PARENT READINESS TO CHANGE CHILD WEIGHT BEHAVIOR: THE ROLE OF HEALTH BEHAVIOR CHANGE MODELS AND PERCEPTION OF RISK

by

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ABSTRACT

CECILY ANNETTE BASQUIN: Parent Readiness to Change Child Weight Behavior: The Role of Health Behavior Change Models and Perception of Risk. (Under the direction of DR. LAURA MARIE ARMSTRONG)

Background: Parents play a key role in shaping their child's healthy weight behavior, yet even child weight interventions that incorporate parents can have limited success due to low participation, low completion rates, and poor program compliance. These problems may persist because interventions assume that families are ready to take action and motivated to acquire healthy weight behaviors, when in reality, there is a great deal of variability in parent readiness to engage in health behavior change. One way to address these pitfalls is to consider parents' readiness to change as a precursor to intervention and then tailor interventions to match their level of motivation.

Method: Guided by the Health Beliefs Model and the Transtheoretical Model of Change, we examined predictors of parent readiness to change family health behavior in a sample of parents of overweight, school-aged children, as well as, predictors of parent perception of child risk for future problems. Parents, recruited via Amazon's Mechanical Turk platform, completed an online survey about their self-perceptions (e.g., caregiving efficacy and locus of control), beliefs about health behavior change (e.g., cues to health action, benefits and barriers to change, child-feeding attitudes, and subjective health norms), perception of child risk for future problems, readiness to change, perception of child weight status, child health related quality of life (HRQoL), and perceptions of physician feedback.

Results: The full model predicting readiness to change was significant, R^2=.31, F=6.26, p<.05. While parent self-perceptions did not predict readiness to change above and beyond demographic variables, parent beliefs about health behavior change and parent perception of child risk for future problems did significantly predict parent readiness to change. Additionally, there was a significant interaction between locus of control and parent perception of child risk in predicting parent readiness. Specifically, parents' internal locus of control was related to greater readiness to change among parents who have thought more about the risks their child is facing (β = .02, p < .01); however, this was not the case among parents who have not thought much about the risks to their child. Finally, the full model predicting parent perception of child risk for future problems was significant, R^2=.25 F=7.55, p<.01, with poorer child HRQoL, less weight status discrepancy, and more perceived physician feedback predicting a greater number of risks thought about by parents.

Conclusion: These findings suggest factors that can be targeted in parents with overweight children in the early stages of intervention to increase parent readiness to change and demonstrate the important role of perception of child risk in parent readiness to change.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ABBREVIATIONS

BMI	body mass index
CDC	Centers for Disease Control & Prevention
CHAQ	cues to health action questionnaire
CRQ	child feeding questionnaire
CWRQ	child weight risk questionnaire
HBM	Health Beliefs Model
HRQoL	health related quality of life
HWB	healthy weight behavior
MTurk	Amazon's Mechanical Turk Platform
PECHWB	parent efficacy for child healthy weight behavior scale
PedQL	pediatric quality of life inventory
PLOC	parent locus of control scale
TPB	Theory of Planned Behavior

CHAPTER 1: INTRODCUTION

Childhood overweight and obesity are serious health concerns that affect 12.7 million children and adolescents in the U.S. (Centers for Disease Control and Prevention (CDC), 2016). Children with a body mass index (BMI) between the 85th and 95th percentile on the CDC growth charts for their age and sex are considered overweight, whereas children with a BMI at or above the 95th percentile are considered obese. Given that most research examines child overweight and obesity together and that both categories contribute to serious health complications, child overweight will be used to encompass both weight categories. Child overweight is associated with a host of negative health outcomes including elevated blood pressure, cholesterol, and blood glucose levels, as well as an increased likelihood for obesity and related health concerns into adulthood (CDC, 2016; Kitzman-Ulrich et al., 2010). In addition, mental health problems are common in overweight children, including greater risk for internalizing and externalizing problems, as well as stigmatization and low self-esteem (Morrison, Shin, Tarnopolsky, & Taylor, 2014).

Multiple interrelated factors have contributed to the rise in child weight over the past decades. Children are increasingly eating foods high in saturated fats and added sugar, while also eating fewer foods rich in vitamins and minerals, like fresh fruits and vegetables (American Dietetic Association, 2006). In addition to these dietary changes, children are not getting the recommended 60 minutes of daily physical activity and are engaged in sedentary behavior for extended periods of time (U.S. Department of Health & Human Services, 2010). Although there are many sources of influence on child diet and activity, parents play a key role in shaping their child's healthy weight behavior

(HWB). Healthy weight behaviors include improving diet by increasing fruit and vegetable intake and decreasing fat and sugar intake, increasing physical activity and decreasing time spent in sedentary activities (Nelson & Davis, 2013). Over time, parental decisions become habits for the child and the family, and consequently the most effective way to promote HWB among children is often to engage parents in the process.

Given the harmful consequences of childhood overweight as well as the trend toward unhealthy dietary and activity choices, determining how to support parents in the promotion of HWB for their children is an important public health concern. Specifically, promoting readiness to change among parents of overweight elementary aged children may be particularly important as this is a period of childhood in which children are gaining autonomy, but still heavily influenced by the family system. There is likely variability in how parents view their role in influencing child dietary and physical activities habits during the elementary years and this is often a time when diet and physical activity habits are formed for children (Moore, Wilkie, & Desrochers, 2016). Thus, intervening with parents of elementary aged children provides an opportunity to create lasting change and encourage healthy habits that will be built upon in the teenage and adult years (Hill, 2002). Drawing from relevant theories of health behavior change, this study will examine how parent self-perceptions, beliefs about change, and perception of child risk for future problems influence parents' readiness to make health behavior changes on behalf of their overweight child.

1.1 Parental Influence on Child Weight

Parents have a high degree of control over their children's experiences and environments (Anzman, Rollins, & Birch, 2010). From the time a child is born, parents

influence what their children eat, how much they eat, and when they eat it (White, 2013). As one example, the decision to breastfeed or formula-feed a newborn infant is one of the first food-related decisions that parents make for their preschool children (Birch & Fisher, 1997). Dietary habits beyond infancy are largely shaped by what is familiar, and children's initial food preferences often mirror the dietary preferences of their parents (Oliveria, Ellison, Moore, Gillman, Garrahie, & Singer, 1992; Scaglioni, Salvioni, & Galimberti, 2008). Therefore, early availability and accessibility of healthy food is largely controlled by parents and shapes the development of children's dietary habits over time.

As children age, eating becomes a social event and observations of others begin to influence their eating habits and preferences. Modeling is one way of shaping children's eating habits (Birch & Fisher, 1997), and parents are particularly influential models for young children. Harper and Sanders (1975) found that preschool aged children were more likely to try a new food if they watched their mother eat the food versus a stranger. In addition to modeling, parental control over their child's eating behavior is related to child weight, with excessively controlling feeding practices (i.e., restricting access to certain foods; using bribes or threats to get children to eat) predicting child overweight among children aged 2 to 18-years-old (Faith, Scanlon, Birch, Francis, & Sherry, 2004). Controlling a child's eating habits through restriction or pressure may interfere with the child's ability to self-regulate their eating behavior and increases the likelihood that a child will eat in the absence of hunger (Birch, Fisher, Grimm-Thomas, Markey, Sawyer, & Johnson, 2001). Common feeding strategies like encouraging children to "clean their plate" or rewarding children with dessert after eating their vegetables may actually

undermine children's ability to regulate their hunger outside of these external cues (Faith et al., 2004). Clearly, parents are instrumental in the achievement of healthy eating habits for their children, thus understanding the factors that contribute to parent readiness to change these habits is important in child weight research.

Child overweight is also largely influenced by children's activity levels. In the United States, more than half of school-aged children do not get the recommended amount (i.e., 60 minutes per day) of physical activity (Troiano, Berrigan, Dodd, Mâsse, Tilert, & McDowell, 2008; U.S. Department of Health and Human Services, 2008). In many ways, parents are "gate-keepers" to physical activity for school-aged children and adolescents (Gustafson & Rhodes, 2006), and parental support is an essential ingredient in establishing healthy physical activity habits for children (Gustafson & Rhodes, 2006; Van der Horst, Paw, Twisk, & Van Mechelen, 2007; Beets, Cardinal, & Alderman, 2010). Tangible support, in the form of money, transportation, and equipment, as well as intangible supportive activities like watching a child participate in a sports game or participating in physical activity alongside a child are effective means of encouraging physical activity among children (Yao & Rhodes, 2015). Evidence suggests that family rules limiting time spent using electronics is associated with higher levels of physical activity in school-aged children and adolescents (Salmon, Timperio, Telford, Carver, & Crawford, 2005; Granich, Rosenberg, Knuiman, & Timperio, 2011). Additionally, the home environment influences the child's activity level. For example, homes with multiple TVs, video game consoles, and limited outdoor space hinder physical activity. On the other hand, families that encourage physical activity often limit access to TV and video games and provide children with outside equipment like playground sets,

basketball hoops, or trampolines (Maitland, Stratton, Foster, Braham, & Rosenberg, 2013). The high degree of influence that parents have over their child's physical activity level highlights the importance of understanding factors that impact parent readiness to promote physical activity for their children.

The development of healthy weight behaviors in children is a complex process that begins at birth and is largely influenced by parents. Parents introduce their children to new foods, model eating habits, and use varying levels of pressure to encourage children to eat; all of which contribute to children's eating habits over time. Additionally, the level of support provided for physical activity and the home environment are instrumental in establishing healthy physical activity habits among children. Given that parents have a high degree of influence on their child's eating and activity habits, it is important to better understand which factors most strongly contribute to parents' decisions regarding their child's weight behaviors as well as parent readiness to intervene in an effort to foster healthy weight behaviors, especially on behalf of children who are overweight.

1.2 Childhood Weight Interventions

The literature has consistently shown that interventions to treat child overweight aimed at the parent and child together are more successful than interventions aimed at only the child (Epstein, Valoski, Wing, McCurley, 1990, Wrontniak, Epstein, Paluch, & Roemmich, 2004). In fact, a meta-analysis of child (≤ 18) weight interventions from 1978 to 2010, demonstrated that all successful interventions incorporated the family, and parents in particular (Ho et al., 2012), which further attests to the high degree of influence that parents have in shaping children's weight behaviors and the importance of parental

involvement in child weight interventions. In addition, the Minnesota Home Team Study compared a school-based weight loss intervention to a home-based (parent-involved) weight loss program for third graders. Compared to those in the school-based program, children participating in home-based treatment showed more behavior change, had reduced total fat, saturated fat, and monosaturated fat in their diets, and had more of the recommended foods in their pantries at home (Perry, 1988). Interventions that facilitate parent problem-solving, parent-child connectedness, and parent praise of healthy behavior (Graves, Meyers, & Clark, 1988; DeVore & Ginsberg, 2005; Wrontniak, Epstein, Paluch, & Roemmich, 2005), as well as sensitive caregiving and family functioning (Kitzman-Ulrich et al., 2010) appear to be most effective in promoting children's health. Furthermore, 7- to 15-year-olds consistently described the importance of role-models and adult involvement in their efforts to lose weight (Murtagh, Dixey, & Rudolf, 2006). Taken together, it is clear that parents play a key role in changing the weight behaviors of children.

Although it is well-established that parent involvement in child weight interventions is essential, even those that incorporate parents can have limited success (Summerbell et al., 2003; McCullum et al., 2007; Taveras et al., 2011). For example, in the High Five for Kids weight loss intervention aimed at children aged 2 to 6-years, child BMI actually increased in both the intervention and usual care groups. The intervention involved four in-person motivational interviewing sessions and three telephone calls from a nurse practitioner focused on parent responsibility, resolving ambivalence about behavior change, and goal setting. Contrary to expectations, the intervention was unsuccessful in reducing BMI, as children receiving the intervention had a mean increase

in BMI of .31 and children in the usual care group had a mean BMI increase of .49 (Taveras et al., 2011). Another child weight intervention, LEAP, consisted of four sessions with school-aged children's general practitioner focused on goal setting, accompanied by a personalized "family folder" with information on weight loss in children. Results showed no difference in BMI between the intervention group and the control group immediately following treatment, at 9 months, or at 15 months post-treatment (McCallum et al., 2007).

Of particular relevance to the current study, there is often low participation in intervention activities and low completion rates in child weight loss intervention studies, which undermines the effectiveness (Taveras et al., 2011; McCallum et al., 2007). In the High Five for Kids intervention, only 56% of families completed at least 2 of the 6 motivational interviewing sessions (Taveras et al., 2011). Similarly, only 41% of the families in the LEAP intervention attended all four of the intervention sessions (McCallum et al., 2007). In a meta-analysis of child weight interventions, retention rates ranged from 38% to 95% (Ho et al., 2012). When few families are exposed to sufficient dosage of an intervention due to inconsistent attendance, poor program compliance and premature dropout (e.g. Baker, Arnold, & Meagher, 2011), substantial time and resources are wasted, and the promise of the approach is diminished. Furthermore, in the High Five for Kids intervention only 25% of eligible families enrolled in the program (Taveras et al., 2011), and in the LEAP intervention, only 32% of eligible families enrolled (McCallum et al., 2007). Low enrollment and high dropout rates may persist due to a mismatch between parents and typical health behavior strategies (DiClemente & Velasquez, 2002; Nock & Ferriter, 2005). Therefore, lack of attention to individual

differences in parents' readiness for engagement may be a major impediment to fully realizing the benefits of intervention. Most interventions assume that families are ready and able to take action and equally motivated to acquire healthy weight behaviors (Prochaska, DiClemente, & Norcross, 1992); however, many parents may not be ready for the behavioral change and high demands required by interventions targeting child weight.

One way to address these pitfalls in child weight interventions is to consider parents' readiness to change as a precursor to intervention and then tailor interventions to match their level of motivation (Rhee, Delago, Arscott-Mills, Mehta, & Davis, 2005). As such, the factors that contribute to parents' readiness to implement healthy change within the family to combat a child's weight challenges must be better understood. Three theories of health behavior change, the transtheoretical model of change, the theory of planned behavior, and the health beliefs model, suggest key factors that affect individuals' readiness to change.

1.3 Theoretical Framework for Parents' Readiness to Engage in Health Behavior Change

1.3.1 Transtheoretical Model of Change.

The transtheoretical model of change proposes five stages (pre-contemplation, contemplation, preparation, action, maintenance) of change, reflecting an individual's level of readiness to adopt new behaviors. The first stage, *pre-contemplation*, is characterized by not intending to make a change at all. The next stage is *contemplation*, within which people are aware of the benefits of changing and the risks associated with not changing, and they intend to make a change within the next six months. Those in the *preparation* stage have a specific plan to make a change and intend to implement it in the next month. The *action* stage includes

those who have already begun making some modifications in their lifestyle, and the final stage, *maintenance*, is achieved when individuals have sustained the behavior change with limited temptation to revert back to the unhealthy behavior (Prochaska & DiClemente, 1983). Individuals do not necessarily progress through the stages of change linearly, and there is an elevated risk of relapse for behaviors that are particularly challenging to change, like weight behavior (Perri et al., 2001; Byrne, Cooper, & Fairburn, 2003; Byrne, 2002). Although the transtheoretical model of change has been used as a framework for examining various health outcomes, including smoking cessation (Prochaska & DiClemente, 1983; Robinson & Vail, 2012), alcohol use (Naar-King et al., 2006) and personal weight loss (Mastellos, Gunn, Feliz, Car, & Majeed, 2014), this model is not often used in the context of parent readiness to change the unhealthy behavior of their overweight children (but see Rhee et al., 2005; Taveras, Mitchell, & Gortmaker, 2009; Rhee, McEachern, & Jelalian, 2014 for exceptions).

There is a great deal of variability in parents' readiness to change the behaviors of their overweight children. Rhee et al. (2005) assessed readiness to change child weight behavior for 151 parents of overweight children (BMI $\geq 85^{th}$ percentile) aged 2 to 12 years before their visit to a pediatrician. The results of the study indicated that 44% of parents were in the precontemplation stage of change, 17% were in the contemplation stage, and 38% were in the preparation or action stage of change. Furthermore, having an older child (i.e., 8 to 12 years old) and perceiving the child's weight as a problem was associated with being in the preparation/action stage of change, whereas viewing oneself as overweight was associated with being in the contemplation stage (Rhee et al., 2005). These findings suggest that there are important individual differences in parents'

readiness to change and that many parents with overweight children are not thinking about change or are just beginning to consider making a change (Rhee et al., 2005).

In a separate study, 209 parents of children (aged 5 to 20 years old) attending an obesity clinic were given surveys about family habits, perception of weight, and readiness to change upon their initial visit (Rhee et al., 2014). In this investigation, researchers assessed readiness to change separately for dietary change and physical activity change. For dietary change, 17.3% of parents were in the precontemplation/contemplation stage, 21.3% were in the preparation stage, and 61.4% were in the action/maintenance stage. For physical activity change, 41.1% of parents were in the precontemplation/contemplation stage, 18.3% of parents were in the preparation stage, and 40.6% of parents were in the action/maintenance stage of change. A higher percentage of parents were in the action/maintenance stage for making dietary changes than were in this stage for physical activity change. The overall variability in readiness to change is notable, especially within the context of families attending an obesity clinic, as one might expect more parents to report higher levels of readiness to make dietary and physical activity changes on behalf of their child. Consistent with Rhee and colleagues' (2005) study, for dietary change, parents were less likely to be in the action/maintenance stage if they perceived themselves as overweight or their own weight as a health risk. For physical activity change, parents were less likely to make changes if they had older children (≥14) or if they thought their child's weight was a health problem; these findings are not consistent with other studies that find parents are more likely to make changes for older children or when they perceive their child's weight is a problem (Rhee at el., 2005). Therefore, more work is needed to better understand this complex process and shed light

on factors influencing parents' readiness to change children's dietary and physical activity habits.

Taken together, these studies highlight important individual differences in parent readiness to change. It is often assumed that most parents with overweight children are ready and able to make changes that will benefit their child's health, but empirical evidence suggests that this is not the case. Parent perception of child weight, as well as child and parent demographic factors, appear to be important in predicting parent readiness to change. Perhaps when parents have an accurate perception of the child as overweight, this highlights for the parent just how vulnerable the child is to future health problems due to his/her weight status, which in turn impacts parent motivation or readiness to make change. However, there are likely other factors that influence parent readiness, and therefore considering additional health behavior change models, such as the health beliefs model and the theory of planned behavior should enhance our understanding of individual differences in parents' readiness to change.

1.3.2 Health Beliefs Model. The health beliefs model (HBM) was originally developed to assess people's intentions to engage in preventative behaviors to avoid disease and is now widely used in therapy and research (Sapp & Weng, 2007). According to the HBM, individuals often intend to change their behavior when they perceive a threat that could have serious consequences for them, believe that the intervention will be successful, and see few barriers to action (Sapp & Weng, 2007; Henshaw & Freedman-Doan, 2009). Cues to action (i.e., occurrences that remind an individual of the severity of the threat) are another component of the HBM (Henshaw & Freedman-Doan, 2009). For example, parents may be more likely to take action regarding their child's weight if they

hear an advertisement for a product or service related to child weight on TV. Additionally, Rosenstock, Strecher, and Becker (1988) added the component of self-efficacy to the model, which is an individual's belief that they are capable of success.

The model has been instrumental in understanding personal weight loss among adolescents. Numerous studies have demonstrated that health beliefs constructs are associated with weight change; however, findings are inconclusive regarding which factors are most predictive of change. In a sample of adolescent girls of all weight statuses, perceived threat, cues to action, and self-efficacy were predictive of intention to diet, with cues to action emerging as the strongest predictor (Park, 2011). Kang et al. (1998) found that the perceived benefit of losing weight was the most robust predictor of intention to lose weight among a mixed-gender sample of overweight adolescents. Finally, in a study examining predictors of dieting for overweight and healthy weight adolescents, for those adolescents who were overweight, perceived barriers and benefits to dieting were most predictive of dieting behavior, whereas for healthy weight adolescents, perceived susceptibility to obesity was most predictive (O'Connell, Price, Roberts, Jurs, & McKinley, 1985). Therefore, it is important to consider population characteristics like weight status when determining which aspects of the HBM may be most useful in informing readiness to change.

There are fewer studies specifically related to parents' intentions to change the weight behavior of their children. However, the HBM has been used to assess parents' participation and decision making for other health related behaviors. For example, Brock and Beazley (1995) found that perceived barriers to participation and parenting self-efficacy were the most robust factors in distinguishing parents who completed an at-home

sex-education program with their adolescent and those who did not. Another study found that parents' decisions to give their 10 to 18-year-old child the HPV vaccine were predicted by doctor's recommendation, perceived barriers to getting the vaccine, and the perceived risks to the child if given the vaccine (Reiter, Brewer, Gottlieb, McRee, & Smith, 2009). Taken together, it appears that each component of the health beliefs model has predictive value, but less is known about how these factors influence parent readiness to change child weight behaviors. Therefore, drawing from the HBM, the current study will examine the unique and combined effects of parenting self-efficacy, perceived benefits and barriers to change, cues to action, and perceptions of child risk for future problems on parent readiness to change child weight behaviors.

1.3.3 Theory of Planned Behavior. The theory of planned behavior (TPB) suggests that behavioral intention is a primary determinant of actual behavior. Behavioral intention is influenced by one's attitudes toward the behavior, subjective norms, and one's perceived ability to engage in the behavior. Attitudes are a person's overall feelings about a behavior (i.e., "my child should eat all of the food on his/her plate"). Subjective norms are the expectations of important others in one's life and a person's views about whether significant others believe they should engage in the behavior. Finally, perceived behavioral control is a person's belief about the ease of engaging in healthy behavior and how that behavior influences the health problem. The construct of perceived behavioral control can be thought of as a combination of self-efficacy and locus of control (Godin, Valois, & Lepage, 1993; Ajzen, 2002; Villarrubia, 2006)

Specific to parenting, the theory of planned behavior has been used to predict the health choices that parents make for their children. For example, parents with more

negative views of TV viewing have children and adolescents who watch less TV and engage in more physical recreation (Christoper, Fabes, & Wilson, 1989). Also, Villarubia (2006) demonstrated that parents sought approval from family members, health associations, and health professionals when making nutritional choices for their school-aged child, indicating that subjective norms are important in parental decision making. Additionally, perceived behavioral control was influential as parents made worse nutritional choices when they did not have confidence in their ability to give their child healthy foods due to busy schedules, lack of time, and child being away from the home (Villarubia, 2006). Furthermore, Andrews and colleagues found that social norms, perceived behavioral control, and attitudes were significant predictors of parents' intention to monitor their preschool child's food consumption (Andrews, Silk, & Eneli, 2010). In addition to the selected factors from the health beliefs model, the current study will also examine how factors drawn from the TPB, including locus of control, attitudes, and subjective norms impact parents' readiness to make health behavior changes on behalf of their overweight child.

In sum, the transtheoretical model, health beliefs model, and theory of planned behavior represent well validated approaches to examining the health decisions of individuals. They have been applied to parenting decisions about children's physical and behavioral health, but rarely in the context of a parent's decision to change unhealthy behaviors on behalf of an overweight child. Although these theories are typically examined separately, combining them may lead to a more comprehensive model of behavior change. In fact, an approach that integrates these theories may elucidate a more detailed path toward readiness to change and address key questions that arise when

drawing from each theory in isolation. For example, the transtheoretical model of change presents different stages of readiness, but sparks questions about how movement along this continuum might be encouraged. The health beliefs model and the theory of planned behavior provide evidence for factors that are associated with different stages of change. The health beliefs model can provide insights into how individuals begin to recognize that certain behaviors or characteristics might be problematic and require change, but this model does not address how an individual's intentions lead to action. The theory of planned behavior resolves this by suggesting that intentions are the primary determinant of actual behavior and proposing a model of factors that link intention to action. Health behavior change research can benefit from "taking the most promising aspects from each model and integrating them" (Baranowksi, Cullen, Nicklas, Thompson, & Baranowski, 2003, p. 23), and therefore this study will examine the combination of factors from each theory that may be critical for developing a comprehensive model of parents' readiness to change the weight behaviors of their child and family. We will test a new, integrative model of family health behavior change by examining factors that fall into the broad domains of parent self-perceptions (caregiving efficacy for child HWB and locus of control for child HWB), parent beliefs about change (barrier focused decisional balance, cues to health action, child feeding attitudes, subjective health norms), and parent perception of child risk for future problems. Figure 1 displays our hypothesized model developed by combining factors from the health beliefs model and theory of planned behavior to predict readiness to change.

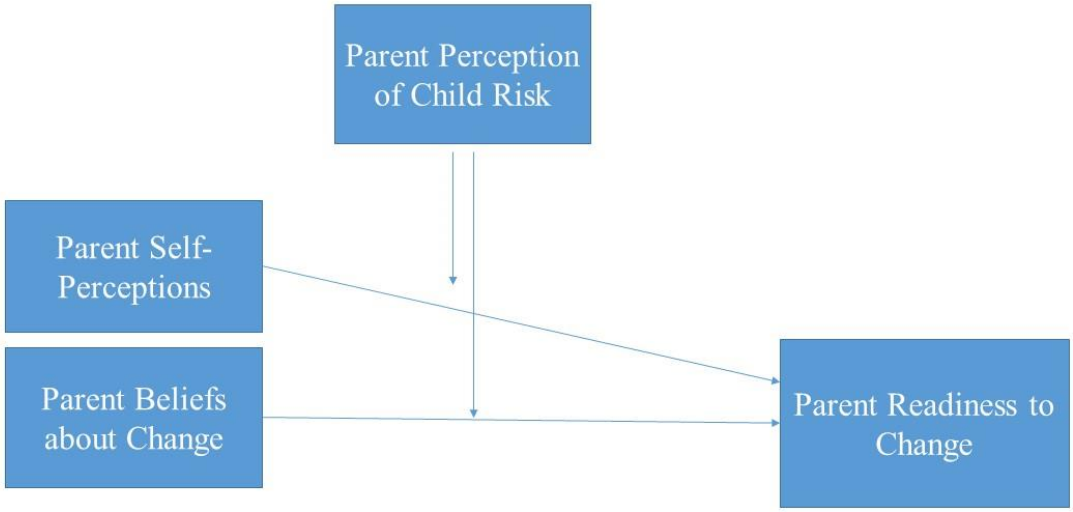

Figure 1. Integrative model drawing from the HBM and TPB.

1.4 Parent Self-Perceptions

1.4.1 Caregiving Efficacy. This construct is drawn from self-efficacy, a key component of Albert Bandura's social-cognitive theory defined as one's belief in their personal abilities (Bandura, 1997). Self-efficacy influences one's goals, motivation, mood, and perseverance, and is a vital aspect of the health beliefs model. Those with a high sense of self-efficacy are more likely to have high aspirations, approach difficult situations as challenges, and believe in their ability to change, whereas those with low self-efficacy are more likely to avoid difficult situations, dwell on obstacles, and harbor self-doubt (Bandura, 1997).

A type of self-efficacy relevant for parent motivation for heath behavior change is caregiving efficacy, which refers to a parent's confidence in her ability to successfully rear the child and fulfill the parenting role. Caregiving efficacy is associated with greater

optimism, taking action, and persevering in the face of challenges. The construct has been examined in multiple contexts, revealing that parents with greater caregiving efficacy are more successful in parenting children with difficult temperaments, children with severe illnesses, and infants born prematurely (Hess, Teti, & Hussey-Gardner, 2004). Additionally, according to the health beliefs model, self-efficacy impacts parents' ability to teach their children healthy lifestyle habits (Ekim, 2016). Although self-efficacy is associated with readiness to change across a number of situations including eating disorders, problem drinking, and adult weight loss, there are few examinations in the context of parents' readiness to change weight behaviors on behalf of their children (Horacek et al., 2002; Demmel, Beck, Richter, & Reker, 2004; Woerner, King, & Costa, 2016). This is surprising given that self-efficacy is an essential element of the health beliefs model and is likely relevant in the context of parents' health behaviors and decision-making on behalf of their overweight child. Diet and physical activity change are challenging tasks and can be characterized by frustration, setbacks and relapses; therefore, parents who feel more efficacious regarding their ability to implement healthy weight behaviors should also demonstrate greater readiness to change on behalf of their overweight child.

1.4.2 Locus of Control. Although not explicitly contained in behavior change theories, locus of control or beliefs about how much influence one has over life experiences and events, is part of the theory of planned behavior construct of perceived behavioral control and likely to influence parents' readiness to change. Those with an internal locus of control believe they have influence over their life and are aware of the connection between their actions and the outcomes of those actions. People with an

internal locus of control are more likely to have successful coping strategies and experience less stress (Rotter, 1966; Collins, 1974). On the other hand, people with an external locus of control believe that their actions do not matter and think that life events are explained by fate, chance, and luck. These individuals often perceive life as more difficult and have higher levels of stress (Rotter, 1966; Collins, 1974).

In regard to parenting, locus of control can be defined as the extent to which parents believe that they have control over their child's behavior, in this case, their child's weight behaviors. Locus of control is thought to be an important factor when teaching parenting skills (Brewer, Tollesfson, & Fine, 1981), when deciding on a therapeutic approach (Rotter, Chance, & Phares, 1972), and in designing interventions (Abramowitz et al., 1974). In addition, locus of control influences parents' beliefs about the source of their child's weight and their perception of child weight as a problem (Campis, Lyman, & Prentice-Dunn, 1986; Moreland, Felton, Hanson, Jackson, & Dumas, 2016). Parents who believe that their child's weight is due to genetics or bad luck, for example, have an external locus of control, whereas those that believe their child's weight is influenced by family decisions and habits (especially with respect to diet and activity) have an internal locus of control. Parents are unlikely to consider making changes on behalf of their overweight child if they believe their behaviors have little or no influence on their child's weight. Therefore, parents who believe they can influence their child's weight (i.e., those with high internal locus of control) should also show greater readiness to change.

1.5 Parent Beliefs about Change

1.5.1 Perceived Barriers and Benefits.

The health beliefs model suggests that benefits and barriers to change are strong predictors of health behavior over time (Carpenter, 2010). Common barriers to healthy weight behavior in families with school-aged children are the cost of healthy food, limited time, child food and activity preferences, the availability of healthy foods, and neighborhood safety (Villarrubia, 2006; Vann et al., 2011). Barriers are often cited by parents who are reluctant or having difficultly changing the health behaviors of their children. Often emotional barriers (e.g., I feel guilty when I tell my child that he can't have sweets) are more meaningful then logistical ones (e.g., we don't have the time to cook healthy meals), and parents can think more flexibly about how to overcome logistical/practical barriers when the emotional barriers are addressed and the benefits of taking action are clear (Steinsbekk, Odegard, & Wichstrom, 2011). In addition to weight loss and improved physical health, parents cite improved psychosocial outcomes, like mood and self-esteem, as important benefits to weight-related health behavior change (Hart, Herriot, Bishop, & Truby, 2003). Furthermore, the short-term, academic and socio-emotional benefits of healthy weight behavior often outweigh the long-term physical health benefits of losing weight. For example, parents report improved school performance and fewer experiences of bullying as more meaningful motivators of change than benefits like reduced risk of heart disease or diabetes (Hart et al., 2003; O'Dea, 2003). There is also evidence to suggest that the absolute number of benefits and barriers may be less important than the ratio of benefits and barriers (Highland et al., 2016). Therefore, parents who perceive a higher proportion

of benefits to barriers with respect to adopting healthy weight behaviors may also report greater readiness to change on behalf of their overweight child.

1.5.2 Cues to Action. Cues to action are an integral motivational factor in the health beliefs model with the potential to explain individual differences in behavior change. They are also thought to be important for an individual's movement though the stages of change in the transtheoretical model (Juniper, Oman, Hamm, & Kerby, 2003; Chou & Wister, 2005). However, there has been little research on cues to action, possibly because of their diverse nature and the difficulty of measuring them (Baranowski, et al. 2003; Randolph, Fincham, & Radey, 2009). Research has shown that internal cues, for example, having more energy after beginning an exercise regimen, are more likely to prompt further action compared to external cues (e.g., advertisement about healthy child weight behaviors on TV); however, internal cues are difficult to measure when parents are reporting on behalf of their children. It has also been suggested that evidence-based cues from a doctor are influential in prompting action (Jones, Fowler, & Hubbard, 2000). For example, in relation to parents' intentions to vaccinate their 10 to 18-year-old children with the HPV vaccine, a doctor's recommendation to have the child vaccinated was found to be an effective cue to action (Reiter et al., 2009). Although research on how cues to action influence parents' motivation for health behavior change on behalf of their children is limited, in a study examining an elementary school drug prevention program, parents and teachers cited cues to action as the most important variable influencing parent engagement. Results indicated that the most important cue was "child-to-parent communication", where children were expressing enthusiasm and interest about the program and reminding the parent about program activities (Hahn, Simpson, & Kidd,

1996). Given the importance of cues to action in other family health decisions, it is likely that parents who perceive greater cues to action with respect to their child's weight will express greater readiness to change child weight behaviors.

1.5.3 Attitudes. Based on the theory of planned behavior, parental attitudes about weight behavior should impact parent intentions to adopt healthy weight behavior practices. For example, parents who hold more favorable attitudes toward vegetable consumption have stronger intentions to feed their school-aged children four servings of vegetables per day. Beliefs that vegetable consumption contributes to overall health, comprises a healthy diet, and encourages good eating habits were common attitudes among parents who intended to feed their children vegetables daily (Villarrubia, 2006). Additionally, parent attitudes toward TV viewing influence the amount of TV their child watches, one major predictor of childhood obesity (Christopher, Fabes, & Wilson, 1989). Negative attitudes towards TV viewing were associated with less screen time and more physical activity for the child (Christopher et al., 1989). Additionally, attitudes about child-feeding may also be important in the context of parent health decision making, as parents who hold favorable attitudes toward controlling their school-aged child's eating habits (i.e., restricting access to high fat foods) may also report high levels of investment in their child's health and perceive their child's weight to be a health risk (Birch et al., 2001). However, when these controlling attitudes become excessive or overly harsh, they are associated with negative outcomes, including child weight gain (Scaglioni et al., 2008). Given that parent attitudes influence children's weight behaviors, it is likely that parents who report healthier attitudes regarding their child's eating and activity habits are likely to express greater readiness to make changes on behalf of their overweight child.

1.5.4 Subjective Norms. According to research based on the theory of planned behavior, subjective norms influence parenting behavior across a number of contexts. For example, in a study examining parents' behaviors to prevent drug use for their adolescents, parents influenced by subjective norms were more likely to monitor their child's activity and to have parent-child discussions about drug use (Stephenson, Quick, Atkinson, & Tschida, 2005). Additionally, researchers found that the perceived expectations of husbands/partners and doctors predicted mothers' use of medication to reduce their preschool child's fever (Walsh, Edwards, & Fraser, 2009). With respect to child weight, Epstein and colleagues found that family and friend support of parents' efforts to make healthy changes for their school-aged children was predictive of child weight loss (Epstein, Valoski, Wing, & McCurley, 1990). Similarly, subjective norms, especially the beliefs of family and health professionals, predict parents' intentions to serve their school-aged children vegetables (Villarrubia, 2006). Furthermore, parents' intention to engage in behavior change and monitor their school-aged child's healthy food intake was associated with greater perceived influence of subjective norms (Andrews, et al., 2010). Taken together, this literature suggests that parents who perceive greater social pressure to engage in healthy change on behalf of their child should also report greater readiness to adopt healthy weight behaviors.

1.6 Parent Perception of Child Risk for Future Problems as a Potential Moderator

While some studies have found clear links between parent self-perceptions, parent beliefs about change, and parent readiness to change (or actual parent behavior change), these links are less clear in other studies. For example, White (2013) found no association between parents' perceived barriers to child diet and physical activity change and

parents' stage of change. Similarly, perceived barriers were not predictive of parent engagement in a health behavior change intervention for children aged 2 to 11-years-old (Schmied, 2015). Additionally, Beale and Manstead (1991) found that of the constructs included in the theory of planned behavior (TPB), subjective norms were not a predictor of parent intention to limit sugar intake for their infant. In another study of the predictive utility of the TPB, Rempel (2004) found that attitudes and subjective norms were not predictive of mothers' feeding choices. This inconsistency may suggest that the association between parent factors (i.e., self-perceptions and beliefs about change) and readiness to change is moderated by perceptions about the child, and particularly the perception that the child is at risk for future problems.

Although parents are clearly instrumental in child weight interventions, parental involvement may be most effective if parents recognize and are concerned about the risks associated with their child's weight (Opusunju, 2013). When parents do not believe that their child is susceptible to problems because of his/her weight status, then the relevance of family health behavior change decreases, which in combination with parental factors may influence readiness to engage in interventions. Therefore, if parents recognize that their child's weight presents a threat to their child's well-being, then greater caregiving efficacy and an internal locus of control, as well as more positive beliefs about change should help to motivate parents to initiate health behavior change on behalf of their overweight child. On the other hand, if parents are not aware of the psychosocial and health risks their child faces for being overweight, then feeling more efficacious, having an internal locus of control, and endorsing positive beliefs about health behavior change may have less of an impact on parents' readiness to take action.

Unfortunately, parents are often unaware of the risks associated with childhood overweight. Young-Hyman and colleagues (2000) found that of parents with overweight school-aged children, only 45% indicated that their child's weight was a health risk. Similarly, in a large sample of school-age children, Wake et al. (2002) found that 42% of parents of obese children and 81% of parents of overweight children did not express concern for their child's health. There is a clear discrepancy between parents' perceptions and the actual health risks these children face, which potentially weakens the association between parent factors and readiness to make weight behavior changes. Furthermore, parents with lower levels of education are even less likely to perceive their child's health risk accurately. One study demonstrated that among mothers who did not go to college, only 33% believed that their overweight preschool child faced future health risks (Jain, et al. 2001). Education level may be important because it affords an understanding of and greater access to accurate information about the links between weight and health problems, the benefits of healthy foods, and the impact of personal behavior choices on weight.

Children are unlikely to get support for healthy weight behavior unless their caregivers believe there is a risk for negative health outcomes (Alexander, Alfonos, Cao, & Wright, 2017). In fact, parental perception of child risk is associated with treatment seeking behavior (Lampard, Byrne, Zubrick, & Davis, 2008) and treatment compliance (Becker, Maiman, Kirscht, Haefner, & Drachman, 1977). Crawford and colleagues (2005) found that parental concern for child's future health risks was associated with parents use of strategies to promote healthy weight behaviors for their school-aged child. It has even been suggested that parents cannot progress through the stages of the

transtheoretical model without first perceiving their child to be at risk for problems due to his/her weight (Howard, 2007). For example, a mother with high caregiving efficacy may have confidence in her ability to encourage healthy weight behaviors in her child; however, if this mother does not also perceive her child's weight to be a health risk, she may remain in an earlier stage of change. On the other hand, if she had greater awareness of her child's risk, then caregiving efficacy may play a more powerful role in motivating change as she begins to recognize the importance of healthy weight behavior and moves towards actually making behavior change.

In sum, parent perception of child risk for future problems may be an important moderator, as the associations among parent self-perceptions, parental beliefs about change, and parent readiness to change may depend on parent perceptions of child risk. We expect that among parents who report greater child risk, the association between parent self-perceptions and parent readiness to change will strengthen, as will the association between parent beliefs about change and parent readiness to change. In contrast, among parents who report less child risk, the association between parent self-perceptions and parent readiness to change will weaken, as will the association between beliefs about change and parent readiness to change.

1.7 Predictors of Parent Perception of Child Risk for Future Problems

If parent perception of child risk for future problems is important for readiness to change, then determining what factors contribute to this perception is a crucial next step. Accurate perception of child weight status, child health-related quality of life, and physician feedback appear to be key factors influencing the extent to which parents recognize their child's susceptibility to the health risks of being overweight.

1.7.1 Accurate Perception of Weight Status. Accurate perception of child weight status is associated with parent perceptions of child health risk. In a study examining the association between parent perception of child weight status and concern for child health risks, Lampard et al. (2008) found that parents who underestimated their 3 to 12-year-old child's body size reported lower levels of concern for their child's health. In addition, Wald et al., (2007) reported that of parents who correctly perceived their child as overweight, over 85% expressed concern for their child's health. Therefore, parents who accurately perceive their child as overweight also have greater awareness of the health risks their overweight child is facing. However, there appears to be a discrepancy between child weight status and parent perception of child weight status.

Multiple studies have shown that it is difficult for parents to accurately perceive their child as overweight. (Maynard, Galuska, Blanck, & Serudla, 2003; Jones et al. 2011). Maynard et al. (2003) found that only 66.7% of mothers correctly classified their 2 to 11-year old children who were at or above the 95th percentile as overweight. Another study found that of the 23.7% of 6 to 8-year-old children considered overweight by International Obesity Taskforce standards (IOTF), only 7.3% of these children were classified as "overweight" by their parents. Furthermore, among parents of overweight children, 69.3% reported their child was "normal" weight (Jones, et al., 2011). Finally, Parkinson and colleagues (2011) found that 6 to 8-year-old children in their study had to have a BMI of 21.3 or higher for mothers to classify them as overweight. This is at the 99^{th} percentile for both males and females. Clearly there can be a disconnect between actual child weight and parent perceptions of their child's weight, with multiple parent and child factors influencing this misperception.

With respect to parent factors, there are three aspects (i.e., comparison to extreme cases, parent weight status, and understanding weight measurement methods) that appear to be particularly relevant in the accurate perception of child weight. First, parents are not always aware of what "normal weight" should look like, and it is common for parents to form their judgements about a child's weight on comparisons to other children instead of clinical measures (Jones, et al., 2011; White, 2013). When this is the case, parents often compare their child to extreme cases of morbidly obese children and thus, parents do not perceive their own child as overweight because he or she is not as heavy as the extreme case (Jones, et al. 2011). Second, mothers who are overweight are less likely to think their child has a weight problem (Neumark-Sztainer, Story, & Harris, 2002; Jain et al. 2001). It may be that failed personal experiences with weight loss or perceiving obesity as normal or familiar may contribute to this inaccurate perception. Third, knowledge about weight measurement methods in children is an important factor in parent recognition of overweight in children. Growth charts are the typical measurement method used by physicians to explain obesity and highlight where a child fits in relation to the average child, but they are not as meaningful to the general population as they are to those in health professions. In fact, low-income mothers thought growth charts were not an accurate reflection of weight status, did not trust them, and did not think they applied to their preschool child specifically (Jain et al., 2001). Visible measures of overweight such as waist circumference and skin folds are more strongly associated with mothers' recognizing their school-aged child as overweight, compared to less visible manifestations of weight like BMI, fat percentage score, and placement on growth charts (Parkinson et al., 2011).

Child factors also impact the accuracy of parent perception of child weight. Girls are more often perceived as overweight than boys, and parents are more likely to overestimate girls' weight than boys' (Maynard et al., 2003; Boutelle, Fulkerson, Neumark-Sztainer, & Story, 2004; Towns & D'Auria, 2009; Opusunju, 2013). One study found that mothers were three times more likely to classify their at-risk 2 to 11-year old daughters as overweight than their at-risk sons (Maynard et al., 2003), possibly because of cultural standards that emphasize the thin ideal for women. In addition, child age matters, as parents are more likely to consider older children overweight than younger children (Young-Hyman et al., 2000; Maynard et al., 2003; Genovesi et al., 2005; Rhee et al., 2005; Opusunju, 2013). Parents may think the 'baby fat' will go away, that their child will grow into their weight, or that the child is big boned (Jain et al., 2001; Rich et al., 2005; Maynard et al., 2003). In sum, this research suggests that it is important to take child gender and age as well as parent weight status into account when examining the link between parent perceptions of child weight status and parent perceptions of child risk for health problems.

1.7.2 Health Related Quality of life. Health related quality of life (HRQoL) is defined as the effect of a health condition (in this case child overweight) on the child's daily activities, physical symptoms, social interactions, and emotional well-being (Friedlander, Larkin, Rosen, Palermo, & Redline, 2003). Children who are overweight are more likely to have negative self-perceptions, decreased self-worth, more behavior problems, and low self-esteem, compared to their healthy weight peers. Friedlander et al. (2003) found that overweight school-aged children had lower scores on quality of life measures, including psychosocial health, self-esteem, behavior, and global general health.

Overweight children were two to four times more likely to have low scores in these areas than healthy weight children (Friedlander et al., 2003).

Findings have consistently shown that parents may be more likely to believe that the child's weight is a problem if it is negatively impacting the child's quality of life (Wingfield, 2013). For example, Lampard et al. (2008) found that impaired quality of life was a significant predictor of parental concern about child weight among school-aged children. In addition, parents are often more worried about social and emotional consequences of their child's weight than the physical health consequences (Jain et al. 2001). Inactivity and low self-esteem (i.e. being teased by peers) were the most important characteristics in mother's perceiving their preschool child's weight as a problem (Jain et al. 2001). Relatedly, Hart and colleagues (2003) found that parents thought that improved mood and self-esteem were more important benefits to weight loss than were the physical health benefits for their school-aged child. Therefore, HRQoL may be a useful construct for understanding parent perceptions about the extent to which their child's weight is a problem and increasing parent readiness to change. We expect that parents who report a lower quality of life for their children will be more likely to recognize the risks of their child's excess weight.

1.7.3 Physician Feedback. Physician-parent communication may be another key factor in shaping parents' perceptions of the psychosocial and physical health risks their overweight child is facing. Rhee and colleagues (2005) demonstrated that physician feedback about the child's weight was associated with greater readiness to change among parents of overweight 2 to 12-year-old children. Of the parents who believed their child's weight posed a health risk, 56% reported that a doctor had shown concern about their

child's weight. However, among those parents who did not believe their child's weight was a health risk, only 8% reported a doctor addressing the issue with them. Furthermore, in a sample of families attending an obesity clinic, parents were asked about their communication with their child's primary care physician. Of these parents, 85% reported that their child's physician had expressed concern for the school-aged child's weight and that this was an important factor in their initial attendance at the clinic (Giannisi et al., 2014).

In a study by Taveras, Mitchell, and Gortmaker (2009), parents were asked to recall one week after their child's physical if the child's physician had asked about the parents' confidence to make weight related changes for their 2 to 12-year-old child and their readiness to make these changes. Results showed that parents who were asked about their confidence and readiness to make changes were more confident in making actual changes at follow-up than parents who were not asked about confidence and readiness. Interestingly, only 41% of physicians asked about parent confidence to make changes and 35% asked about parent readiness to make changes. In addition, parents who report having discussions about weight loss strategies for their child (aged 5 to 12-years-old) with a physician are more likely to be in the later stages of readiness to change (Rhee et al., 2014). Taken together, it is clear that physician feedback can be an effective vehicle for changing weight, diet, and exercise, as discussions about child weight are instrumental in parent perceptions of the health risks associated with their child's weight. When a physician expresses concern about a child's weight, it may bring into focus the current and future consequences the child could suffer due to his/her weight. Thus, we

expect that parents who report greater physician feedback about child weight will also express greater awareness of the weight-related risks their child is facing.

While physician feedback is likely to have an influence on parents' perceptions of the health risks their overweight child is facing, it may be less influential than child quality of life and accurate perception of child weight status. There is evidence to suggest that typical methods used by physicians to communicate weight concern, like growth charts, are not easily understandable to all parents (Jain et al., 2001). This could result in parents leaving the doctor's office without realizing the implications or consequences of their child's excess weight. Additionally, the immediate, proximal detriments to quality of life, like a child being teased at school due to his or her weight, are more influential than the long-term, distal consequences of obesity (e.g., diabetes) that physicians typically highlight (Hart et al., 2003; Wingfield, 2013). Therefore, it is likely that child health related quality of life and parent perception of their child's weight status will be more meaningful than physician feedback when it comes to parent perception of their overweight child's health risks.

1.8 Current Study

Drawing from health behavior change theories, this study aims to examine factors that contribute to parent readiness to implement healthy change within the family on behalf of their overweight child. This work has the potential to refine parent-focused child weight interventions by informing ways to enhance parent engagement in treatment. By combining factors from well-established health behavior change models, this study will test a new, comprehensive model of parent motivation to engage in healthy weight behaviors. This study will address the following aims:

Aim 1: To determine the unique effects of parent self-perceptions, parent beliefs about change, and parent perception of child risk for future problems on parent readiness to engage in health behavior change on behalf of their child. We expect that all variables of interest will be predictive of parent readiness to change.

Aim 2: To examine whether the effect of parent self-perceptions and that of parent beliefs about change on readiness to change is moderated by parent perception of child risk for future problems. We hypothesize that the association between self-perceptions and readiness to change, as well as the association between beliefs about change and readiness to change will be strengthened in the context of parents believing their child is at risk for health problems due to weight.

Aim 3: Based on findings from Aim 2, it will likely be important to examine factors that foster perception of child risk for future problems among parents. Therefore, an additional goal of the study will be to determine the unique effects of weight status discrepancy, health related quality of life (HRQoL), and perceptions of physician feedback on parent perception of child risk for future problems. We expect that when HRQoL, weight status discrepancy, and perceptions of physician feedback are examined simultaneously, HRQoL and weight status discrepancy will be more predictive of child risk than perceptions of physician feedback.

CHAPTER 2: METHOD

2.1 Participants

A sample of 253 parents of overweight children living in the United States was recruited via Amazon's Mechanical Turk platform. Three manipulation check questions were embedded throughout the online questionnaire and analysis of participant responses to these questions excluded 13 participants from the study for failing two of the three manipulation checks (Cheung, Burns, Sinclair, & Stitler, 2017; Downs, Holbrook, & Peel, 2012). Furthermore, 20 participants were excluded for reporting weight or height information that seemed improbable. Specifically, three participants were excluded because they reported child BMI values that were more than four standard deviations above the mean (BMI >100); 11 participants were excluded because they reported child height values that were under 2ft, 5in, which was more than 1.75 standard deviations below the mean; 6 participants were excluded because they reported parent weight values that were below 74 pounds (two standard deviations below the mean). Four additional participants were excluded because they were missing child demographic information (i.e., gender or age). The final sample available for analyses included 216 participants. Results did not change when analyses included all participants. On average, parents were 34.43 years old (SD = 6.54) and 60.6% were fathers. All parents had a child between 6 and 12 years old (M_{age}= 8.16, SD = 1.89) who was overweight (M_{BMI} = 28.73). Of these children, 24.2% were overweight (BMI >85th percentile) and 75.8% were obese (BMI>95th percentile).

A majority of participants identified as White/Caucasian (77.3%), 15.3% identified as Black/African American, 2.8% identified as Asian/Asian American, 2.8%

identified as Bi-Racial/Multi-Racial, and 1.9% identified as American Indian/Alaska Native. With respect to income, 1.4% reported an income below $10,000, 32.9% reported an income of $10,000-24,999, 32.9% reported an income of $25,000-49,999, 32.4% reported an income of $50,000-74,999, 13.9% reported an income between $75,000-99,999, and 7.4% reported an income greater than $100,000. Over half (55%) had a college degree or higher.

2.2 Procedure

Participants were recruited via Amazon's Mechanical Turk (MTurk) platform and asked to complete an online survey. MTurk is a software that assists researchers in finding participants for their studies and is open to a world-wide population. The questionnaires were compiled using the Qualtrics software, and participants gained access to the questionnaires via a link from the MTurk website. Parents first provided the birthdate, height, and weight of their child through a screener survey on MTurk. The child's body mass index was calculated using an embedded formula in Qualtrics, and only those participants who met eligibility criteria (BMI $\geq 85^{th}$ percentile) were given access to the full survey. Before beginning the survey, participants read and electronically accepted the informed consent. The entire battery of questionnaires took an average of 39 minutes to complete (*SD*=28.22), and participants were compensated $5.40 for their time. The battery of questionnaires assessed demographic information, self-perceptions, beliefs about change, perception of child risk, and readiness to change child weight behaviors. All procedures were approved by the UNC Charlotte Institutional Review Board.

2.3 Measures

2.3.1 Parent Self-Perceptions

2.3.1.1 Caregiving Efficacy for Child Healthy Weight Behavior.

The Parent Efficacy for Child Healthy Weight Behaviour Scale (PECHWB; Nelson & Davis, 2012) was used to measure caregiving efficacy. The PECHWB is a 65-item parent report measure of confidence in promoting healthy weight behaviors in their children. The PECHWB has four subscales, Fat and Sugar, Sedentary Behaviours, Physical Activity, and Fruits and Vegetables. Parents are asked to rate their confidence in supporting each health behavior in the face of barriers. Sample behaviors include: "*minimizing fat and sugar intake*", "*eating healthy snacks*", and "*engaging in one hour of physical activity*". Sample barriers include: "*on school days*", "*child is busy*", and *"lack of partner support*". Responses are provided on a 100-point scale from "not at all confident" to "extremely confident". Mean scores were calculated to create subscale and total scale scores, with higher scores reflecting greater caregiving efficacy. In the initial validation study, Nelson and Davis (2013) found that the scale demonstrated good convergent validity with the Parent Sense of Competence – Efficacy subscale (r =.29). Additionally, the PECHWB was negatively correlated with the DASS subscales depression (r = -.24), anxiety (r = -.19), and stress (r = -.18) (Nelson & Davis, 2013). The PECHWB Total score had an internal consistency of .99 in this sample.

2.3.1.2 Locus of Control for Child Healthy Weight Behavior.

We developed a measure of Locus of Control for child healthy weight behaviors, which was adapted from the Parental Locus of Control scale (PLOC; Campis, Lyman, & Prentice-Dunn, 1986). The Locus of Control – Child Weight scale is a 47-item parent report measure of the

extent to which parents believe they can influence their child's healthy weight behavior. The Locus of Control – Child Weight scale has five subscales: Parental Efficacy, Parental Responsibility, Child Control of Parents' Life, Parental Belief in Fate/Chance, and Parental Control of Child's Behavior. Sample questions for Parental Efficacy include: *"What I do has little effect on my child's weight"* and "*When something goes wrong between me and my child in regards to healthy weight behaviors, there is little I can do to correct it"*. Sample questions for Parental Responsibility include*: "There is no such thing as healthy or unhealthy children – just healthy or unhealthy parents"* and *"I am responsible for my child's weight*". Sample questions for Child Control of Parents' Life include: *"My life is chiefly controlled by my child's weight and weight related challenges"* and *"My child's weight and weight related challenges do not control my life*". Sample questions for Parental Belief in Fate/Chance include: *"I'm just one of those lucky parents who happened to have a child of normal weight"* and *"Neither my child nor myself is responsible for his/her weight-related behavior"*. Sample questions for Parental Control of Child's Behavior include: *"I always feel in control when it comes to my child's weight"* and *"Sometimes I feel that my child's weight is hopeless"*. Responses are provided on a 5-point Likert scale, anchored from 1 = strongly disagree to 5 = strongly agree. Responses were summed, with higher scores reflecting parent perceptions that they have greater influence over their child's health and weight (i.e., an internal locus of control). There was no missing data for items that make up the PLOC total score in our sample. Cronbach's alpha for the entire scale of the original PLOC is .92, and the test-retest reliability coefficient is .83. The correlation between the Parental Locus of Control scale and the I-E (a general measure of internal versus external locus of control) supports

the construct validity of the PLOC (Campis, Lyman, & Prentice-Dunn, 1986). The total score on the Locus of Control – Child Weight scale had an internal consistency of .93 in our sample. The internal consistency of the five subscales ranged from .79 to .89 in our sample.

2.3.2 Parent Beliefs about Change

2.3.2.1 Barrier-Focused Decisional Balance. The Health Beliefs Survey (Highland et al., 2016) was used to assess parent perception of benefits and barriers to making changes on behalf of their child. The Health Beliefs Survey is a 24-item parent report measure of perceived benefits and barriers to change. There are two subscales, one measuring benefits to change and one measuring barriers to change. Sample items for the Benefits scale include: "*Exercise lowers risk of illness"* and *"Healthy foods result in feeling better".* Sample items for the Barriers scale include: *"Healthy foods are too expensive*" and "*There is no time for exercise"*. Parents were asked to indicate whether each of the statements is true or false. For this study, we created a barrier-focused decisional balance variable by subtracting perceived benefits from perceived barriers, with higher scores reflecting greater perceived barriers relative to benefits. Additionally, we separately summed the number of barriers and benefits endorsed to create a score for each subscale. Higher scores on each subscale indicate higher perceived benefits or barriers (Highland, et al., 2016). There was no missing data on Health Beliefs Survey items. The internal consistency for the barriers scale was .84 and the internal consistency for the benefits subscale was .76.

2.3.2.2 Cues to Health Action. The Cues to Health Action Questionnaire (CHAQ; Jones et al., 2000) was used to examine experiences that motivate parents to change. The

CHAQ is a 32-item parent report measure of how influential certain cues are in motivating individuals to make a change regarding a specific health concern. Sample items include, "*information on TV news or news magazine show*", "*general advice from a friend*", and "*agreeing with your health care provider that you will begin an action, with a specific plan*". Responses are provided on a 4-point Likert scale from 0 = not at all to 3 = very likely, in terms of how likely it would be that the cue would motivate the individual to make the behavior change. Responses were summed to create a Total Cues to Health Action Score, with higher scores representing greater susceptibility to health-related cues. This questionnaire was developed and validated for use with adults, but the instructions were modified to reflect family weight behavior change so that it could be used with parents. The CHAQ had good internal consistency with an alpha of .93 in our sample.

2.3.2.3 Child Feeding Attitudes. The Child Feeding Questionnaire (CFQ; Birch et al., 2001) was used to assess parental attitudes. The CFQ is a 23-item parent report measure of attitudes about child feeding. The CFQ factors include Perceived Parent Weight, Perceived Child Weight, Concern About Child Weight, Pressure to Eat, Monitoring, and Restriction. The Perceived Parent Weight scale asks parents to indicate whether they were markedly underweight, underweight, normal weight, overweight, or markedly overweight at four different life stages and the Perceived Child Weight scale asks parents to indicate whether their child is currently markedly underweight, underweight, normal weight, overweight, or markedly overweight. Sample questions for Concern About Child Weight include "*How concerned are you about your child eating too much when you are not around her/him*?" and "*How concerned are you about your*

child becoming overweight?" Sample items for Restriction include *"I have to be sure that my child does not eat too many high-fat foods"* and *"I intentionally keep some foods out of my child's reach".* Sample items for Pressure to Eat include *"My child should always eat all of the food on his/her plate"* and *"I have to be especially careful to make sure that my child eats enough*". Sample questions for Monitoring include "*How much do you keep track of the high-fat foods that your child eats?"* and "*How much do you keep track of the sweets your child eats?*". Responses were provided on a 5-point Likert scale from "unconcerned" to "very concerned" for Concern about Child Weight, "disagree" to "agree" for Restriction and Pressure to Eat, and from "never" to "always" for Monitoring. Mean scores were calculated for Concern About Child Weight, Pressure to Eat, Monitoring, and Restriction with higher scores reflecting more concern and more controlling feeding practices (Birch et al., 2001). The internal consistency of the factors ranged from .62 to .90 in our sample. We used a Total Child Feeding Attitudes score in the analyses by calculating the mean across the Restriction, Pressure to Eat, and Monitoring subscales.

2.3.2.4 Subjective Health Norms. Subjective health norms were evaluated through five questions about parents' perceptions of what important others think about their weight-related parenting behaviors (Andrews et al., 2010). Sample questions include, "*Most people who are important to me think I should limit my child's intake of sweetened drinks each day*" and "*The people in my life whose opinions I value think that I should give my child 5 servings of fruits and vegetables per day*". Responses were provided on a seven-point Likert scale anchored with strongly disagree and strongly agree. Scores were averaged with higher scores indicating greater perceived pressure to engage in health

behavior. The internal consistency of the subjective norms scale was .83 in our sample. This method of measuring subjective norms is consistent with measurement of subjective norms in similar studies (Stephenson et al., 2005; Villarrubia 2006; Walsh, Edwards, & Fraser, 2009; Whitaker et al., 2016).

2.3.3 Parent Perception of Child Risk for Future Problems

We developed a measure of parent perception of child risk for future problems, the Child Weight Risk Questionnaire (CWRQ), which was adapted from the Child Risk Questionnaire (Shepard, Armstrong, Silver, Berger, & Seifer, 2012; Spoth & Redmond, 1995). The CWRQ assesses parent perceptions of their child's susceptibility to 15 future problems due to the child's weight across three time periods, "a year from now", "as a teenager", and "as an adult". For each time period, parents were asked to indicate whether or not they have thought about a series of risks before, the likelihood of each risk occurring, how concerned they are about each risk, and how much control they have over whether or not each risk will occur. Sample risk items include, "*be made fun of by his/her peers because of weight*," "*have health complications because of his/her weight*," and "*have low self-esteem because of his/her weight*". Responses were provided on a "yes" or "no" scale for having thought about each risk before, a 5-point scale with choices, "never thought about it", "will not happen," "might happen", "is likely to happen", and "will happen" for the likelihood questions, a 5-point Likert scale with anchors "not at all" to "extremely" for the concern questions, and a 5-pont Likert scale with anchors "none" to "a lot" for the control questions. A Total Parent Perception of Child Risk for Future Problems score was calculated by summing the number of risks endorsed by parents across all three time periods; this Total Score was used in all

substantive analyses. Higher scores represent greater reflection of the myriad risks facing the child. Likelihood, Concern, and Control composite scores were created by averaging responses to these prompts across all three time periods. Higher scores represent greater perceived likelihood that the risks will occur, greater concern about the risks, and greater perceived control over whether or not the risks will occur. The internal consistency of the Parent Perceptions of Child Risk for Future Problems scale was .94. The internal consistency of the Likelihood, Concern, and Control scales was .95, .97, and .95, respectively. Correlations between the Parent Perceptions of Child Risk for Future Problems scale and other study variables were in the expected direction, supporting the validity of the scale. For example, there was a significant, positive correlation between Parent Perception of Child Risk for Future Problems and HRQoL, such that more perceived risks were associated with worse HRQoL. All four of the CWRQ scales were positively correlated with each other.

2.3.4 Predictors of Child Risk Perception

2.3.4.1 Weight Status Discrepancy. The figure rating scale (Eckstein, et al., 2006) was used to assess parents' perception of their child's weight. Parents were shown an image containing seven sketches of children of varying body sizes and asked to indicate which image most closely matches their child (Eckstein, et al., 2006; White, 2013). The seven sketches represent three weight categories: lighter weight (images 1 & 2), average weight (images 3, 4, & 5), and heavier weight (images 6 & 7). A weight status discrepancy variable was created by subtracting the image the parent selected from the image thought to reflect the child's calculated BMI (image 6 representing overweight children and image 7 representing obese children). For example, if a child has a BMI

matching image 6 but the parent selects image 4, the resulting weight status discrepancy score would be two, indicating that the image representing the child's calculated BMI is two units higher than the parent's perception of their child's weight status. A weight status discrepancy score of zero indicates that parent choice matched the image thought to reflect the BMI calculation. High weight status discrepancy scores represent more discrepancy between parent selected image and image thought to reflect child's calculated BMI. The figure rating scale is widely used in studies of parent perception of child weight (e.g., Eckstein, et al., 2006, Schmied, 2015; White, 2013). Test-retest reliability for the figure rating scale is 91.7% (Eckstein, et al., 2006).

2.3.4.2 Health Related Quality of Life. The Pediatric Quality of Life Inventory Version 4.0 (PedsQL; Varni, et al., 2002) is a 23-item measure that assesses parent perceptions of child health related quality of life (HRQoL). This measure captures a child's Physical Functioning (8 items; sample questions include: "*Walking more than one block*" and "*Lifting something heavy*"), Emotional Functioning (5 items; sample items include: "*Feeling sad or blue*" and "*Feeling angry*"), Social Functioning (5 items; sample items include: "*Getting along with other children*" and "*Getting teased by other children*"), and School Functioning (5 items; "*Paying attention in class*" and "*Forgetting things*"). Parents rate each item from 0 = never a problem to 4 = almost always a problem. Items are transformed to a 100-point scale (0=0, 1=25, 2=50, 3=75, 4=100) and summed to create four subscale scores and a Total HRQoL Scale Score. Higher scores reflect poorer quality of life. There was no missing data on PedsQL items. The Total HRQoL Scale Score had an internal consistency of .96 in this sample.

2.3.4.3 Perceptions of Physician Feedback. Parents were asked to indicate

whether their child's physician had expressed concern about the child's weight using items drawn from several studies (Eckstein, et al. 2006; Taveras et al., 2009; Rhee et al., 2014; White, 2013). Questions included, "*How often has your child's doctor told you that your child is gaining weight too fast or is overweight*?", "*How would you rate the quality of advice you received about nutrition at your child's primary care visit*?", "*How would you rate the quality of advice you received about physical activity at your child's primary care visit*?", and "*Has your child's doctor talked to you about strategies you can use to help your child be healthy*?" Responses were provided on a 5-point Likert scale with higher scores reflecting parent perceptions of more or higher quality physician feedback. In addition, parents were asked one open-ended question about the specific strategies their primary care physician has discussed with them.

2.3.5 Readiness to Change

Readiness to change was measured through the Readiness to Change Algorithm originally developed by Kristal et al. (1999) and adapted for child weight studies by Rhee and colleagues (2005). The algorithm includes questions about the extent to which parents are thinking about making lifestyle changes on behalf of their children and how likely they are to make these changes within the next six months. Based on their answers to these questions, parents were placed into one of the stages of change of the Transtheoretical Model of Change. If parents answered "no" to thinking about making changes they were placed into the precontemplation stage. If parents reported that they were thinking about making changes, then their stage was determined by the likelihood that they would follow through with those changes in the next 6 months. Parents were placed in the contemplation stage if they were thinking about making changes but

unlikely to make these changes within the next six months. Parents were placed in the preparation stage if they were very likely to make changes but were not currently making these changes more than 50% of the time, whereas parents were placed in the action stage if they were making these changes more than 50% of the time. Each stage was assigned a number to create a continuous variable, where 1 = precontemplation, 2 = contemplation, 3 = preparation, and 4 = action. Higher scores represent more readiness to change. This method is widely used in the literature on parent motivation to change the unhealthy behaviors of their children, but no reliability or validity data have been reported (Kristal et al., 1999; Rhee et al., 2005; White, 2013). In addition to the algorithm, if parents reported that they were actively making changes, they were asked to describe those changes.

CHAPTER 3: DATA ANALYSIS

We conducted a power analysis using GPower 3.1 to determine the required sample size to find effects (Faul, Erdfelder, Buchner, & Lang, 2009). With an alpha of .05, effect size = .15, power = .80, and six tested predictor variables a sample size of 98 participants is required; therefore, our sample size of 216 participants is sufficient to detect small to medium effects. As a first step, descriptive statistics were run to ensure that the data were normally distributed, there were no outliers, and there was enough variance to run the analyses. All variables were centered. Zero-order correlations among the study variables were computed to determine whether they were in the expected direction.

Aim 1: To determine the unique effects of parent self-perceptions, parent beliefs about change, and parent perception of child risk for future problems on parent readiness to engage in health behavior change on behalf of their child. We expected that all variables of interest would be predictive of parent readiness to change.

To examine Aim 1, we used hierarchical regression to determine which variables accounted for the most variance in parents' readiness to change. On the first step, the control variables (i.e., parent age, parent gender, selective social status, child age, child gender, and child BMI percentile) were entered. On the second step, the parent self-perception variables were entered, specifically caregiving efficacy for child healthy weight behavior and locus of control for child healthy weight behavior. On the third step, parent beliefs about change, specifically barrier-focused decisional balance, cues to health action, child feeding attitudes, and subjective health norms, were entered. On the

final step, parent perception of child risk for future problems was entered. The readiness to change score was entered as the dependent variable.

The R^2 for the full model was examined to determine how much variance in parent readiness to change was explained by the entire model. In addition, the R^2 change from each step to the next was analyzed for practical and statistical significance to see if the newly introduced variables predicted above and beyond the previously entered variables. Main effects were examined using the regression coefficient for each variable.

Aim 2: To examine whether the effect of parent self-perceptions and that of parent beliefs about change on readiness to change is moderated by parent perception of child risk for future problems. We hypothesized that the association between self-perceptions and readiness to change, as well as the association between beliefs about change and readiness to change would be strengthened in the context of parents believing their child is at risk for health problems due to weight.

To examine Aim 2, we used hierarchical regression to test the interaction of parent perception of child risk for future problems x parent self-perceptions and parent perception of child risk for future problems x parent beliefs about change on readiness to change. Multiple interaction terms were calculated to generate the product of each independent variable and the hypothesized moderator (i.e., perceived child risk). For example, to assess the extent to which perception of child risk moderates the association between caregiving efficacy for child healthy weight behavior and readiness to change, the cross product of perception of child risk and caregiving efficacy was calculated. On the first step, the control variables that were significantly related to readiness were entered. On the second step, parent self-perceptions were entered, specifically caregiving

efficacy for child healthy weight behavior and locus of control for child healthy weight behavior. On the third step, parent beliefs about change were entered, specifically barrier-focused decisional balance, cues to health action, child feeding attitudes, and subjective health norms. On the fourth step, parent perception of child risk for future problems was entered. The final step tested the interaction term. Six separate regressions were run, with parent readiness to change entered as the dependent variable. Each of the six regressions included a different interaction term in the fifth step to test the various possible interactions (parent perception of child risk for future problems x caregiving efficacy, parent perception of child risk for future problems x barrier-focused decisional balance, etc.). The R^2 change from the fourth to the fifth step was analyzed for practical and statistical significance to see if the interaction was meaningful. If the interaction was significant, a simple slopes plot was created to model the interaction.

Aim 3: Based on findings from Aim 2, it will likely be important to examine factors that foster perception of child risk among parents. Therefore, an additional goal of the study was to determine the unique effects of weight status discrepancy, health related quality of life (HRQoL), and perceptions of physician feedback on parent perception of child risk for future problems. We expected that when HRQoL, weight status discrepancy, and perceptions of physician feedback are examined simultaneously, HRQoL and weight status discrepancy would be more predictive of parent perception of child risk for future problems than perceptions of physician feedback.

To examine Aim 3, we used hierarchical regression to determine the unique effects of weight status discrepancy, perceptions of physician feedback, and HRQoL on parent perception of child risk for future problems. On the first step, the control variables

were entered. On the second step, weight status discrepancy, perceptions of physician feedback, and HRQoL were entered. Parent perception of child risk for future problems was the dependent variable. Main effects were examined using the regression coefficient for each variable.

CHAPTER 4: RESULTS

4.1 Missing Data

Missing data analyses were performed on items in each scale. Two hundred nine participants had complete data. Four participants were missing one item on the measure of caregiving efficacy for child healthy weight behavior, two participants were missing one item on the teenager time point of the measure of perception of child risk, and one participant did not respond to the Figure Rating Scale. Less than 1% of the data were missing. Little's MCAR test was not significant (X^2=528.44, p=.76), demonstrating that the data were missing completely at random (Little, 1998).

4.2 Preliminary Analyses

Descriptive statistics and zero order correlations for study variables are reported in *Table 1* and *Table 2*. All means were within a reasonable range and standard deviations indicate that the sample exhibited acceptable variability in responses for each variable. Variables were normally distributed as indicated by skew and kurtosis less than |2|. There was variability in parent readiness to change, with 45.8% of parents in the precontemplation stage, 14.4% of parents in the contemplation stage, 4.6% of parents in the preparation stage, and 35.2% of parents in the action stage. Although some studies have examined readiness to change as a categorical variable, this study examines readiness to change as a continuous variable as is consistent with other work in the field (e.g., Blanchard et al., 2003; Cunningham et al., 2002; DiClemente, Doyle, & Donovan, 2009).

As shown in Table 2, many of the zero-order correlations were in the expected direction. There was a significant, positive correlation between parent readiness to

change and each of the parent beliefs about change variables (i.e., barrier-focused decisional balance, cues to health action, child feeding attitudes, and subjective health norms). As expected, greater attention to health-related cues, more controlling child feeding attitudes, and greater perceived pressure to engage in health behavior was associated with greater readiness to change among parents. Unexpectedly, more perceived barriers relative to benefits was associated with greater readiness to change. Contrary to predictions, parent readiness to change was not significantly associated with parent self-perceptions (i.e., caregiving efficacy for child healthy weight behavior and locus of control for child weight behavior). When the relations between perceptions of child risk for future problems and HRQoL, perceptions of physician feedback, and weight status discrepancy were examined, all were in the expected direction. Specifically, parents who reported greater perceived risks due to their child's weight also reported less discrepancy with regard to their child's weight status, poorer HRQoL for their child, and more physician feedback.

With respect to within construct variables, the two indicators of parent self-perceptions (caregiving efficacy for child healthy weight behavior and locus of control for child weight behavior) were not significantly correlated. However, many of the indicators of parent beliefs about change were significantly related to each other. Specifically, cues to health action, child feeding attitudes, and subjective health norms were all significantly and positively correlated with each other. Unexpectedly, barrier-focused decisional balance was not significantly related to the other parent beliefs about change variables (i.e., cues to health action, child feeding attitudes, and subjective health norms). Finally, HRQoL, weight status discrepancy, and perceptions of physician

feedback were all significantly correlated with each other in expected ways, such that parents reporting lower HRQoL for their child also reported greater physician feedback and less discrepancy in their child's weight status. Contrary to expectations, lower weight status discrepancy scores were associated with less physician feedback.

We conducted t-tests to examine child and parent gender differences among study variables. There were significant differences on HRQoL (F=6.22, p<.05) between boys and girls, with parents reporting worse quality of life for boys than for girls. There were also significant differences between mothers and fathers on readiness to change (F=4.32, p<.05), HRQoL (F=16.12, p<.01), and barrier-focused decisional balance (F=5.65, p<.05), with mothers reporting greater readiness to change and poorer child HRQoL than fathers, but fathers reporting greater barrier-focused decisional balance than mothers. Given these gender differences, we controlled for parent and child gender in our regression analyses. Parent age, child age, selective social status, and child BMI percentile were all significantly correlated with readiness to change. Older parents, older children, higher selective social status, and higher child BMI percentile were associated with greater parent readiness to change. Selective social status was also significantly correlated with parent perception of child risk for future problems, such that higher selective social status was associated with greater perception of child risk. As such, we controlled for these demographic variables in our regression analyses.

4.3 Substantive Analyses

Aim 1: To determine the unique effects of parent self-perceptions, parent beliefs about change, and parent perception of child risk for future problems on parent readiness to

engage in health behavior change on behalf of their child. We expected that all variables of interest would be predictive of parent readiness to change.

As shown in *Table 3*, the full model predicting readiness to change was significant, R^2=.29, F(1, 197)=6.37, p<.05. As hypothesized, parents' barrier-focused decisional balance (β=.21, p<.05), child feeding attitudes (β=.15, p<.05), and perception of child risk for future problems (β=.17, p<.05), each explained significant variance in parents' readiness to change, even after accounting for demographic variables. Contrary to expectations, parent self-perceptions (i.e., caregiving efficacy for child healthy weight behavior and locus of control for child weight behavior), cues to health action, and subjective health norms did not predict parent readiness to change in the full model.

Aim 2: To examine whether the effect of parent self-perceptions and that of parent beliefs about change on readiness to change is moderated by parent perception of child risk for future problems. We hypothesized that the association between self-perceptions and readiness to change, as well as the association between beliefs about change and readiness to change would be strengthened in the context of parents believing their child is at risk for future problems due to weight.

As depicted in *Table 3* and *Figure 2*, there was a significant interaction between locus of control for child weight behavior and parent perception of child risk for future problems in predicting parent readiness to change (ΔR^2 = .02, F(1, 196)=6.56, p<.05). The interaction was probed using a simple slopes plot (see *Figure 2*). Specifically, parents' locus of control was related to readiness to change when parents perceived their child to be at high risk for future problems (β =.02, p< .01), but not when parents perceived their child to be at lower risk. That is, among parents who perceived their child

to be at high risk for future problems, parents' with greater internal locus of control also reported greater readiness to change. Contrary to expectations, parent perception of child risk for future problems did not moderate the associations between other study variables (i.e., caregiving efficacy for child healthy weight behavior, barrier-focused decisional balance, cues to health action, subjective health norms, or child feeding attitudes) and readiness to change.

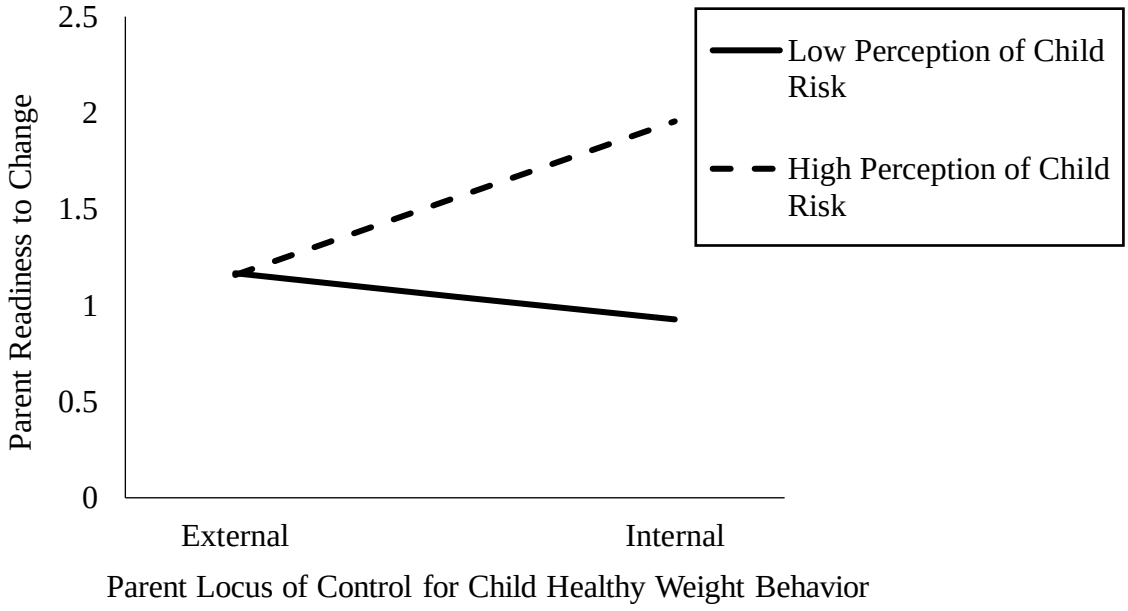

Figure 2. Simple slopes plot for the interaction between parent locus of control and parent perception of child risk on readiness to change.

Aim 3: To determine the unique effects of weight status discrepancy, health related quality of life (HRQoL) and perceptions of physician feedback on parent perception of child risk for future problems. We expected that when HRQoL, weight status discrepancy, and perceptions of physician feedback were examined simultaneously, HRQoL and weight status discrepancy would be more predictive of parent perception of child risk for future problems than perceptions of physician feedback.

As depicted in *Table 4*, the model predicting parent perception of child risk for future problems was significant, R^2=.25 (F=7.55, p<.01). Our hypothesis was partially supported with HRQoL (β =.23, p<.01) and weight status discrepancy (β =-.23, p<.01) significantly predicting parent perception of child risk for future problems. Contrary to our hypothesis, perceptions of physician feedback (β =.20, p<.01) was also a significant predictor of parent perception of child risk. Therefore, parent report of worse quality of life for the child, less weight status discrepancy, and more physician feedback predicted greater perception of child risk for future problems due to weight.

4.4 Post-Hoc Analyses

To better understand the substantive analyses, we ran a series of post-hoc analyses that dismantled the composite scores in an effort to determine which of the subscales accounted for the significant effects of parent beliefs about change on readiness to change. For the association between barrier-focused decisional balance and readiness to change, we examined the effects of total benefits endorsed and total barriers endorsed on readiness to change using hierarchical regression and found that only total barriers (β =.20, p<.01) significantly predicted parent readiness to change. A one-way ANOVA was used to further examine the relation between barriers to change and parent readiness to change. Results of the ANOVA revealed that parents in the contemplation, preparation, and action stages of change perceived significantly more barriers to change than parents in the precontemplation stage of change (F=9.06, p<.01). Next, to understand the association between child feeding attitudes and readiness to change, we examined the effects of the Restriction, Monitoring, and Pressure to Eat subscales that make up the Child Feeding Attitudes scale on readiness to change using hierarchical regression.

Restriction (β =.24, p<.01) and Pressure to Eat (β =-.23, p<.01) were significant predictors of parent readiness to change; however, Monitoring was not (β =.05, *ns*).

Additional post-hoc analyses were run to determine which time period (i.e., a year from now, teenager, or adult) accounted for the significant effects of parent perception of child risk for future problems on readiness to change. Parent perception of child risk for the teenage years significantly predicted readiness to change (β =.25, p<.01), while parent perception of child risk for the next year and for the adult years approached significance. Although our focus in the substantive analyses was to determine the effect of parent perception of child risk on parent readiness to change, our measure of child risk also provided parent perceptions of the *likelihood* that the child would experience future problems, parent *concern* about the child experiencing future problems, and parent perception of their *control* over whether their child experienced future problems. These additional subscale scores were added to the hierarchical regression model in step four along with parent perception of child risk for future problems. However, these subscales (Likelihood, Concern, and Control) did not significantly predict parent readiness to change when parent perception of child risk was in the model.

Hierarchical regression analyses were also used to further understand the relations between HRQoL and parent perceptions of physician feedback on parent perception of child risk for future problems. To better understand the effect of HRQoL on parent perception of child risk for future problems, the effects of the individual subscales (Physical Functioning, Emotional Functioning, Social Functioning, and School Functioning) on parent perception of child risk for future problems were examined. The four subscales were not predictive of parent perception of child risk for future problems

on their own (β =-.06 to .18, p's>.05). Next, we examined the association between perceptions of physician feedback and parent perception of child risk for future problems, by exploring the effects of *quantity* of physician feedback and *quality* of physician feedback on parent perception of child risk for future problems. Hierarchical regression analyses demonstrated that *quantity* of physician feedback was a significant predictor of parent perception of child risk for future problems (β =.32, p<.01), whereas quality of physician feedback only approached significance.

Finally, post-hoc analyses were run to determine if the relations between parent perception of child risk for future problems and HRQoL, weight status discrepancy, and perceptions of physician feedback were the same across all three risk time periods (i.e., a year from now, teenager, or adult). Our findings revealed that HRQoL, weight status discrepancy, and perceptions of physician feedback were significant predictors of parent perception of child risk for future problems for the next year and for the adult years when each time period was examined separately. The direction of the effects were as expected. With respect to the teenage years, weight status discrepancy (β =-.23, p<.01) and HRQoL (β =.16, p=.05) significantly predicted child risk in the teenage years, whereas perceptions of physician feedback did not (β =.12, p=.21).

CHAPTER 5: DISCUSSION

Drawing from theories of health behavior change, this study aimed to develop a new, integrated model of parent readiness to change family health behavior in a sample of parents of overweight, school-aged children. Consistent with prior research on parent readiness to change, there was wide variability in readiness to change among our sample (Rhee et al. 2005, Rhee et al., 2014). Our integrative model demonstrated that barrier-focused decisional balance, child feeding attitudes, and parent perception of child risk for future problems were the strongest predictors of parent readiness to change. Contrary to our hypothesis, parent self-perceptions (i.e., caregiving efficacy for child healthy weight behavior and parent locus of control for child healthy weight behavior) were not significantly related to parent readiness to change, and cues to health action and subjective health norms did not predict parent readiness to change after accounting for other factors. As predicted, a significant interaction was found between parent locus of control for child healthy weight behavior and perception of child risk for future problems on parent readiness to change. Specifically, among parents who perceived their child to be at high risk for future problems due to weight, parents' internal locus of control was positively associated with their readiness to change, whereas among parents who perceived their child to be at low risk for future problems, there was not a significant relation between locus of control and readiness to change. Finally, poorer HRQoL, less weight status discrepancy, and more physician feedback were predictive of parents perceiving a greater number of risks facing their child.

Consistent with previous literature, we found that there were marked individual differences in parents' readiness to change family health behavior (Rhee et al., 2005:

Rhee et al., 2014), with nearly half of participants in the precontemplation stage. This variability in readiness, even among parents of children with weight difficulties, underscores the need to address parent motivation when working with families to change health behavior. Our findings revealed that one meaningful predictor of parent motivation was their perception of benefits and barriers to change. Unexpectedly, a more barrier-focused perspective was associated with greater readiness to change. Furthermore, when benefits and barriers were examined separately, only barriers significantly predicted readiness. These findings are not consistent with previous studies, which demonstrate the utility of focusing on benefits to change in promoting healthful behavior among families (e.g., Highland et al., 2016; Matheson et al., 2006). For example, Highland and colleagues (2016) found that parents' perception of a greater proportion of benefits to barriers was associated with healthier youth soda consumption patterns. Many studies that incorporate benefits and barriers to change examine their effect on actual family behavior patterns (Matheson et al., 2006; Vann et al., 2006; Brock and Beazley 1995; Highland et al., 2016; Reiter et al., 2009), and thus motivation to change and actual behavior change may reflect two distinct processes.

In our study, parents in the more advanced stages of change perceived significantly more barriers than parents in the lowest stage of change. Perhaps for parents who are actively thinking about and preparing to make a change or for those who are already making efforts to change, the barriers to healthful eating and activity habits are particularly salient. In contrast, parents in the lower stages of change, who are less prepared to take action, may not be aware of the nature and pervasiveness of barriers that they are likely to encounter as they attempt to change family dietary and activity patterns.

Therefore, working with parents to identify potential barriers to change, empathically joining with parents regarding these barriers, and problem-solving ways of overcoming perceived barriers could be instrumental in increasing parent motivation for change and helping parents move toward more advanced stages of change.

Our findings also revealed that more controlling parental attitudes about child feeding are predictive of greater readiness to change family health behavior. This is in contrast to prior studies wherein controlling feeding attitudes and behaviors are thought to be harmful (Faith et al., 2004). Perhaps for parents of overweight children, these attitudes indicate a high level of investment in their child's health and are related to the promotion of health and weight-loss within their family (Birch et al., 2001). Previous work has shown that parents of overweight children less frequently pressure their children to eat compared to parents of underweight or normal weight children and use greater amounts of restriction in their child feeding practices (Birch et al., 2001). Parents of children who are overweight and obese may believe that restricting unhealthy foods, encouraging healthful food consumption, and prompting physical activity are necessary for addressing their child's weight challenges. In fact, physician feedback and child weight interventions can encourage this type of control among parents when recommending strategies for child weight-loss (Daniels & Hassink, 2015; Wilson et al., 2018). This was illustrated in our sample when one parent reported, "the most important advice [the physicians] gave was to not even [bring] any junk foods in the house and if I do lock them up or hide them in my room," demonstrating restrictive child feeding practices. Perhaps controlling attitudes about child feeding result in unhealthy child behaviors in the context of harsh and punitive family environments (Scaglioni et al.,

2008), but are less concerning within the context of family warmth and support. Therefore, future research should clarify the nature of these processes by investigating the effects of controlling attitudes across different family contexts.

As expected, parent perception of child risk for future problems was a strong predictor of parent readiness to change, such that parents who perceived a greater number of risks facing their child were more likely to be higher on the continuum of change. Consistent with past research showing low levels of parental concern about child weight (Wald et al., 2007; Jones et al., 2011; Parkinson et al., 2011), parents in our sample had thought about a small number of risks facing their child (average = 10 out of 27 risks). Additionally, the association between parent locus of control and readiness to change was stronger among parents who perceived their child to be at greater risk for future problems. When parents perceive their child to be at greater risk for future problems, they may draw on personal strengths, like an internal locus of control, in efforts to engage in family health behavior change. Therefore, increasing parent understanding of the risks facing their overweight child and empowering parents to become aware of the influence they have over their child's weight and health may be key intervention points towards building parent motivation for family health behavior change.

Contrary to our hypotheses, caregiving efficacy for child healthy weight behavior was not predictive of readiness to change. It is possible that the relation between caregiving efficacy and parent readiness to change is non-linear and thus not captured by our analysis. Perhaps there is an "optimal" level of confidence when it comes to family health behavior change. It may be that parents with very little confidence are unlikely to be motivated to change because of a fear of failure or negative past experiences related to

health behavior change. On the other hand, parents who have very high levels of confidence may have already successfully made changes or not believe changes are necessary. It may be that parents with a moderate amount of confidence are more likely to indicate readiness to make health behavior changes because they are not held back by fears of failure or powerlessness, and at the same time, they recognize the value of efforts to make changes in the family. Further exploration of the possible curvilinear relation between caregiving efficacy and parent readiness to change would inform efforts to bolster parent motivation to improve child healthy weight behavior.

Additionally, subjective health norms and cues to health action were not significant predictors of readiness to change in the context of other factors included in the model. In contrast to our findings, prior research has consistently shown that subjective health norms are important predictors of parents' efforts to promote healthy family behavior (Walsh, Edwards, & Fraser, 2009; Epstein et al., 1990, Andrew et al., 2010). However, when it comes to cues to health action, findings have been inconclusive regarding their predictive utility (Brock & Beazley, 1995; Park, 2011). It should be noted that both subjective health norms and cues to health action were significantly correlated at the zero-order level with parents' readiness to change in our sample. It is likely that other factors included in our integrated model diminished the effect of subjective health norms and cues to health action on readiness to change. The variables that were most predictive of readiness to change (i.e., barrier-focused decisional balance, child feeding attitudes, and parent perception of child risk for future problems) were focused more heavily on characteristics that were unique to the child and family. Therefore, when it

comes to readiness to change, individualized factors may be more meaningful for parent motivation than factors assessing more broad-based social pressures.

Weight status discrepancy, HRQoL, and perceptions of physician feedback were strong predictors of parents perceiving a greater number of risks facing their child in our study. Perception of child body size as overweight is a likely precursor to developing an awareness of the health risks a child is facing due to weight; however, most parents in this sample underestimated their child's weight status. These findings are consistent with past research that has examined parent perception of child body size and found inconsistencies in child weight status and parent perception of child weight status (White, 2007; Young-Hyman et al. 2000; Parkinson et al., 2011). Weight norms are changing in the U.S. with increasing rates of child overweight, which may be influencing parents' perceptions of normal or healthy weight for children in general and thus, impacting their perception of their own child's weight status (Black et al., 2015; Katz 2015). Our findings are consistent with research that has shown less weight status discrepancy to be associated with greater parental concern about child weight (Lampard et al., 2008; Wald et al., 2007). However, our study is the first to demonstrate the important relation between weight status discrepancy and a detailed measure of parent perception of child risk.

Typically, parents are more concerned with child health problems, like obesity, when they notice a negative impact of the problem on their child's quality of life (Hart et al., 2003; O'Dea, 2003). Consistent with these findings, HRQoL had a significant impact on parent perception of child risk for future problems in our sample. However, contrary to previous work that has shown that the socio-emotional aspects of quality of life can be

more impactful on parents than specific health details (e.g., child at risk for high cholesterol), the socio-emotional components of HRQoL were not more important for readiness to change than the physical aspects of HRQoL in our sample. The physical HRQoL items on our measure consisted of things that influence children in everyday life (e.g., walking more than a block) rather than longer term physical consequences like much previous research has examined and thus may make them important for readiness to change as they are equally apparent as socioemotional factors in the child's everyday life. There is also evidence that declines in HRQoL become even more apparent for parents during adolescence (Simon et al., 2008; Tsiros et al., 2009). Therefore, it is also possible that in the developmental period examined in this study, where both parents and peers are important aspects of a child's life, impairments in socio-emotional domains were not as noticeable or concerning for parents. This distinction between the different domains of HRQoL may become more apparent in adolescence as peer relationships often take precedence over family life, social networks become more complex, and bullying becomes more common (Sullivan & Cleary, 2004). These findings suggest that asking parents about the negative, everyday socio-emotional and physical consequences that child overweight has on a child's life may be an effective way of increasing parent awareness of the risks their child is facing due to overweight and thus promoting readiness to change.

Contrary to expectations, perception of physician feedback was also a significant predictor of perception of child risk for future problems. Previous research has found that physician feedback is not always effective in promoting perception of child risk and family change due to the difficulty some parents have in understanding typical methods

of communicating information about child obesity (i.e., growth charts) (Jain et al., 2001; Parkinson et al., 2011). Perhaps methodological differences explain the discrepancy between findings from the current study and past research. More specifically, physician feedback is often assessed immediately after the doctor's visit and focuses on that one visit (Giannisi et al., 2014; Rhee et al., 2005; Taveras, Mitchell, and Gortmaker, 2009); however, our measure of physician feedback captured general perceptions of amount and quality of physician feedback across multiple pediatrician visits. Perceptions of physician feedback may be a stronger predictor of perception of child risk than actual physician behavior as it captures physician advice in a more global, meaningful way by considering parent understanding and appraisal of feedback. Many parents in our sample reported that their physician discussed "the obvious strategies" with them, including healthy diet and physical activity, while some parents reported more detailed physician feedback, like concern that a child "could be pre-diabetic". On the other hand, some parents reported that discussions about weight "rarely happen" with their doctor. Given that we did not parse out the type of feedback received (i.e., growth charts versus general discussion about child weight) it is likely that our measure of perceptions of physician feedback only captured feedback that was understood and meaningful to parents and missed instances of physician feedback that were solely based on growth charts or other mechanisms that may be difficult for parents to understand. In our sample, the quantity of physician feedback was most strongly related to parent perception of child risk for future problems. It may be that repeated feedback about child weight and strategies to promote child health encourages parents to think about the risks their child is facing.

5.1 Strengths, Limitations, & Future Directions

The present study had several strengths that should be noted. First, our participants were drawn from a national sample of parents using Amazon's MTurk. One benefit of this recruitment method for this particular study is that it avoids the bias inherent in assessing readiness to change in parents who are already utilizing treatment for their overweight child, a common sampling procedure used in previous studies. Second, our study had a strong theoretical base in health behavior change literature and our findings extend our understanding of how health behavior change theories are applicable in the context of child overweight. Third, our study incorporated a comprehensive measure of parent perception of child risk for future problems, allowing us to better understand this construct as it relates to parent readiness to change. Although the association between "concern" (typically measured using a single item) about child weight or body size and readiness to change has been established (White, 2007; Rhee et al. 2005), the examination of current and future risks through the Child Weight Risk Questionnaire is a unique contribution of this study. Fourth, our measures were specific to child overweight and parenting, providing a more nuanced understanding of factors that promote readiness to change child weight behavior than if these constructs were assessed more generally.

Despite these strengths, there were limitations within our study that should be considered. While precautions were taken to gather high quality data from a representative sample using MTurk (i.e., setting a 95% approval rating to restrict poor MTurk workers from accessing the study, integrating attention check questions throughout the survey, including a screener questionnaire, and providing fair

compensation), it is possible that there are problems with MTurk data including poor participant attention (Goodman, Cryder, & Cheema, 2013), individuals outside the U.S. creating fake U.S. accounts (Harms & DiSimone, 2015), and lack of representativeness of participants' income and profession (Harms & DiSimone, 2015). However, research has shown that there is high test-retest reliability (.80 to .94) among MTurk workers (Buhrmester, Kwang, & Gosling, 2011), and that MTurk is "governed by strong norms of honesty and accuracy" (Shapiro, Chandler, & Mueller, 2013, p. 214), which speaks to the quality of the data. Nonetheless, an important next step will be to replicate these findings in a community sample, perhaps gathered from a pediatrician's office.

Among our sample, 60% of parents were fathers, which may impact the generalizability of these findings to mothers. Additionally, most of the participants in our sample were white and highly educated, thus the findings may not be generalizable to more demographically diverse parents. Future studies should include a more heterogeneous sample and more mothers to increase generalizability of the findings and to determine how these constructs relate in more demographically diverse parents. Our study focused on factors that promote readiness to change and perception of child risk in parents of overweight children; however, it did not take into account values and beliefs associated with various identities and cultures that may influence or act as barriers to parent readiness to change. For example, research shows that among low-income mothers, having a larger child is a sign of child health and good parenting (Baughcum et al. 1998) and that Black and Hispanic women do not perceive overweight in children until well above the CDC cut-off (Fitzgibbon, Blackman, & Avellone, 2000). Future research should consider how these parental beliefs about weight and health influence

parent readiness to change and examine parent readiness to change from different cultural frameworks.

The cross-sectional nature of this study also limits understanding of the direction of effects. For example, we cannot be certain that perceptions of physician feedback increase parents' perception of the risks their child is facing or if it simply reinforces the knowledge of risks that parents of overweight children already perceive. Longitudinal studies are needed to clarify the nature of relationships among study variables and will be important in informing child weight interventions. While self-report is the main method of assessing parent beliefs, childhood obesity is a sensitive subject, so there is a risk that parents did not provide truthful answers to all questions or chose the responses they thought were "correct". In particular, self-reported height and weight pose a threat to the reliability of BMI calculations as there is a natural tendency for humans to underreport weight and over report height. Self-report also requires parents to know their child's current height and weight, which they may not unless the child has had a recent doctor's visit. However, as the study was conducted online, precise measurements could not be obtained. The screener survey at the beginning of the study ensures that only parents who reported a height and weight for their child that qualified as overweight or obese according to the CDC standards were given access to the full survey. Future studies may eliminate some of the concern regarding self-report by replicating these findings in a community setting and using more precise measurements of child weight.

CHAPTER 6: CONCLUSIONS

Overall, this study demonstrates that multiple factors from theories of health behavior change are useful in predicting parent readiness to change child healthy weight behavior. Most important among our sample were child feeding attitudes, barrier-focused decisional balance, and parent perception of child risk for future problems. Additionally, this study reinforces the fact that there is a great deal of variability in parent readiness to change the health behaviors of overweight and obese children. Given the significance of parents when it comes to child weight interventions (Ho et al., 2012), this study underscores the importance of efforts aimed at moving parents forward on the continuum of change.

Our findings have implications for child weight interventions and suggest avenues of further research. As a first step, it will be important to replicate these findings in a community sample of parents with overweight children. Too often, child weight interventions and physicians assume that families are ready and able to make child weight behavior change. With an increased understanding of factors that impact parent readiness to change child healthy weight behavior, child weight interventions can be developed that assess readiness to change and target specific factors associated with readiness to change as a first step in intervention. Because children regularly visit the pediatrician with a parent throughout childhood and physician feedback was found to be an important contributor to parent perception of child risk, primary care efforts may be a feasible and cost-effective way of motivating change in parents of overweight and obese children. Innovative strategies that pediatricians can use to communicate accurate information about child weight status and the associated risks of overweight should be

developed as a first step in this effort. Most importantly, those attempting to promote healthy weight behavior in families of overweight children must understand the variability in readiness to change and acknowledge that all families are not equally motivated to participate in child weight interventions. This recognition may encourage researchers and health-care workers to target readiness to change first, thus potentially increasing the effectiveness of child weight interventions in the long run. By identifying underlying mechanisms that account for individual differences in parent readiness to change and parent perception of child risk, this study is a necessary step toward building more effective child weight interventions.

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APPENDIX A: TABLES

Table 1

Descriptive Statistics for Study Variables

	Min.	Max.	Mean	SD	Skewness	Kurtosis
Readiness to Change	0.00	3.00	1.29	1.35	.32	-1.73
Caregiving Efficacy for Child HWB	.48	100.00	54.32	22.21	-.11	-.31
Locus of Control for Child HWB	154.00	237.00	188.03	21.49	.55	-.87
Barrier-Focused DB	-9.00	7.00	-3.55	4.35	.53	-.91
Cues to Health Action	0.00	94.00	52.31	16.75	-.16	.28
Child Feeding Attitudes	1.07	5.00	3.44	.61	-.50	1.34
Subjective Health Norms	1.00	7.00	5.01	1.16	-.78	.74
Perception of Child Risk	0.00	27.00	10.69	8.03	.38	-.85
HRQoL	0.00	80.43	28.83	21.19	.62	-.44
Weight Status Discrepancy	-5.00	0.00	-3.23	1.15	.07	-.62
Perceptions of PF	0.00	14.00	8.17	3.03	-.36	-.24

Note. HWB = Healthy Weight Behavior; DB = Decisional Balance; HRQoL = Health Related Quality of Life; PF = Physician Feedback; higher scores represent poorer HRQoL.

Table 2

Zero Order Correlations for Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1.Readiness to Change	--									
2.Caregiving Efficacy for Child HWB	.101	--								
3.Locus of Control for Child HWB	-.037	.103	--							
4.Barrier-Focused DB	.161[b]	-.105	-.605[a]	--						
5.Cues to Health Action	.266[a]	.403[a]	.010	.060	--					
6.Child Feeding Attitudes	.242[a]	.263[a]	-.135[b]	.091	.461[a]	--				
7.Subjective Health Norms	.193[a]	.352[a]	.198[a]	-.096	.499[a]	.418[a]	--			
8.Perception of Child Risk	.315[a]	.110	-.069	.174[b]	.373[a]	.255[a]	.265[a]	--		
9.HRQoL	.223[a]	.173[b]	-.551[a]	.538[a]	.361[a]	.308[a]	.157[b]	.343[a]	--	
10.Weight Status Discrepancy	-.393[a]	-.040	.239[a]	-.223[a]	-.219[a]	-.116	-.138[a]	.220[a]	-.346[a]	--
11.Perceptions of PF	.312[a]	.268[a]	-.219[a]	.173[b]	.563[a]	.339[a]	.352[a]	.377[a]	.339[a]	.316[a]

Note. HWB = Healthy Weight Behavior; DB = Decisional Balance; HRQoL = Health Related Quality of Life; PF = Physician Feedback; [a] $p < .01$; [b] $p < .05$; higher scores represent poorer HRQoL.

Table 3

Hierarchical Regression Predicting Parent Readiness to Change

Model		*B*	*β*	S.E.	R^2	ΔR^2	*F*
Step 1	(Demographic Variables)				**.16[a]**	**.16[a]**	**6.47[a]**
	Parent Age	.02	.10	.01			
	Parent Gender	-.24	-.09	.19			
	Selective Social Status	**.14[a]**	**.19[a]**	**.05**			
	Child Age	**.20[a]**	**.28[a]**	**.05**			
	Child Gender	-.04	-.01	.20			
	Child BMI Percentile	**.08[a]**	**.23[a]**	**.02**			
Step 2	(Parent Self-Perceptions)				.16[a]	.01	5.04
	Parent Age	.02	.09	.01			
	Parent Gender	-.23	-.08	.19			
	Selective Social Status	**.12[b]**	**.16[b]**	**.06**			
	Child Age	**.20[a]**	**.29[a]**	**.05**			
	Child Gender	-.02	-.01	.20			
	Child BMI Percentile	**.09[a]**	**.24[a]**	**.02**			
	Caregiving Efficacy for Child HWB	.01	.08	.00			
	Locus of Control for Child HWB	.00	.02	.01			
Step 3	(Parent Beliefs about Change)				**.27[a]**	**.12**	**6.23[a]**
	Parent Age	.02	.10	.01			
	Parent Gender	-.32	-.11	.19			
	Selective Social Status	.03	.04	.06			
	Child Age	**.22[a]**	**.32[a]**	**.05**			
	Child Gender	-.04	-.01	.19			
	Child BMI Percentile	**.08[a]**	**.22[a]**	**.02**			
	Caregiving Efficacy for Child HWB	.00	.02	.00			
	Locus of Control for Child HWB	.01	.11	.01			
	Barrier-Focused DB	**.07[a]**	**.24[a]**	**.02**			
	Cues to Health Action	.01	.13	.01			
	Child Feeding Attitudes	**.35[b]**	**.16[b]**	**.16**			
	Subjective Health Norms	.12	.10	.10			
Step 4	(Perception of Child Risk)				**.29[b]**	**.02[b]**	**6.37[b]**
	Parent Age	.02	.08	.01			
	Parent Gender	**-.36[b]**	**-.13[b]**	**.18**			
	Selective Social Status	.03	.04	.06			
	Child Age	**.22[a]**	**.30[a]**	**.05**			
	Child Gender	-.07	-.03	.19			
	Child BMI Percentile	**.07[a]**	**.21[a]**	**.02**			
	Caregiving Efficacy for Child HWB	.00	.03	.00			
	Locus of Control for Child HWB	.01	.10	.01			
	Barrier-Focused DB	**.07[a]**	**.21[a]**	**.02**			
	Cues to Health Action	.01	.08	.01			
	Child Feeding Attitudes	**.32[b]**	**.15[b]**	**.16**			
	Subjective Health Norms	.09	.08	.09			
	Perception of Child Risk	**.03[b]**	**.17[b]**	**.01**			
Step 5	(Interaction)				**.31[b]**	**.02[b]**	**6.56[b]**
	Parent Age	.02	.08	.01			

Parent Gender	**-.38[b]**	**-.14[b]**	**.18**
Selective Social Status	.06	.08	.06
Child Age	**.20[a]**	**.29[a]**	**.05**
Child Gender	-.14	-.05	.19
Child BMI Percentile	**.07[a]**	**.20[a]**	**.02**
Caregiving Efficacy for Child HWB	.00	.06	.00
Locus of Control for Child HWB	.01	.14	.01
Barrier-Focused DB	**.07[a]**	**.22[a]**	**.02**
Cues to Health Action	.01	.08	.01
Child Feeding Attitudes	.28	.13	.16
Subjective Health Norms	.10	.08	.09
Perception of Child Risk	**.03[b]**	**.15[b]**	**.01**
Risks X Locus of Control	**.00[b]**	**.17[b]**	**.00**

Note. N = 216. Mother is the reference group for the dummy coded parent gender variable; b = unstandardized regression weight; β = standardized beta weight; ΔR^2 = Change in R^2 from prior model; HWB = Healthy Weight Behavior; DB = Decisional Balance; [a] $p < .01$; [b] $p < .05$.

Table 4

Hierarchical Multiple Regression Analysis Predicting Total Risks

Model		*b*	*β*	S.E.	R^2	ΔR^2	*F*
Step 1					**.08[a]**	**.08[a]**	**2.88[a]**
	Parent Age	.13	.11	.09			
	Parent Gender	**2.21[b]**	**.13[b]**	**1.20**			
	Selective Social Status	**.75[b]**	**.18[b]**	**.30**			
	Child Age	.24	.06	.30			
	Child Gender	1.38	.08	1.23			
	Child BMI Percentile	.20	.10	.14			
Step 2					**.25[a]**	**.17[a]**	**7.55[a]**
	Parent Age	**.18[b]**	**.15[b]**	**.08**			
	Parent Gender	1.42	.09	1.10			
	Child Age	-.12	-.06	.33			
	Child BMI Percentile	.17	.08	.13			
	Selective Social Status	-.27	-.06	.33			
	HRQoL	**.09[a]**	**.23[a]**	**.03**			
	Weight Status Discrepancy	**-1.63[a]**	**-.23[a]**	**.47**			
	Perceptions of PF	**.54[a]**	**.20[a]**	**.20**			

Note. $N = 216$.[a] $p < .01$, [b]$p < .05$. *b* = unstandardized regression weight; *β* = standardized beta weight. ΔR^2 = Change in R^2 from prior model, HRQoL = Health Related Quality of Life, PF = Physician Feedback; higher scores represent poorer HRQoL.

APPENDIX B: SURVEY QUESTIONNAIRES

I. Screener Questions

1. Do you have at least one 6 to 12 year old child?
   - Yes
   - No

2. If you have more than one 6 to 12 year old child, please choose ONE child to answer ALL survey questions about.

3. What is your child's height?
   Feet_____
   inches _____

4. How much does your child weight?
   Pounds _____

5. What is your child's gender?
   Male
   Female

6. How old is your child?
   Years _____

7. When was your child born?
   Month _____ day _____ year _____

II. Parent Efficacy for Child Healthy Weight Behaviour Scale

Nelson, M. & Davis, M. C. (2013) Development and preliminary validation of the parent efficacy for child healthy weight behaviour scale. *Journal of Health Psychology, 18*(2), 282-291.

Scoring Information: Responses are provided on a 100-point scale from "not at all confident" to "extremely confident". Mean scores are calculated to create subscale and total scale scores, with higher scores reflecting more caregiving efficacy.

Instructions: Listed below are a number of barriers that might make it difficult for parents to ensure that their children have a healthy diet and activity level to maintain a healthy weight. For each of the following situations, please rate your degree of confidence by recording a number from 0-100 using the scale below.

0	10	20	30	40	50	60	70	80	90	100
Not at All confident					moderately confident					extremely confident

I can consistently ensure that my child eats 3 or more servings of fruit per day:

	Confidence 0-100
1. On school-days	
2. On weekends	
3. On holidays/vacations	
4. When I am tired or stressed	
5. When I am unwell	
6. When I have a busy schedule	
7. When my child doesn't like the food or complains about eating it	
8. When my child is stressed or in a bad mood	
9. When my child is outside of the home	
10. When my partner or other family members do not support me	

I can consistently ensure that my child eats 4 or more servings of vegetables per day.

	Confidence 0-100
11. On school-days	
12. On weekends	
13. On holidays/vacations	
14. When I am tired or stressed	
15. When I am unwell	
16. When I have a busy schedule	
17. When my child doesn't like the food or complains about eating it	
18. When my child is stressed or in a bad mood	
19. When my child is outside of the home	
20. When my partner or other family members do not support me	

I can consistently minimize the amount of high fat and sugar foods my child eats.

	Confidence 0-100
21. On school-days	
22. On weekends	
23. On holidays/vacations	
24. When I am tired or stressed	
25. When I am unwell	
26. When I have a busy schedule	
27. When my child demands or requests this food	
28. When my child doesn't like or complains about eating healthy food	
29. When my child is stressed or in a bad mood	
30. When my child is outside of the home	

31. When my partner or other family members do not support me
32. When I eat at restaurant with my child
33. When we order take-away food

I can consistently ensure that my child eats healthy snacks (i.e. low fat and low sugar content).

	Confidence 0-100
34. On school-days	
35. On weekends	
36. On holidays/vacations	
37. When I am tired or stressed	
38. When I am unwell	
39. When I have a busy schedule	
40. When my child doesn't like the food or complains about eating it	
41. When my child demands or requests unhealthy snacks	
42. When my child is stressed or in a bad mood	
43. When my child is outside of the home	
44. When my partner or other family members do not support me	

I can consistently ensure that my child does at least one hour of vigorous activity per day.

	Confidence 0-100
45. On school-days	
46. On weekends	
47. On holidays/vacations	
48. When I am tired or stressed	

49. When I am unwell
50. When I have a busy schedule
51. When my child is stressed or in a bad mood
52. When my child has a busy schedule
53. When the weather is bad (e.g., hot, cold, raining)
54. When my child is not motivated or interested in being physically active
55. When my partner or other family members do not support me

I can ensure that my child spends no more than 2 hours per day on screen-based leisure activities (e.g. watching TV, playing on computer, surfing internet, using internet for socializing, Nintendo DS, Playstation, Wii etc)

	Confidence 0-100
56. On school-days	
57. On weekends	
58. On holidays/vacations	
59. When I am tired or stressed	
60. When I am unwell	
61. When I have a busy schedule	
62. When my child is stressed or in a bad mood	
63. When the weather is bad (e.g., hot, cold, raining)	
64. When my child demands or requests these activities	
65. When my partner or other family members do not support me	

III. Parenting Locus of Control Questionnaire for Weight Related Child Behavior

Adapted from:
Campis, L. K. Lyman, R. D., & Prentice-Dunn, S. (1986). The Parental Locus of Control scale: Development and validation. *Journal of Clinical Child Psychology, 15*(3), 260-267.

Scoring: 5 factors - parental efficacy, parental responsibility, child control of parents' life, parental belief in fate/chance, and parental control of child's behavior. Sum scores. Higher scores mean more of an external orientation.

5-point Likert scale.
1 = Strongly Disagree
2 = Somewhat Disagree
3 = Neither Disagree nor Agree
4 = Somewhat Agree
5 = Strongly Agree

Instructions: Indicate the extent to which you agree or disagree with each statement by selecting the appropriate number.

Child healthy weight behaviors include improving diet by increasing fruit and vegetable intake and decreasing fat and sugar intake, increasing physical activity and decreasing time spent in sedentary activities (Nelson & Davis, 2013).

Factor 1: Parental Efficacy

1. What I do has little effect on my child's weight.
2. When something goes wrong between me and my child in regards to healthy weight behaviors, there is little I can do to correct it.
3. Parents should address problems with their child's weight because ignoring them won't make them go away (R)
4. If your child refuses to eat healthy or stay active no matter what you try, you might as well give up.
5. My child usually ends up getting his/her way when it comes to food choice and physical activity, so why try.
6. No matter how hard a parent tries, some children will never learn to be healthy.
7. I am often able to predict my child's behavior when it comes to food choice and activity level. (R)
8. It is not always wise to expect too much from my child in regard to healthy weight behaviors because many things turn out to be a matter of good or bad luck anyway.
9. When my child gets angry about eating healthy and being active, I can usually deal with him/her if I stay calm. (R)
10. When I set expectations for my child about diet or physical activity, I am almost certain that I can help him/her meet them. (R)

Factor 2: Parental Responsibility

11. There is no such thing as healthy or unhealthy children – just healthy or unhealthy parents. (R)
12. When my child is engaging in healthy behavior, it is because he/she is responding to my efforts. (R)
13. Parents who can't get their children to listen to them with regards to engaging in healthy weight-related behaviors don't understand how to guide their children. (R)
14. My child's weight-related health problems are no one's fault but my own. (R)
15. Capable people who fail to manage their child's weight effectively have not followed through on opportunities for good health. (R)
16. Children's weight-related problems are often due to mistakes their parents made. (R)
17. Parents whose children make them feel helpless when it comes to managing their child's weight just aren't using the best parenting techniques. (R)
18. Most children's weight-related problems would not have developed if their parents had had better parenting skills. (R)
19. I am responsible for my child's weight. (R)
20. The misfortunes and successes I have had in terms of managing my child's weight are the direct result of my own behavior. (R)

Factor 3: Child Control of Parents' Life

21. My life is chiefly controlled by my child's weight and weight related challenges.
22. My child's weight and weight related challenges do not control my life. (R)
23. My child's weight and weight related challenges influences the number of friends I have.
24. I feel like what happens in my life is mostly determined by my child's weight-related behaviors.
25. It is easy for me to function independently and avoid thinking about my child's attempts to have control over our eating behavior. (R)
26. When I make a mistake with managing my child's weight-related behaviors I am usually able to correct it. (R)
27. Even if a child has weight-related problems, the parent should not give up. (R)

Factor 4: Parental Belief in Fate/Chance

28. Being able to effectively manage your child's weight often depends on being lucky enough to have a healthy child.
29. I'm just one of those lucky parents who happened to have a child of normal weight.
30. I have often found that when it comes to my child's weight, what is going to happen will happen.
31. Fate was kind to me – if I had had an overweight child I don't know what I would have done.
32. Success in dealing with children's weight seems to be more a matter of the child's moods and feelings rather than one's own actions.
33. Neither my child nor myself is responsible for his/her weight-related behavior.

34. In order to have my plans for supporting my child's healthy weight work, I make sure they align with the desires of my child.
35. Most parents don't realize the extent to which their child's weight is influenced by accidental happenings.
36. Heredity plays the major role in determining a child's weight.
37. Without the right breaks from routine, a parent cannot effectively manage their child's weight.

Factor 5: Parental Control of Child's Behavior

38. I always feel in control when it comes to my child's weight. (R)
39. My child's weight is sometimes more than I can handle.
40. Sometimes I feel that my child's weight is hopeless.
41. It is often easier to let my child have his/her way when it comes to weight-related behaviors than to put up with pleading or a tantrum.
42. I find that sometimes my child can get me to do things, like buy/cook unhealthy food or engage in sedentary activities, I really did not want to do.
43. My child often engages in weight-related behaviors in a manner very different from the way I would want him/her to.
44. Sometimes when I'm tired I let my child eat things I normally wouldn't
45. Sometimes I feel that I do not have enough control over the direction my child's weight is taking.
46. I allow my child to get away with unhealthy weight-related things.
47. It is not too difficult to change my child's mind about food and physical (in)activity. (R)

IV. Health Beliefs Survey

Highland, K. B., Lundahl, A., Kidwell, K. M., Hankey, M., Caballos, M., McChargue, D. (2016). Latina and non-Latina mothers' perceived health barriers and benefits and their relationships to children's health behaviors. *Maternal and Child Health Journal, 20,* 1305-1313. DOI: 10.1007/s10995-016-1932-1

Scoring: Subscale scores are summed. Higher scores indicate greater perceived benefit or barrier. Decisional balance variable can be created by subtracting perceived barriers from perceived benefits, with higher scores reflecting greater perceived benefits relative to barriers

Instructions: Below is a list of thoughts that might come up for you when thinking about whether or not to make dietary or physical activity changes for your child. Please indicate whether or not each statement is true or false in your family.

True ---- False

Perceived dietary barriers

1. Healthy foods are too expensive to afford.
2. Unhealthy eating habits are hard to change.
3. Most healthy foods taste bad.
4. Do not have access to shops with healthy foods
5. Do not know which foods are healthy
6. Do not have enough time to make healthy foods.
7. Forget about eating healthy.

Perceived dietary benefits

8. Healthy foods result in feeling physically better
9. Eating healthy foods results in less fatigue and tiredness
10. Eating healthy increases self-confidence
11. Eating healthy results in being a good role model
12. Eating healthy lessens the probability of having future health problems

Perceived exercise barriers

13. Exercise creates bad feelings about self
14. Exercise takes time away that could be spent with family/friends
15. Exercise is too tiring
16. There is no time for exercise.
17. Exercise is boring
18. Exercise is something that has been tried in the past, but failed.
19. Exercising is not supported by friends and/or family

Perceived exercise benefits

20. Exercise helps with weight management
21. Exercise lowers risk of illnesses

22. Exercise reduces feelings of depression, anxiety, or stress
23. Exercise is a fun activity to do with friends
24. Exercise improves self-esteem and feelings of well-being

V. Cues to Health Action Questionnaire

Jones, T., Fowler, M. C., & Hubbard, D. (2000). Refining a tool to measure cues to action in encouraging health-promoting behavior – the CHAQ. *American Journal of Health Promotion, 14*(3), 170-173.

Scoring: Scores are summed with higher scores indicating more susceptibility to cues to action.

Instructions: Below is a list of things you and your child might experience in day to day life. Please indicate how likely each cue would be in prompting you to take action to change your child's weight.

0 – not at all likely; 1 – possibly likely; 2 – moderately likely 3 – very likely

1. General public service announcement on radio.
2. Advertisement for a product or service related to this health action (i.e. child's weight) on radio.
3. Information about your child's health indicators, such as blood pressure or cholesterol, received at a health fair or screening.
4. Information on a TV talk show.
5. Information on TV news or news magazine show.
6. Advertisement for a product or service related to this health action (i.e. child's weight) on TV.
7. Public service announcement on TV.
8. News story in a newspaper.
9. Newspaper advertisement for a product or service related this health action (i.e. child's weight).
10. Book.
11. Article or personal quiz in a magazine.
12. Newsletter from a business or organization.
13. Material you or a friend or family member find on the internet.
14. Information provided at church or church group.
15. Information provided at club or association meeting.
16. Information provided at a convention or workshop you attend.
17. Specific advice from a health care provider, based on information about your child's health status.
18. Specific advice from a friend, based on information about your child's health status.
19. Specific advice from a close family member, based on information about your child's health status.

20. General advice from a health care provider (not based on specific information about your child's health status).
21. General advice from a friend (not based on specific information about your child's health status).
22. General advice from a close family member (not based on specific information about your child's health status).
23. Agreeing with or promising a friend that you will begin to take action to change your child's weight, with a specific plan.
24. Agreeing with or promising a close family member that you will begin to take action to change your child's weight, with a specific plan.
25. Agreeing with your health care provider that you will begin to take action to change your child's weight, with a specific plan.
26. Your child feeling better or feeling good physically after beginning to take action.
27. Your child feeling better or feeling good mentally after beginning to take action.
28. Being complimented about taking action to change your child's weight by someone whose opinion you value.
29. Your child feeling bad or uncomfortable physically when you do not engage in action.
30. Your child feeling bad or uncomfortable mentally when you do not engage in action.
31. Your child feeling bad or uncomfortable physically after a health crisis.
32. Your child feeling bad or uncomfortable mentally after a health crisis.

VI. Child Feeding Questionnaire

Birch, L. L., Fisher, J. O., Grimm-Thomas, K., Markey, C. N., Sawyer, R., & Johnson, S. L. (1994). Confirmatory factor analysis of the child feeding questionnaire: a measure of parent attitudes, beliefs, and practices about child feeding and obesity proneness. *Appetite, 36,* 201-210.

Scoring: Subscale scores are created by calculating the mean score for items in the subscale. For the second set of subscales (5, 6, & 7) higher scores reflect more controlling parent feeding attitudes.

Perceived Parent Weight:

(1) markedly underweight --- (2) underweight --- (3) normal --- (4) overweight --- (5) markedly overweight

1. Your childhood (5 to 10 years old)
2. Your adolescence
3. Your 20s
4. At present

Perceived Child Weight:

(1) markedly underweight --- (2) underweight --- (3) normal --- (4) overweight --- (5) markedly overweight

5. How would you categorize your child's weight?

Concern about child weight:

(1) unconcerned --- (2) a little concerned --- (3) concerned --- (4) fairly concerned --- (5) very concerned

6. How concerned are you about your child eating too much when you are not around her/him?
7. How concerned are you about your child having to diet to maintain a desirable weight?
8. How concerned are you about your child becoming overweight?

Restriction:

(1) disagree --- (2) slightly disagree --- (3) neutral --- (4) slightly agree --- (5) agree

9. I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries).
10. I have to be sure that my child does not eat too many high-fat foods.
11. I have to be sure that my child does not eat too much of her favorite foods.
12. I intentionally keep some foods out of my child's reach.
13. I offer sweets (candy, ice cream, cake or pastries) to my child as a reward for good behavior.

14. I offer my child her/his favorite food in exchange for good behavior.
15. If I did not guide or regulate my child's eating, she/he would eat too many junk foods.
16. If I did not guide or regulate my child's eating she/he would eat too much of her/his favorite foods.

Pressure to Eat:

(1) disagree --- (2) slightly disagree --- (3) neutral --- (4) slightly agree --- (5) agree

17. My child should always eat all of the food on her/his plate.
18. I have to be especially careful to make sure my child eats enough.
19. If my child says "I'm not hungry", I try to get her/him to eat anyway.
20. If I did not guide or regulate my child's eating, she/he would eat much less than he/she should.

Monitoring:

(1) Never --- (2) rarely--- (3) sometimes --- (4) mostly --- (5) always

21. How much do you keep track of the sweets (candy, ice cream, cakes, pies, pastries) that your child eats?
22. How much do you keep track of the snack food (potato chips, Doritos, cheese puffs) that your child eats?
23. How much do you keep track of the high-fat foods that your child eats?

VII. Subjective Norms

Andrews, K. R., Silk, K. S., & Eneli, I. U. (2010). Parents as health promoters: A theory of planned behavior perspective on the prevention of childhood obesity. *Journal of Health Communication, 15*, 95-107. Doi: 10.1080/10810730903460567

Scoring: 7-point Likert scale; scores are averaged with higher scores reflecting more perceived pressure to engage in the behavior.

Instructions: Please indicate the extent to which you agree with each statement.

1 (strongly disagree) --- 2 ---- 3 --- 4 --- 5 --- 6 --- 7 (strongly agree)

1) Most people who are important to me think that I should control what my child eats each day.

2) Most people who are important to me think that I should control how much physical activity my child gets each day.

3) Most people who are important to me think that I should give my child 5 servings of fruits and vegetables per day.

4) Most people who are important to me think that I should limit my child's intake of sweetened drinks per day.

5) The people in my life whose opinions I value think that I should give my child 5 servings of fruits and vegetables per day.

6) The people in my life whose opinions I value think that I should limit my child's intake of sweetened drinks each day.

7) The people in my life whose opinions I value think that I should limit the time my child spends participating in sedentary activities (i.e. watching TV, playing videogames) each day.

8) The people in my life whose opinions I value think that I should control what my child eats each day.

VIII. Child Weight Risk Questionnaire

Adapted from:

Shepard, S., Armstrong, L. M., Silver, R. B., Berger, R., & Seifer, R. (2012). Embedding the family check-up and evidence-based parenting programmes in Head Start to increase parent engagement and reduce conduct problems in young children. *Advances in school mental health promotion*, *5*(3), 194-207.

Scoring: Yes or No items are summed across all three time periods to create a Total Parent Perception of Child Risk Score. Likelihood, Concern, and Control items are averaged across all three time periods to create three composite scores.

The following questions focus on your child's behavior or experiences in the next year.

Have you thought about the likelihood of your child refusing to eat a healthy snack (i.e., apple slices, carrots, yogurt) in the next year?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child refusing to play outside in the next year?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having trouble participating in activities that take a lot of energy (i.e., soccer, bike riding) because of his/her weight in the next year?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having difficulty doing physical things that other children his/her age can do in the next year?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child being made fun of by peers because of his/her weight in the next year?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having low self-esteem because of his/her weight in the next year?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child feeling upset because of his/her weight in the next year?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes) in the next year?

(0)	(1)
No	Yes

Note: Items in this section will only be visible to parents who answer "yes" in the section above to having thought about each item.

In the next year, how likely is your child to:

(0)	(1)	(2)	(3)	(4)
Will not happen		Might happen		Will happen

- Refuse to eat a healthy snack (i.e., apple slices, carrots, yogurt)?
- Refuse to play outside (even when it is safe and comfortable to be outside)?
- Have trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight?
- Have difficulty doing physical things that other children his/her age can do?
- Be made fun of by peers because of his/her weight?
- Have low self-esteem because of his/her weight?
- Feel upset because of his/her weight?
- Have health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes)?

As a parent, how concerned would you be if your child did or experienced each of the following in the next year?

(0)	(1)	(2)	(3)	(4)
Not at all		Somewhat		Extremely

- Refused to eat a healthy snack (i.e., apple slices, carrots, yogurt)?
- Refused to play outside (even when it is safe and comfortable to be outside)?

- Had trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight?
- Had difficulty doing physical things that other children his/her age can do?
- Was made fun of by peers because of his/her weight?
- Had low self-esteem because of his/her weight?
- Felt upset because of his/her weight?
- Had health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes)?

As a parent, how much control do you have over whether or not your child does or experiences each of the following in the next year?

(0) None	(1)	(2) Some	(3)	(4) A lot

- Refuses to eat a healthy snack (i.e., apple slices, carrots, yogurt).
- Refuses to play outside (even when it is safe and comfortable to be outside).
- Has trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight.
- Has difficulty doing physical things that other children his/her age can do.
- Is made fun of by peers because of his/her weight.
- Has low self-esteem because of his/her weight.
- Feels upset because of his/her weight.
- Has health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes).

Now we'll be asking you to anticipate the future experiences of your child.

Have you thought about the likelihood of your child regularly choosing unhealthy snacks over healthy snacks as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child spending large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet) as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having trouble participating in activities that take a lot of energy (i.e., soccer, bike riding) because of his/her weight as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child struggling in school (i.e., receiving bad grades, having trouble focusing) as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child being made fun of by peers because of his/her weight as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having low self-esteem because of his/her weight as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child suffering from depression or anxiety because of his/her weight as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes) as a teenager?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child being overweight as a teenager?

(0)	(1)

No	Yes

Note: Items in this section will only be visible to parents who answer "yes" in the section above to having thought about each item.

As a teenager, how likely is your child to:

(0) Will not happen	(1)	(2) Might happen	(3)	(4) Will happen

- Regularly choose unhealthy snacks over healthy snacks?
- Spend large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet)?
- Have trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight?
- Struggle in school (i.e. receive bad grades, have trouble focusing)?
- Be made fun of by peers because of his/her weight?
- Have low self-esteem because of his/her weight?
- Suffer from depression or anxiety because of his/her weight?
- Have health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes)?
- Be overweight?

As a parent, how concerned would you be if your child did or experienced each of the following as a teenager?

(0) Not at all	(1)	(2) Somewhat	(3)	(4) Extremely

- Regularly chose unhealthy snacks over healthy snacks?
- Spent large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet)?

- Had trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight?
- Struggled in school (i.e. receive bad grades, have trouble focusing)?
- Was made fun of by peers because of his/her weight?
- Had low self-esteem because of his/her weight?
- Suffered from depression or anxiety because of his/her weight?
- Had health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes)?
- Was overweight?

As a parent, how much control do you have over whether or not your child does or experiences each of following when he/she is a teenager?

	(0) None	(1)	(2) Some	(3)	(4) A lot

- Regularly chooses unhealthy snacks over healthy snacks.
- Spends large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet).
- Has trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight.
- Struggles in school (i.e. receive bad grades, have trouble focusing).
- Is made fun of by peers because of his/her weight.
- Has low self-esteem because of his/her weight.
- Suffers from depression or anxiety because of his/her weight.
- Has health complications because of his/her weight (e.g., asthma, high cholesterol, diabetes).
- Is overweight.

Now, we'll be asking you to anticipate your child's experiences as an adult.

Have you thought about the likelihood of your child regularly choosing unhealthy snacks over healthy snacks as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child spending large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet) as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having trouble participating in activities that take a lot of energy (i.e., soccer, bike riding) because of his/her weight as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child being limited in job and career choice as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having problems in social and romantic relationships as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having low self-esteem because of his/her weight as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child suffering from depression or anxiety because of his/her weight as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child feeling stigmatized or discriminated against due to his/her weight as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child having health complications because of his/her weight (e.g., diabetes, high blood pressure, or cardiovascular disease) as an adult?

(0)	(1)
No	Yes

Have you thought about the likelihood of your child being overweight as an adult?

(0)	(1)
No	Yes

As an adult (age 18+), how likely is your child to:

(0)	(1)	(2)	(3)	(4)
Will not happen		Might happen		Will happen

- Regularly choose unhealthy snacks over healthy snacks?
- Spend large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet)?
- Have trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight?
- Be limited in job and career choice?
- Have problems in social and romantic relationships?
- Have low self-esteem because of his/her weight?
- Suffer from depression or anxiety because of his/her weight?
- Feel stigmatized or discriminated against due to his/her weight?
- Have health complications because of his/her weight (e.g., diabetes, high blood pressure, or cardiovascular disease)?
- Be overweight?

As a parent, how concerned would you be if your child did or experienced each of the following as an adult (age 18+)?

(0)	(1)	(2)	(3)	(4)
Not at all		Somewhat		Extremely

- Regularly chose unhealthy snacks over healthy snacks?
- Spent large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet)?
- Had trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight?
- Was limited in job and career choice?
- Had problems in social and romantic relationships?
- Had low self-esteem because of his/her weight?
- Suffered from depression or anxiety because of his/her weight?
- Felt stigmatized or discriminated against due to his/her weight?
- Had health complications because of his/her weight (e.g., diabetes, high blood pressure, or cardiovascular disease)?
- Was overweight?

As a parent, how much control do you have over whether or not your child does or experiences each of the following when he/she is an adult (age 18+)?

	(0) None	(1)	(2) Some	(3)	(4) A lot

- Regularly chooses unhealthy snacks over healthy snacks.
- Spends large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet).
- Has trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight.
- Is limited in job and career choice.
- Has problems in social and romantic relationships.
- Has low self-esteem because of his/her weight.
- Suffers from depression or anxiety because of his/her weight.

- Feels stigmatized or discriminated against due to his/her weight?
- Has health complications because of his/her weight (e.g., diabetes, high blood pressure, or cardiovascular disease).
- Is overweight.

As a parent, how concerned would you be if your child did or experienced each of the following as an adult (age 18+)?

(0) Not at all	(1)	(2) Somewhat	(3)	(4) Extremely

- Regularly chose unhealthy snacks over healthy snacks?
- Spent large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet)?
- Had trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight?
- Was limited in job and career choice?
- Had problems in social and romantic relationships?
- Had low self-esteem because of his/her weight?
- Suffered from depression or anxiety because of his/her weight?
- Felt stigmatized or discriminated against due to his/her weight?
- Had health complications because of his/her weight (e.g., diabetes, high blood pressure, or cardiovascular disease)?
- Was overweight?

As a parent, how much control do you have over whether or not your child does or experiences each of the following when he/she is an adult (age 18+)?

(0) None	(1)	(2) Some	(3)	(4) A lot

- Regularly chooses unhealthy snacks over healthy snacks.

- Spends large amounts of time participating in sedentary activities (i.e., watching TV, playing video games, using phone or tablet).
- Has trouble participating in activities that take a lot of energy (i.e. soccer, bike riding) because of his/her weight.
- Is limited in job and career choice.
- Has problems in social and romantic relationships.
- Has low self-esteem because of his/her weight.
- Suffers from depression or anxiety because of his/her weight.
- Feels stigmatized or discriminated against due to his/her weight?
- Has health complications because of his/her weight (e.g., diabetes, high blood pressure, or cardiovascular disease).
- Is overweight.

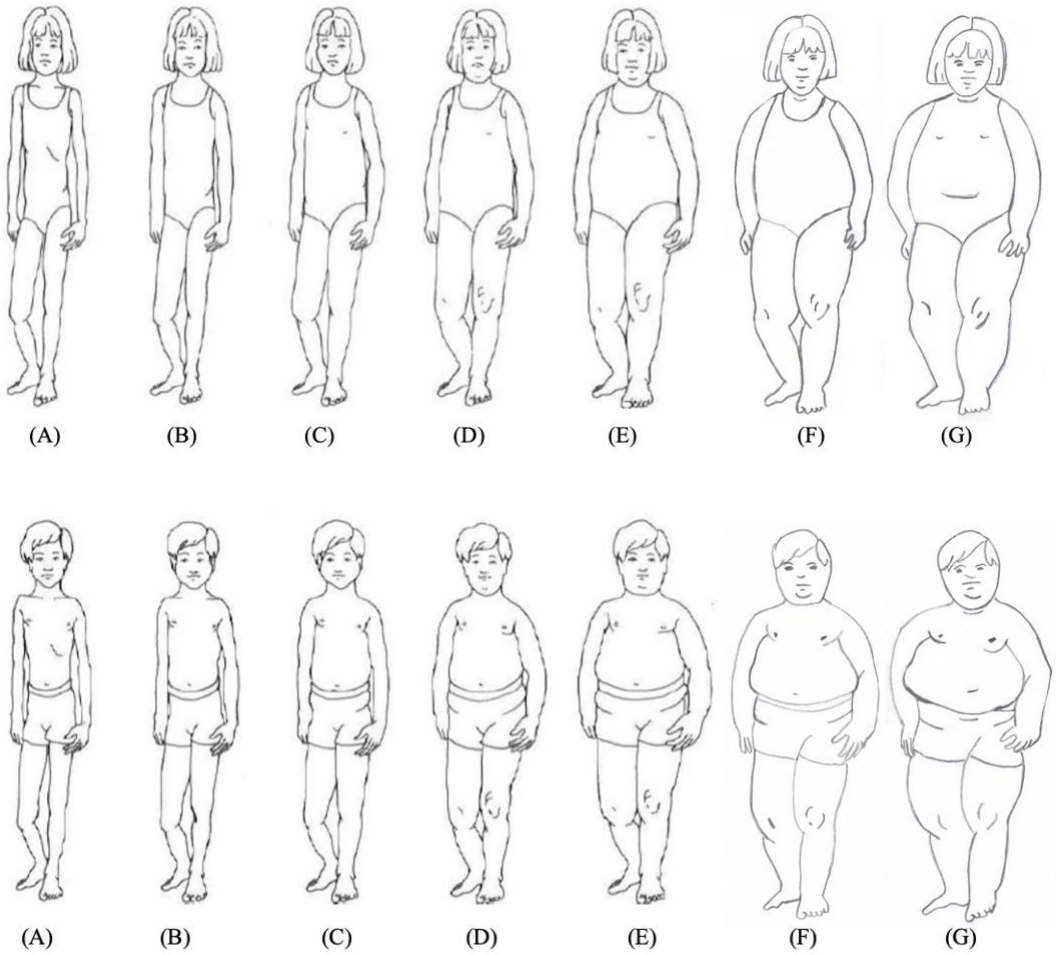
IX. Figure Rating Scale

Adapted from:

Eckstein, K. C., Mikhail, L. M., Ariza, A. J., Thomson, J. S., Millard, S. C., & Binns, H. J. (2006). Parents' perceptions of their child's weight and health. *Pediatrics, 117*(3), 681 690.

Scoring: Compare image selection to child BMI. Subtract parent choice from the accurate choice to create a weight status discrepancy variable.

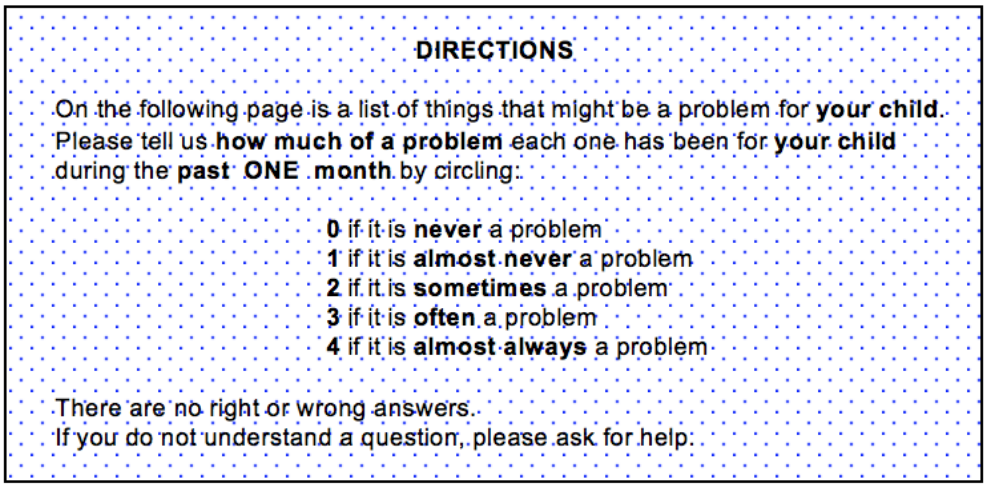
Instructions: Which drawing most resembles your 6 to 12-year-old child?



X. The Pediatric Quality of Life Inventory Version 4.0

Varni, J. W., Seid, M., Knight, T. S., Uzark, K., & Szer, S. I. (2002). The PedsQL 4.0 genericcore scales: Sensitivity, responsiveness, and impact on clinical decision making. *Journal of Behavioral Medicine, 25*(2), 175-193.

Scoring: Items are reverse-scored and linearly transformed to a 0-100 scale (0=100, 1=75, 2=50, 3=25, 4=0), so that higher scored indicate better HRQOL. Scale scores are computed as the sum of the items divided by the number of items answered. If more than 50% of the items in the scale are missing, the scale score is not computed. The Physical Health Summary Score is the same as the Physical Functioning Scale. The Psychosocial Summary Score is computed by summing the items in the Emotional, Social, and School Functioning Scales and dividing by the number of items answered.



DIRECTIONS

On the following page is a list of things that might be a problem for **your child**. Please tell us **how much of a problem** each one has been for **your child** during the **past ONE month** by circling:

0 if it is **never** a problem
1 if it is **almost never** a problem
2 if it is **sometimes** a problem
3 if it is **often** a problem
4 if it is **almost always** a problem

There are no right or wrong answers.
If you do not understand a question, please ask for help.

PHYSICAL FUNCTIONING *(problems with…)*	Never	Almost Never	Some-times	Often	Almost Always
1. Walking more than one block	0	1	2	3	4
2. Running	0	1	2	3	4
3. Participating in sports activity or exercise	0	1	2	3	4
4. Lifting something heavy	0	1	2	3	4
5. Taking a bath or shower by him or herself	0	1	2	3	4
6. Doing chores around the house	0	1	2	3	4
7. Having hurts or aches	0	1	2	3	4
8. Low energy level	0	1	2	3	4

EMOTIONAL FUNCTIONING *(problems with…)*	Never	Almost Never	Some-times	Often	Almost Always
1. Feeling afraid or scared	0	1	2	3	4
2. Feeling sad or blue	0	1	2	3	4
3. Feeling angry	0	1	2	3	4
4. Trouble sleeping	0	1	2	3	4
5. Worrying about what will happen to him or her	0	1	2	3	4

SOCIAL FUNCTIONING *(problems with…)*	Never	Almost Never	Some-times	Often	Almost Always
1. Getting along with other children	0	1	2	3	4
2. Other kids not wanting to be his or her friend	0	1	2	3	4
3. Getting teased by other children	0	1	2	3	4
4. Not able to do things that other children his or her age can do	0	1	2	3	4
5. Keeping up when playing with other children	0	1	2	3	4

SCHOOL FUNCTIONING *(problems with…)*	Never	Almost Never	Some-times	Often	Almost Always
1. Paying attention in class	0	1	2	3	4
2. Forgetting things	0	1	2	3	4
3. Keeping up with schoolwork	0	1	2	3	4
4. Missing school because of not feeling well	0	1	2	3	4
5. Missing school to go to the doctor or hospital	0	1	2	3	4

XI. Physician Feedback

(Eckstein, et al. 2006; Rhee et al., 2014; Taveras et al., 2009)

Scoring: Sum scores with higher scores reflecting more physician feedback.

(1) How often has your child's doctor told you that your child is gaining weight too fast or is overweight?

never --- rarely --- sometimes --- frequently --- every visit

(2) Has your child's doctor talked to you about strategies you can use to help your child be healthy?

never --- rarely --- sometimes --- frequently --- every visit

(3) If yes, please list the strategies your child's doctor has discussed with you?

---

(4) How would you rate the quality of advice you received about nutrition at your child's primary care visit?"
poor --- fair --- good --- very good --- excellent

(5) How would you rate the quality of advice you received about physical activity at your child's primary care visit?"
poor --- fair --- good --- very good --- excellent

XII. Readiness to Change Algorithm

Rhee, K. E., DeLago, C. W., Arscott-Mills, T., Mehta, S. D., & Davis, R. K. (2005). Factors associated with parental readiness to make changes for overweight children. *Pediatrics, 116*(1).

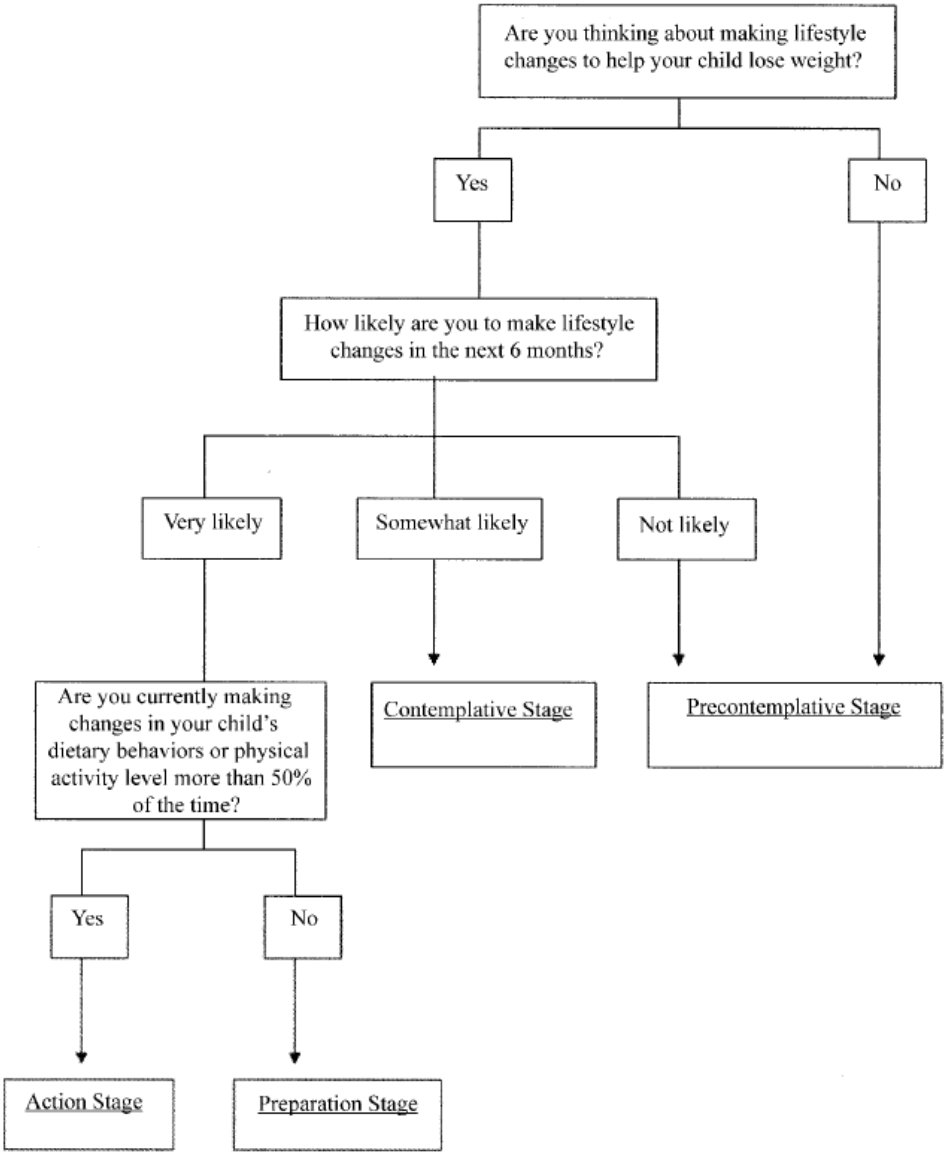


Fig 1. Algorithm for assigning parental stage of change.

Follow up question for those in the action stage: Please describe the changes you are making in your child's dietary behaviors or physical activity level?

_____

_____

_____

_____

XIII. Attention Check Questions

Dunn, A. M., Heggestad, E. D, Shanock, L. R., & Theilgard, N. (2016). Intra-individual response variability as an indicator of insufficient effort responding: Comparison to other indicators and relationships with individual differences. *Journal of Business and Psychology, 33*(1), 105-121. DOI: 10.1007/s10869-016-9479-0

1. I have been around the world ninety-two times.

   Strongly disagree – Disagree – Agree – Strongly agree

2. I was born on February 30th

   True ---- False

3. Mark strongly agree to this item.

   Strongly disagree – Disagree – Agree – Strongly agree

XIV. Demographics

1. How old are you in years? _____

2. Please select. Are you: "Male" or "Female" or "Other (please specify): _____"

3. What country do you live in? _____

4. How tall are you? (in feet and inches) Feet ____ Inches _____

5. How much do you weigh? (in pounds) _____

6. Do you identify with a Hispanic, Latino or Spanish origin? Yes No Don't know/Prefer not to answer

7. Which one of the groups below would you say best represents your race?:
   White or Caucasian
   Black or African American
   Asian or Asian American
   Native Hawaiian or Other Pacific Islander
   American Indian or Alaska Native
   Middle Eastern or Arab American
   Bi-racial or Multi-racial
   Other (please specify): _____
   Don't know/Prefer not to answer

8. What is your marital status?
   Single
   Married
   Common law marriage
   In a relationship
   Separated
   Divorced
   Widowed

9. Which one best describes your religious beliefs?
   Christian-Catholic
   Christian-Protestant
   Jewish
   Muslim
   Buddhist
   Hindu
   Agnostic
   Atheist
   Not affiliated
   Other _____

Don’t know/Not sure

10. What is the highest level of education you have completed?
    Graduate or professional training
    College
    Some college
    High school diploma
    Some high school
    Junior high school
    Less than 7 years
    I prefer not to answer

11. Which of the following categories best describes your pre-tax household income in the last year?
    Less than 10,000
    10,000 to 24,999
    25,000 to 49,999
    50,000 to 74, 999
    75,000 to 99,999
    More than 100,000
    I prefer not to answer

12. What is your current occupation status?
    Employed
    Unemployed
    Retired

If you are employed, please list your current occupation: _____

13. What grade is your child in? _____

- Kindergarten
- First grade
- Second grade
- Third grade
- Fourth grade
- Fifth grade
- Sixth grade
- Seventh grade
- Eighth grade

14. Please list a few activities that your child likes to take part in: _____

15. Does your child have difficulty with any of the following (select all that apply):

- Psychological problems
- Emotional problems
- Physical problems
- Behavioral problems

16. Aside from your 6 to 12 year old child that you are answering the questions about, do you have any other children?

- Yes
- No

17. (If Yes to 2) How many total children do you have? _____

18. During the past month, how would you rate your sleep quality overall?

Very Good
Fairly Good
Fairly Bad
Bad

19. Do you currently smoke cigarettes?

Yes
No

20. When did you start smoking?

Month: _____
Year: _____

21. On average, how many cigarettes do you smoke a day?

Number: _____

22. On average, how many alcoholic drinks (12 ounces of beer, 5 ounces of wine, or 1.5 ounces of hard liquor) do you normally have in a week?

Number of 12 ounce beers per week: _____
Number of 5 ounce glasses of wine per week: _____
Number of 1.5 ounce shots of liquor per week: _____

23. Subjective Social Status measure

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy, White women. Health Psychology, 19(6), 586-592. doi:10.1037/0278 6133.19.6.586

Instructions: Think of this as a ladder representing where people stand in the United States. At the **top** of the ladder are the people who are best off -- those who have the most money, the most education, and the most respected jobs. At the **bottom** are the people who are the worst off -- who have the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the bottom.

Where would you place yourself on this ladder? Please indicate a number, 1-10, where you think you stand at this time in your life, relative to other people in the United States.

1 2 3 4 5 6 7 8 9 10