported on negative weight-based talk from their parents (orange) and from other family
members (grey). Parents reported more negative weight-based talk from themselves (32.9%)
than adolescents reported from parents (23.5%, Figure 5). Parent BMI, 38.15 ± 13.9, was not
correlated with parent or adolescent reports of negative weight-based talk from parents (p = .433).
Figure 5

Negative Weight-Based Talk from Parents and Family Members as Reported by Parents and Adolescents

Note. This figure shows the percent of parents and adolescents who reported negative weight-based talk from parents and family members with three different levels of reporting (n = 17). Total average talk from all three levels is also presented.

Research Question 2: Is there an association between parental dietary restrictions and their adolescent’s unhealthy weight control behaviors?

Overall, more parents reported using strategies to restrict or regulate their adolescent’s access to food and using food to reward their adolescent (77.2%) compared to adolescents who reported
those strategies in their parents (58.5%, Figure 6). The majority of adolescents reported using no unhealthy weight control behaviors, but some skip meals (23.5%) or fast for 24 hours or more (11.8%). Parent dietary restrictions were not correlated to adolescent unhealthy weight control behaviors ($p = .116$).

**Figure 6**

*Parental Use of Dietary Restrictions Placed on Adolescents as Reported by Parents and Adolescents*

Note. This figure illustrates the percent of dietary restrictions parents place on their adolescents from eight restriction items ($n = 17$). Total average restrictions from parent and adolescent report is also presented.
**Research Question 3: Is there an association between parent’s health- and weight-focused talk with their adolescent and the parent’s healthy weight control behaviors?**

The majority of parents reported using any healthy weight control behavior more than not using healthy weight control behaviors (71.2% vs 28.8%), and the majority of behaviors (10 of 13) were reported by at least half of the parents (Figure 7).

Parents reported more frequency of health- and weight-focused talk with their adolescents (about once a week) than adolescents reported such talk (a few times). Parent report of health-focused talk (healthy eating and physical activity) was about as frequent as parent report of weight-focused talk (weight or size) (47.1% and 52.9% vs 52.9%, respectively, Figure 8). Parent health- and weight-focused talk was not correlated with parent healthy weight control behaviors ($p = .506$).
Figure 7

*Parent Report of Healthy Weight Control Behaviors*

Note. This figure shows the percent of parents who reported their own use of healthy weight control behaviors (*n* = 17).
Figure 8

Frequency of Parent Health- and Weight-Focused Talk with Their Adolescent

Note. This figure shows the frequency of parent health- and weight-focused talk reported by parents and adolescents (n = 17). Health-focused talk is talk of healthy eating and physical activity. Weight-focused talk is talk about weight and size.

Research Question 4: Is there an association between the adolescent’s perception of their weight and the parent’s perception of their adolescents’ weight?

All parents reported their adolescent’s weight as “a little overweight” or “very overweight” (100%, n = 17). Similarly, all adolescents reported their own weight as “a little overweight” or
“very overweight” (100%). Among the 17-paired parent-adolescent dyads, 11 adolescents and their parents reported matching response to perceived adolescent weight (64.7%, 11 of 17). The remaining six-paired dyads were evenly split: three parents reported their adolescent’s weight under and three parents reported their adolescent’s weight over what the adolescents reported for themselves (See Appendix 4, Tables 5 and 7). Adolescent perception of their weight was not correlated with parent perception of their adolescents’ weight ($p = .350$).

**Research Question 5: To what extent is parent report of their negative weight-based talk aligned with adolescent report of parent’s negative weight-based talk?**

Overall, parents report more negative weight-based talk than their adolescents, with the exception of adolescent report that their parents said their adolescents were fat (29.4% vs. 23.5%, $n = 17$ dyads). Parents reported two items of negative weight-based talk most frequently: saying their adolescent should diet (52.9%) and the foods they eat will make them fat (47.1%, Figure 9). To examine alignment of parent-adolescent dyads regarding history of parent negative weight-based talk from five different negative talk items, we assessed the extent to which parents reported engaging in negative weight-based talk matched adolescent report of parent’s negative weight-based talk (Figure 10). Parent negative weight-based talk was not normally distributed and was correlated with adolescent report of their parent’s negative weight-based talk ($r_s = .475$, $p = .054$).
Figure 9

Reporting of Parent Negative Weight-Based Talk by Parent and Adolescent

Note. This figure shows the difference in percent of parent and adolescent (n = 17) reporting of five-items of parent negative weight-based talk.
Figure 10

Occurrence and Percent Alignment of Parent Negative Weight-Based Talk by Parent-Adolescent Dyads

Note. This figure illustrates the percent alignment, and the occurrence, of five-items of parent negative weight-based talk by parent-adolescent dyads (n=17 dyads).

4.2 QUALITATIVE DATA

Of the 40 parents who completed surveys, 19 agreed to do interviews. Of those 19 interviewed parents, 17 adolescents agreed to be interviewed, with parental consent (11 boys and 6 girls). Of those 17, four were siblings (two interviews with the same parent were completed for both siblings; siblings were discussed separately). The following research questions informed
development of the interview guide (see Appendix 3), and the subsequent themes are summarized below.

Research Question 6: What are the barriers to adolescent weight loss as reported by adolescents and parents?

Research Question 7: What are the facilitators to adolescent weight loss as reported by adolescents and parents?

Research Question 8: What are the desired programmatic components of an adolescent weight loss program, as reported by adolescents and parents?

4.2.1 PARTICIPANT DEMOGRAPHICS

The majority of parents interviewed (n = 19) were female (89.5%) and Hispanic/Latino (78.9%) with a mean age of 41.0 ± 5.5 years and mean BMI of 39.2 ± 13.6; 100% reported having tried to lose weight in the past. The adolescents interviewed (n = 17) were female (35.3%) and Hispanic/Latino (82.4) with a mean age of 15.4 ± 1.5 years and mean BMI of 34.9 ± 5.4. Additional details are provided in Appendix 4 (Tables 8 and 9).

4.3 PARENT THEMES

Four themes emerged from parent interviews: need for increased knowledge and practice of healthy eating active living, negative experiences with pediatric providers, challenges perceived as core to family norms, and perceived apathy of adolescents regarding healthy eating, active living, and weight loss.

4.3.1 KNOWLEDGE AND PRACTICE OF HEALTHY EATING ACTIVE LIVING

Knowledge and practice of healthy eating active living centered on five subthemes: parent lack of healthy eating active living, parent duality in practice of healthy eating active living, unhealthy influence from family members and peers of adolescents, COVID impact on healthy eating and physical activity, and lack of knowledge and practice of healthy eating active living.
eating active living, and parent report of their adolescent’s healthy eating active living and weight loss success.

Parent Lack of Healthy Eating Active Living

Parents generally reported a lack of knowledge surrounding nutrition (e.g. healthy food options and healthy cooking) and physical activity. One mother acknowledged, "I think I feel pretty guilty about it a lot actually, because it’s my responsibility to learn healthy lifestyles and do what’s best for their health.” Parents suggested that their lack of education and awareness of healthy eating active living negatively impact their abilities to recommend, guide, model, and positively influence their adolescent’s attempts toward a healthier weight. Parents are seeking to be empowered with healthy eating active living strategies and expressed feelings of “guilt” and “responsibility” related to being able to “explain it better.” For example, one mother said:

That I’m not really good with healthy foods, that’s why I wanted to do this, to see maybe I could learn something, like, I wanted to get like a nutrition, to see if it could give us ideas for making like breakfast. We don’t even know what to cook anymore.

Parent Duality in Practice of Healthy Eating Active Living

Parents reported being both supporters and detractors of healthy eating active living for their adolescents. They remarked on their attempts to promote healthier choices for their adolescents while also struggling with their own personal desires for less healthier food choices and constraints that effect their physical activity. One mother recounted, “The problem with me is we like sweets. Like right now I’m doing low carb so I don’t buy anything, and then I go crazy and I buy a bunch of candy.” Many parents realize the mixed messaging impact that such supporter/detractor volleying has on their adolescent and seek help to find a realistic solution to promote, for example:
There are days where we’re so tired and that we get fast food, or I’ll text my husband that I’m super craving ice cream and he’ll bring it home, so we encourage him [adolescent], but we have our own behaviors that aren’t the healthiest choices, so we probably sabotage him [adolescent] in those ways.

Time constraints that default to quick fix, fast food meal options and parents’ own struggles to moderate snacking and sweets (“sweet tooth”) place parents in conflicting roles of both supporter and detractor of healthier behaviors. Parents perceive their acts of duality negatively, as represented in the words they use to describe it: “laziness,” “sabotage,” and “hypocrite.” The following mother commented on her struggles to create healthier food choices for herself while also modeling such behaviors to her adolescent.

It’s kinda hard, because I had those same battles myself, but then it’s very easily to grab the munchies and sweet chips, and all the sweet stuff. And then you say, oh, I’ll start tomorrow, and I’ll start tomorrow, and then like, we don’t.

Unhealthy Influence from Family Members and Peers of Adolescents

Parents perceived some family members as not recognizing or simply disregarding the importance of supporting or modeling healthy eating active living for their adolescents. Family members were perceived as unhealthy influencers of healthy eating active living largely due to their personal lifestyle not representing healthy eating active living priorities or that they do not prescribe to positive modeling of healthy eating active living for these adolescent participants. One mother explained:
I think on her dad’s side. They don’t take it too seriously when it comes to 'let’s take care of your weight', or 'let’s take care of the complications with the weight gain', or ‘let’s not eat this, let’s cook a little better’. And there’s not a lot of support in that.

While most parents reported being supportive of healthy eating active living, in some cases the parent was not willing to sacrifice their own preferences in order to create a more supportive environment, as described by this father: “Why am I going to stop drinking Coke just because you guys can’t drink Coke?”

Peers of adolescents were also categorized by parents as being unhealthy influencers. Parents suggest that adolescent peers often pose barriers to their adolescent’s healthier eating and physical activity, “they’ll just eat junk food”, “…they don’t even want to eat healthier food.” As the following mother described:

He is going into high school this year, and he’ll be able to go off campus for lunch, and he’s a finagler, and if he doesn’t have money, I know he can get his friends to buy him food at Taco Bell. So those are things that worry me too.

**COVID Impact on Healthy Eating Active Living**

The impact of COVID on adolescent healthy eating active living has been multifaceted. Psychologically, parents reported COVID has produced feelings of depression, isolation, and anxiety in their adolescents. These effects of COVID have reduced adolescents’ drive to engage life and ultimately reduce their frequency of healthy eating active living activities. Parents reported increased screen time due to online schooling, which led to increased gaming, food consumption, sedentarism, and ignoring personal hygiene. One mother described: “When the pandemic was going on, she became sort of my introvert in her bedroom, not wanting to go anywhere. She didn’t even want to shower at that point.” Another mother explained:
It's been going on for about 2 years, with the onset of this kind of starting around the onset of COVID. I think it got worse with not being able to go out and just being stuck at home. COVID was definitely a barrier to her weight loss strategies.

*Parent Report of Their Adolescent’s Use of Healthy Eating Active Living and Weight Loss Success*

Parents have reported that their adolescents are making associations between their efforts toward healthy eating active living behaviors and their weight loss results. Such associations inevitably help adolescents realize that their healthy behaviors in food and physical activity are having a positive impact. Such realizations promote their continued drive, motivation, and sometimes sustainability of healthy behaviors, while increasing the likelihood of success toward a healthier weight. For example, one mother noted, “He recognizes that if he alters his nutrition behaviors, that he has an effect on his decreased body weight.” Another mother commented, “And when she starts exercising and starts seeing the difference in her body, that’s when she gets a little more motivated. And she keeps doing it.” This mother described:

It's been a few weeks of this, where 2 or 3 times a week he’s had to walk the two miles home from school because the bus stopped running for the day, and he does not like it, it’s very hot. But he was like, ‘On the upside, I think I lost like 10lbs’.

**4.3.2 PEDIATRIC PROVIDERS**

The majority of communication by pediatric health care providers was reported by parents to be lacking or unhelpful. Unhelpful communication fell into two categories: 1) scripted and superficial or 2) negative (biased or blaming). These styles of communication were reported by parents to be a barrier for healthier lifestyle behaviors and detrimental to weight loss.

*Lack of communication*
Some parents indicated their pediatricians did not discuss weight. For example, one father said, “No, I don’t recall that there has been a conversation [about healthy behaviors] ever, even in the heart of [my son’s] biggest weight gain.” Similarly, one mother said, “I don’t see them like interested in helping or telling you information…”

*Scripted and Superficial Communication*

Other parents suggest pediatricians communicate with scripted or superficial suggestions regarding weight loss strategies. In some cases, although parents describe the pediatrician as a facilitator to their adolescent’s weight loss, they also deem such appointments as “meaningless.” When asked if her pediatrician is a facilitator or a barrier to her adolescent’s weight loss, one mother replied, “No, he talks to me [while teen is in the room]. Probably a barrier since he talks to me and not to him.” Another mother spoke of the scriptedness of her pediatrician’s healthy discussion: “…and she [pediatrician] was just like, ‘You need to make sure that you are getting 45 minutes of exercise a day.’”

*Weight Bias, Blaming, and Negative Communication*

Some pediatricians are communicating to adolescents with weight bias and blame exemplified by, “The doctor called me fat,” reported by one teen, and “I’m not happy with you…you look bigger from last time,” said by one pediatrician to another teen. Such cases are prompting anxiety in adolescents prior to their pediatric visit which can severely diminish the facilitation of pediatric messaging toward adolescent weight loss. As one mother described of her son:

Before, he [son’s name] would get mad. He wouldn’t like to be told, ‘You need to lose weight.’ Or he would not like going with the GI doctor, because it was like all this stress about, ‘Oh, I didn’t lose the weight I was supposed to lose,’ or, ‘I didn’t stay
committed to the diet so I didn’t lose weight, and he’s gonna get mad at me.” He was always worried about it.

While some communication may be intended by pediatricians to motivate adolescents, the language is reflective of weight bias that is evidenced by the assertion that weight loss is simply a matter of choosing to do it. For example, one mother described their pediatrician in this way: “Then she tells her from a personal standpoint as well, where she tells her, ‘I know what you can do, and you choose not to.’”

4.3.3 FAMILY NORMS

Family norms negatively affecting adolescent weight were the most commonly reported theme, noted by 16 of 19 parents. Three subthemes included 1) enablers of unhealthy weight and unhealthy behaviors, 2) weight bias/weight stigma, fat shaming, and negative communication, and 3) food representing love and therefore justifying pressure to eat. An additional family norm subtheme barrier was observed by researchers based on types of comments made by parents: authoritarian parenting style. Many parents perceived these family norms to be specific to their Hispanic heritage, as suggested by this mother:

> We used to be fairly traditional about Hispanic food in our home. For example, we always had tortillas in the house because they are such a staple. Now we rarely have them. We always used to make bean and cheese burritos but in the last year or so we have stopped because we feel they are not the healthy choice we’re looking for.

*Enablers of Unhealthy Weight and Unhealthy Behaviors*

Parents reported that family members often enabled and promoted the adolescent to consume unhealthy foods. This enabling was explained as almost an act of defiance of healthy behaviors or even a rite of passage for elderly family members due to seniority or respect. Some parents
noted that family members stigmatized the adolescent’s choice for healthier food behaviors or that attempts to promote moderation in unhealthy foods, which was often the alternative path offered by parents, was inevitably dismantled and disregarded – as noted by this mother: “Yes, Grandma will always have a confrontational response to [son’s name] choosing healthier behaviors.” Another mom described how the grandmother defies the healthy behaviors she has tried to model for her adolescent: “Oh, you know your mom’s crazy so here’s a little bit more. You need to get another burrito or you need an extra helping or serving, or here’s a bag of chips or some candy or something.” One mother described:

   My in-laws talk to the kids a lot on their own and ask what they want, so like they bring boxes of Hot Pockets from Sam’s, and giant bags of chips from Sam’s, and Arizona sweet tea for [my son], and you know, they know the things that they like, and they don’t care what we say, they just bring whatever they want.

**Weight Bias/Weight Stigma, Fat Shaming, and Negative Communication**

Weight bias, fat shaming, and negative communication were reported as being prolific among most family members, as exampled by this mother: “My family speaks Spanish and his nickname was ‘gordito.’ Some of my brothers call him Gordito, but yeah, he’s always been on the heavier side and he gets bullied because of it.” This mother suggested that it is most predominant among older generations of Hispanics and those residing within Mexico. “My parents, they call her *gorda* as like a term of endearment, but for me, I’m like, ‘Don’t call her that, it’s not good.’” This family norm was sometimes reported to be commonplace and without malice, but widely viewed as derogatory and hurtful. Examples from this mother include:
My family in Juarez say ‘[parent’s name]’s kids, you know they eat a lot.’ And so, whenever they see them (my kids) it’s like, ‘ah, she got really fat, you’re too fat, you need to lose some weight’ and they tell everyone, along with my oldest daughter.

I tell her you don’t want to have diabetes and struggle and I tell her I don’t want you to be like this, and there’s more to it than just looking fat. You’re pretty, it’s not that, but you don’t want to get sick out of it.

Food Representing Love and Justifying Pressure to Eat

Parents described a common family norm is that food represents love and therefore pressure to consume excessive amounts of food is acceptable. For example, some parents and adolescents reported explaining to family member their preference for healthier food choices or smaller portion sizes, but family members found these reasons to be insufficient to warrant offending those preparing food or hosting the gathering. For example, these two mothers explained:

There’s going to be a back-end comment or always a stigma [from grandma] if [daughter’s name] were to say, ‘Grandma, I know, but you gave me such a huge portion size, and I’m really not that hungry, can I just eat half of this?’ or ‘Grandma, can I have some more vegetable instead of so much of the mole?’

Her father's family will expect her to eat the food they make. And the idea of food with love is very prevalent for her father's family. The family is upset and sad that food is disregarded or not completely eaten. They say, ‘why don't you eat it all’. Or, ‘you should eat more.’
Despite reporting that family norms are a barrier to adolescents’ weight loss strategies, many parents expressed forgiveness and acceptance of these behaviors. Some parents commented on their explanations and concessions they offered their adolescents when exposed to these negative comments, citing the rationale “you can’t just take it too hard everything that they say” and “you also just have to deal with it too.” The following comments from mothers indicated an overall acceptance of this family norm:

And you know, it’s hard. They’re their only grandparents, and I personally feel like grandparents should be able to spoil their grandchildren however they want, and I wish it wasn’t with food, but that’s typically what it is.

Despite gordito being a term of endearment, so to speak, it is that. Taken in by someone who struggles with their weight as, ‘Ooh, that’s not really cool, but it’s a term of endearment.’

**Authoritarian Parenting**

Authoritarian parenting styles were noted by researchers in the parents’ account of parent-adolescent weight-related communication, which included words such as ‘control,’ and ‘manipulate.’ For example, when one mother was asked if she has any concerns about her adolescent participating in a weight loss treatment program for adolescents, she replied “No, I’ll just have to make her.” Another mother used extreme restriction of foods to remedy a perceived junk food concern: “She feels that even if she eats junk food, if she eats a little bit of it, it’s ok. I tell her we need to cut it out completely.” Similar accounts from this mother and father, respectively, demonstrated authoritarian parenting style:
There were too many limitations, where I felt like I was a helicopter parent, you know, just kind of always monitoring it [adolescent food choices], and then essentially when I wasn't there, she didn’t make the right choice.

Oh, I right away tell him, what have you been eating, what do you need to eat more. That's how we started getting more salad, and you know little dressing, or light dressing, or no dressing.

4.3.4 ADOLESCENT APATHY AND LACK OF SKILLS IN HEALTHY EATING
ACTIVE LIVING AND WEIGHT LOSS

Adolescent Apathy in healthy Eating Active Living and Weight Loss

Parents reported that adolescents are exhibiting a sense of lethargy or minimal to no effort regarding their weight loss strategies and that their adolescents need to be more proactive and less dependent on parents in their weight management. For example, with regards to eating healthier foods, one mother commented, “He'll always say, ‘well if you make it for me.’” Some parents seemed surprised by their adolescent’s lack of concern for their weight status, as reported by these mothers: “She says she’s happy with her body, and there’s nothing wrong with her” and “Well, she doesn't really, I mean she cares [about her weight], but at the same time she doesn't really get it. You know that she has a [weight] problem.” Some parents reported frustration and disdain for their adolescent’s lack of effort toward attaining a healthier weight, as illustrated by this mother’s comment:
I got [my son] a membership at the gym. We live very close to [the gym], so in all actuality, get off your ass and walk if you don’t want to drive. There’s a car sitting in the driveway waiting for you to drive it, but you’re afraid to drive, so that’s your problem.

Adolescents Skipping Meals

Parent report of adolescents skipping meals indicates adolescent lack of skills in healthy eating active living. Over one-third parents report their adolescents are skipping meals and 24% of adolescents reported skipping meals as an unhealthy weight control behavior in surveys. Reasons include school morning time constraints, dislike for school lunches, dieting strategy, and perceived lack of healthy options. For example, three mothers recounted: “Usually he’ll skip breakfast, and then I feel like he’s setting himself up to overeat at lunch, and those types of things.” And, “She doesn't like the food from school but instead of her trying to take something to eat, she just won’t eat.” Lastly, “[Daughter’s name]’s weight loss right now, is she just doesn’t eat. She lost 11lbs actually.”

4.4 ADOLESCENT THEMES

Three themes were identified from adolescent interviews: knowledge and practice of healthy eating active living, family norms, and adolescent appearance.

4.4.1 KNOWLEDGE AND PRACTICE OF HEALTHY EATING ACTIVE LIVING

Knowledge and practice of healthy eating active living centered on three subthemes: parent lack of healthy eating active living, parent duality in practice of healthy eating active living, and adolescent association of healthy eating active living and healthy eating active living effects.

Parent Lack of Healthy Eating Active Living

Adolescents corroborate parent reports that parents lack general knowledge surrounding nutrition, physical activity, healthy food options, and healthy cooking. Adolescent participants
were asked a series of questions designed to address parents’ support of their adolescent’s weight loss, including a question that asked what adolescents would like their parents to learn in an intervention program. Adolescents reported that parents need to be more skilled at offering healthy eating active living strategies and this need is likely the reason why parents are less likely to offer them healthy eating active living advice and guidance, as this son describes: “Uh, on healthy eating, I don’t think they really could give advice. And physical activity, yeah, I don’t think they could give advice on that one either.” Another son explains:

If anything, they don’t push at all. Like they need to push more. I would appreciate it if they would put more effort into like giving me and my brothers the resources to actually lose weight in a healthy way.

*Parent Duality in Practice of healthy eating active living*

Adolescents also corroborate parent report that parents play a dual role as both supporters and detractors of healthy eating active living. Adolescents often express disappointment by the outcomes of such duality, suggesting that their parents frequently make plans or promises regarding healthier eating, dieting, or exercising but then break such plans or promises. This “lack of commitment” and “follow-through that doesn’t materialize” cited by adolescents “diminishes drive” and promotes additional barriers to their weight loss successes. As one son emphasized, “Commitment! Like, if we’re gonna start exercising, commit. Or if we’re going to start going to the gym, like to commit and keep going, or like if we do a diet, commit to it and not break it.” Another son commented: “Because they’ll say, ‘We’re not eating any junk food,’ then there’ll just be junk food in the cabinets and the fridge and stuff. Makes me more think, Oh, if it’s there.... I can eat it.” The following adolescent males highlight their desire for additional support and follow through from parents:
My dad, like he has this habit of saying that we’re going to do things, and then it never happens. [For example] ‘Ok, so we’re going to start on this like paleo diet, ok? We aren’t going to eat like any bread or sugar, right?’ And ‘I'm going to get rid of all the junk food in the house.’ Never got rid of it.

I think like, when my mom gives me advice, like to go outside or eat healthier, I would like to do it, but I don’t know if, like I can do it by myself, but it would be harder for me, because seeing my brother or my mom eating chips, and like running from me, it makes it harder for me.

Adolescent Associations of healthy Eating Active Living and Its Effects

Adolescents have reported their feeling of greater well-being, “accomplishment,” and “greater self-worth,” as a result of their hard work toward healthy eating active living behaviors and the results that ensue. Importantly, adolescents report making associations between engaging in healthy eating active living behaviors and the positive effects such behaviors have on their physique, weight loss, and psyche. One daughter recounted: “When the pandemic hit, my mom ordered the Peloton bike, and we started getting on it, and I started losing weight. I was like 180, and then I dropped like 10lbs.” These associations help to perpetuate further efforts toward healthy behaviors that help to produce a healthier weight, while also helping some adolescents to formulate their own personal strategies toward weight loss success. One daughter reported her strategy for removing temptation to eat junk food: “When I look at something junk food that I want to eat it, I say, ‘[daughters name], stay back. Don’t eat it, you know you want to be healthier,’ and I go to the healthier choice of food.” Another daughter, when asked about facilitators to weight loss, suggested: “Just to feel good afterwards, because I do like the
workout. You go hard and you feel comfortable, and you’re like, ‘Ok, I feel great about it.’”

Another daughter explained:

I have these shorts that fit me so tight, but I hadn’t had them on like in two weeks, until I finally put them on, and they were a little looser on my legs. So, I was like, maybe that running did pay off.

4.4.2 FAMILY NORMS

Like parents, adolescents also reported the belief that their family norms act as a barrier to their weight loss strategies. These barriers fall into four subthemes: enablers of unhealthy weight and unhealthy behaviors, weight bias/weight stigma, fat shaming, and negative communication, food representing love and therefore justifying pressure to eat, and acceptance and allowance for food with love/pressure to eat.

Enablers of Unhealthy Weight and Unhealthy Behaviors

Grandparents and other elderly generations of Hispanic family members were reported mostly as enablers of adolescents’ unhealthy weight and unhealthy weight-control behaviors. As one granddaughter described: “My Grandma, she like goes up to Mom and she’s telling her ‘she’s fine, like her body weight’s ok.’” She continued:

I always went off [my grandma's words to me] of my grandma’s type like, “Oh, my body’s perfect, I don’t need to worry about anything, I instantly regret saying that to the 17yr old me.

Sometimes the enabling rests with parents. In this example the daughter explained that her mom is not very supportive of her weight loss efforts since she believes weight loss is not needed, “My mom, she says, you don’t need to lose weight, you’re beautiful.” Similarly, another
daughter recounted her father’s lack of support, “Because sometimes he’ll be like, ‘why are you working out, or what are you doing?’”

**Weight Bias/Weight Stigma and Negative Communication**

Adolescent participants reported the widespread presence of weight bias/weight stigma, fat shaming, and negative communication among family members, much the way it was reported by parent participants. Often Hispanics suggest these types of communications exist simply because it is their culture, as one son explained: “So, I’m Mexican right, so like a really big thing in Mexican culture is, “Oh, you’re skinny? That’s a good thing. Oh, you’re fat? That’s a bad thing.”

Another adolescent female told a story that indicated the frequency of such communication within their family. She said her grandmother is strict and often remarks that both her mom and herself “need to lose weight,” that she “should go on a diet,” or “eat less.” When it was suggested by the interviewer that her grandma’s comments could instead be perceived as being positive but that grandma perhaps needs help in her message delivery, this adolescent said, “Not really. We’re a family that just says it out like that.”

Notwithstanding, negative weight-based communication and fat shaming are reported as common family dialogue among these two male adolescent participants: “Like they [siblings] call me fat, but I mean my brother can’t really say anything because he’s fat, too.” And, “You need to get more active, you need to eat more healthy foods, you keep eating that and you’ll get fat.” This daughter explained:

My junior year, I was like snacking on potato chips, and they [my aunts] were like, ‘Hey, you need to calm down on your eating,’ because like I ate something huge before, ‘And now you’re eating this now, you need to chill out?’ It made me feel like a slap in the face. and then just after hearing that it’s like, ‘Oh my God, she thinks I’m fat.’
Food Representing Love and Therefore Justifying Pressure to Eat

Adolescents reported many instances of pressure to eat from family members, and while many pleas are given by adolescents to prove why they should not have to consume, expectations by family members for adolescents to eat, or continue to eat, remain steadfast and often forceful. Examples from these two sons include, “Oh, Mijo, you aren’t eating enough, eat more,” and “My tia Marta promotes me to eat when I really don’t want to.”

Often food is prepared and presented as a sign of love from family members. Adolescents reported that rejecting such food can therefore come at quite a price, regardless of their reasons to substantiate their choice not to eat, as noted by this female adolescent:

It’s happened from my grandma and my mom and dad [different households]. Because when I decide to not to eat anymore, like I’m full, I don’t want to eat anymore, they’re like, ‘really? Why? You don’t love me. Go away. You don’t eat my food, I made this with all my love’, and then I force myself a little bit. It’s mostly my dad now [not her mom anymore since her gastric bypass].

Sometimes the desire not to eat was simply a weight loss strategy by the adolescent, which according to this adolescent male was of no consequence to his grandma, “Because when I was on the keto diet, I would reject the food that I can’t eat, but she’d [Grandma] still tell me to eat it.”

In response to overcoming pressure to eat and food with love from family members, many adolescents simply find themselves at a loss in their attempts to resolve the problem or have a common ground with whomever is pressuring food. One adolescent admitted that she has no strategy to overcome these family norms, instead she admits, “I just kinda eat it.” Another female reported, “I was constantly forced to eat a little bit when I wasn’t hungry and I just didn’t want to
get on her bad side on that so I would eat it.” Adolescent reports of feeling guilted into pressures to eat sometimes coincided with their parents simultaneously feeling guilted into the same food pressures, as described by this adolescent male:

Even if my mom sees this happen, she won’t say anything to my grandma because she doesn’t want to upset my grandma either. I feel guilty if I don’t eat what my grandma makes for me and I think my mom might feel guilty too since she knows how much my grandma loves cooking for us.

4.4.3 ADOLESCENT APPEARANCE

Parents and adolescents have reported an awareness for adolescent personal appearance. Sometimes this awareness is manifested as a barrier to their perceived self-image, other times it’s used to drive body image goals and positive healthy behaviors. For example, one boy described, “it’s not like I look at myself and I’m like ‘Wow, I hate myself, but at the same time I really wish I didn’t have these side-boobs.” Conversely, this adolescent uses cosplay as a motivator to attain her “perfect body”, which she uses as “…one of my terms to make weight loss easier for me.”

Adolescent appearance falls under two subthemes, parent report of adolescent hiding their body, and adolescent’s displaying no associations to having an unhealthy weight, while instead being accepting of their OW/OB status.

Parent and Adolescent Report of Adolescents Hiding Body

Parents have reported instances of their adolescents attempting to hide their bodies by wearing oversized clothing or by altering their posture to conceal portions of their body. When parents were asked how they perceived their adolescent’s experience with weight struggles, one father replied: “He thinks he looks too big, so he’ll put another shirt over it so he won’t look too big.” Another parent admitted that she believes the oversized clothes are a tool to hide his
physique: “His comfort zone, because he wears over-sized shirts, not so oversized pants, but that’s his comfort.” One parent related his adolescent’s low confidence to his need to perpetually alter his posture to mask his physique: “I know that it [his body image] greatly affected his confidence, he started altering his posture, shrugging his shoulders forward, almost as though to try and buckle himself and hide his abdominal area.” The adolescent to this parent-adolescent dyad reported a supporting comment.

When I was 12. And just like wearing baggier clothes, like purposely getting oversized things just so I wouldn’t see [attempt to hide midsection], pulling your shirt down a lot to like cover, if the wind was blowing, grab your shirt and push it forward that way the wind wouldn’t show your stomach kind of thing. ...then it just became habit. Same thing with like pulling your chest in a lot instead of just letting it hang out. Almost like your constantly breathed in.

**Recognition of Unhealthy Weight Status and Acceptance of OW/OB**

Adolescents have reported perceptions of having minimal weight struggle or being accepting of their unhealthy weight status. When asked their importance of weight loss on a scale of 1 to 10, one adolescent male reported “about a 4 or a 5.” When probed more, this adolescent agreed to not really having that much of an issue with weight control, then later suggested “I still kind of struggle with my weight problem.” Another adolescent male, when was asked if he had any concerns about discussing his weight in a program, namely being embarrassed to discuss his weight, responded: “Not really, I’m not really ashamed of my weight. I personally think I don’t look that bad.” These adolescent reports coincide with parent reports indicating their adolescents have some level of denial regarding their unhealthy weight status. One mother stated, “She says she’s happy with her body, and there’s nothing wrong with her.” This mother continued:
I think for her, it’s been a little bit of a struggle in the sense that she doesn’t even want to admit. She knows she’s overweight, but she doesn’t even want to address it in any way, shape, or form.

4.5 PROGRAM PREFERENCES

Parents and adolescents were asked their preferences about different aspects of the program that will be developed as a result of this research. Both parents and adolescents seemed willing to commit time on a weekly basis. Time of day/day of week and location of program preferences varied by family circumstances and location of home, work, and school. Three major intervention components surfaced from adolescent responses: 1) parents and adolescents should be in separate learning sessions; 2) intervention program facilitators should have experience in weight loss struggles; and 3) the use of text messaging as an intervention tool.

Separate Learning

Adolescents report that, although their parents’ involvement in the program is essential and welcomed, being in program sessions together with their parents is not desired. Adolescents suggested a number of reasons for this division, such as “embarrassment” and their need to be transparent, which according to adolescents, could not happen in front of their parents. For example, one son described, “It would probably be better if for the most part it was parents and kids separated, because I know for a lot of people, they don’t feel comfortable saying stuff in front of their parents.” It was also predicted by adolescents that parents would not be forthright about what happens at home, as described by this daughter:

If you were to put the parent in the room, they would deny everything because you are the child, like it’s your perspective on what they’re giving you, and then like if you have a
parent here, and they’re just like, “I never give that to you,” and it would just cause tension in the household and you’ll never get anywhere.

Many adolescents gave no rationale for their preference for separation other than to decisively comment against it, as reported by this son: “Different sessions, just don't want them in class with me.” One adolescent offers a more detailed response:

I would say different sessions, just because I feel like if you have kids with their parents, there’s a side that they’re gonna kinda keep closed off. Like I do that. I’m not gonna want to say everything that I feel in front of my parents, so my mom’s going to get all touchy-feely and be like, “Oh, are you ok?” Like, I’d rather them go somewhere else.

Facilitator Preferences

Nearly one-third adolescents reported the need for program facilitators to have personal experience in weight management and weight loss struggles. Relatability was most frequently mentioned as rationale for such experience, as were “trustworthiness” and “motivation,” as noted by this daughter:

Possibly, with like people that actually relate to me, like in that category, like the same weight group and everything, and like how are they feeling? I’m just like, possibly someone that I can relate to, like, ‘Oh, ok, they’ve been through this journey, like I understand what they’re going through.’

Adolescents also mentioned that facilitators should have a physical appearance suggestive of success in their weight loss experiences and that they have overcome struggles to some degree – “They look good” and they have a body that is “fit,” One daughter described: “Something in the middle between looking fit and being someone who looks like they struggle with their weight.”

Text Messaging
Adolescents were asked interview questions that involved facilitator use of motivational text messaging during the intervention. Messaging in this sense was explained as an attempt to stay connected with adolescent participants, to help reiterate and reinforce weight loss goals or strategies that were developed during program sessions, and to reinforce the power of coaching and motivation as tools to aid in adolescent weight loss success. All adolescents (100%) reported that 1) they would appreciate receiving text messages that reminded them of healthy behaviors and goals they had set for themselves, and 2) that text messaging would be an empowering way to communicate with their facilitator. Examples from two sons include: “Yeah, I feel like, if I hadn’t done it and I see like a reminder, I would be like, hey, gotta do it” and “Yes, it would give me motivation and I would feel supported.” Only one participant offered a stipulation to his receiving text messages, which directed the frequency of texting, “Yeah. As long as it’s not too frequent, like once a week.”
CHAPTER 5. DISCUSSION

The purpose of this study was to gather qualitative and quantitative data about parents and adolescents in the Paso del Norte region to inform development of a highly effective group program to support healthy weight loss in adolescents with obesity. This project developed based on input from regional healthcare providers, school health professionals, and parents who articulated the need for such a program.

Descriptive results from the current study indicate that over one-half parents and over one-third adolescents report the occurrence of negative weight-based talk from parents. Negative weight-based talk from family members, residing inside or outside the home, was also assessed and which accounted for more than 40% of adolescent reporting. These data corroborate previous research from family, including talk from parents, siblings, and family, where adolescent reporting of negative weight-based talk from parents and family ranged from 40% to 60% (Berge et al. 2016; Pearlman et al., 2020; Pont et al., 2017; Puhl et al., 2013; Schvey et al., 2019).

The present study found a significant correlation between parent and adolescent reporting of parent negative weight-based talk. Parents generally reported more negative weight-based talk than adolescents reported, with the exception of more “fat” talk reported by adolescents. Conflictingly, among the parent-adolescent dyads, alignment of such talk showed that adolescents among the dyads reported more negative weight-based talk than parents. These contradictions in occurrence from parents has been shown previously (Berge et al., 2015b) and are especially relevant considering the implications that certain words (e.g., “fat”) can have on the negative emotions of adolescent girls while also contradicting adolescent preferred language from parents (e.g., “weight problem,” “unhealthy weight”) (Puhl & Himmelstein, 2018). This
finding is key in helping interventionist develop parent-involved curricula that aid in defining, reducing, and explaining the implications of parent and family negative weight-based talk in adolescent weight-loss behavioral treatment.

Parent restriction of adolescent foods was reported by the majority of parents for all 8 items in the restrictive subscale in five of eight restrictive subscale items (82%) of the modified child feeding questionnaire (CFQ) for adolescents. Restrictions from the remaining three items were greater than 50%. Recent debate around restrictive feeding practices by parents has been prevalent in the field and research results are mixed. Prior research suggests that parent restrictive practices are counterproductive in controlling adolescent weight and dietary intake patterns and can possibly lead to adolescents’ overconsumption and preference for restricted foods and avoidance and dislike for pressured foods (Birch & Fisher, 2000; Fisher & Birch, 1999). In contrast, more recent cross-sectional and prospective research suggests that high parental levels of enforcement in food limits and restriction are associated with improved dietary intake markers (Couch et al., 2014; Johannsen, Johannsen, & Speckler, 2006). Still, Loth and colleagues found food restriction to be positively associated with both healthful (i.e., F/V intake) and unhealthful (i.e., sugar-sweetened beverage intake) adolescent dietary intake (Loth et al., 2016). In this paradoxical realm of food restriction, it is evident that some parental concern for nutrition guidance is required but balance is needed. Interventionists should emphasize that helping parents to understand the delicate balance between agency and relatedness (the autonomous-related self, Figure 3) in the context of supporting healthy lifestyles could be key in navigating these complex interactions. However, further research is needed to conclude best practice in parent food restriction to yield optimal adolescent health impact.
The present study found that half of parents reported engaging in weekly conversations focused on weight, healthy eating, and physical activity (53%, 47%, and 53%, respectively). To put these results into perspective, a meta-analysis finding from associative studies reported that children’s perception of being encouraged to exercise or diet explicitly for weight control is correlated with poorer physical self-perceptions and greater engagement in dieting and dysfunctional eating (Gillison et al., 2016). Findings in the current study support previous research that showed conversations about healthy eating, physical activity, and weight were common and a majority of parents engage in both (Berge et al., 2015a; Winkler et al., 2018). Findings were also correlated among parents who have recently dieted (Winkler et al., 2018), were of Hispanic/Latino populations (Berge et al., 2015a), and perceived their adolescents to be overweight (as opposed to being perceived as about the right weight) (Winkler et al., 2018). In addition, the present study had a lower prevalence of health-focused talk (~50%) and higher prevalence of weight-focused talk (~50%) than did previous studies (≥75%, >25%, respectively) (Winkler et al., 2018). These present data may help to inform interventionists strategies to open safe and effective conversations about health and weight topics with their adolescents. An important strategy used in adult obesity treatment that should be considered for adolescents and their families is to help them understand that obesity is caused by an internal dysregulation of energy storage, not by what they eat or how much they move, but that their diet and physical activity levels are important ways in which they can minimize the health risk associated with the energy storage dysregulation.

Adolescents in the present study reported few unhealthy weight control behaviors but their prevalence for skipping meals (23.5%) is notable. These data, along with our results from negative weight-based talk, reported by 52% of parents, correspond with prior research
documenting associations between negative weight-based talk and the use of unhealthy weight control behaviors (Neumark-Sztainer et al., 2002). In addition, the present study supports previous research that skipping meals was the most abundantly reported unhealthy weight control behavior (Boutelle et al., 2009). Our interview data also indicated health care providers may be encouraging skipping meals. In children and adolescents, it is recommended that meals not be intentionally skipped and eating breakfast is recommended (Monzani et al., 2019).

Hispanic adolescent’s with OW/OB and their parents described many barriers to their adolescents’ weight loss. Often mentioned by adolescents was the lack of healthy eating and active living knowledge and support from parents. Similar accounts were noted from a systematic review of adolescents with obesity attending lifestyle obesity treatment interventions (Jones et al., 2019). The absence of support and knowledge from parents regarding healthy eating active living can lead to misguidance, frustration, and lack of direction felt by adolescents.

Also noted by parents and adolescents was the dichotomous nature of parent behavior in acting as both supporters and detractors of healthy eating active living. These behaviors proved concerning to parents simply because they represent conflicting modeling ideals to their adolescents. They also proved confusing and counterproductive to adolescents because they threatened the execution of their positive and progressive weight loss strategies.

Parents also commented on their discontent for pediatric providers’ communication toward their adolescent’s weight loss, often stating that such communication is either lacking or unhelpful and not without weight bias and blaming. Studies suggest that physicians spend less office-visit time with patients with obesity than patients with a healthier weight (Palad et al., 2019; Pont et al., 2017). This might help explain why parents in the present study felt their pediatrician visits were “meaningless” or that the pediatrician was a barrier to weight loss since
they chose not to talk directly to the child. Parents in the present study also pointed to the use of stigmatizing and blaming language from pediatricians; words like “fat” were used to describe adolescent patients. This corresponds to results from a national study (Puhl et al., 2011) that asked parents to rate the most common words used by pediatricians to describe patient excess body weight. The term “fat” was one of three chosen by parents that was most undesirable and stigmatizing (Puhl & Himmelstein, 2018).

Parents in the present study reported significant impact from COVID-19 mandates and stay-at-home orders on the healthy eating active living practices of adolescents. Some impacts from COVID were positive (e.g. more home-cooked meals and families developing new physical activity routines), but many were negative. Parents reported that depression, isolation, and screen-based sedentary behaviors have contributed to greater challenges for adolescents with OW/OB. Parent concerns about depression concerns here are supported by other research showing that one-in-four adolescents felt clinically depressive symptoms within 1-2 months of COVID lockdown (Vacaru et al., 2022). Importantly, the positive role of the family environment for adolescents’ mental health has been shown to reduce symptoms of depression in times of crisis (Vacaru et al., 2022). Parent concerns for challenges associated with increased adolescent screen-time and sedentary behavior are supported by research that suggests these behaviors are associated with overconsumption of food (Marsh et al., 2013). Concerns escalate when considering that social distancing orders are still in flux and that video game usage among adolescents is soaring (Rundle et al., 2020). These COVID challenges on adolescent health are likely to remain a public health concern, especially in the face of new variants and additional impending COVID restrictions. Interventionists must adopt innovative approaches to support healthy eating active living among COVID norms.
Regarding family norms, most Mexican-American parents (77.5%) in the present study associated their Mexican-American heritage with the prevalence of family member weight stigma, negative weight-based talk, food presented as love and therefore justifying pressure to eat, and enabling unhealthy weight and food behaviors. Berge and colleagues reported that nearly two-thirds of parents thought the influence of their culture promoted the use of weight talk and teasing in the home (Berge et al., 2015b). A national sample of adolescents suggest that weight stigma conversations are most common among adolescents categorized as overweight and in adolescents of Hispanic/Latino or Asian/Hmong descent (Pudney et al., 2019).

Additionally, weight teasing in adolescent girls by family members has been shown to be significantly different across race/ethnicity, with more weight teasing by Hispanic and Asian-American family members compared to whites (Van Den Berg et al., 2008). Other research supports the notion that Hispanics view their traditional Mexican foods as unhealthy and perceive American foods as healthier (Ramirez et al., 2018). Similarly, another study asked Latino teens about their racial/ethnic tendency to be overweight. Most teens reported that the “palatable high fat foods” denoted by their cultural eating were mostly responsible for many Latino youth being “full-figured” or overweight and that such eating was attributed to widespread acceptance of overweight (Barroso et al., 2010). To summarize, all racial/ethnic backgrounds bring differences in culture and the social and behavioral norms that make each culture distinct. Importantly, most adolescents, regardless of race/ethnicity, face weight teasing and weight-based challenges. Those adolescents with overweight are more at risk and those with obesity have extremely high risk of weight teasing (Van Den Berg et al., 2008). Interventionists must help parents and adolescents develop strategies that work within cultural norms to set
respectful and appropriate limits for behaviors that impose barriers to adolescent weight loss and well-being.

Some adolescents in the present study have suggested that their current weight status equates to their minimal weight struggle or simply that they do not agree to having an unhealthy weight. Likewise, parents in the present study reported that their adolescents are exhibiting some level of denial about their unhealthy weight status or that their adolescent is not concerned about their weight. Body positive and body acceptance public health messaging have been created to offset the widespread western cultural, perhaps normative, preoccupation with thinness and dieting. A growing body of literature supports body positivity (Cohen et al., 2019), size acceptance (Sobal, 2017) and frameworks such as Health at Every Size (HAES) (Marks et al., 2020), while countering weight centric approaches. These messages may conflict with basic behavior change theories that govern OW/OB weight management interventions and restrict youth with OW/OB from adopting healthier lifestyles (Maximova et al., 2008). Adolescent weight loss interventionists can create a balance by using health-focused (rather weight-focused) approaches to reduce negative health outcomes from OW/OB. Acceptance-based therapy (ABT) is one such approach that uses mindfulness, acceptance, and self-compassion techniques to increase efficacy of weight management interventions.

In the present study, as a facilitator to adolescent weight loss, about one-half of the parents engaged in health-focused conversation (healthy eating and physical activity) with their adolescents about once a week. A previous study reported much higher prevalence of health-focused talk from healthy eating (82%) and physical activity (75%) conversations (Winkler et al., 2018). Importantly, weight-focused conversation also accounted for about one-half of parents’ conversations from this study.
Preferred intervention program components were also reported in the present study. Adolescents preferred the use of text messaging from the program facilitators to promote encouragement and to reiterate lessons taught and goals created during the course of the program. Adolescents also expressed preference for the program facilitators to have experience in weight loss or weight struggles, citing that this shared comradery promotes facilitator relatability. Similar findings were presented in previous research, where adolescent participants preferred their intervention instructor to have past weight loss experience and be relatable (Lee et al., 2021). Adolescents in the present study also reported the value of parents being part of the intervention process but preferred that parents and adolescents have separate learning experiences. Lee and colleagues reported similar adolescent preferences in recommending that parent involvement be optional during interventions (Lee et al., 2021). This was largely attributed to adolescent perceptions that parents are both facilitators and barriers to adolescent health and though parent education via interventions can support adolescents, not all adolescents share this view. Future interventions should take note of the intersection between the autonomous preferences of adolescents and the guidance/modeling skills that parents can gain through intervention participation.
CHAPTER 6. LIMITATIONS

Limitations of this study include the use of a convenience sample, which was necessary because high-level online fraud from participant surveys disrupted our original intent of broad recruitment through advertising. Though many attempts were made to recruit participants from various areas within this study’s region, most participants (~65%) were eventually selected from the patient portal of a dietetics clinic that collaborated with this study. In addition, only English-speaking participants were contacted for study recruitment because the lead researcher is not bilingual. However, not all aspects of the study were English-only like the interview portion of the study, as parent surveys were available in English and Spanish.

Another limitation was in survey and adolescent interview length. Both parent and adolescent surveys were 86 and 93 questions in length, respectively. Average time taken to complete surveys was 19–21 minutes for parents and 18 minutes for teens. Although parent-adolescent dyad surveys of this study had minimal missing data points, this was largely due to research personnel contacting participants after surveys were received to address missing questions. Many parent surveys, not included in this study, were incomplete and often followed a pattern suggestive of survey fatigue since typically the last one-third of the survey was left incomplete.

In addition, the interviewer’s perception is that adolescents lack developmental skills to contextualize such a program without ever having participated in such a program. Many adolescents did not answer many of the program development questions for reasons of “I don’t know,” or “I’m not sure.” Thus, attaining input from adolescents regarding program preferences may be more useful in the context of the pilot program.

COVID restrictions affected our data collection processes by initially postponing this study’s start date, as IRB protocols were restructured for COVID restriction procedures. Similarly, the
replacement of in-person interviewing with virtual interviewing was another limitation. Technology of virtual communications via video conferencing have advanced tremendously in light of COVID lifestyles. However, it is possible that the lack of in-person interactions impacted interviews.

CHAPTER 7. CONCLUSION

Next steps for this project will be to use the data from the present study to modify adult ABT lesson plans so that content is appropriate for adolescents and consistent with the input from regional adolescents and their parents. We have identified collaborators with expertise in family counseling, communication, and nutrition and culinary arts to partner on development of this adolescent version of ABT. Program components will be developed to address the barriers described above. In addition to the modified ABT content, we will incorporate an online dietary tool developed by the UTHHeath Center for Community Health Impact. This tool, called Small Changes, is a structure program that provides the user autonomy to develop their own meal plan. The program algorithm adjusts recipes and dietary instructions to meet the calorie needs of the user. The meal plan is designed using evidence-based strategies to maximize fat loss, minimize loss of lean mass, and minimize hunger. The Small Changes app was adapted for the Paso del Norte region from one originally developed by Metabologix, a company that was launched for the purpose of using digital tools to scale effective one-on-one clinical weight loss treatment approaches (Dhurandhar & Kulkarni, 1993). This coupling of adolescent ABT+ Small Changes will then be pilot tested in two cohorts of adolescents. A secondary goal of these pilot test studies is to design a training program for facilitators of the ABT+Small Changes program for adolescents. These next steps intend the development of an evidence-based, scalable behavioral and nutrition weight loss program for adolescents in the Paso del Norte region.
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APPENDICES

APPENDIX 1

ABT PARENT SURVEY

First, we are going to ask you a few questions about yourself (the parent), then we will ask you questions about your adolescent child.

1. What is your relationship to the adolescent?
   - Mother
   - Father
   - Stepmother
   - Stepparent
   - Other ____________________

2. Are you Hispanic or Latino?
   - Yes
   - No

3. What is your race? (Select one or more responses)
   - American Indian or Alaska Native
   - Asian
   - Black or African American
   - Native Hawaiian or Other Pacific Islander
   - White

4. Which one of these groups best describes you? (Select only one response)
   - American Indian or Alaska Native
   - Asian
   - Black or African American
   - Hispanic or Latino
   - Native Hawaiian or Other Pacific Islander
   - White

5. In general, would you say your health is…?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor

6. What is your height? ________ feet ________ inches

7. What is your weight? ________ lbs.
8. What is your age? ________
9. Are you male or female?
  - Male
  - Female

10. Some people describe themselves as transgender when they experience a different gender identity from their sex at birth. For example, a person born into a male body, but who feels female or lives as a woman. Do you consider yourself to be transgender?
  - Yes, transgender male-to-female
  - Yes, transgender female-to-male
  - Yes, transgender, gender nonconforming
  - No
  - Don’t know/not sure
  - I don’t wish to answer this question

The next two questions will refer to the PARENTS of your adolescent child

11. [For Mother’s only] What is your highest level of education completed?
   **Mother**
   - 8th grade or less
   - Some high school
   - High school diploma/GED
   - Some college
   - Associate degree
   - Completed tech or vocational school
   - College graduate
   - Some graduate or professional school
   - Graduate or professional degree
   - Don’t know

12. [For Father’s only] What is your highest level of education completed?
   **Father**
   - 8th grade or less
   - Some high school
   - High school diploma/GED
   - Some college
   - Associate degree
   - Completed tech or vocational school
   - College graduate
   - Some graduate or professional school
   - Graduate or professional degree
   - Don’t know

13. What political affiliation do you associate yourself with the most?
   - Democrat
Republican
Independent
Other If so, please indicate here: ____________________

14. Have you ever tried to lose weight before?
   Yes
   No

   If yes, what did you do to try to lose weight?
   Made lifestyle changes (watched eating behavior, more physical activity)
   Jenny Craig
   Weight Watchers
   Fad diet (e.g., Keto, The Paleo, etc.)
   Other If so, please indicate here: ____________________

Now we are going to ask you a few questions about your adolescent child.

15. What is your adolescent’s height? ______ feet ______ inches

16. What is your adolescent’s weight? ______ lbs.

17. Is your adolescent male or female?
   Male
   Female

18. What is your adolescent’s age? ______
The next two questions ask you to refer to the ladder images to answer the questions

19. Imagine that this ladder represents the place that people occupy in *American society*.

- At the top of the ladder are the people who are the best off—they have the most money, the most education, and the respected jobs.
- At the bottom are the people who are the worst off—they have the least money, the least education, and the least respected jobs or no job.

*Now think about your family. Please tell us where you think your family would be on this ladder. Move the slider below to the number that best represents where your family would be on this ladder.*

20. Now imagine that this ladder represents the place that people occupy in their *community*.

- At the top of the ladder are the people who are the best off—they have the most money, the most education, and the respected jobs.
- At the bottom are the people who are the worst off—they have the least money, the least education, and the least respected jobs or no job.

*Now think about yourself. Where would you place yourself on this ladder? Move the slider below to the number that best represents where you would be on this ladder.*

[continue to the next page]
The next two body image questions ask you to discuss how feel about your body.

21. The next question asks how you feel about **YOUR** body. (Please look at the following card showing different body types)

   a. Choose the number here that best describes you now  ______
   b. Choose the number here that you want to be  ______

   ![Males Body Types](image1)
   ![Females Body Types](image2)

22. What is your perceived self-weight at present?
   - Very underweight
   - A little underweight
   - Just right
   - A little overweight
   - Very overweight

23. Please describe how you feel about your body and your weight?
The next two body image questions ask you to discuss how feel about your adolescent's body.

24. The next question asks how you feel about your adolescent’s body. (Please look at the following card showing different body types for adolescents)

a. Choose the number here that best describes how you see your adolescent ______

b. Choose the number here that you want your adolescent to be ______

25. How do you perceive your adolescent’s weight at present?

- Very underweight
- A little underweight
- Just right
- A little overweight
- Very overweight

26. Please describe how you feel about your adolescent’s body and your adolescent’s weight?
27. When your adolescent is at home, how often are you responsible for preparing their meals?
- Never
- Rarely
- Sometimes
- Mostly
- Always

28. How often are you responsible for deciding what your adolescent’s portion sizes are?
- Never
- Rarely
- Sometimes
- Mostly
- Always

29. How often are you responsible for deciding if your adolescent has eaten the right kind of foods?
- Never
- Rarely
- Sometimes
- Mostly
- Always

30. How concerned are you about your adolescent eating too much when you are not around them?
- Not at all concerned
- Slightly concerned
- Somewhat concerned
- Moderately concerned
- Extremely concerned

31. How concerned are you about your adolescent having to diet to maintain a desirable weight?
- Not at all concerned
- Slightly concerned
- Somewhat concerned
- Moderately concerned
- Extremely concerned

32. How concerned are you about your adolescent becoming overweight?
- Not at all concerned
- Slightly concerned
- Somewhat concerned
- Moderately concerned
- Extremely concerned
How true do you feel the following statements are for you? Select a response for every question.

33. I have to watch out that my adolescent does not eat too many sweets (candy, ice cream, cake, or pastries).
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

34. I have to watch out that my adolescent does not eat too many high-fat foods.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

35. I have to watch out that my adolescent does not eat too many of their favorite foods.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

36. I intentionally keep some foods out of my adolescent’s reach.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

37. I offer sweets (candy, ice cream, cake, pastries) to my adolescent as a reward for good behavior.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

38. I offer my adolescent their favorite foods in exchange for good behavior.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

39. If I did not guide or regulate my adolescent’s eating, they would eat too many junk foods.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true
40. If I did not guide or regulate my adolescent’s eating, they would eat too much of their favorite foods.
- Not at all true
- A little true
- Pretty much true
- Very much true

41. My adolescent should always eat all of the food on their plate.
- Not at all true
- A little true
- Pretty much true
- Very much true

42. I have to be especially careful to make sure my adolescent eats enough.
- Not at all true
- A little true
- Pretty much true
- Very much true

43. If my adolescent says “I’m not hungry”, I try to get them to eat anyway.
- Not at all true
- A little true
- Pretty much true
- Very much true

44. If I did not guide or regulate my adolescent’s eating, they would each much less than they should.
- Not at all true
- A little true
- Pretty much true
- Very much true

45. How often do you keep track of the sweets (candy, ice cream, pies, pastry) that your adolescent eats?
- Never
- Rarely
- Sometimes
- Mostly
- Always

46. How often do you keep track of the snack foods (potato chips, Doritos, cheese puffs, etc.) that your adolescent eats?
- Never
- Rarely
- Sometimes
- Mostly
- Always
47. How often do you keep track of the high-fat foods that your adolescent eats?
   - Never
   - Rarely
   - Sometimes
   - Mostly
   - Always

48. How often do you keep track of the sugared beverages that your adolescent drinks?
   - Never
   - Rarely
   - Sometimes
   - Mostly
   - Always

49. How do you feel about your adolescent’s eating patterns and eating habits?

During the past year, did you do any of the following things in order to lose weight or keep from gaining weight? Select a response for every question.

50. Eat fewer calories  ☐ Yes ☐ No
51. Increase exercise level  ☐ Yes ☐ No
52. Eat less high fat foods  ☐ Yes ☐ No
53. Eat less junk foods or sweets  ☐ Yes ☐ No
54. Drink less soda  ☐ Yes ☐ No
55. Drink more water  ☐ Yes ☐ No
56. Do different kinds of exercise  ☐ Yes ☐ No
57. Increase fruits and vegetables  ☐ Yes ☐ No
58. Cut out between meal snacking  ☐ Yes ☐ No
59. Spend less time watching television  ☐ Yes ☐ No
60. Walk more, climb stairs  ☐ Yes ☐ No
61. Spend less time on computer/video games  ☐ Yes ☐ No
62. Weigh yourself  ☐ Yes ☐ No
63. Take laxatives  ☐ Yes ☐ No
64. Take diuretics  ☐ Yes ☐ No
65. Vomit after eating  ☐ Yes ☐ No
66. Smoke cigarettes to help control my weight  ☐ Yes ☐ No
67. Take diet pills or appetite suppressants  ☐ Yes ☐ No
68. Skip meals  ☐ Yes ☐ No
69. Follow a ‘keto’ diet  ☐ Yes ☐ No
70. Follow a structured diet  ☐ Yes ☐ No
71. Fasting for 24 hour or more  ☐ Yes ☐ No
72. Eat more protein  ☐ Yes  ☐ No
73. Eat less meat  ☐ Yes  ☐ No
74. Eat less high carbohydrate foods  ☐ Yes  ☐ No
75. Follow the Paleo Diet  ☐ Yes  ☐ No
76. Eat a certain number of calories each day  ☐ Yes  ☐ No
77. Count amount of calories or fat  ☐ Yes  ☐ No
78. Attend a weight loss group  ☐ Yes  ☐ No
79. Work with a professional  ☐ Yes  ☐ No
80. Write down what I eat  ☐ Yes  ☐ No

81. How often do either you or your spouse/significant other make comments to your adolescent about their weight?
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ Very often

82. How often do you talk about your own weight, shape, or size?
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ Very often

83. How often do you make comments about other people’s weight, shape, or size?
☐ Never
☐ Rarely
☐ Sometimes
☐ Often
☐ Very often

84. How often in the past year have you talked with your adolescent about healthy eating habits?
☐ Never
☐ A few times
☐ About once a month
☐ About once a week
☐ Every day

85. If you have had a conversation about healthy eating habits with your adolescent, please describe the conversation.

86. How often in the past year have you talked with your adolescent about being physically active?
☐ Never
87. If you have had a conversation about being physically active with your adolescent, please describe the conversation.

88. How often in the past year have you talked with your adolescent about their weight or size?
   - Never
   - A few times
   - About once a month
   - About once a week
   - Every day

89. Have you ever said to your adolescent that you think they are fat?
   - Yes
   - No

90. Have you ever teased or made fun of your adolescent about the size or shape of their body?
   - Yes
   - No

91. Have you ever said to your adolescent that they should go on a diet?
   - Yes
   - No

92. Have you ever told your adolescent that the foods they eat will make them fat?
   - Yes
   - No

93. Have you ever told your adolescent that they would look better if they were thinner?
   - Yes
   - No
APPENDIX 2

ABT ADOLESCENT SURVEY

1. Are you Hispanic or Latino?
   ○ Yes
   ○ No

2. What is your race (Select one or more responses)
   ○ American Indian or Alaska Native
   ○ Asian
   ○ Black or African American
   ○ Native Hawaiian or Other Pacific Islander
   ○ White

3. Which one of these groups best describes you? (Select only one response)
   ○ American Indian or Alaska Native
   ○ Asian
   ○ Black or African American
   ○ Hispanic or Latino
   ○ Native Hawaiian or Other Pacific Islander
   ○ White

4. In general, would you say your health is…?
   ○ Excellent
   ○ Very good
   ○ Good
   ○ Fair
   ○ Poor

5. What is your height? ________ feet ________ inches

6. What is your weight? ________ lbs.

7. What is your age? ________

8. What is your sex?
   ○ Male
   ○ Female

9. Some people describe themselves as transgender, genderqueer, or genderfluid when their sex at birth does not match the way they think or feel about their gender. Do you consider yourself transgender, genderqueer, or genderfluid?
   ○ No, I am not transgender, genderqueer, or genderfluid
   ○ Yes, I am transgender, genderqueer, or genderfluid
○ I am not sure if I am transgender, genderqueer, or genderfluid
○ I do not know what this question is asking

10. What is your Mother’s highest level of education completed?
○ 8th grade or less
○ Some high school
○ High school diploma/GED
○ Some college
○ Associate degree
○ Completed tech or vocational school
○ College graduate
○ Some graduate or professional school
○ Graduate or professional degree
○ Don’t know

11. What is your Father’s highest level of education completed?
○ 8th grade or less
○ Some high school
○ High school diploma/GED
○ Some college
○ Associate degree
○ Completed tech or vocational school
○ College graduate
○ Some graduate or professional school
○ Graduate or professional degree
○ Don’t know

12. What political affiliation do you associate yourself with the most?
○ Democrat
○ Republican
○ Independent
○ Other If so, please indicate here: __________________________

13. Have you ever tried to lose weight before?
○ Yes
○ No

If yes, what did you do to try to lose weight?
○ Made lifestyle changes (watched eating behavior, more physical activity)
○ Jenny Craig
○ Weight Watchers
○ Fad diet (e.g., Keto, The Paleo, etc.)
○ Other If so, please indicate here: __________________________
The next two questions ask you to refer to the ladder images to answer the questions

14. Imagine that this ladder pictures how American society is set up

- At the top of the ladder are the people who are the best off—they have the most money, the highest amount of schooling, and the jobs that bring the most respect.

- At the bottom are the people who are the worst off—they have the least money, little or no education, no job or jobs that no one wants or respect.

*Now think about your family. Please tell us where you think your family would be on this ladder. Where would you place yourself on this ladder? Move the slider below to the number that best represents where your family would be on this ladder.*

15. Now assume that the ladder is a way of picturing your school.

- At the top of the ladder are the people in your school with the most respect, the highest grades, and the highest standing.

- At the bottom are the people in your school who no one respects, no one wants to hang around with, and have the worst grades.

*Now think about yourself. Where would you place yourself on this ladder? Move the slider below to the number that best represents where you would be on this ladder.*
The next two body image questions ask you to discuss how you feel about YOUR body.

16. The next question asks how you feel about YOUR body. Please look at the following images showing different body types.

Choose the number here that best **DESCRIBES YOU NOW** ______

Males

Females
17. The next question also asks how you feel about **YOUR** body but in a different way. Please look at the following images showing different body types.

Choose the number here that you **WANT TO BE** ______

![Body Types](image)

18. What is your perceived self-weight at present?
   - Very underweight
   - A little underweight
   - Just right
   - A little overweight
   - Very overweight

19. Please describe how you feel about your body and your weight

20. When you are at home, how often do you prefer to be responsible for preparing your meals?
   - Never
   - Rarely
   - Sometimes
   - Mostly
   - Always
21. How often do you prefer to be responsible for deciding the portion sizes of your meals?
   ○ Never
   ○ Rarely
   ○ Sometimes
   ○ Mostly
   ○ Always

22. How often do you prefer to be responsible for deciding if you have eaten the right kind of foods?
   ○ Never
   ○ Rarely
   ○ Sometimes
   ○ Mostly
   ○ Always

23. How concerned do you think your parent(s) are that you eat too much when they are not around you?
   ○ Not at all concerned
   ○ Slightly concerned
   ○ Somewhat concerned
   ○ Moderately concerned
   ○ Extremely concerned

24. How concerned do you think your parent(s) are that you must diet in order for you to maintain a desirable weight?
   ○ Not at all concerned
   ○ Slightly concerned
   ○ Somewhat concerned
   ○ Moderately concerned
   ○ Extremely concerned

25. How concerned do you think your parent(s) are about you becoming overweight?
   ○ Not at all concerned
   ○ Slightly concerned
   ○ Somewhat concerned
   ○ Moderately concerned
   ○ Extremely concerned

How true do you feel the following statements are for you? Select a response for every question.

26. My parent(s) think they have to watch out that I do not eat too many sweets (candy, ice cream, cake, or pastries).
   ○ Not at all true
   ○ A little true
   ○ Pretty much true
   ○ Very much true
27. My parent(s) think they have to watch out that I do not eat too many high-fat foods.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

28. My parent(s) think they have to watch out that I do not eat too many of my favorite foods.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

29. My parent(s) intentionally keep some foods out of my reach.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

30. My parent(s) offer me sweets (candy, ice cream, cake, pastries) as a reward for my good behavior.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

31. My parent(s) offer me my favorite foods in exchange for my good behavior.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

32. My parents think that they have to guide or regulate my eating so I don’t eat too many junk foods.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

33. My parent(s) think that if they did not guide or regulate my eating, I would eat too much of my favorite foods.
   - Not at all true
   - A little true
   - Pretty much true
   - Very much true

34. My parent(s) think that I should always eat all the food on my plate.
   - Not at all true
   - A little true
35. My parent(s) think that they have to be especially careful to make sure I eat enough.
- Not at all true
- A little true
- Pretty much true
- Very much true

36. If I say I’m not hungry, my parent(s) try to get me to eat anyway.
- Not at all true
- A little true
- Pretty much true
- Very much true

37. My parents think that if they did not guide or regulate my eating, I would eat much less than I should.
- Not at all true
- A little true
- Pretty much true
- Very much true

38. How often do your parent(s) keep track of the sweets (candy, ice cream, pies, pastry) that you eat?
- Never
- Rarely
- Sometimes
- Mostly
- Always

39. How often do your parent(s) keep track of the snack foods (potato chips, Doritos, cheese puffs, etc.) that you eat?
- Never
- Rarely
- Sometimes
- Mostly
- Always

40. How often do your parent(s) keep track of the high-fat foods that you eat?
- Never
- Rarely
- Sometimes
- Mostly
- Always

41. How often do your parent(s) keep track of the sugared beverages that you drink?
- Never
- Rarely
42. How do you feel about your eating patterns and eating habits

**During the past year, did you do any of the following things in order to lose weight or keep from gaining weight? Select a response for every question.**

43. Eat fewer calories  ☐ Yes  ☐ No
44. Increase exercise level  ☐ Yes  ☐ No
45. Eat less high fat foods  ☐ Yes  ☐ No
46. Eat less junk foods or sweets  ☐ Yes  ☐ No
47. Drink less soda  ☐ Yes  ☐ No
48. Drink more water  ☐ Yes  ☐ No
49. Do different kinds of exercise  ☐ Yes  ☐ No
50. Increase fruits and vegetables  ☐ Yes  ☐ No
51. Cut out between meal snacking  ☐ Yes  ☐ No
52. Spend less time watching television  ☐ Yes  ☐ No
53. Walk more, climb stairs  ☐ Yes  ☐ No
54. Spend less time on computer/video games  ☐ Yes  ☐ No
55. Weigh yourself  ☐ Yes  ☐ No
56. Take laxatives  ☐ Yes  ☐ No
57. Take diuretics  ☐ Yes  ☐ No
58. Vomit after eating  ☐ Yes  ☐ No
59. Smoke cigarettes to help control my weight  ☐ Yes  ☐ No
60. Take diet pills or appetite suppressants  ☐ Yes  ☐ No
61. Skip meals  ☐ Yes  ☐ No
62. Follow a ‘keto’ diet  ☐ Yes  ☐ No
63. Follow a structured diet  ☐ Yes  ☐ No
64. Fasting for 24 hour or more  ☐ Yes  ☐ No
65. Eat more protein  ☐ Yes  ☐ No
66. Eat less meat  ☐ Yes  ☐ No
67. Eat less high carbohydrate foods  ☐ Yes  ☐ No
68. Follow the Paleo Diet  ☐ Yes  ☐ No
69. Eat a certain number of calories each day  ☐ Yes  ☐ No
70. Count amount of calories or fat  ☐ Yes  ☐ No
71. Attend a weight loss group  ☐ Yes  ☐ No
72. Work with a professional  ☐ Yes  ☐ No
73. Write down what I eat  ☐ Yes  ☐ No
74. How often does your parent(s) make comments about your weight?
○ Never
○ Rarely
○ Sometimes
○ Often
○ Very often

75. How often does your parent(s) talk about their own weight, shape, or size?
○ Never
○ Rarely
○ Sometimes
○ Often
○ Very often

76. How often does your parent(s) make comments about other people’s weight, shape, or size?
○ Never
○ Rarely
○ Sometimes
○ Often
○ Very often

77. How often in the past year, have your parent(s) talked with you about healthy eating habits?
○ Never
○ A few times
○ About once a month
○ About once a week
○ Every day

78. If you have had a conversation about healthy eating habits with your parent(s), please describe the conversation.

79. How often in the past year, have your parent(s) talked with you about being physically active?
○ Never
○ A few times
○ About once a month
○ About once a week
○ Every day

80. If you have had a conversation about being physically active with your parent(s), please describe the conversation.
81. How often in the past year, have your parent(s) talked with you about your weight or size?
- Never
- A few times
- About once a month
- About once a week
- Every day

The following questions can have more than one answer (check all that apply):

82. Have either your parent(s) or another family member ever said you were fat?
- Yes, parent(s)
- Yes, a family member
- Neither parents nor family member

83. Have either your parent(s) or another family member ever teased you or made fun of you about the size or shape of your body?
- Yes, parent(s)
- Yes, a family member
- Neither parents nor family member

84. Have either your parent(s) or another family member ever said that you should go on a diet?
- Yes, parent(s)
- Yes, a family member
- Neither parents nor family member

85. Have either your parent(s) or another family member ever said that you eat food that will make you fat?
- Yes, parent(s)
- Yes, a family member
- Neither parents nor family member

86. Have either your parent(s) or another family member ever said that you would look better if you were thinner?
- Yes, parent(s)
- Yes, a family member
- Neither parents nor family member
APPENDIX 3

PARENT INTERVIEW MODERATOR GUIDE

Parent Remote Interviewer Guide

Acceptance-Based Therapy Weight Loss Program for Adolescents

Transition:
- Give us your first name or a name you’d like to be called.

Transition: I’d like to get some general feedback about the following. All input is useful here.
- Has your adolescent ever struggled with their weight?
  - What was that experience like for them?
  - What was that experience like for you?
  - What do you think contributes to your child’s weight struggles?
  - What do you think makes it hard your adolescent to lose weight?
  - What do you think helps your adolescent to lose weight?
- Does your pediatrician talk to your adolescent about their weight?
  - Do you feel that your adolescent’s pediatrician is a facilitator or barrier to your adolescent’s weight loss?
  - Does your child make comments about their pediatrician visit if weight loss has been discussed?
• Who are the people in your adolescent’s life who support him/her in making healthy choices?

• Who are the people in your adolescent’s life that make it hard for him/her to make healthy choices?

• Have you ever struggled with your weight?

• Do members of your family comment on your adolescent’s weight, the types or amounts of food he/she eats, or their physical activity level?

• If your adolescent were to ask you advice about healthier eating and physical activity, how do you feel about responding to them?

• How do you feel about communicating health information to your adolescent?

Transition: Thank you again for your feedback. Now let’s talk about living in the Border Region. Being of a predominantly Hispanic environment, are there any cultural implications that act as barriers or benefits to your attempts to leading a healthier lifestyle? An example of a barrier might be that Grandma sometimes makes unhealthy food and a benefit is that Grandma cooks for you.

• Do you experience any cultural implications in your home or extended home environments?

Transition: I’m now going to ask your thoughts about specific components of a weight loss program for adolescent’s. When I talk about a weight loss program, I am talking about a program that includes three components:

1. Education and recommendations for nutrition
2. Education and recommendations for physical activity
3. Teaching strategies to help your teen make behavior changes in their life (ex. this may include skills that help them choose to eat an apple instead of a piece of cake.)

The weight loss program we will be conducting will be in-person group sessions that meet for six months. Now, I’m going to ask you about your thoughts on how a weight loss program for adolescents should be delivered.

• Would you support your adolescent participating in a weight loss program like this?
• If NO, probe why

  • Would you be willing to participate in a parent component of this program?

  • If no, ask why

  • Do you have any concerns related to you and your adolescent participating in a weight loss program for adolescents.

  • (Probes to be used if not brought up by individual):
    o …being embarrassed to discuss your weight or your teen’s weight?

      ▪ What would it take to overcome that?

    o …being able to find time to participate or fitting it into your schedule?

      ▪ What would it take to overcome that?

    o …those around you, such as family and friends, not being supportive?

      ▪ What would it take to overcome that?

    o …a program might ask you and your adolescent to do things you don’t want to do, such as exercise more than you want to or eat differently than you normally do?

      ▪ What would it take to overcome that?

• What type of time commitment is possible for you and your adolescent to participate in a weight loss program?

  • Probe on frequency and duration of session time for adolescent and parent.
Final Thoughts and Thank You

Wrap-Up: Thank you for your participation and thoughtful feedback today. We really appreciate it. We just have one final question.

• Do you have any additional thoughts or any feedback you would like to give?
Transition: Thank you so much for sharing those experiences with us. We know how difficult it can be to talk about weight. Like the previous questions, we are interested in your general feedback. Anything you have to say is important and useful here.

- What are some things that make it hard to lose weight?

  - Do you experience any of these barriers? If so, which ones?
  - Who do you live with?
  - Do you feel supported by your family members?
  - On a scale from 1 to 10, how supportive are your parents in your efforts to lose weight?
  - How do they or what do they do to help support your efforts to lose weight?
  - Do members of your family comment on your weight, the types or amounts of food you eat, or your physical activity level?

- Who are the people in your life who support you in making healthy choices? Who in your life makes it hard for you to make healthy choices?

- What are some things that make it easier to lose weight?

  - How did you learn these things that make it easier to lose weight?
  - Have you done any of these things? If so, have they been helpful?
• How do you feel about getting advice from your parents about healthier eating and physical activity?

Transition: I’m now going to ask your thoughts about specific components of a weight loss program. When I talk about a weight loss program, I am talking about a program that includes three components:

4. Education and recommendations for nutrition
5. Education and recommendations for physical activity
6. Teaching strategies to help you make behavior change in your life (ex. This may include skills that help you choose to eat an apple instead of a piece of cake.)

The weight loss program we will be conducting will be in-person group sessions that meet for six months. Now, I’m going to ask you about your thoughts on how a weight loss program for adolescents should be delivered.

• Please tell me about any concerns related to attending a weight loss program for adolescents.

• (Probes to be used if not brought up by group):
  o …being embarrassed to discuss weight?

  ▪ What would it take to overcome that?

  o …being able to find time to participate or fitting it into your schedule?

  ▪ What would it take to overcome that?

  o …those around you, such as family and friends, not being supportive?

  ▪ What would it take to overcome that?

  o …a program might ask you to do things you don’t want to do, such as exercise more than you want to or eat differently than you normally do?

  ▪ What would it take to overcome that?
Transition: [If you were to enroll] in a weight loss program, is there a specific person or type of person you would like to lead (be in charge of/run) the program? In other words, I want you to describe the type of person you would want to hear information from and what it is about them that would make you want to participate in the program?

- What does this person look like?
- Is this person a man or a woman?
- How old is this person?
- What kind of expertise would they have?

- How do you feel about having your parents or a family member be part of the program?
  - If “yes” to parents or family member:
    - Which part(s) of the program do you think they should be part of?

  - Would you want them in the sessions with you or would you want them to be part of different sessions?

- What would you want your parents or family members to learn about in the program?

- If “no” to parents or family member:
  - What are some reasons you do not want your parents involved in the program?

- Who else/what other people do you believe would be important to involve in the program? Why?

- What type of time commitment would you be willing to give in order to participate in a weight loss program?

- Where would you like for the program to be conducted?
• What do you want the message of the intervention to be (health, weight, diet, physical activity, being strong)?

Transition: Thank you again for your feedback. Now let’s talk about living in the Border Region. Being of a predominantly Hispanic environment, are there any cultural implications that act as barriers or benefits to your attempts to leading a healthier lifestyle? An example of a barrier might be that Grandma sometimes makes unhealthy food and a benefit is that Grandma cooks for you.
• Do you experience any cultural implications in your home or extended home environments?

Transition: Thanks again for your helpful feedback… now, we are going to talk more about food diaries. Do you know what a food diary is?
• If yes: What can you tell me about them? What has your experience been with food diaries?

• If no, briefly explain what they are and why they are important.
  o Show examples of a written food diary and an online tracking system where you enter the last 24 hours of everything you have eaten.) Here is an example of two ways that are used to record your food and beverage intake. The online system can be used on a phone, tablet, or computer.
• Feedback on the two examples:
  o How would you feel about keeping a food diary?

  ▪ Do you think it would be helpful to you personally (why or why not)?

  o If you had to choose between the written food diary and the online 24-hour tracking system, which would you be more likely to use? Why?

• Would you appreciate receiving text messages from a program instructor or health coach that remind you of the healthy behaviors goals you have set for yourself?
If so, would text messaging be an empowering way for your instructor/nutritionist to communicate with you?

Closing Questions

Transition: We really appreciate your thoughts on the process of modifying the weight loss program to fit the needs of adolescents. We just have a few more questions.

• How could the program be further improved to engage or involve adolescents or make it more relevant to adolescents?

• What would be some of the best ways to recruit adolescents into a weight loss program or make them want to be a part of such a program?

• How do we find adolescents that would be interested in a weight loss program?

• What should we say to them?

• Where should we place information about the program?

• When should we give them the information?

• What should the posters/flyers say on them (kids engaging in physical activity, what body size, racial/ethnic diversity)?

• Ask similar questions if they suggest involving parents.

Final Thoughts and Thank You

Wrap-Up: Thank you for your participation and thoughtful feedback today. We really appreciate it. We just have one final question.

• Do you have any additional thoughts or any feedback you would like to give?
### APPENDIX 4

### TABLES OF DEMOGRAPHICS AND DESCRIPTIVES HEALTH DATA

#### Table 2

*Parent Survey (n = 40) Demographics by Sex*

<table>
<thead>
<tr>
<th>Variable</th>
<th>All (n = 40)</th>
<th>Sex</th>
<th></th>
<th></th>
</tr>
</thead>
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<td></td>
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<td>Female (n = 28)</td>
<td>Male (n = 12)</td>
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<tr>
<td>Relationship to adolescent (%)</td>
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<td>Hispanic/Latino (%)</td>
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<td>82.1</td>
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<td>66.7</td>
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<td>Multiple Race (%)</td>
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<td>25</td>
<td></td>
<td>12</td>
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<td>American Indian/Alaska Native</td>
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<td>American Indian/Alaska Native</td>
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<td>0</td>
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<tr>
<td>Asian</td>
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<td>Transgender (%)</td>
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<td>------------------------------------------</td>
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<td>High school diploma/GED</td>
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<td>Graduate or professional degree</td>
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<td>Some college</td>
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<td>10.7</td>
<td>25.0</td>
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<tr>
<td>Associate degree</td>
<td>5.0</td>
<td>3.6</td>
<td>8.3</td>
</tr>
<tr>
<td>Completed tech or vocational school</td>
<td>2.5</td>
<td>3.6</td>
<td>0</td>
</tr>
<tr>
<td>College graduate</td>
<td>17.5</td>
<td>7.1</td>
<td>41.7</td>
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<tr>
<td>Some graduate or professional school</td>
<td>5.0</td>
<td>3.6</td>
<td>8.3</td>
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<tr>
<td>Graduate or professional degree</td>
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<td>8.3</td>
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<td>-------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>-----</td>
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<tr>
<td>All - moderate 1, not disclosing 1, none 2</td>
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Table 3

*Parent Survey (n = 40) Health Descriptives by Sex

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<td>Subjective social status family*</td>
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<td>Subjective social status self*</td>
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<td>5.9 (2.4)</td>
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<tr>
<td>Figure Rating Scale body now*</td>
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<td>7.0 (1.4)</td>
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<tr>
<td>Figure Rating Scale body want*</td>
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<td>4.6 (1.5)</td>
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<tr>
<td>Parent perceived Figure Rating Scale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>adolescent body now (parametric)*</td>
<td>38</td>
<td>7.2 (1.6)</td>
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<tr>
<td>Parent want Figure Rating Scale</td>
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<td></td>
</tr>
<tr>
<td>adolescent body (parametric)*</td>
<td>38</td>
<td>5.4 (1.1)</td>
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<td>Perceived health (%)</td>
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<td>Very good</td>
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<td>Good</td>
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<td>Fair</td>
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<td>27.5</td>
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<td>Poor</td>
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<tr>
<td>Tried to lose weight (%)</td>
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<td>How tried lose weight (%)</td>
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<td>28</td>
</tr>
<tr>
<td>Made lifestyle changes (watched eating behavior, more physical activity)</td>
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<td>71.4</td>
</tr>
<tr>
<td>Jenny Craig</td>
<td></td>
<td>5.3</td>
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<tr>
<td>Weight Watchers</td>
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<td>5.3</td>
</tr>
<tr>
<td>Fad diet (e.g., Keto, The Paleo, etc.)</td>
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<td>7.1</td>
</tr>
<tr>
<td>Other</td>
<td>7.9</td>
<td>10.7</td>
</tr>
<tr>
<td>All - 'no reply' 2, 'all of the above' 1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Perceived self-weight (%) |  |
| A little underweight | 2.5 | 3.6 | 0 |
| Just right | 12.5 | 3.6 | 33.3 |
| A little overweight | 45.0 | 39.3 | 58.3 |
| Very overweight | 40.0 | 53.6 | 8.3 |

| Parent perceived adolescent weight (%) |  |
| A little underweight | 2.5 | 3.6 | 0 |
| Just right | 5.0 | 0 | 16.7 |
| A little overweight | 62.5 | 60.7 | 66.7 |
| Very overweight | 30.0 | 35.7 | 16.7 |

| BMI* | 38 | 36.6 (12.5) | 26 | 39.7 (13.1) | 12 | 29.8 (8.2) |

*Note. * indicates mean (SD)*
Table 4

*Parent Surveys (n = 17) Demographics by Sex*

<table>
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<tr>
<th>Variable</th>
<th>All (n = 17)</th>
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<tr>
<td>Relationship to adolescent (%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>82.4</td>
<td>93.3</td>
<td>0</td>
</tr>
<tr>
<td>Father</td>
<td>11.8</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Other (Aunt/guardian)</td>
<td>5.9</td>
<td>6.7</td>
<td>0</td>
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<tr>
<td>Age (years, mean ± SD) (parametric)</td>
<td>41.5 (5.0)</td>
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<td>Sex (% female)</td>
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<td>88.2</td>
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<tr>
<td>Hispanic/Latino (%)</td>
<td>76.5</td>
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<td>50.0</td>
</tr>
<tr>
<td>Multiple Race, n = 15 (%)</td>
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<tr>
<td>White</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Single Race (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
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<td>73.3</td>
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<tr>
<td>White</td>
<td>29.4</td>
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<td>50.0</td>
</tr>
<tr>
<td>Transgender (%)</td>
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<tr>
<td>No</td>
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<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Mother education (%)</td>
<td></td>
<td></td>
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<tr>
<td>High school diploma/GED</td>
<td>5.9</td>
<td>6.7</td>
<td>0</td>
</tr>
<tr>
<td>Some college</td>
<td>41.2</td>
<td>33.3</td>
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<tr>
<td>Associate degree</td>
<td>5.9</td>
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<td>0</td>
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<tr>
<td>Completed tech or vocational school</td>
<td>11.8</td>
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<tr>
<td>College graduate</td>
<td>23.5</td>
<td>26.7</td>
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<tr>
<td>Some graduate or professional school</td>
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<td>13.3</td>
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<tr>
<td>Father education (%)</td>
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</tr>
<tr>
<td>-----------------------------------------------------</td>
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<tr>
<td>Some high school</td>
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<td>35.3</td>
<td>0</td>
<td>50.0</td>
</tr>
<tr>
<td>Do not know</td>
<td>11.8</td>
<td>13.3</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Political affiliation, n = 16 (%)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Democrat</td>
<td>37.5</td>
<td>35.7</td>
<td>0</td>
</tr>
<tr>
<td>Republican</td>
<td>25</td>
<td>28.6</td>
<td>0</td>
</tr>
<tr>
<td>Independent</td>
<td>18.8</td>
<td>21.4</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>18.8</td>
<td>14.3</td>
<td>100</td>
</tr>
</tbody>
</table>

All - moderate 1, none 2
### Table 5

*Parent Survey (n = 17) Health Descriptives by Sex*

<table>
<thead>
<tr>
<th>Variable</th>
<th>All</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 17)</td>
<td>(n = 15)</td>
<td>(n = 2 )</td>
</tr>
<tr>
<td>Subjective social status family*</td>
<td>5.4 (2.5)</td>
<td>5.1 (2.5)</td>
<td>7.0 (1.4)</td>
</tr>
<tr>
<td>Subjective social status self*</td>
<td>5.4 (2.5)</td>
<td>5.4 (2.5)</td>
<td>5.5 (3.5)</td>
</tr>
<tr>
<td>Figure Rating Scale body now*</td>
<td>6.7 (1.7)</td>
<td>7.1 (1.2)</td>
<td>3.5 (0.7)</td>
</tr>
<tr>
<td>Figure Rating Scale body want*</td>
<td>4.3 (0.9)</td>
<td>4.5 (0.5)</td>
<td>2.5 (0.7)</td>
</tr>
<tr>
<td>Parent perceived Figure Rating Scale adolescent body now (parametric)*</td>
<td>7.3 (1.5)</td>
<td>7.2 (1.5)</td>
<td>8.0 (1.4)</td>
</tr>
<tr>
<td>Parent want Figure Rating Scale adolescent body (parametric)*</td>
<td>5.1 (1.0)</td>
<td>5.1 (1.1)</td>
<td>4.5 (0.7)</td>
</tr>
<tr>
<td>Perceived health (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>11.8</td>
<td>6.7</td>
<td>50.0</td>
</tr>
<tr>
<td>Good</td>
<td>47.1</td>
<td>46.7</td>
<td>50.0</td>
</tr>
<tr>
<td>Fair</td>
<td>23.5</td>
<td>26.7</td>
<td>0</td>
</tr>
<tr>
<td>Poor</td>
<td>17.6</td>
<td>20.0</td>
<td>0</td>
</tr>
<tr>
<td>Tried to lose weight (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>How tried lose weight (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made lifestyle changes (watched eating behavior, more physical activity)</td>
<td>70.6</td>
<td>66.7</td>
<td>100</td>
</tr>
<tr>
<td>Jenny Craig</td>
<td>5.9</td>
<td>6.7</td>
<td>0</td>
</tr>
<tr>
<td>Weight Watchers</td>
<td>5.9</td>
<td>6.7</td>
<td>0</td>
</tr>
<tr>
<td>Fad diet (e.g., Keto, The Paleo, etc.)</td>
<td>11.8</td>
<td>13.3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>Other</td>
<td>5.9</td>
<td>6.7</td>
<td>0</td>
</tr>
<tr>
<td>All - no reply</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Perceived self-weight (%)**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Just right</td>
<td>11.8</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>A little overweight</td>
<td>35.3</td>
<td>40.0</td>
<td>0</td>
</tr>
<tr>
<td>Very overweight</td>
<td>52.9</td>
<td>60.0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Parent perceived adolescent weight (%)**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A little overweight</td>
<td>58.8</td>
<td>60.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Very overweight</td>
<td>41.2</td>
<td>40.0</td>
<td>50.0</td>
</tr>
</tbody>
</table>

**BMI***

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>38.2 (13.9)</td>
<td>39.5 (14.3)</td>
<td>28.3 (1.3)</td>
<td></td>
</tr>
</tbody>
</table>

*Note. * indicates mean (SD)
Table 6  
Adolescent Survey ($n = 17$) Demographics by Sex

<table>
<thead>
<tr>
<th>Variable</th>
<th>All ($n = 17$)</th>
<th>Female ($n = 6$)</th>
<th>Male ($n = 11$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years, mean ± SD)</td>
<td>15.4 (1.5)</td>
<td>15.2 (1.9)</td>
<td>15.5 (1.2)</td>
</tr>
<tr>
<td>Sex (% female)</td>
<td>35.3</td>
<td>100.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Hispanic/Latino (%)</td>
<td>82.4</td>
<td>100.0</td>
<td>72.7</td>
</tr>
<tr>
<td>Multiple Race, $n = 15$ (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Single Race (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>76.5</td>
<td>83.3</td>
<td>72.7</td>
</tr>
<tr>
<td>White</td>
<td>23.5</td>
<td>16.7</td>
<td>27.3</td>
</tr>
<tr>
<td>Transgender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No, I am not transgender, genderqueer, or genderfluid</td>
<td>88.2</td>
<td>83.3</td>
<td>90.9</td>
</tr>
<tr>
<td>Yes, I am not transgender, genderqueer, or genderfluid</td>
<td>11.8</td>
<td>16.7</td>
<td>9.1</td>
</tr>
<tr>
<td>Mother education (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>11.8</td>
<td>16.7</td>
<td>9.1</td>
</tr>
<tr>
<td>Some college</td>
<td>17.6</td>
<td>33.3</td>
<td>9.1</td>
</tr>
<tr>
<td>Associate degree</td>
<td>11.8</td>
<td>0</td>
<td>18.2</td>
</tr>
<tr>
<td>Completed tech or vocational school</td>
<td>17.6</td>
<td>16.7</td>
<td>18.2</td>
</tr>
<tr>
<td>College graduate</td>
<td>5.9</td>
<td>0</td>
<td>9.1</td>
</tr>
<tr>
<td>Some graduate or professional school</td>
<td>5.9</td>
<td>0</td>
<td>9.1</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>17.6</td>
<td>16.7</td>
<td>18.2</td>
</tr>
<tr>
<td>Do not know</td>
<td>11.8</td>
<td>16.7</td>
<td>9.1</td>
</tr>
<tr>
<td>Father education (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education Level</td>
<td>% Democratic</td>
<td>% Republican</td>
<td>% Independent</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>---------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Some high school</td>
<td>17.6</td>
<td>33.3</td>
<td>9.1</td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>17.6</td>
<td>33.3</td>
<td>9.1</td>
</tr>
<tr>
<td>Some college</td>
<td>5.9</td>
<td>0</td>
<td>9.1</td>
</tr>
<tr>
<td>Completed tech or vocational school</td>
<td>5.9</td>
<td>16.7</td>
<td>0</td>
</tr>
<tr>
<td>College graduate</td>
<td>5.9</td>
<td>0</td>
<td>9.1</td>
</tr>
<tr>
<td>Some graduate or professional school</td>
<td>5.9</td>
<td>0</td>
<td>9.1</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>23.5</td>
<td>0</td>
<td>36.4</td>
</tr>
<tr>
<td>Do not know</td>
<td>17.6</td>
<td>16.7</td>
<td>18.2</td>
</tr>
</tbody>
</table>

**Political affiliation, n = 15 (%)**

<table>
<thead>
<tr>
<th>Political Affiliation</th>
<th>% Democratic</th>
<th>% Republican</th>
<th>% Independent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Democrat</td>
<td>40.0</td>
<td>50.0</td>
<td>33.3</td>
</tr>
<tr>
<td>Republican</td>
<td>20.0</td>
<td>16.7</td>
<td>22.2</td>
</tr>
<tr>
<td>Independent</td>
<td>13.3</td>
<td>16.7</td>
<td>11.1</td>
</tr>
<tr>
<td>Other</td>
<td>26.7</td>
<td>16.7</td>
<td>33.3</td>
</tr>
</tbody>
</table>

All - in the middle 1, not decided 1, none 2
### Table 7

Adolescent Survey (n = 17) Health Descriptives by Sex

<table>
<thead>
<tr>
<th>Variable</th>
<th>All (n = 17)</th>
<th>Female (n = 6)</th>
<th>Male (n = 11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective social status family, n = 16*</td>
<td>5.5 (1.6)</td>
<td>5.3 (2.3)</td>
<td>5.6 (1.2)</td>
</tr>
<tr>
<td>Subjective social status self*</td>
<td>6.3 (1.6)</td>
<td>6.5 (2.1)</td>
<td>6.2 (1.3)</td>
</tr>
<tr>
<td>Figure Rating Scale body now*</td>
<td>7.4 (0.9)</td>
<td>7.2 (1.0)</td>
<td>7.6 (0.9)</td>
</tr>
<tr>
<td>Figure Rating Scale body want*</td>
<td>5.9 (1.3)</td>
<td>6.0 (1.3)</td>
<td>5.9 (1.3)</td>
</tr>
<tr>
<td>Perceived health (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>17.6</td>
<td>16.7</td>
<td>18.2</td>
</tr>
<tr>
<td>Good</td>
<td>29.4</td>
<td>33.3</td>
<td>27.3</td>
</tr>
<tr>
<td>Fair</td>
<td>41.2</td>
<td>33.3</td>
<td>45.5</td>
</tr>
<tr>
<td>Poor</td>
<td>11.8</td>
<td>16.7</td>
<td>9.1</td>
</tr>
<tr>
<td>Tried to lose weight (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>How tried lose weight, n = 16 (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made lifestyle changes (watched eating behavior,</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>more physical activity)</td>
<td>75</td>
<td>66.7</td>
<td>72.7</td>
</tr>
<tr>
<td>Fad diet (e.g., Keto, The Paleo, etc.)</td>
<td>6.3</td>
<td>0</td>
<td>9.1</td>
</tr>
<tr>
<td>Other</td>
<td>18.7</td>
<td>33.3</td>
<td>9.1</td>
</tr>
<tr>
<td>All - I'm constantly trying to lose weight, starving</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>myself, 1; calorie tracker cardio home workouts, 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived self-weight (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A little overweight</td>
<td>58.8</td>
<td>66.7</td>
<td>54.5</td>
</tr>
<tr>
<td>Very overweight</td>
<td>41.2</td>
<td>33.3</td>
<td>45.5</td>
</tr>
<tr>
<td>BMI*</td>
<td>34.9 (5.4)</td>
<td>36.9 (5.3)</td>
<td>33.8 (5.3)</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
</tr>
<tr>
<td>BMI class (%)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Class I obesity</td>
<td>41.2</td>
<td>33.3</td>
<td>45.5</td>
</tr>
<tr>
<td>Class II obesity</td>
<td>35.3</td>
<td>33.3</td>
<td>36.4</td>
</tr>
<tr>
<td>Class III obesity</td>
<td>23.5</td>
<td>33.3</td>
<td>18.2</td>
</tr>
</tbody>
</table>

*Note. * indicates mean (SD)*
### Table 8

*Parent Interview (n = 19) Demographics by Sex*

<table>
<thead>
<tr>
<th>Variable</th>
<th>All (n = 19)</th>
<th>Female (n = 17)</th>
<th>Male (n = 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship to adolescent (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>84.2</td>
<td>94.1</td>
<td>0</td>
</tr>
<tr>
<td>Father</td>
<td>10.2</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Other (Aunt/guardian)</td>
<td>5.3</td>
<td>5.9</td>
<td>0</td>
</tr>
<tr>
<td>Age (years, mean ± SD)</td>
<td>41.0 (5.5)</td>
<td>40.0 (4.7)</td>
<td>49.5 (5.0)</td>
</tr>
<tr>
<td>Sex (% female) (parametric)</td>
<td>89.5</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Hispanic/Latino (%)</td>
<td>78.9</td>
<td>82.4</td>
<td>50.0</td>
</tr>
<tr>
<td>Multiple Race (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Black or African American</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>White</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Single Race (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Black or African American</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>73.7</td>
<td>76.5</td>
<td>50.0</td>
</tr>
<tr>
<td>White</td>
<td>26.3</td>
<td>23.5</td>
<td>50.0</td>
</tr>
<tr>
<td>Transgender (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Mother education (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education Level</td>
<td>Father Education (%)</td>
<td>Democratic (%)</td>
<td>Republican (%)</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>High school diploma/GED</td>
<td>5.3 5.9 0</td>
<td>44.4 43.8 50.0</td>
<td>22.2 25 0</td>
</tr>
<tr>
<td>Some college</td>
<td>42.1 35.3 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate degree</td>
<td>5.3 5.9 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed tech or vocational school</td>
<td>10.3 11.8 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College graduate</td>
<td>26.3 29.4 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some graduate or professional school</td>
<td>0 11.8 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>10.5 0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political affiliation, n = 18 (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democrat</td>
<td>44.4 43.8 50.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Republican</td>
<td>22.2 25 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td>16.7 18.8 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>16.7 12.5 50.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All - moderate 1, none 2
Table 9

*Parent Interview (n = 19) Health Descriptives by Sex*

<table>
<thead>
<tr>
<th>Variable</th>
<th>All (n = 19)</th>
<th>Sex</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female (n = 17)</td>
<td>Male (n = 2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective social status family*</td>
<td>5.5 (2.4)</td>
<td>5.29 (2.4)</td>
<td>7.0 (1.4)</td>
<td></td>
</tr>
<tr>
<td>Subjective social status self*</td>
<td>5.5 (2.4)</td>
<td>5.53 (2.4)</td>
<td>5.5 (3.5)</td>
<td></td>
</tr>
<tr>
<td>Figure Rating Scale body now*</td>
<td>6.7 (1.6)</td>
<td>7.12 (1.2)</td>
<td>3.6 (0.7)</td>
<td></td>
</tr>
<tr>
<td>Figure Rating Scale body want*</td>
<td>4.5 (1.0)</td>
<td>4.7 (0.7)</td>
<td>2.5 (0.7)</td>
<td></td>
</tr>
<tr>
<td>Parent perceived Figure Rating Scale adolescent body now (parametric)*</td>
<td>7.3 (1.4)</td>
<td>7.2 (1.4)</td>
<td>8.0 (1.4)</td>
<td></td>
</tr>
<tr>
<td>Parent want Figure Rating Scale adolescent body want (parametric) *</td>
<td>5.2 (1.2)</td>
<td>5.3 (1.2)</td>
<td>4.5 (0.7)</td>
<td></td>
</tr>
<tr>
<td>Perceived health (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>10.5</td>
<td>5.9</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>47.4</td>
<td>47.1</td>
<td>50.0</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>26.3</td>
<td>29.4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>15.8</td>
<td>17.6</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Tried to lose weight (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>How tried lose weight (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made lifestyle changes (watched eating behavior, more physical activity).</td>
<td>68.4</td>
<td>64.7</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Jenny Craig</td>
<td>5.3</td>
<td>5.9</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Weight Watchers</td>
<td>5.3</td>
<td>5.9</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Fad diet (e.g., Keto, The Paleo, etc.)</td>
<td>10.5</td>
<td>11.8</td>
<td>0</td>
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</tr>
<tr>
<td>Perceived self-weight (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td></td>
</tr>
<tr>
<td>Just right</td>
<td>10.5</td>
<td>0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>A little overweight</td>
<td>31.6</td>
<td>35.3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Very overweight</td>
<td>57.9</td>
<td>64.7</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parent perceived adolescent weight (%)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A little overweight</td>
<td>57.9</td>
<td>58.8</td>
<td>50.0</td>
</tr>
<tr>
<td>Very overweight</td>
<td>42.1</td>
<td>41.2</td>
<td>50.0</td>
</tr>
<tr>
<td>BMI*</td>
<td>39.2 (13.6)</td>
<td>40.5 (13.8)</td>
<td>28.3 (1.3)</td>
</tr>
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</table>

*Note. * indicates mean (SD)*
CURRICULA VITA

My early professional background, after earning a BS in Nutritional Science from California Polytechnic State University, was that of a strength and conditioning coach, corporate fitness and nutrition, a physique athlete coach, and the owner of a small fitness training studio. I later moved on to study public health at the University of Texas at El Paso (UTEP). My MPH research study centered on healthy eating active living among Hispanic populations while working as a graduate research assistant for the Paso del Norte Institute for Health Living.

Immediately following my MPH degree, I began the Interdisciplinary Health Sciences PhD Program at UTEP. My dissertation study focused on Hispanic adolescent overweight and obesity weight loss treatment programs. In this dissertation, my aim was to inform the parent component of an adolescent weight loss treatment program while also tailoring it to the Paso del Norte Region. Data and results of this dissertation research will be used to pilot test the first Acceptance-Based Behavioral Therapy weight loss treatment program for Hispanic adolescents.

I worked concurrently in my PhD study as a diabetes educator, establishing my clinical hourly credentials needed to take the Certified Diabetes Care Education Specialist (CDCES) exam in November of 2022. Now with my PhD degree, I will also be going to back to school at Iowa State University, under an accelerated pathway for doctoral students, within the Department of Food Science and Human Nutrition. This program study will grant me a Registered Dietitian Nutritionist degree and qualify me as a practitioner and clinician of nutrition and diabetes care. My final career goal is to open a clinical setting on the Central Coast of California (my home town) that offers medical nutrition therapy and diabetes care in a setting that allows me to continue my work as an obesity research scientist, while also incorporating translational research and implementation science.