Development and Initial Testing of the Adolescent Digital Perception of Self Questionnaire (ADPoSQ)

by

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Abstract

The goal of this study was to understand and measure young adolescent boys' perception of self. This study documented and began to measure the five constructs of the Integrated Behavior Model, that is, (a) ATTITUDE: feelings and beliefs about self including body, body parts, and weight, perception of self, accuracy of own perception compared to actual measurements of body parts, height, weight, satisfaction with current self, and importance of changing one's self; (b) PERCEIVED NORM: influence of others regarding one's self; (c) PERSONAL AGENCY: perception of boys' ability to be in charge of their own self; (d) INTENTIONS: plans to maintain or change one's self; and (e) ACTIONS: activities taken to maintain or change one's self. The instrument, provisionally entitled ADPoSQ (Adolescent Digital Perception of Self Questionnaire), was developed and tested for content validity and internal consistency and test-retest reliability. It is necessary to develop, a theory-driven, developmentally appropriate, reliable, valid, and culturally neutral instrument, the ADPoSQ. The Body Mass Index (BMI) is limited to body weight, therefore being an incomplete measure for appropriately referring adolescents for treatment of weight issues. The ADPoSQ allows boys to create computerized selves (avatars) to portray their current and preferred bodies to augment and expand the survey questions. The findings of this initial study are that the ADPoSQ has adequate content validity and internal consistency. It is clearly feasible for the boys to use as well as the investigator to collect, manage, and interpret the data. Further development is necessary in the measurement of personal agency. The long-term goal of the development and testing of the ADPoSQ is to make it available to researchers and professionals to screen and target young adolescent boys for appropriate targeted interventions to attain and maintain healthy self. The ADPoSQ has potential for use in schools and clinics, however, will require continued development and testing for construct and criterion validity and reliability.

Chapter 1

Introduction

Over the past 30 years, childhood obesity has tripled with more than one third of children and adolescents in 2008 being overweight or obese (Ogden et al., 2010; National Center for Health Statistics, 2010). The prevalence of above normal body weight in adolescents is a vexing and complex public health problem in the United States and internationally. There are immediate health effects to being overweight or obese such as having pre-diabetes, a condition that can indicate a high risk for development of diabetes (Li et al., 2009; Centers for Disease Control, 2011) or bone and joint problems, sleep apnea, and social and psychological problems such as stigmatization and poor self-esteem (Daniels et al., 2005; Dietz, 2004; Office of Surgeon General, 2010). There are also long-term health effects. These long-term health effects include the likelihood of obese children and adolescents becoming obese adults (Freedman et al., 2009; Guo & Chumlea, 2009) putting them at greater risk for adult health problems such as heart disease, type 2 diabetes, stroke, cancer, and osteoarthritis (Office of Surgeon General, 2010). In addition to these health effects, childhood obesity accounts for a large fraction of medical expenditures. In 2006, it was reported that each obese child (aged 6-17 years of age) spent $264 more on annual medical care than a normal-weight child (Ma & Frick, 2011). It has been projected that by 2050 medical costs associated with childhood obesity will increase to $10 billion (Lightwood et al., 2009).

More research is needed to identify the behavioral, biological, and environmental factors sustaining this problem. One step in tackling this crucial problem is examining how perceptions of weight are related to one's intention and action to change or maintain weight. There has been some attention given to adolescent girl's satisfaction with body weight, but boys have been virtually ignored. Researchers need to correctly identify and classify adolescent boys whose body weight and perceptions place them at increased risk for health problems in order to allow creation, targeting, and implementation of efficacious weight management interventions. To

tackle obesity among children and adolescents, it is necessary to understand youth's perception of weight and making the assessment part of a routine screening and referral procedures (Whitlock et al., 2010). The purpose of this dissertation was to develop and initially test a screening instrument entitled Adolescent Digital Perception of Self Questionnaire (ADPoSQ) that can be used to measure selected constructs of the Integrated Behavior Model (Montano & Kasprzyk, 2008) in adolescent boys. The ADPoSQ is specifically being tested with adolescent boys ages 11 to 14 regardless of size and race. In the future, the ADPoSQ will be adapted to be used with males and females of all ages regardless of size and race.

BMI, a common, inexpensive method used to identify adolescents who are overweight and obese, can be plotted on the Centers for Disease Control (CDC) BMI-for-age growth charts to obtain a percentile ranking (http://www.cdc.gov/obesity/childhood/basics.html). As Hall and Cole (2006) reported, most researchers and practitioners focus on BMI as an indicator of need for diet, exercise, and behavioral intervention. A limitation of the BMI is that it is simply a measure of weight and does not measure body composition. BMI does not distinguish between fat and muscle. There is considerable individual variability in the relationship between BMI and body fat, cardiovascular risk factors, and long term health outcomes, making BMI an imperfect proxy for obesity (Hall & Cole, 2006). The ADPoSQ will complement the BMI, revealing adolescent boys' perceptions of self including body, body parts, and weight. The BMI categorizes what weight category the boy is in while the ADPoSQ will allow for further discussion regarding his body as guided by selected constructs of the Integrated Behavior Model (IBM): attitude, perceived norm, personal agency, intentions, and actions, all to be discussed later.

Using the IBM (Montano & Kasprzyk, 2008) as a guiding framework, the overall purpose of the proposed research was to develop and test the ADPoSQ and answer five research questions: (1) *How do middle school adolescent boys describe their feelings and beliefs about, other people's thoughts about, how much control they have over changing, and intentions of*

changing their bodies and body parts? (2) How do middle school adolescent boys use avatars to describe their perceptions of their bodies and body parts? (3) *To what extent are the constructs, avatars, and instrument internally consistent?* (4) *To what extent is the instrument stable as indicated by a re-test? (5) How feasible is it for boys to complete the ADPoSQ online?* Feasibility is defined as: completion of the ADPoSQ during an allotted time, clear instructions and items, and data entered by the boys can be managed and interpreted by the investigator. The long-term goal of my research program is to help adolescent boys attain and maintain a healthy self including body, body parts, and weight.

Chapter 2

Background and Literature Review

Overweight and Obesity among Adolescents

Definitions. To begin, there are multiple ways of determining overweight and obesity. Whitlock and colleagues (2010) report there is no universally accepted definition that distinguishes children with normal or healthy weight from those with unhealthy levels of adiposity. BMI continues to be the most common measure used to define overweight and obesity in children, adolescents, and adults (Whitlock et al., 2010). According to the Centers for Disease Control and Prevention (CDC) "overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height" (http://www.cdc.gov/obesity/childhood/basics.html). Body Mass Index (BMI) ranges for youth take into account normal differences in body fat between boys and girls and differences in body fat at various ages; however, it does not directly measure body fat (http://www.cdc.gov/obesity/childhood/basics.html). Barlow (2007) reported overweight among youth as BMI at or above the 85th percentile and lower than the 95th percentile for youth of the same age and sex and obese as a BMI at or above the 95th percentile for youth of the same age and sex. In addition to these categories, Ogden and colleagues (2010), identify a third category of "high BMI" as BMI for age at or above the 97th percentile.

Body Mass Index (BMI). There is little found in the literature on the potential harms or benefits of BMI screening to classify children and adolescents. There is also a lack of good data on the diagnostic accuracy of BMI as a measure of obesity (Westwood et al, 2007). Therefore, use of BMI for screening of individuals in schools or in other screening programs is not universally accepted (Hall et al., 2006; Westwood et al., 2007). According to Hall and Cole (2006), BMI performs moderately well as a proxy for indicators of future cardiovascular and metabolic disease, particularly at the upper end of the distribution curve, however, there is a wide variation among individuals. In effect, BMI is a screening test and if it is used to identify

children at risk, there is a need to follow up with a more detailed evaluation to assess risk and plan intervention (Hall & Cole, 2006).

Measurement of Body Composition. Many methods exist to measure body composition; however there is no 'gold standard' technique as the only direct measure of body composition can be carried out by chemical analysis of cadavers (Hosking et al., 2006). Magnetic resonance imaging (MRI) and computed tomography (CT scan) provide visual images of adipose tissue and can reliably distinguish between intra-abdominal and subcutaneous fat. MRI and CT scan have been directly validated against cadaver analyses of body composition (Ross & Janssen, 2005).

Dual-energy X-ray absorptiometry (DEXA) uses two x-ray beams with different energy levels aimed at the person's bones to measure body fat, lean mass, and bone mass. DEXA is relatively more comfortable and uses minimal radiation exposure as compared to an MRI and CT scan. On the other hand, DEXA is of limited availability, relatively expensive, and time consuming (Hosking et al., 2006).

Hydrostatic weighing (HW) uses a 2-compartment model that measures underwater body mass where body density is calculated and entered into an equation to determine percent body fat. A person is first weighed on land then the person gets into a large tank of water. While sitting on a special scale, the person is lowered underwater, expels all the air from the lungs, and remains motionless. This is repeated 3 times and then averaged. Hydrostatic weighing is also expensive and not easily accessible. This method may too be time consuming and not practical with children and adolescents.

Therefore, instead of using these methods with children and adolescents to measure body composition, body bioelectrical impedance analysis (BIA) is commonly used in clinical and field settings. BIA measures the body's impedance by measuring differing electrical conductivities (water content) of various components of the body (Kyle et al., 2004). At first the traditional method of using gel electrodes attached to wrists and ankles was used however a

pressure-contact electrode system (similar to a bathroom scale) has been introduced. The BIA is quick, cheap, and easy to use and has been found to be reliable and valid.

Another method to measure high trunk fat among children and adolescents is waist circumference. Waist circumference is measured using an anthropometric tape with the person wearing light clothing. The measurement of the waist is taken at the minimum circumference between the iliac crest and the rib cage. The waist circumference performs well as an index of central adiposity in children and adolescents (Taylor et al., 2000). Similarly to the BIA, this method is quick, cheap, and easy to use and can be used to screen for high central adiposity.

Youth Perception of Self. A more detailed evaluation of weight should include assessing youth's perceptions of self. Barlow and colleagues (2006) report that the chief barriers to effective treatment of weight issues are the following: lack of motivation, lack of family support, and lack of perception that weight is a problem. Maximova and colleagues (2008) also identify that obesity prevention intervention may have limited success due to misperception of overweight. These barriers contribute to the need to understand youth's perception of weight so to screen and refer the youth appropriately. The youth are more likely to adopt healthy lifestyle behaviors if they recognize themselves as overweight (Maximova et al., 2008). Perception influences how intensely an individual engages in behavior change (Bittner Fagan et al., 2008) and misperception awareness should be incorporated as a component of obesity prevention (Maximova, 2008). In addition to perception, it is necessary to understand body image and how an individual feels about himself (Markey, 2010). Markey et al. (2010) further recommend that research should extend our understanding of how different factors such as body satisfaction relate to youth's identity and ways the factors can be altered to help improve youth's body image and general sense of self. By understanding youth's perception of self, health professionals can screen and refer appropriately (Whitlock et al., 2007).

The ADPoSQ is an instrument that measures a youth's attitudes (including perceptions), perceived norm, personal agency, intentions, and actions to screen the adolescent appropriately

for future interventions. The ADPoSQ will measure the perception of self which includes the body, body parts, and weight.

Overweight and Obesity in Boys. While there is a concern for overweight and obesity among both boys and girls, the 2007-2008 National Health and Nutrition Survey (NHANES) documents the prevalence of overweight, obese, or high BMI in children 6 through 19 years of age as higher for boys than for girls (Figure 1). In addition, the percent of all boys 6 through 19 years of age classified in the high BMI category continues to increase (Ogden et al., 2010). However, most research conducted on weight change focused on weight loss among adolescent girls and adult women (Patton et al., 1997; Stice & Shaw, 2004). Both researchers and clinicians have recognized an inadequate conceptualization and assessment of self and the associated behavioral problems that exist among males (McCabe & Ricciardelli, 2001).

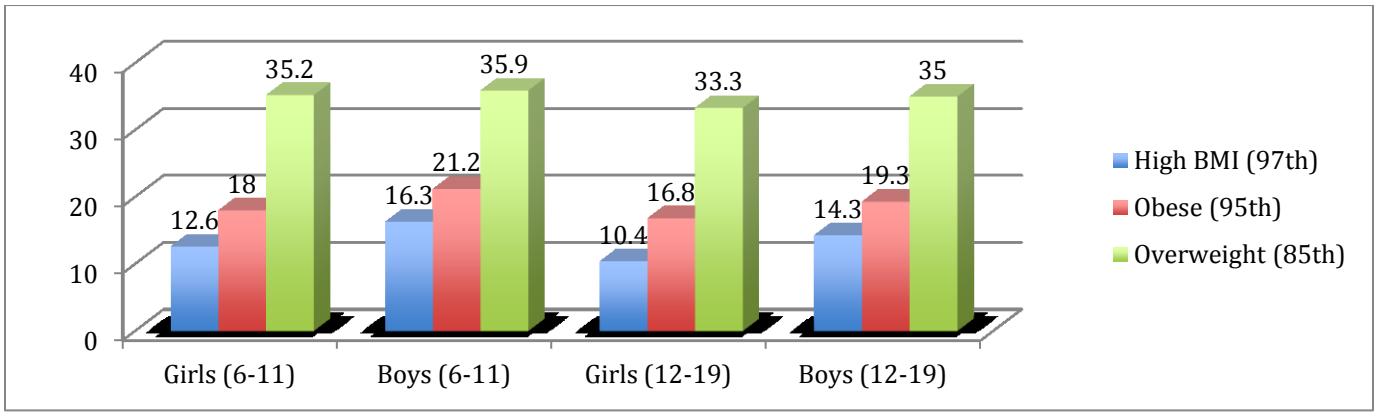

Figure 1. Prevalence of BMI for boys and girls 6 to 19 years of age (2007-2008)

McCullough and colleagues (2009) also report that research has excluded boys when examining the relationship between perception and weight. This may be due to Western culture paying more attention to female weight than male and the maintenance of an ideal body weight (McCullough et al., 2009). There have been a number of universal prevention programs that have demonstrated favorable outcomes in girls but not for boys (Goran & Reynolds, 2005; Mo-suwan et al., 1998; Plachta-Danielzik et al., 2007; Stice et al., 2006). Haynos and Donohue

(2011) report that for there to be favorable obesity related outcomes for boys there needs to be future research that examines ways for existing prevention programs to be altered or new approaches researched,

There exists a difference in body composition between adult males and adolescent males. Taylor and colleagues (2010) studied 1009 predominantly white children and young adults between the ages of 5 and 29 in which the Tanner stage of pubertal development was assessed in all subjects. There was 4.4lbs (2 kg) more total fat and a significant amount more trunk fat among the adult males than the adolescent males but similar levels of extremity fat as measured using the Dual-energy X-ray absorptiometry **(**DXA) scan. Nordstrom (2008) also confirmed these findings when he studied 17 year old males over an 8 year period and found that the men (both active and inactive) became fatter and stored more abdominal fat by study end.

Taylor et al. (2010) also found differences among boys and girls in that the differences in trunk fat were not apparent until late puberty. In addition, young prepubertal girls stored less fat in the waist region and more over the hips than boys. There are also differences between boys and girls when comparing perception and their desired weight. Girls are more than twice as likely to want to weigh less while boys want to weigh more (Strauss, 1999). Boys are more variable than girls with some who desire to lose weight while others desire to gain weight (Bearman et al., 2006; McCabe et al., 2001; Neumark-Sztainer et al., 2006). Harter and colleagues (2003) report that what contributes most significantly to both sexes' overall sense of self is the adolescents' perceptions of their physical appearance.

Adolescent Obesity Prevention. Melnyk and colleagues (2012) report primary care remains underutilized for providing preventive services. Clinical preventive services that often can be delivered in primary care settings are screenings, immunizations, and behavioral counseling interventions. Even though clinicians have been provided with published prevention service guidelines and recommendations for various child and adolescent preventative health

topics, there are many challenges the clinicians face due to the different methodological approaches that have been used to form these guidelines. These different methodological approaches can lead to conflicting and inconsistent recommendations resulting in clinicians making decisions under uncertain conditions (Melnyk et al., 2012). The following are two important issues that Melnyk (2012) and colleagues report need to be addressed in order to achieve high quality preventive clinical services: (a) increasing the pool of available high quality research studies that focus on the critical key questions already identified such as screening obesity in children and adolescents, exercise counseling, and healthy diet counseling and (b) improving the approval and use of evidence-based guidelines in practice through innovative methods.

The best approach for these preventive methods to have an impact on childhood obesity is to assess obesity risk for all children and adolescents while providing guidance on health behaviors to minimize the risk (Barlow, 2007). Barlow (2007) recommends a yearly evaluation that includes the following: weight status, qualitative assessment of dietary patterns, physical activity/sedentary behaviors, and self-efficacy and readiness to change. In addition to Barlow's universal approach, I am recommending that research be conducted to assess children's and adolescents' perception of self because perceptions have been documented to have impact on weight.

Screening adolescents' perceptions would also use a universal approach and assess all adolescents' perception of self, including weight, body, and body parts. Barlow (2007) suggests that BMI is an initial screen that can be used as a starting point for classification and then a selective approach for counseling the children and families including receiving support, prevention counseling, or more active intervention to focus on weight control practices. Assessing perceptions can also be used as a universal initial screen for classification and then a selective approach for counseling and targeting interventions for those that need it. When assessing adolescents' perceptions of self, certain inaccurate perceptions, such as not

recognizing how big they are, one can discuss their perceptions and the healthiest way to intervene once goals are established. In addition, adolescents who have a "healthy" BMI but perceive their abdomens as being too big, for example, can have discussions about their feelings and find the healthiest way to intervene once goals are established.

Age of adolescent. After conducting a meta-analysis of 37 studies with a combined sample of 27,946 children, Waters and colleagues (2011) reported there is no evidence of effective obesity preventive interventions with children aged 0-5 years and with adolescents. It was found that the majority of the research focused on children aged 6 to 12 years of age (Waters et al., 2011). There have also been few intervention studies conducted with middle school youth (11 to 14 years of age) that have had consistent impact on weight measures and behaviors (Gortmaker et al.,1999; Singh, 2007; Haerens, 2006a, 2006b, 2007; Rosenbaum, 2007). Whereas, with children 6 to 12 years of age a body of evidence exists that supports effective obesity prevention but lacks the direction to implement to scale and sustainability effectively (Waters et al., 2011). There is a need to consider researching the impact of effective prevention strategies for adolescents and the need to identify and treat these adolescents (Westwood et al., 2007). Due to gender and age findings, this dissertation focuses on adolescent boys 11 to 14 years of age. The ADPoSQ was developed to measure constructs of the Integrated Behavior Model (IBM) in order to develop and target interventions that may help boys meet their weight attainment and maintenance goals.

Integrated Behavior Model (IBM). A theory is an abstract generalization that systematically explains the relationships among phenomena. Theories and models are used to explain behavior and suggest ways to achieve behavior change (Polit & Beck, 2008). A model, which includes several theories, that can support the difficult and complex phenomena of high body fat among adolescent boys including their perceptions, is the Integrated Behavior Model (IBM) (Montano & Kasprzyk, 2008). The IBM includes constructs from the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) as well as other influential theories

(Montano & Kasprzyk, 2008). Baranowski and colleagues (2003) concluded that explanatory and intervention research within the context of the Theory of Planned Behavior offers the greatest promise for obesity prevention. There have been a modest number of behavioral theories and models in addition to the TRA and TPB used to investigate health behaviors (Glanz, Rimer, & Lewis, 2002). These include the Social Cognitive Theory (Bandura, 1989), Health Belief Model (Rosenstock & Kazdin, 2000), theory of subjective culture (Triandis, 1972), and the Transtheoretical Model (Prochaska & DiClemente, 2005). Weinstein (1993) concludes that these theories are similar and complimentary but that too much attention has been made of their differences (Weinstein, 1993).

In 1992, the National Institute of Mental Health (NIMH) sponsored a workshop with the originators of these theories to develop a theoretical framework to integrate their constructs. With recommendations from the NIMH theorists' workshop and experience with several studies, an integrated model, the IBM, was created as a further extension of the TRA and TPM (Montano & Kasprzyk, 2008). As in TRA and TPB, IBM proposes that the most important determinant of behavior is INTENTION to perform the behavior. A person is not likely to carry out (ACTION) a recommended behavior without motivation (intention). A particular behavior is likely to occur if (a) a person has a strong behavioral intention and the knowledge and skill to carry out the behavior (b) there is no serious environmental constraint preventing performance (c) the behavior is perceived as important, and (d) the person has performed the behavior previously (Montano & Kasprzyk, 2008).

Montano and Kasprzyk (2008) explain that behavioral intention, which leads to action to carry out the behavior, is determined by three constructs as displayed in Figure 2. Reading the model from right to left, it is seen that actions are best predicted by intentions. Intentions are determined by Attitude, Perceived Norm, and Personal Agency, all discussed and defined in turn.

The first construct, ATTITUDE toward the behavior, is defined as a person's overall favorableness or unfavorableness toward performing the behavior. Factors that determine attitude include feelings and beliefs about the behavior or attributes of performing the behavior (behavioral beliefs). The second construct PERCEIVED NORM, reflects the social pressure one feels to perform or not perform a particular behavior. Factors that determine perceived norm include normative beliefs and normative beliefs about other's behavior. Last, PERSONAL AGENCY consists of both self-efficacy and perceived control. Factors that determine personal agency include beliefs about perceived control and self-efficacy. Perceived control is the perception of the degree to which various environmental factors make it easy or difficult to carry out the behavior. Self-efficacy is the degree of confidence in one's ability to perform the behavior in the face of various obstacles and challenges. The stronger one's beliefs that one can perform the behavior despite various specific barriers, the greater one's self-efficacy is about carrying out the behavior. It is important to the health of the population to identify salient behavioral, normative, efficacy, and control beliefs associated with the behavior (Montano & Kasprzyk, 2008).

The importance of ATTITUDE, PERCEIVED NORM, and PERSONAL AGENCY in determining behavioral intention may vary from one behavior to another and from one population to another. Intention to perform a behavior may be largely determined by attitude for the behavior while another behavioral intention may be determined by normative influence. It is necessary to first determine the degree to which that intention is influenced by attitude, perceived norm, and personal agency when designing effective interventions to influence behavioral intentions (Montano & Kasprzyk, 2008).

A critical step in applying the IBM is to conduct open-ended elicitation interviews to identify normative, behavioral, control and efficacy beliefs for a particular behavior and population. Behavior is the main focus of the IBM, however, for this study, behavior is replaced by the construct of "weight" which is shaded in Figure 2.

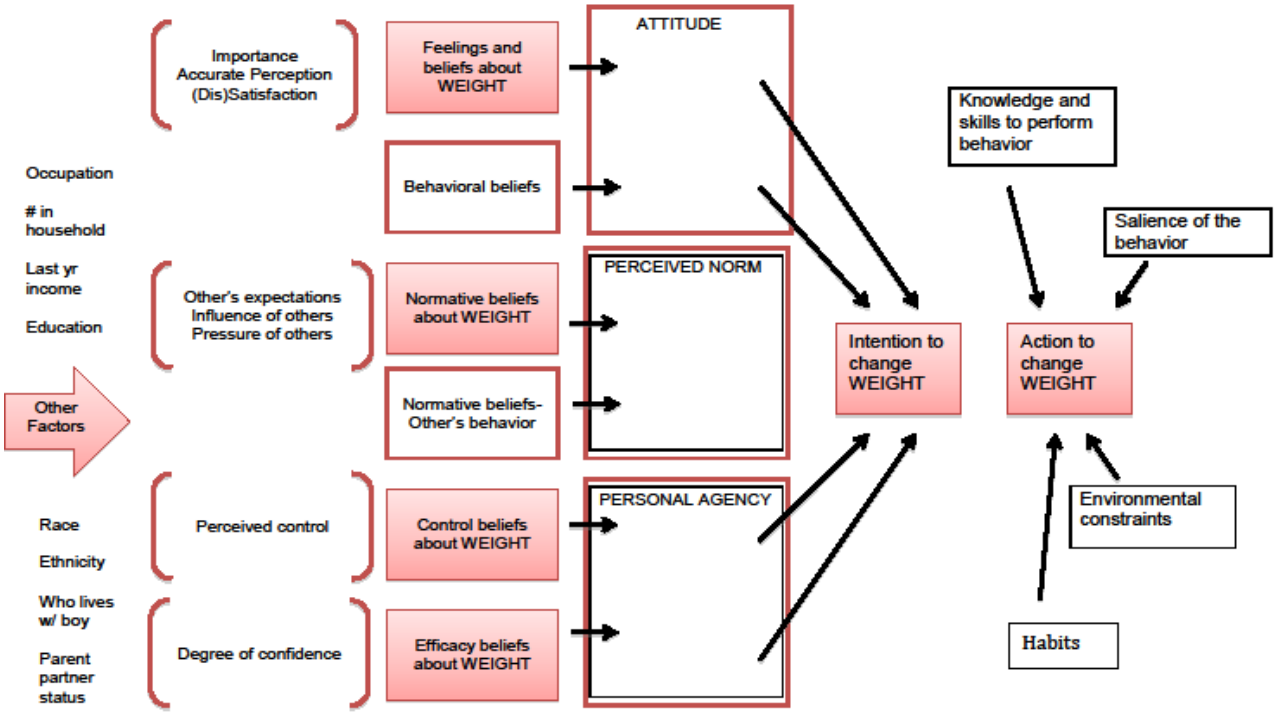

Figure 2. Conceptual framework for perception of weight as guided by Integrated Behavior Model. Permission to adapt the figure was obtained from Daniel E. Montaño, Ph.D via email.

There is a need to understand young adolescent boys' attitude about weight and their body before understanding a particular behavior. In particular, interviewing could document the following: feelings and beliefs toward weight (attitude) instead of behavior, social pressure one feels about weight (perceived norm), one's control or ability to be in charge of weight (personal agency), and one's perception of the degree that various environmental factors influence weight (personal agency) (Figure 2). The variables, constructs, and measurements that are included in the ADPoSQ are shown in Table 1 and will be explained in greater detail later.

Applying the Constructs to Understand Boys' Perceptions

The three constructs that are being examined are shaded in Figure 2. Behavioral beliefs and normative beliefs – others' behavior were not included because these behavioral concepts were not examined in this study for the behavior concept has been replaced with the concept of weight. Ultimately, the IBM is used to guide the understanding of adolescent boys' perceptions of themselves.

Table 1. Variables, constructs, and measurements of the ADPoSQ.

Variable	IBM (Constructs)	Measurements
Self perception	ATTITUDE (Feelings of self and behavioral beliefs)	Survey items
Accuracy		Survey items Accurate Avatar
Satisfaction of weight		Survey questions Difference between Current Avatar and Preferred Avatar
Importance of weight		Survey items
Influence of others	PERCEIVED NORM (Normative beliefs Others' expectations about weight)	Survey items
Control of weight	PERSONAL AGENCY (Efficacy beliefs)	Survey items
Intention to change or maintain weight	INTENTION to perform behavior	Survey items
Action taken to change or maintain weight	ACTION (Behavior)	Survey items

Attitude

*Perception***.** Perception is a way of regarding, understanding, or interpreting something (Oxford Dictionary). In this case, something is one's self. Self will include the body, body parts, and weight. When applying the IBM constructs to understand adolescent boys' perceptions, the first construct, attitude, is reflected by adolescent boys' feelings and beliefs about weight. Their beliefs include the degree to which weight is important and perceptions of their weight, height, and body composition including both accurate and inaccurate perceptions. Their feelings include their degree of satisfaction with their current weight, height, and body composition. Attitude includes both importance and satisfaction and also includes whether or not the

perception is accurate.

*Accurate Perception***.** There is concern about whether adolescents are accurate when classifying their weight category. If adolescent beliefs about their weight are not accurate, health professionals' discussions about the adolescents' weight may not be consistent with the boys' perceptions. There may be a lack of recognition of a weight issue. There may be incongruencies between the adolescent and the health professional.

A survey of 498 low-income African American adolescents revealed that of those who were overweight, 61% of boys and 31% of girls considered themselves as normal weight or underweight. A quarter of the boys and girls had inaccurate perceptions of their body weight. Of the girls in the obese and overweight categories, 27% perceived themselves as underweight. Of the boys, 25% perceived themselves as underweight (Wang et al., 2009). In another study conducted by Brener and colleagues (2004) there was a diverse sample of 2032 students in grades 9 to 12 whose height and weight and their perception of weight were measured. The sample consisted of 52% girls, 43.2% Caucasian, 40.7% African American, 7.9% Hispanic, and 8.2% in other racial/ethnic groups. The results indicated that nearly one-half of the sample had a measured height and weight that classified them as overweight or obese yet less than one-fourth of the total sample perceived themselves as overweight. There was no consistent pattern revealed among the four racial/ethnic groups. There was no clear indication of what the students were using as reference points when reporting what weight category they were in. It is unclear if the comparison was made with their personally desired size, medical standards, the size of peers, or some other standard (Brener et al., 2004). It would be important in future research to use a personal standard or require the student to create a current, ideal and actual body.

Parents and teens were documented as being poor informants for they failed to identify teens who were in fact obese and incorrectly identified teens as obese who were not (Goodman et al., 2000). It is possible that the parents and teens actually were not poor informants but

were inaccurate in their perceptions. Standley and colleagues (2009) measured the height and weight of 4,167 adolescents (2394 boys and 1773 girls) 14 to 15 years of age and assessed their perception using an instrument adapted from Thompson and Gray's Contour Drawing Rating Scale (1995). This paper and pencil instrument allowed the adolescents to identify their body size among a range of 11 fixed figures that increased in size and shape. More than a quarter of overweight or obese adolescents were unaware of their excess weight. This underestimation was more common than overestimation and was greatest among boys and ethnic minorities. Over-estimation was more common in Caucasian adolescents and under-estimation was more common in African American adolescents (Standley et al., 2009).

A secondary analysis of NHANES data collected between January 2005 and December 2006 consisted of measuring weight perception of 2,401 adolescents 10 to 18 years of age by placing them into three categories: correct perception, underestimate, and overestimate. Of the girls and boys, more than one third of girls (36%) and boys (38%) were overweight according to CDC BMI charts. A substantial percentage of those overweight, that is 25% of girls and 33% of boys, misclassified their own weight status. As the BMI increased, the greater the chance that adolescents overestimated their body size (Yan et al., 2009). This finding is in contrast to studies conducted by Wang et al. (2009) and Brener et al (2004) in which the overweight and/or obese students underestimated their weight category.

It is important for these inaccuracies in both scenarios to be addressed for it can lead to potential problems: those overweight adolescents that may underestimate their weight are less likely to take steps to reduce their weight, may not receive necessary treatment, and risk additional complications (Strauss, 1999; Goodman et al., 2000; Wardle, Haase, & Streptoe, 2005). It has also been reported that normal weight and underweight adolescents may overestimate their weight and in turn adopt unhealthy weight control behaviors and eating disorders and may receive inappropriate treatment (Felts, Parillo, Chenier, & Dunn, 1996; Field et al, 1999; Strauss, 1999; Goodman et al., 2000; Talamayan, Springer, Kelder, Gorospe, &

Joyce, 2006).

Perception has been measured using questions such as “do you think you are thin, about right, fat, too fat”, “what do your parents/peers think about weight (Al-Sendi et al, 2004). In addition, “How do you describe your weight?” (responses include “very overweight”, “slightly overweight”, “about right weight”, “slightly underweight”, and “very underweight”) is another question commonly used to assess weight perceptions (Brener et al., 2004). Using only one or two questions to assess weight perceptions may not provide the variability in response and lead to perceptions being inaccurate, invalid, and not reliable.

Al-Sendi and colleagues (2004) also critiqued the nine figure silhouettes developed by Stunkard et al (1983) to assess adolescents’ perceptions of ideal body image and how it compares with their current body weight. These nine silhouettes limit the choices an adolescent can make to reflect what the body looks like (current and ideal). The silhouettes increase in size by the whole body not by individual body parts. By presenting the body as a whole, the adolescent is limited to the choices provided. Adolescents may have a bigger abdomen but smaller legs and arms or bigger legs but a smaller abdomen; therefore the silhouettes often used do not accurately reflect their perceptions of their current and ideal bodies. Thus, an instrument is needed that allows the adolescents to manipulate different body parts such as avatars to reveal accurate perceptions.

*Satisfaction/ Dissatisfaction***.** Correlates for weight control practices also include satisfaction or dissatisfaction with weight (Wang et al., 2009). A study was conducted by Al Sabbah and colleagues (2009) in 24 countries with 2500 children ages 11, 13, and 15 in which surveys were completed about weight satisfaction. In almost all countries, there was a positive association with adolescents’ age, overweight status, and body weight dissatisfaction.

Boys generally display less overall concern than girls, however, boys of all ages reported dissatisfaction with their bodies (Cohane et al., 2001). When examining girls and boys at the same level of satisfaction, girls who reported satisfaction with their bodies and weight were

significantly thinner than boys who also reported satisfaction with their bodies and weight. In addition, there were boys of nearly the same weight who exhibited both high levels of dissatisfaction and high levels of satisfaction (Bearman et al, 2006). Overall a quarter (24.2%) of African American adolescents in grades 5 to 7 reported body weight dissatisfaction with girls twice as likely as boys to be dissatisfied (30.6% vs 15.9%). Of those adolescents with a BMI greater than or equal to the 85th percentile, 37.7% were dissatisfied while 50% of those with BMI greater than or equal to the 95th percentile were dissatisfied. Comparing boys to girls, overweight girls were more dissatisfied than overweight boys (Wang et al., 2009). Body satisfaction in adolescent boys may be associated with gaining muscle whereas dissatisfaction may be associated with gaining fat. Gaining muscle and gaining fat tissue increase body weight yet can result in the same BMI for an adolescent of the same height and age (Bearman et al., 2006). Although it may be complicated, including both fat and muscle when analyzing adolescent boys' satisfaction makes the research valid.

Instead of being a motivator for engaging in healthy weight management, lower body satisfaction is associated with the use of unhealthy behaviors that may lead to weight gain and poorer overall health (Strauss, 1999; Brenner et al., 2004; Neumark-Sztainer et al., 2006; Edwards et al., 2010;). A comparative longitudinal study conducted by Neumark-Sztainer and colleagues (2006) with a sample of 1130 males and 1386 females revealed that lower body satisfaction among the males predicted higher levels of dieting, healthy, unhealthy and very unhealthy weight control behaviors, binge eating, and smoking, and lower levels of physical activity than in girls. The source of the body dissatisfaction was not defined.

To summarize the knowledge about boys' perceptions of their bodies and weight, we know that perceptions have a high likelihood of being inaccurate that in turn may contribute to incongruencies among health professionals, adolescents, and their parents. The adolescents' satisfaction and dissatisfaction with their body and weight may include wanting to be bigger or smaller which may not be known to others in their lives. Finally, measurement of perceptions

has been limited to fixed choice measurements that do not allow perception of body parts. A measure that incorporates manipulations of body parts would allow for more accurate body perceptions.

Perceived Norm

The adolescent's peers and his/her parents influence perception. Although peer influence is known to be prominent throughout adolescence, parental relationships also are relevant and remain a powerful predictor of adolescent body satisfaction (Bearman et al., 2006). Parent-adolescent interactions may be the most important relationship factor linked to adolescent weight concerns (May et al., 2006). Parents reportedly provide the strongest and most consistent messages about body image to young adolescent boys (Stanford & McCabe, 2005).

On the other hand, Mitola and colleagues (2007) found disagreement between female primary caregivers (term used to include mothers and grandmothers) and African American adolescents about the level of satisfaction with adolescent body size. Up until their adolescent was overweight, most caregivers were satisfied with their adolescent's body size. Almost half of the adolescents classified as overweight desired to be thinner, yet fewer than 5% of these overweight adolescents and their caregivers agreed the adolescents should be thinner. With those classified as obese, there was more agreement (80%) between the adolescent and caregiver that the adolescent should be thinner, leaving 20% of the obese adolescents and their caregivers in disagreement. In the cases of the 20% that disagreed, the caregiver was satisfied. Even though at times young people self-initiate weight control practices, support from family, school, health care providers, and society is crucial (Wang et al., 2009). Support from others can include participating in healthy weight control practices as well as sharing accurate perceptions of what a healthy body is.

Personal Agency

Contento and colleagues (2010) found that middle school youth appear to be responsive

to an approach that helps them understand that they have choices, can exert control, and can make changes in their own eating and physical activity behaviors along with personal food environments for purposes of improving their health and allowing their bodies to perform. As adolescents become older, they may become less interested in achieving healthier weights for they may become more comfortable, more accepting and/or even resigned to their current weight status (Thunfors et al., 2009). Thunfors and colleagues (2009) found that adolescents gain autonomy over their lifestyles and further develop their own personal belief systems yet may not be amenable to the perspectives and recommendations regarding health behaviors that are imposed upon them by adult authority figures. Adolescents who want to change their weight do not always appear to have a clear preference for which health behavior they would like to use to lose weight suggesting that they may need instruction and information to develop specific health behavior interests and experiences to take control and achieve their weight loss goals (Thunfors et al., 2009).

Intentions and Actions

Adolescents may have taken action to lose weight and reach their goals in the past. They may no longer have an intention to take an action because of a lack of success or because frustration may prevent the adolescent from changing behavior (Bittner et al., 2008). Bittner and colleagues (2009) compared an obese group of adolescents with an overweight group and found the overweight group had a less accurate perception of weight, less intent to lose weight, and were less likely to have taken action to lose weight than those in the obese group. The overweight group may not be visibly overweight, or recognized as having a high BMI, and thus, the opportunity to intervene missed (Bittner et al., 2008). Bittner and colleagues (2008) found that a high proportion of these adolescents are reporting they are trying to lose or maintain weight yet the rising prevalence of overweight and obese adolescents exists. This discrepancy may imply that adolescents are taking actions to maintain or lose weight that are not effective (Bittner et al., 2008). Daley and colleagues (2008) found through semi-structured

interviews that participants reported enjoying the exercise interventions supporting the view that obese young people are motivated to exercise, when given appropriate opportunities and support to do so.

Taken together, the IBM can be an effective framework when understanding and measuring adolescents' perception of self. The model includes constructs of attitude, perceived norm, personal agency, and intentions that drive behavior change. Measuring the constructs of the IBM is important in order to develop and target interventions that may help adolescents meet their weight attainment and maintenance goals.

Current Instruments

According to Cohane and Pope (2001), most investigators use figure drawings and questionnaires to examine body image and attitudes in children (Table 2). These measures typically include sets of seven to nine male and/or female figure drawings, ranging from extremely thin to extremely fat and have usually be adapted from those created by Stunkard, Sorenson, and Schlusinger (1983).

Thompson and Gray (1995) adapted these nine silhouettes of men and women and created a set of contour drawings that could be split at the waist for accurate upper body and lower body comparisons. These silhouettes and contour drawings however are uni-dimensional and do not distinguish between increasing size due to fat and increasing size due to muscle or between increasing size of certain body parts versus the body as a whole. As a result, a boy that desires a more muscular body, but not a fatter one, or has a bigger abdomen but smaller legs may select a "compromise" image that does not fully expose the magnitude of the difference between his current body and his ideal body (Cohane & Pope, 2001).

Four questionnaires that have been developed and do not include figure drawings are the following: Eating Disorder Inventory (EDI) (Garner et al., 1983), the Body Attitudes Test (BAT) (Probst et al., 1995), the Body Shape Questionnaire (BSQ) (Cooper et al., 1987), and the Body Attitude Questionnaire (BAQ) (Ben-Tovim & Walker, 1991). These four self-report

questionnaires were developed to assess a woman's attitude toward her body with moderate to high reliability and moderate to high validity. Literature on the four questionnaires was not explicit about whether or not a theory was used to guide the development of the questionnaires.

The EDI measures drive for thinness and body satisfaction. It is used in conjunction with clinical judgment by clinicians as a preliminary screening to identify groups with formal eating disorders. The BAT evaluates women's preoccupation with body shape and feelings of being overweight and their progression during treatment. The BSQ specifically measures concerns about body shape and the experience of "feeling fat". Lastly the BAQ assesses a broad range of attitudes, which women hold toward their bodies. All four questionnaires were designed to differentiate between women suffering from an eating disorder and those who do not and demonstrated a moderate degree of validity when comparing the two classifications among women. These questionnaires were not intended for use with males nor were they tested on male subjects during their development.

Probst (2009) examined and tested these four questionnaires with a sample size of 386 female and 427 male Caucasian, Belgium natives ages 14 to 25. All questionnaires were sufficiently internally consistent and reliable (Cronbach alpha range between 0.85 to 0.97). These questionnaires however did not distinguish between male and female control subjects for females scored higher on all questionnaires. This could be the result of males having a more positive body attitude than females or the questionnaires not encompassing enough aspects of the male body attitude (Probst, 2009).

There is a need to develop and test the ADPoSQ for use with adolescent boys now and other ages and females in the future. Existing questionnaires are limited to measuring only one or two of the IBM constructs, do not have an explicit theory/model guiding them, and are not focused on boys including early adolescent boys 11 to 14 years of age (Folk et al., 1993; McCreary & Sasse, 2000). It is important to have a measure focused upon young adolescent boys because this developmental period is a time that boys tend to be dissatisfied with weight

(Bearman et al., 2006). Not only is it essential to understand the adolescent boy's feelings and beliefs about himself but also whether or not those beliefs are accurate. It is necessary to augment these existing instruments with a measure that is multidimensional and can be used in conjunction with the BMI to understand early adolescent boy's perception of self.

Table 2. Summary of Measures to Assess Body Perception

Instrument Name	Eating Disorder Inventory
Authors	Garner, Olmstead, and Polivy (1983)
Target of Measurement	Assessment of psychological and behavioral traits common in anorexia nervosa and bulimia
Number of Items	64 item self-report (eight subscales: drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, and maturity fears)
Psychometrics	Average inter- item-total correlation (0.63, SD 0.13). Criterion-related validity: anorexia nervosa group scored significantly higher (p,.001) than that female group and male college group on all subscales; agreement between therapist-consultant ratings and the anorexia nervosa patients' self-report subscale showed significant correlations at the p< 0.002 level. Intercorrelation among subscales: for the anorexia nervosa group only 9 of the 28 correlations were significant, with no coefficients reaching 0.60 Construct validity: ability to differentiate between the anorexia nervosa group and the female comparison group.
Indications for Use	Preliminary screening: identify groups in which a high proportion of subjects have formal eating disorders. To be used in conjunction with clinical judgment
Adaptations	EDI-2 (male and females over age of 12), EDI-3 (females 13-53 years of age), EDI-3SC (symptom checklist to measure frequency of symptoms), EDI-3RF (referral form to use in non-clinical settings)
Instrument Name	Body Attitude Test
Authors	Probst, Vandereycken, Van Coppenolle, and Vanderlinden (1995)
Target of Measurement	Female patients with eating disorders
Number of Items	20 item self-report
Psychometrics	Internal consistency: cronbach's alpha coefficient (0.93) Test-retest reliability: for anorexia nervosa patients, 17 items have correlation of more than 0.70; for students 10 of 20 items have correlation of more than 0.70. Convergent validity: BAT and BSQ (0.93); BAT and EDI Total (0.75); BAT and EAT (subscale "dieting" only significant correlation)
Indications for Use	Screening: evaluate the preoccupation with body shape and feelings of being overweight and progress in treatment
Adaptations	Dutch, French German, Spanish, Italian, Czech
Instrument Name	Body Shape Questionnaire
Authors	Cooper, Taylor, Cooper, and Fairburn (1987)
Target of Measurement	Women
Number of Items	34 item self-report
Psychometrics	Concurrent validity: significant correlations between BSQ and total score of Eating Attitudes Test (EAT) (0.35, p<0.02) and Body Dissatisfaction Scale of the EDI (0.66, p<0.001). Discriminant validity: community sample of women concerned about weight and shape scored significantly higher

	on the BSQ than those unconcerned with weight and shape (p<0.000).
Indications for Use	Screening: Specific measure of concerns about body shape, in particular the phenomenon, experience of "feeling fat"
Adaptations	BSQ-14 (short form 14)
Instrument Name	Body Attitude Questionnaire
Authors	Ben-Tovim and Walker, (1991)
Target of Measurement	Body experience of women
Number of Items	44 item self-report (six subscales: feelings of overall fatness, self-disparagement, strength, salience of weight, feelings of attractiveness, consciousness of lower body fat)
Psychometrics	Internal consistency: Kuder Richardson correlation-coefficient (0.92) Test-retest reliability (r=0.83) Convergent validity: Correlations between BAQ, Body Satisfaction Scale, and Body Shape Questionnaire ("feeling fat" subscale noteworthy) Discriminant validity: Student's t test, response of the anorexic patients to each of the subscales differed significantly than the community sample at the p<0.0001 level. Combination of the "disparagement", "attractiveness", and "strength" subscales was the best discriminator (correctly identified 86.4% of the anorexic sample and mis-classifying 7.2%of community sample)
Indications for Use	Screening: Assess a broad range of attitudes which women hold toward their bodies
Adaptations	Portuguese and Japanese versions
Instrument Name	None
Authors	Stunkard, Sorensen, and Schulsinger (1983)
Target of Measurement	Men and Women
Number of Items	9 silhouettes of men and 9 silhouettes of women
Psychometrics	Not reported
Indications for Use	Determine accurate weight statuses perception of adults
Adaptations	None
Instrument Name	Contour Drawing Rating Scale
Authors	Thompson and Gray (1995)
Target of Measurement	Men and women
Number of Items	9 male and 9 female contour drawings
Psychometrics	Test re-test reliability (r=0.78) Validity: Correctly positioned drawings for female set (95.2%) and male set (96.1%) Concurrent validity: Degree of correspondence between individual's reported weight and current self-ratings (r=0.71, p<0.0005) and with BMI (r=0.59, p<0.0005)
Indications for Use	Screening: Assess individual's perceived and desired body size and discrepancy.
Adaptations	None

Chapter 3

Preliminary Work: Elicitation Interviews

The purpose of this chapter is to describe the preliminary work accomplished to date contributing to the instrument development process. Instrument development for the ADPoSQ will follow the steps outlined in Devillis (2003). The steps include a literature review, analysis of existing instruments, concept analysis, item generation, establishing face and content validity, and testing for test-retest and internal reliability, and construct validity. As part of the item generation process, elicitation interviews were conducted as recommended by the developers of the Integrated Behavior Model (IBM), the theory guiding this study (Montano & Kasprzyk, 2008).

Montano and Kasprzyk (2008) suggest that the sample for the elicitation interviews should consist at a minimum of 15 to 20 individuals from each target group, about half of whom have performed or intend to perform the behavior under investigation and half of who have not performed the behavior. The target group was divided by weight category: underweight, about right weight (healthy), overweight, obese, and high BMI.

One novel approach to these interviews was to replace the “behavior” component of the construct with “weight”. Behavior is very complicated and therefore it was necessary to examine the possible antecedents to the behavior before addressing the behavior. It was necessary to understand what young adolescent boys think about weight as guided by the selected constructs of the IBM.

The concepts of the IBM guided the essential points to understand boys’ perceptions of their bodies and weight. The perceptions included the following: what the boys liked and disliked about their bodies, if they were in charge of their weight, if they thought weight was important, if weight was something that was discussed, and what they wanted to do about their weight. The adolescent boys that were interviewed were categorized in one of the five weight categories: underweight, about right weight, overweight, obese, and high BMI. It was vital to

include all weight categories as it has been documented that boys have a desire to lose and gain weight (Bearman et al., 2006; McCabe et al., 2001; Neumark-Sztainer et al., 2006) and that might not have been captured if only bigger boys or only smaller boys were included. Having been able to discuss with adolescent boys of all weight categories their feelings and beliefs about weight allowed for a finite pool of items in the adolescent boys' own words that can be used for the survey part of the ADPoSQ.

The purpose of this study was to conduct elicitation, semi-structured interviews with young adolescent boys 11 to 14 years of age to generate an item pool from which an instrument entitled Adolescents' Digital Perception of Self Questionnaire (ADPoSQ) would be developed.

Design. The design for this study used semi-structured interviewing to generate items for a questionnaire.

*Sample***.** The target population was 20 young adolescent boys ages 11 to 14 of all five weight categories.

The inclusion criteria for the youth were: (a) male gender (b) between ages of 11 and 14 (c) speak, read, and write English. Caregivers needed to be able to read and write English to provide consent and complete a brief demographic form. The need for English proficiency is due to the researcher's language limitations. Subject exclusion criteria were (a) cognitive disabilities that would limit understanding the interview and (b) a chronic medical condition that affects weight or ability to eat independently, requiring gastric tube feeds, or being treated with chronic steroids, chemotherapy, or immune suppressants.

Twenty young adolescent boys age 11 to 14 years of age, four from each of the five Body Mass Index (BMI) classifications; underweight, about right weight (healthy), overweight, obese, and high BMI (Ogden et al., 2010) were targeted. Montano and Kasprzyk (2008) recommended interviewing a minimum of 15 to 20 individuals expecting that this number will provide unique responses without much duplication of responses.

Instrument. A semi-structured grade 4 reading level interview guide was developed

based upon the concepts of the IBM. The intention was to find out what boys thought about changing their weight, what they liked and disliked about their bodies, if they felt they were in charge of their weight, if they thought weight was important, if weight was something that was discussed among the boys and their parents, friends, or others in their lives, and what they wanted to do about their weight. There were eight questions with probes that were asked of each boy (Appendix A). The parents completed a brief demographic form (Appendix A).

Procedure. Study procedures were reviewed and approved by the University's Health Sciences Institutional Review Board and Madison Metropolitan School District (MMSD) External Research Review Committee. Each adult provided informed consent and each adolescent boy provided assent.

Recruitment. Adolescent boys from a Midwestern public middle school and weight management clinic from September 2011 to September 2012 were invited to participate in the study. In the middle school, the study was explained during the adolescent boys' homerooms. In the weight management clinic, providers distributed a printed announcement to boys during wellness checkups. Those parents and adolescent boys that were interested in the study contacted the researcher by phone or email. The researcher explained the study by phone, confirmed eligibility based on parent report of height, weight, and age, and determined what weight category the adolescent boy was in. The goal was to recruit 4 boys in each of the five weight categories. Once the maximum number of boys in each weight category was achieved, those that were in those categories were informed that they would be contacted later if no new responses in that weight category were reached. The weight category was determined by entering the parent's report of boy's weight, height, and birth date into the CDC BMI calculator http://apps.nccd.cdc.gov/dnpabmi/. Once the weight category was established, a private place and time for interviewing was determined.

Data Collection. The parent, either mother or father, completed a brief demographic form using paper and pencil. The adolescent boy completed semi-structured, face to face, audio-

taped interviews, approximately 10 minutes in length, that were guided by constructs of the Integrated Behavior Model (IBM) (Montano & Kasprzyk, 2008). Following the semi-structured interviews, the adolescent boys' height, weight, and body fat percent were measured with a stadiometer and Bioelectrical Impedance Scale. The parent received $5 and the adolescent boy $20 cash.

Data Analysis. Deductive content analysis, to test categories and concepts, was used to analyze the data (Elo & Kyngas, 2007). The semi-structured interviews were professionally transcribed verbatim and printed. Responses by the adolescent boys were the unit of analyses. A research team consisting of four members analyzed the messages according to the Elo and Kyngas (2007) process, which included the following three phases: preparation, organizing, and reporting. The preparation phase included selecting the unit of analysis and making sense of the data as a whole. The organizing phase included developing a categorization matrix and to code the data according to the categories. The reporting phase included the results of analyzing process and the results. The research team included a PhD prepared pediatric nurse researcher, a pediatric nursing doctoral student, and two undergraduate nursing students.

Results

Sample. A description of the sample is displayed in Appendix B, Table 3. The sample consisted of one underweight, nine about right (healthy) weight, four overweight, four obese, and two high BMI boys. Due to mis reporting by the parents over the phone prior to the interviews, seven of the twenty adolescent boys were categorized into one weight category prior to the interview (reported) and categorized in another weight category post interview (actual). The ages of the boys ranged from a minimum of 11 years 5 months to a maximum of 14 years 11 months, measured weight from a minimum of 84.8 pounds to a maximum of 203.8 pounds, measured height from a minimum of 58.5 inches to a maximum of 73 inches, actual BMI from a minimum of 15.8 to a maximum of 30.1, and percent body fat (as measured by a Body Impedance Analyzer) from a minimum of 2.7% to a maximum of 34.1%. Of the nine boys that

were in the about right (healthy) category, three were currently trying to lose weight and one was currently trying to gain weight.

The demographics of the participants and their parent are displayed in Appendix B, Table 4. Of the thirteen boys that had a BMI of 85% or greater, seven were currently trying to lose weight and three currently trying to stay the same. Of the parent participants, there were thirteen mothers and four fathers. One mother had 2 sons that participated (participants 101 and 102) and one father had a set of twins and an older son participate (participants 106, 107, and 108). All the parents and boys were non-Hispanic except one mother and her son and one other boy. The races represented in this sample were Caucasian and African American with one mother and two boys choosing more than one race. All the parents had at least finished high school and according to the 2011 HHS (Health and Human Services) Poverty Guidelines, four families were considered living in poverty (National Center Health Statistics, 2011).

Preparation phase. The units of analysis were the boys' responses. The interviews were read several times by the research team.

Organizing phase. Research team members evaluated responses according to each interview question. Team members individually created a categorization table to account for the participant responses. All the tables were compared and contrasted by the researcher. In Appendix B, Table 5, the final categorization matrix from all the team members of the responses by the participants is displayed.

Reporting phase. If there was disagreement among the team members, the team member was asked to re read the selected text and indicate whether he or she would maintain their initial code. After reviewing all the potential disagreements, all team members adjusted their codes such that there was 100% agreement among all the team members. As depicted in Appendix B, Table 5, examples of terms boys used to describe what they would want their weight to be included "lower", "skinnier", "comfortable now", "less", and "just right". Terms boys used to describe what they liked about their bodies included all of it, legs, face, and tall. Boys

stated they disliked their stomach, chest, butt, and flabby. How important was their weight yielded answers from not very to a lot to would get bullied less if bigger. To the question, do others talk about weight, their responses included they felt no pressure to they've been told not to overeat and that they are heavy. Examples of those who they talk about their weight with include their doctor, friends, parents, and coaches. Most of the boys thought they were fully, solely, or 100% in charge of their weight while others responded somewhat, half, and pretty much. When asked to provide examples of how they were in charge of their weight, the boys said by exercising and eating. To the item designed to elicit what boys are currently doing about their weight, most said they wanted to lose or stay the same while one boy wanted to get bigger.

The frequencies of the responses are depicted in bar graphs (Appendix C, Figure 3). The boys' responses were used to create survey questions in the ADPoSQ (Appendix E) consistent with the IBM constructs. The measures used verbatim comments from the interviews to reflect actual wording used by the boys, as recommended by Montano and Kasprzyk (2008) when developing a questionnaire. These survey questions will be pilot tested with adolescent boys and experts to assess clarity and representativeness of the constructs, to be discussed during content validity assessment.

*Pool of Instrument Items***.** The survey questions are the first section of the ADPoSQ and will initially include four different parts for a total of 38 questions (Appendix E). The IBM constructs are represented in the four parts: Part I, Attitudes; Part II, Perceived Norm; Part III, Personal Agency; Part IV, Intentions and Actions.

To gain a more complete description of how boys perceive their bodies and weight than can be obtained from a survey, a visual instrument was conceived. The second section of the ADPoSQ thus, includes the creation of avatars by the adolescent boys. Three avatars will be created, the Current Avatar, the Preferred Avatar, and the Actual Avatar. The avatar creation will allow the boy to create his current self and preferred self by changing specific body parts

individually. The boy does not have to make the whole body bigger just because he thinks only his stomach, for example, is too big. This manipulation of the avatar will identify which body part(s) is of most concern for the boy. In addition, it will also allow the researcher to assess for accuracy of individual parts and body as a whole. An application developer was hired to create the ADPoSQ and design the avatars. Samples of the avatars are displayed in Figure 4.

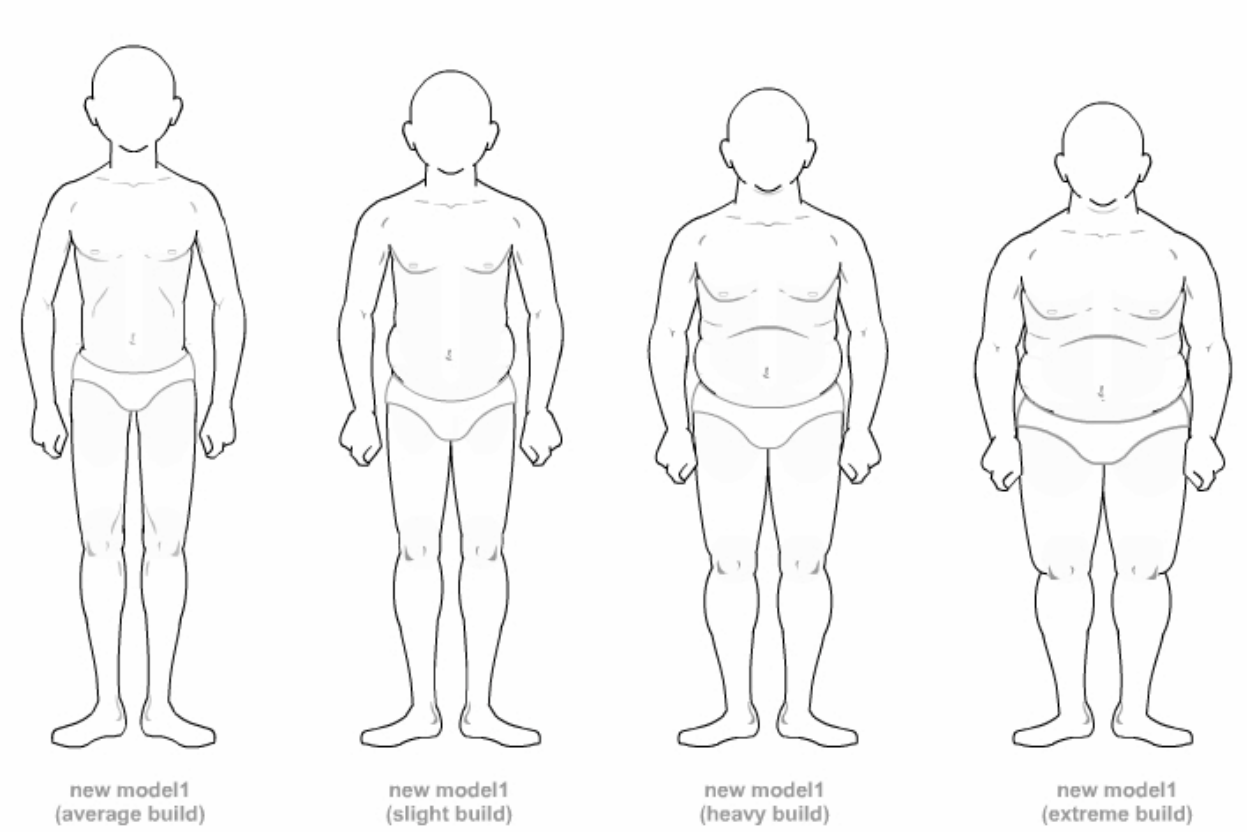

Figure 4. Samples of the avatars for use in the ADPoSQ application

Discussion

Little research exists on what boys think about their weight and bodies as spoken in their own words. The 20 boys that were interviewed were willing to talk about weight and reported they wanted to lose or gain weight or stay the same. The IBM constructs provided a useful guide to describe boys' thoughts, feelings, and perceptions about body parts and weight.

There were many issues with being accurate: parents' report, boys' report, and BMI

compared to percent body fat. To begin, seven parents' reports' of their son's height and weight did not jibe with the measured height and weight. Because of this inaccuracy, the actual weight category was incorrect. Boys' answers similarly did not jibe with the measured height and weight used to calculate BMI. Lastly, according to the CDC (www.cdc.gov/obesity/chidlhood/basics.html), children's body fat ratio fluctuates and therefore there is no healthy standard for body fat percent for children and teens. Because there is no reference to what is an acceptable amount of body fat for teens, it is difficult to interpret those boys with less than 20 percent body fat. The three boys with less than 20 percent body fat had a BMI that categorized them as overweight or bigger (participants #111, 116, and 109). These boys may have an acceptable amount of body fat, yet be referred for intervention inappropriately.

These inaccuracies or discrepancies can lead to inappropriate treatment referral for these boys whether the boy, his parent, or a health provider initiates it. If BMI was used to categorize these boys then those that were about right weight but indicated they wanted to lose (participants #105, 106, and 115) or gain (participant #112) weight might not be referred appropriately. A screening procedure should include parts of the body those in the about right weight category wanted to change and the appropriate way to reach that goal. In addition, those boys that were categorized as overweight, obese or high BMI (participant #110, 111, and 118) or underweight (participant #102) but indicated they wanted to stay the same might also not be referred appropriately. There is a need for a screening procedure that assesses whether boys are accurate in their assessments of not needing to change their bodies. Screening appropriately should contribute to adolescent boys attaining and maintaining a healthy weight in a safe way.

The words that these boys spoke revealed that looking only at height and weight and using a BMI calculator is not adequate for prevention and intervention. Their words will be used when creating questions for the survey part of the ADPoSQ. The ADPoSQ is an instrument that

can be used in conjunction with the BMI to screen boys in all weight categories to identify adolescent boys' perceptions of body weight that may or may not require interventions. In summary, measuring the constructs of the IBM is important in order to develop and target interventions that may help boys meet their weight attainment and maintenance goals. The proposed ADPoSQ study will be conducted to examine, explore, and identify adolescent boys' perceptions of body self including body, body parts, and weight and begin to develop a standardized instrument to measure selected constructs of the IBM that reflect those perceptions.

Chapter 4

Methods

The purpose of this chapter is to describe the design, sample, measures, and procedures to develop face and content validity, examine test-retest and internal reliability, and assess for feasibility of the ADPoSQ. All study procedures were reviewed and approved by the UW-Madison Health Sciences Institutional Review Board.

The ADPoSQ has two components. The first component consists of 40 survey items based upon the Integrated Behavioral Model (Montano & Kasprzyk, 2008). The second component consists of avatars enabling boys to portray their current self and their preferred self. To develop this two-component instrument, several phases were undertaken.

Development of the Avatar

To reflect how adolescent boys perceive their body, body parts, and weight, the ADPoSQ was developed. The process, from inception to final product, took 16 months.

In order for the avatar component of the ADPoSQ to become a reality, a web designer and database developer was needed. Alvaro Barros, the creative director of Creative Basic was recommended by James Dias of Wellbe who works with another School of Nursing faculty member, to create the online ADPoSQ avatar application. Several meetings were conducted to go over the vision and the necessary parts to be included in the ADPoSQ. Meetings included the creative director, the research team members, the statistician, and the director of Instructional Technology at the University of Wisconsin – Madison School of Nursing.

The vision for the avatar component was for boys to be able to manipulate different body parts of an avatar online, including head, neck, upper arm, forearm, chest, waist, hips, thigh, and calf. Manipulating the avatar would include the option of making the body parts bigger or smaller to reflect their perceptions. Developing avatars would allow the adolescent boy to change his individual body parts in contrast to select whole body images afforded by current instruments.

To attain an avatar the boy could recognize as similar to his body, each boy entered his height. Height was designed to generate an avatar on the screen for the boy to manipulate to represent his Current Avatar. The avatar would then look as much like the boy as possible and be proportionate. The measurements of the avatar for each particular height reflected that of boys 11 to 14 years of age at the 50th percentile. The measurements for each body part were configured using anthropometric body measurements including height, weight, head, mid upper arm, waist, thigh, and calf circumferences of 977 adolescent boys 11 to 14 years of age as reported by McDowell et al. (2008). The neck, chest, forearm, and hip measurements for the 50th percentile were estimated using boys' sizing charts (http://www.sportsavenue.org/sg/#SLD). The 50th percentile measurements for boys ages 11 to 14 in relation to height was used as the starting avatar for the boys during creation of the Current Avatar.

Once the Current Avatar was created, it was populated on the next screen for the boy to manipulate his Preferred Avatar. This feature was incorporated so that the boys were working from what they had inputted which reflected their perception of their current self. The boys did not have to "start over" when creating their Preferred Avatar allowing for more accuracy in computing the differences among the avatars: Current, Preferred, and Accurate Avatar. The boys clicked on left and right arrows for each body part to make the avatar smaller (left arrow) and bigger (right arrow). Each click on the arrow, whether bigger or smaller, represented one pixel or one centimeter of movement. The boy was able to make as many changes to the body parts as he wanted until he continued to the last screen and logged out.

The Accurate Avatar for each boy was obtained by research team members. Measurements of the body parts including head, neck, upper arm, forearm, chest, waist, hip, thigh, and calf were individually taken and are explained below.

Development of the Survey Items (Phase 1)

The purpose of the survey items was to document how boys perceived their weight, the accuracy of their perceptions, their satisfaction with and importance of weight, how others'

influence their perceptions, their perceived control over weight, and their intentions and actions to change weight. To develop the items to assess these ideas, procedures developed by DeVillis (2003) were implemented. The items underwent assessment for content validity and were pilot tested (Phase 1).

Sample. Two samples were recruited to develop content validity of the survey items. First, a panel of six health professionals whose specialties were adolescent health was contacted. Second, six adolescent boys were asked to pilot test the questionnaire and provide feedback.

Recruitment. Professional adolescent health experts, known to the researcher, were asked to review the instrument. Health professionals that had experience with adolescents and/or instrument development were asked via email to review the ADPoSQ. A formal Content Validity Instrument (CVI) on which to provide feedback was made available (Appendix D, Table 6). Boys were recruited informally through family members and friends. Family members and friends were asked if their boys 11 to 14 years of age who would be interested in providing feedback about the survey component of ADPoSQ instrument. Of 6 approached, 6 agreed.

Procedure. The adolescent health experts were provided with instructions on how to complete the ADPoSQ (Appendix D, Table 6). The instructions included a brief summary of the ADPoSQ, definitions of the IBM constructs of attitude, perceived norm, personal agency including perceived control and self-efficacy. In addition, the content domain of perception was defined as “a way of regarding, understanding, or interpreting something, in this case, one’s self including weight, body, and body parts. Perceptions include attitude, perceived norm and personal agency”. The health experts were provided with a link to the online ADPoSQ as well as an electronic version of the questions to document their responses (Appendix D, Table 6).

The health experts were asked to review each item and determine if it is a representative measure of one of the five constructs of the IBM and also if the question is clear. The instructions included a 4-point scale for each item. The scale did not include a neutral and

ambivalent point. On the CVI, the health professionals indicated the degree to which the questions were representative and clear by indicating: strongly disagree (SD), disagree (D), agree (A), and strongly agree (SA). With every question, the health expert had the option of providing feedback on how to make the question clearer. The health experts were also asked if the instrument was comprehensive using the same response scale. Lastly the health experts indicated if the instrument instructions given to them were clear using the same response scale. They also had the option to provide comments about the instructions (Appendix D, Table 7).

Boys 11 to 14 years of age were asked in individual interviews to review each item and report whether questions were understandable, important to them, and appropriate. In the individual interviews, the boys were asked to read the survey questions as though they were taking the survey but also to write down what did not make sense and suggestions on how to make the questions clearer. They were also asked if boys their age and between 11 and 14 would think the questions were important to them, and if there were questions that needed to be added or deleted. Lastly the boys were asked to provide feedback whether or not the ADPoSQ was user friendly.

Data Analysis. A content validity index (CVI) for the health experts was calculated. *A priori,* it was decided that those items without the recommended .78 agreement would be eliminated or revised (Lynn, 1986, Polit & Beck, 2006). Further, *a priori,* and based on recommendations from Fabrigar et al. (1999), we anticipated at least four and perhaps as many as six measured items for each common factor. Because the IBM includes six constructs that would represent common factors, a 24 to 36-item scale was anticipated. The individual comments from the adolescent boys were recorded and documented. Feedback from the experts and the adolescent boys were critically evaluated and incorporated into the instrument. If additional items had been needed after this analysis, the pool of items would have been accessed and the procedure repeated.

Results. The agreement for representativeness among the health experts was

evaluated using the CVI. The formula used to compute the CVI is the number of experts rating either a SA or A, divided by the number of experts. Three of the 40 questions had an agreement of 0.83 while the other 37 questions and the use of the avatars had an agreement of 1.00. In regards to the clarity of the questions 6 had 0.66 agreement, 9 had 0.83 agreement, and 25 had 1.00 agreement. The clarity of the avatars was 1.00 agreement. The health experts provided suggestions on how to make the questions more clear and appropriate for use with boys 11 to 14 years of age. The suggestions were reviewed and necessary changes were made to the questions (Appendix D, Table 7). For example, the experts indicated using "Healthcare providers" as a choice would be confusing and suggested using "Doctors or nurses". Another example included changing the order of the choices such as having "No one" first when asking about what other people think about their bodies. All experts agreed (CVI=1.00) the instrument was comprehensive and the instructions, rating scales, and formatting were clear. The changes to each question were made and provided to the developer (Appendix D, Table 8).

The adolescent boys that were interviewed indicated that the ADPoSQ was easy to use and expressed how much they enjoyed creating the avatars of themselves. All the boys reported it took 30 minutes or less to review all the questions and create the avatars. The boys did suggest changing the wording on a question. For example, the boys also indicated that "Doctors or nurses" should be an option instead of "Healthcare providers". The boys reported all the questions were important and did not suggest any question be added or deleted. Upon advice from the health experts and adolescent boys, the necessary changes were made to the ADPoSQ for use with boys 11 to 14 years of age. The revised survey questions were provided to the creative director to incorporate the questions into the ADPoSQ application (Appendix D, Table 8).

Field Testing (Phase 2)

Sample. In phase 2, the instrument (ADPoSQ) with both the survey and avatar components was tested with 59 adolescent boys 11 to 14 years of age for feasibility and

reliability. The inclusion criteria for the youth were: (a) male gender; (b) between ages of 11 and 14; and (c) speak, read, and write English. Parents/guardians needed to be able to read and write English to provide consent. The need for English proficiency is due to the researcher's language limitations. Subject exclusion criterion was cognitive disabilities that would limit understanding of the ADPoSQ, which was assessed by the physical education (PE) teachers

Recruitment. Upon approval from IRB, the recruitment plan consisted of meeting with the school personnel to discuss recruitment strategies. The content of this meeting is outlined under procedures. The research team introduced the study during the physical education classes at a middle school (MS) in a small city in a Midwestern state. Study packets, consisting of a letter summarizing the study, the items included in the first part of the ADPoSQ, parent consent, and boy assent, were distributed for the adolescent boy to take home and discuss with his parent(s) (Appendix F).

Procedure. The research team first met with the school personnel including the principal, Informational Technology staff, physical education teachers, and school nurse to discuss how and when the information would be presented to the adolescent boys during physical education classes. Issues included packet information and distribution, best days of the week to introduce the study and answer questions, scheduling of data collection for initial and test-retest reliability, and potential problems. The ASPoSQ application was demonstrated to the school personnel and questions were answered.

After determining the best days to visit the school, the investigator and three research assistants introduced the study during the first ten minutes of PE and answered any questions. Following the completion of PE class, the research team handed out the packets (Appendix F) for the adolescent boys to take home to discuss with their parents. The study was introduced in each of 12 PE classes on two separate days to capture all adolescent boys in 6^{th}, 7^{th} and 8^{th} grade. A phone number and email address of the investigator and major professor was provided in the packet for the parents if they had any questions or concerns. No phone calls or

emails were received. The boys had a week to return signed parental consent and assent forms. All parental consent and assent forms were picked up by a student research assistant and entered into a spreadsheet for use on the days of data collection.

The adolescent boys, as part of a separate research grant acquired by staff at MS, had their height measured with a stadiometer and weight measured with a digital scale. The PE teachers measured the students with their PE dress of a t-shirt and shorts. The height and weight measurements for those that assented to be in the study were provided by the PE teachers and entered into a spreadsheet.

On the day of data collection, all boys who assented to be in the ADPoSQ study were excused from PE class and chaperoned by the student research assistant to the school library where laptops were set up with the ADPoSQ application. Each boy sat at a laptop with another laptop station separating each boy to maintain privacy during the completion of the ADPoSQ. When a larger number of boys, four or more, were scheduled during the PE period to complete the ADPoSQ, the research team divided the group in half and measured half of the boys and monitored the other half while they completed the ADPoSQ on the laptops. This system allowed for completion of the ADPoSQ and measurements to be taken in the allotted time of 40 minutes.

The completion of the ADPoSQ included the following: the student researcher clicking on the hyperlink of https://research.son.wisc.edu/ADPoSQ.Avatars/ which was provided to the MS Information Technology staff prior to the day of the study for installation on each laptop, the investigator entering in the same login and password for each session, and the boy entering in his first name, avatar name, birthdate, height, ethnicity, race, and answering the 40 survey questions. Following the 40 questions, the boy created a Current Avatar and a Preferred Avatar. Once the avatars were created, the boy logged out. The research team members then took each of the boys' measurements.

For the measurements part of the ADPoSQ application, each boy had his head, neck,

chest, upper arm, forearm, waist, hips, thigh, and calf measured twice using an anthropometric tape measure. The measurement procedure was that recommended by the American College of Sports Medicine (Tucker, 2011). Each research assistant was trained using the measurement procedure (Appendix G). During training, the research team members measured the body parts of the same person to verify measurements were similar, plus or minus two cm. Each boy had one layer of clothing on (shorts or pants and a shirt) and was measured in a separate room of the library with the door closed. If time allotted, each boy returned to PE class otherwise proceeded to the next period once the bell rang

Following the measurements, the boy had the option of entering his name in a drawing for one of two iPod Touches being raffled. The boy indicated on a notecard his name, address, and phone number. The note cards were placed in an enclosed box. The names were selected after all the boys completed the questionnaire. The boys that were selected and their parent were notified that their son won an iPod Touch. The iPod Touches were mailed to the winner's address from the school so that the research team had no identifying information. The research team reminded the boys if they indicated on the consent and assent forms they were interested in completing the ADPoSQ again two weeks later they would complete the same procedure in two weeks, but did not have to have their measurements taken. .

Test-Retest. All boys were asked to indicate if they would complete the ADPoSQ again in two weeks. The two week time frame was chosen because reliability coefficients tend to be higher for short-term retests than for long-term retests, that is, greater than one or two months (Polit & Beck, 2008). Once the retest ADPoSQ was completed, the identifying information on the note cards was shredded.

Procedure. On the day of data collection, all boys who assented to complete the ADPoSQ study again were excused from PE class and chaperoned by the student research assistant to the school library where laptops were set up with the ADPoSQ application. Each boy sat at a laptop with another laptop separating each boy to maintain privacy during the

completion of the ADPoSQ.

The completion of the ADPoSQ included the following: the student researcher clicking on the hyperlink of https://research.son.wisc.edu/ADPoSQ.Avatars/ which was provided to the MS Information Technology staff prior to the day of the study for installation on each laptop, the student researcher entering in the same login and password for each session, and the boy entering in his first name, avatar name, birthdate, height, ethnicity, race, and answering the 40 questions. Following the 40 questions, the boy created a Current Avatar and a Preferred Avatar. Once the avatars were created, the boy logged out.

Once logged out, the boy had the option of answering three questions about his participation in the study. The questions were: What did he like about the survey, what did he not like about the survey, what advice would he give us to improve the ADPoSQ? If time allotted, each boy returned to PE class otherwise proceeded to the next period once the bell rang.

Boys could enter a drawing for an iPod Nano. To enter, the boy indicated on a note card his name, address, and phone number. The note cards were placed in an enclosed box. The names were selected after all the boys completed the questionnaire. The boy that was selected and his parent were notified that his/her son won an iPod Nano. The iPod Nano was mailed to the winner's address from the school so that the research team had no identifying information.

Data Analysis. Analysis consisted of describing the data, establishing reliability and test-retest reliability (DeVillis, 2003), and assessing feasibility. Coefficient alpha was used to assess composite reliability. Data from the test-retest sample were analyzed for stability using Spearman Rho's correlations. The digitalized, Current and Preferred Avatars and the actual measurements of the body parts were compared and a ratio score constituting body satisfaction for each part was computed.

Missing Data. The ADPoSQ application was programmed so that the boy cannot skip a question. If the boy did not wish to answer an item, he could choose the response, "I do not want to answer". Thus, all items were answered and there were no missing data.

Change in Protocol

The original protocol to test the ADPoSQ application for field testing included recruiting 300 adolescent boys 11 to 14 years of age to test the ADPoSQ application. MacCallum et al. (1999) recommended that with communalities in the range of 0.5 and well determined factors the sample size should be in the range of 100-200. The proposed sample size was 300 (150 for exploratory factor analysis and 150 for confirmatory factor analysis).

At first, this sample size did not seem impossible to recruit. The investigator had assisted with a study during the 2011-12 Academic Year in which over 300 participants were recruited. However, issues emerged such that fewer participants were recruited (discussed in Chapter 6).

Six school districts were contacted. The study was reviewed and later denied by two school districts' external review boards. The other four school districts were contacted via the school nurse and later referred to the pupil services coordinator and/or the superintendent who declined to collaborate. The middle school (MS) in a small city in a Midwestern state did agree to participate. This middle school had a total of 723 students in grades 6th through 8th half of which are males. Over 350 male students had the potential of assenting to the ADPoSQ study. A UW-Madison doctoral student in the previous year was able to recruit 232 female students in grades 6th through 8th to complete her study. For these reasons, about 300 students seemed feasible. After introducing the study at the middle school and receiving only 59 consented and assented boys, the PE teachers extended the time period of one more week for boys to return the consent and assent forms. No more boys indicated interest in completing the study.

Upon realization that the total number of male students interested in the ADPoSQ study was 59, dissertation committee members were contacted to approve aims that no longer included construct validity but rather describing data and establishing feasibility and reliability. The research committee members approved the new aims. The protocol was amended with the IRB as well.

Chapter 5

Results

The purpose of this chapter is to answer the research questions. The participant characteristics are described. The participants' responses to the ADPoSQ survey questions and Avatars are reported, the test-retest reliability and internal consistency of the ADPoSQ is analyzed, and the feasibility of the administration of the ADPoSQ is examined.

To begin, 335 packets were distributed during the PE periods at MS. Of the 335 packets distributed, 59 were returned with signed parental consents and participant assents, for a return rate of 17.6%. All 59 boys completed the ADPoSQ and had their body parts measured. For the test re-test two weeks later, 57 boys had signed parental consent and signed participant assent to complete the ADPoSQ a second time. Of the 59 boys, 55 completed the ADPoSQ. Four boys were absent. Please refer to the Consort Diagram, Appendix H.

Description of the Sample

The participants' demographics and height, weight, and BMI are displayed in Appendix I, Table 9. Almost half were age 13 (*M* = 12.6, *SD* = 0.83). Over three-quarters (78%) self-reported their race as Caucasian/White and nearly all (89.9%) reported they were not of Hispanic ethnicity. The minimum measured height was 54 inches and maximum 72 inches (*M* = 63.1, *SD* = 4.23) while the minimum measured weight was 69 pounds and the maximum 291 pounds (*M* = 122.7, *SD* = 36.65). Using the CDC BMI Percentile Calculator for Child and Teen (http://apps.nccd.cdc.gov/dnpabmi/), the BMI was calculated and a weight category assigned from the following weight categories: underweight (<5th percentile), healthy weight (5th percentile up to 85th percentile), overweight (85th percentile to less than 95th percentile), obese (95th percentile to less than 97th percentile), and High BMI (≥ 97th percentile) (Ogden et al., 2010). More than half of the boys were categorized as healthy weight (64.4%) and there were no boys categorized as underweight. The mean CDC BMI-for-age percentile was 63.0 (*SD* = 29.43).

Research Question One

How do middle school adolescent boys describe their feelings and beliefs about, other people's thoughts about, how much control they have over changing, and intentions of changing their bodies and body parts?

Attitude. The adolescent boys were asked about their feelings and beliefs about their body and body parts including their head/neck, chest, stomach, arms, butt, and legs/thighs. Participants could chose a response of "too small," "just right," "too big," and "I do not want to answer." See Appendix I, Table 10 for a display of the data. Most boys thought their body parts were just right. However, many boys (40.7%) thought their stomach was too big, arms too small (28.8%), and thighs too big (22.0%).

Next the boys were asked if they liked their body parts and their response choices were "Strongly Disagree," "Disagree," "Agree," "Strongly Agree," and "I do not want to answer." Most of the boys agreed (64.4%) and strongly agreed (27.1%) they liked their head/neck, chest (61.0%, 15.3%), stomach (52.5%, 10.2%), arms (52.5% 23.7%), butt (71.2%, 15.3%), and legs/thighs (49.2%, 28.8%). However about one-quarter disagreed they liked their chest (23.7%), disagreed (30.5%) or strongly disagreed (5.1%) they liked their stomach, disagreed (20.3%) or strongly disagreed (1.7%) they liked their arms, disagreed they liked their butt (8.5%), and disagreed they liked their legs/thighs (20.3%).

When asked if it is important to change their body parts, the boys again could respond with "Strongly Disagree," "Disagree," "Agree," "Strongly Agree," and "I do not want to answer." As displayed in Appendix I, Table 10, most disagreed (71.2%) or strongly disagreed (16.9%) it was important to change their head/neck. For the chest, about the same proportion of boys reported they disagreed (44.1%) or strongly disagreed (6.8%) as agreed (39.0%) or strongly agreed (10.2%) it was important to change their chest. About their stomach, though, a higher proportion of boys reported they agreed (35.6%) or strongly agreed (28.8%) that it was important to change it than disagreed (25.4%) or strongly disagreed (10.2%). A similar pattern

was found about the importance of changing their arms. A higher proportion of boys agreed (49.2%) or strongly agreed (11.9%) that it was important to change their arms while more than one third disagreed (30.5%) and (8.5%) strongly disagreed that it was important to change their arms. Most the boys, almost three quarters, disagreed (55.9%) or strongly disagreed (22.0%) that it was important to change their butt. Like the chest, about the same proportion of boys reported they disagreed (33.9%) or strongly disagreed (16.9%) as agreed (33.9%) or strongly agreed (13.6%) that it was important to change their legs/thighs.

When asked how the boys perceived their weight, they could respond with "underweight," "about right weight," "a little bit overweight," "overweight," or "very overweight." Over half reported their weight as about right weight (55.9%), and almost a quarter described their weight as a little bit overweight (22.0%). When asked to strongly disagree, disagree, agree, or strongly agree as to if their weight was good for their height, over half agreed (54.2%) or strongly agreed (18.6%) they were a good weight for their height. A lower proportion of the sample disagreed (25.4%) or strongly disagreed (1.7%) they were a good weight for their height.

Perceived Norm. The adolescent boys were asked what other people think about their bodies. The boys were able to choose more than one person; therefore, the percentages do not add up to 100% as reported in Appendix I, Table 10. The boys were asked which people think they should change their body. More than half the boys indicated "no one" (52.5%) thought they should change their bodies. Yet, 22% indicated their coach and 20% indicated their dad thought they should change their bodies.

The boys were asked which people said good things about their bodies. The boys indicated the majority of people who said good things about their bodies were moms (76.3%), dads (71.2%), and friends (50.8%). Similarly, the boys were asked which people said bad things about their bodies. The majority of boys indicated "no one" (71.2%). However, almost 12 percent indicated they did not want to answer the question (11.9%), higher than any of the other questions (Appendix I, Table 10).

The items about which people think the boys should change their body, say good things, and say bad thing included an option for the boy to fill in an “other” response. Examples of other people they included were grandparents, uncles, and me (Appendix I, Table 10).

Personal Agency (perceived control and self-efficacy). The adolescent boys were asked about how much control they have over changing their bodies again using the responses of “Strongly Disagree”, “Disagree”, “Agree”, and “Strongly Agree” (Appendix I, Table 10). Over three-quarters agreed (39.0%) or strongly agreed (39.0%) they were 100% in charge of changing their body, and were certain they can change their body (agreed: 47.0%; strongly agreed: 44.1%). When asked about changing their bodies, over two-thirds were certain they could with help from family (agreed: 54.2%; strongly agreed: 28.8%), friends (agreed: 50.8%; strongly agreed: 27.1%), boys their age (agreed: 49.2%; strongly agreed: 15.3%), coaches (agreed: 35.6%; strongly agreed: 40.7%), and doctors or nurses (agreed: 54.2%; strongly agreed: 28.8%). Over half of the boys disagreed or strongly disagreed they were certain they can change their bodies with help from girls their age (disagreed: 32.2%; strongly disagreed: 25.4%) and teachers (disagreed: 42.4%; strongly disagreed: 20.3%).

Intentions. The adolescent boys were asked about trying to change their bodies and had the option of choosing more than one response (Appendix I, Table 10). Almost three-fourths of the boys were currently trying to change their body by gaining muscle (72.9%), one-third by losing weight (33.9%), and one-third by losing fat (32.2%). When asked about how they are changing their body, over half indicated eating more nutritious/healthy foods (93.2%), exercising more (71.2%), lifting weights (66.1%), eating more protein (62.7%), and eating less junk food (55.9%).

The boys were asked if they have already changed their body. To this item, one half disagreed (44.1%) or strongly disagreed (6.8%) and the other half agreed (40.7%) or strongly agreed (8.5%). To the item, I am not trying to change my body now, but have in the past, over

half indicated they disagreed (59.3%) or strongly disagreed (6.8%). Less than a quarter of the boys agreed (20.3%) or strongly disagreed (3.4%) with this statement.

The boys were asked how they tried to change their body in the past. They could choose from multiple choices (see Table H10). Almost half were able to reach a goal when they tried to change their body in the past (45.8%) while about one quarter chose they thought it was hard (27.1%), they wish they had more help (23.7%), and they did not want to answer (20.3%).

The boys were asked the reason they want to change their body. Over half responded because of the sports they play (67.8%) and they want to be competitive (50.8%). Many wanted to have more energy (40.7%) and about one third indicated because of the girls (33.9%) and the boys around them (32.2%). Of the adolescent boys surveyed, over three-fourths play sports outside of school (78.0%).

Research Question Two

How do middle school adolescent boys use avatars to describe their perceptions of their bodies and body parts? All 59 boys had created a Current and a Preferred Avatar at the first data gathering time point. Two of the boys' data were removed. Their data could not be analyzed because the ADPoSQ was programmed to include heights between 4' 7" (55 inches) and 6' 1" (73 inches). These two boys entered a height of 4' 4" and 4' 6", which exported zeros as measurements. The remaining 57 boys' entries were analyzed; see Consort Diagram, Appendix H.

There are three potential differences to analyze as a result of the avatar creations. First, the difference between the Current and Preferred Avatars was calculated by subtracting the measurements of each body part of the Preferred Avatar from the measurements of each body part of the Current Avatar. Second, the difference between the Current and Accurate Avatars was calculated by subtracting the Accurate Avatar measurements from the Current Avatar measurements. Third, the difference between the Accurate and Preferred Avatars was

calculated by subtracting the Preferred Avatar measurements from the Accurate Avatar measurements.

There are three box plots that were created to reflect the differences among the three Avatars (Appendix J, Figures 6, 7, and 8)). There is also a table of calculations provided with each box plot to reflect the median difference. In Appendix J, Figure 6, the differences between boys' current and preferred avatars are depicted using a box plot. A table of calculations provides the mean, median (band inside the box), standard deviation, 25th percentile (bottom of the box), 75th percentile (top of the box), minimum (bottom whisker), and maximum (top whisker) measurements for each body parts. The "o" indicates the outliers and the "★" extreme outliers. These outliers are labeled using the weight categories of healthy weight, overweight, obese, and high BMI. There was no underweight boy so that weight category was not portrayed.

Current and Preferred Avatar Differences. To interpret the box plot figure, the line at zero centimeters indicates no difference between the Current and Preferred Avatars. A negative number indicates that the boy would prefer the body part to be bigger than what he perceived each body part to be currently. The upper arm and forearm were two body parts that most of the boys preferred to be bigger; however there were extreme outliers on the positive end indicating the Current Avatar body part measurements were bigger than their Preferred Avatar body part measurements. For each body part, there were more outliers and extreme outliers on the positive end than the negative end.

Current and Accurate Avatar Differences. The difference between the boys' Current and Accurate Avatars is depicted using the box plot in Appendix J, Figure 7. The boys overestimated all the Current Avatar body parts when compared to the Accurate Avatar measurements. There are no outliers beyond the maximum but a few beyond the minimum. There exists a wider range of differences when comparing the body parts of chest, waist, and hip.

Accurate and Preferred Avatar Differences. Lastly, in Appendix J, Figure 8, the difference between the Accurate and Preferred Avatar measurements are depicted. The measurements for all the body parts indicate that the boys' prefer to have bigger body parts when compared to their actual measurements as all body parts are almost completely on the negative end. There are few outliers beyond the maximum and no outliers beyond the minimum. Again, there exists a wider range of differences when comparing the body parts of the chest, waist, and hip.

Case Presentations Using Individual Boys' Responses. To further represent the differences among the avatars, line charts were created. A boy from each weight category, underweight, healthy weight, overweight, obese, and high BMI were randomly chosen to serve as exemplars. There were no underweight boys in this study so the boy with the lowest BMI (6^{th} percentile) was chosen.

Healthy weight (6^{th} percentile). To begin, in Appendix K, Figure 9 there are three lines used to depict the Current Avatar, Preferred Avatar, and Accurate Avatar measurements for each body part. This boy indicated on his Preferred Avatar that he wanted his chest to be 20 cm greater than his Current Avatar chest measurements. Comparing his Current Avatar with his Accurate Avatar measurements, his chest measurement was accurate with the difference only being 1 cm. However, the remaining body parts, head, neck, upper arm, forearm, waist, thigh and calf had a smaller difference of at least 15 cm, with the hip difference being smaller than 25 cm. This boy's body part measurements of his Preferred Avatar were greater by at least 15 cm than his Accurate Avatar measurements, while his hip measurement difference was even greater than 30 cm (Appendix K, Figure 9). This boy indicated in the survey questions that he was currently trying to gain weight because of the sports he plays and strongly disagreed that he already changed his body (Appendix K, Table 11).

Healthy weight (55^{th} percentile). This boy had a minimal difference among his neck, upper arm, forearm, chest, and waist measurements when his Current Avatar was compared to

his Preferred Avatar. He indicated he preferred his head smaller by 19 cm than the head of his Current Avatar. He also preferred his hip, thigh, and calf to be greater by at least 15 cm than his hip, thigh, and calf of his Current Avatar (Appendix K, Figure 10). When his Current Avatar was compared to his Accurate Avatar, there was a minimal difference among his neck, forearm, and calf, while he overestimated the measurements of his head, upper arm, chest, and waist by at least 10 cm. He underestimated his thigh measurements by at least 5 cm (Appendix K, Figure 10). His Preferred Avatar measurements of his upper arm, hip, and calf were greater than at least 20 cm when compared to his Accurate Avatar measurements. His chest and waist measurements were greater by at least 10 cm (Appendix K, Figure 10). This boy indicated in the survey questions his stomach and legs/thighs were too big, he disagreed he likes his stomach and legs/thighs, he strongly agreed it was important to change his stomach and legs/thighs, he was currently trying to lose weight and gain muscle for the reasons of he does not want to be out of breath, wanted to have more energy, and wanted to be more healthy and disagreed that he already changed his body (Appendix K, Table 11).

Overweight. The greatest difference (at least 5 cm) between the body part measurements of the Current and Preferred Avatars existed with the waist, hip, thigh, and calf. The other body part measurements, head, neck, upper arm, forearm, and chest had a minimal difference of 3 cm or less (Appendix K, Figure 11). When assessing for accuracy, this boy overestimated all his body part measurements by at least 10 cm, with his upper arm, hip, and calf being greater than 20 cm (Appendix K, Figure 11). The Accurate Avatar measurements were compared with the Preferred Avatar measurements. A difference existed with the Preferred Avatar measurements being greater by at least 15 cm among the head, neck, upper arm, forearm, hip, and calf. The chest, waist, and thigh measurements were greater by less than 10 cm (Appendix K, Figure 11). This boy specified in the survey questions his stomach and legs/thighs were too big, he disagreed he likes his stomach and legs/thighs, he agreed or strongly agreed it is important to change his chest, stomach, and legs/thighs, he was currently

trying to lose weight and lose fat for the reason that he wrote in of “I do not like the way I think I look” and disagreed he already changed his body (Appendix K, Table 11).

Obese. This boy indicated a minimal difference between his Current Avatar and Preferred Avatar measurements among his head, neck, upper arm, chest, and waist while his forearm, hip, thigh and calf had a difference of at least 20 cm (Appendix K, Figure 12). This boy overestimated all Current Avatar body part measurements by at least 10 cm and his thigh (at least 5 cm) when compared to his Accurate Avatar measurements. His waist was underestimated by at least 10 cm (Appendix K, Figure 12). There was a minimal difference between the Accurate Avatar forearm, hip, and calf measurements when compared to the Preferred Avatar. The Preferred Avatar measurements of the head, neck, and upper arm were greater than 15 cm when compared to the Accurate Avatar. The waist and thigh measurements of the Preferred Avatar were smaller by at least 10 cm when compared to the Accurate Avatar (Appendix K, Figure 12). This boy denoted that his chest and stomach are too big, and his legs/thigh are too small, he disagreed that he likes his chest and stomach, agreed or strongly agreed it was important to change his chest, stomach, and butt, he was currently trying to lose weight and lose fat and the reasons were because he wanted to have more energy, and wanted to be more healthy and disagreed he already changed his body (Appendix K, Table 11).

High BMI. This boy indicated a minimal difference between the Current Avatar body parts and the Preferred Avatar body parts except for the upper arm where the Current Avatar upper arm was bigger by 6 cm than the Preferred Avatar upper arm (Appendix K, Figure 13). When assessing for accuracy, this boy overestimated his Current Avatar measurements of his head, neck, upper arm, forearm, and calf by at least 10 cm. The Current Avatar measurements of the chest, waist were underestimated by at least 10 cm and the hip by 4 cm. There was a minimal difference between the Current Avatar thigh measurements and the Accurate Avatar thigh measurements (Appendix K, Figure 13). The Preferred Avatar measurements of the head, neck, upper arm, forearm, and calf were greater than 10 cm when compared to the Accurate

Avatar measurements. The chest, waist, and hip measurements of the Preferred Avatar were smaller by at least 5 cm than the Accurate Avatar measurements. There was no difference between the Preferred Avatar thigh measurements and the Accurate Avatar thigh measurements (Appendix K, Figure 13). This boy specified in the survey questions that his stomach and legs/thighs were too big, agreed or strongly disagreed he likes his stomach and legs/thighs, agreed or strongly agreed it was important to change his stomach, arms, and legs/thighs, was currently trying to lose weight, lose fat, and gain muscle for the reasons of girls and boys around him, did not want to be out of breath, wanted to have more energy, wanted to be more healthy, the sports he played, and others make fun of him and strongly disagreed he already changed his body (Appendix K, Table 11).

Research Question Three

To what extent are the constructs, avatars, and instrument internally consistent? Internal consistency was calculated using Cronbach's alpha for each construct measured as a continuous variable (Appendix I, Table 10). Whenever a participant responded to a certain question with "I do not want to answer" their data were excluded when calculating Cronbach's alpha for that particular construct. Attitudes (feelings and beliefs) had a Cronbach's alpha of 0.62. The construct of Personal Agency (control and self-efficacy) yielded an alpha coefficient of 0.85. The survey questions with continuous variables yielded an alpha coefficient of 0.79.

Research Question Four

To what extent is the instrument stable as indicated by a re-test? The ADPoSQ application was completed by 55 boys two weeks following the first administration. The boys were asked to answer the same 40 survey questions and recreate their Current and Preferred Avatars at this second time point. Spearman Rho correlation was configured on those items measured as a continuous variable to assess for Test Re-Test Reliability (Appendix I, Table 10). If a participant responded with "I do not want to answer", his data were excluded for that particular question.

All of the items measuring the boys' perceived size of the body parts had correlation co-efficients above 0.40 except the question about the size of the legs/thighs and liking the head/neck. The items measuring the importance of changing body parts had correlation coefficients above 0.50 except the importance of changing the butt. The item, self-described weight had a correlation co-efficient of 0.90 and good weight for height 0.52. The items designed to measure personal agency demonstrated considerable variability in their correlation co-efficients with help from boys my age being as low as 0.36, help from my family and friends each at 0.39. The other items had a correlation co-efficient above 0.50. The item, I have already changed my body, had a correlation co-efficient of 0.58 and the item, I am not trying to change my body now, but have tried in the past, a correlation co-efficient as low as 0.24.

The boys were asked to recreate their Current and Preferred Avatars two weeks later following the first administration at the second time point. The Spearman Rho correlation for Test Re-Test Reliability was calculated for each body part (Appendix I, Table 10).

The Current Avatar measurements of the body parts from the first to second time points yielded Spearman Rho correlations of at least 0.70 for the upper arm, forearm, waist, and mid-thigh. The other five body parts, head, neck, chest, hip, and calf yielded Spearman Rho correlations between 0.50 and 0.69.

On the other hand, the Preferred Avatar measurements of the body parts from the first to second time points yielded only two Spearman Rho correlations above 0.70 (upper arm (0.74) and chest (0.72). The hip was the only body part between 0.50 and 0.69. The other six body parts, head, neck, forearm, waist, mid-thigh, and calf yielded Spearman Rho Correlations less than 0.50 (Appendix I, Table 10).

Research Question Five

How feasible is it for boys to complete the ADPoSQ online? The ADPoSQ took sixteen months to develop from inception to production. There were several revisions made following feedback from the research group, six health experts, and six adolescent boys. The cost of the

ADPoSQ program was approximately $16,000. The investigator's vision was to have the survey questions guided by the IBM and the avatars to reflect the boy's perception of self including body, body parts, and weight and their intentions if any to make changes to their bodies.

In addition, the ADPoSQ includes two other sections for use by the investigator. These two sections are labeled as the Teacher section and Administrator section. The Teacher section allows the user to register his/her information including school name, first name, last name, email, phone number, and to create a user name and password for the teacher to use and a username and password for the students to use. If there is more than one school this allows for different usernames and passwords for each school and the investigator to have the appropriate contact information for each school. The teacher username and password is for the teacher to log in and enter the actual measurements of the students.

The administrator section is for the user to store and examine numerous data based on individual teacher, time period, and all the data. In this section the user is able to view the questions answered, avatars, export the results, and delete students or teachers. The results exported from this section are represented in a CSV (Comma Separated Values) file. This CSV file can then be managed in Microsoft Excel.

Prior to day of data collection the ADPoSQ program creator provided code to University of Wisconsin – Madison School of Nursing Informational Technology (IT) Staff for hosting the ADPoSQ on the University website. The website is entitled https://research.son.wisc.edu/ADPoSQ.Avatars. The IT staff of the middle school added the ADPoSQ website to the school's website for use during the study.

On the day of data collection the boys were able to complete the ADPoSQ within 30 minutes with minimal questions asked. Their measurements were completed within 10 minutes with no boys expressing it was uncomfortable. During data collection, it was necessary for the boy to enter the same case number from the first session into the ADPoSQ two weeks later

during the Re-Test so the investigator could manually link the two sessions into the CSV Excel file for data analysis.

Following the completion of the ADPoSQ at time point two, the boys were asked to answer three questions on a note card. The three questions were, “What did you like about the study?”; “What didn’t you like about the study?”; and “What would you suggest we change about the study?”. The boys’ responses to these questions were grouped together by topic and shown in Appendix L, Table 12.

The topics that the boys wrote about for each question included comments about the survey questions, the avatars, the body, and the layout. About the survey questions, individual boys indicated they liked that they didn’t have to answer some questions, the question about what other people thought of you and about people making fun of you, and about eating more and less. Two boys indicated that the use of the multiple-choice questions brought out their thoughts. One boy thought these were good questions. Individual boys indicated they thought some questions and answers were strange or uncomfortable. Another individual boy did not like the question about what other people think about your body and another thought there were too many questions on the topic. Seven boys wrote there were too many questions or repeated questions. Five boys wrote they didn’t like the questions about their butt because most boys don’t talk about that. Three boys thought some questions or choices didn’t make sense. Their recommendations for change included adding a response, “I don’t’ care,” take out the who likes the body questions, and reduce the number of questions.

About the avatars, sixteen boys wrote they liked them, however one individual boy didn’t like how it was set up and another wanted more options. Their recommendations for change included define whether it is muscle or just size changing and to be more like video game avatars. Three individual boys liked the body because they could see and say how they thought of themselves and it could give help to lose weight. Two boys didn’t like the item about who tells them to change their body or not. One individual recommended bigger arms and body.

About the layout, four boys indicated they liked “all of it.” Two wrote it was an easy and simple survey. Individual boys wrote they liked that it was on the computer, quick, creative, and that they could win an iPod. One individual boy didn’t like that the survey kept “glitching.” Two individual recommendations were that it should all be in one and to fix the glitches. Some responses referred to the setting of the ADPoSQ administration. One boy wrote he liked that he missed gym; four other boys wrote they didn’t like missing gym and that it was administered in the library. One boy wished we had administered the survey during science class.

Prior to data analysis, the CSV file exported from the administrator login was configured from long to wide and coded to reflect time point one and time point two. During data analysis two data errors were discovered. As addressed earlier, the ADPoSQ did not export correct measurements for the two boys that were less than 55 inches, therefore, during any avatar data analyses those two boys were dropped. The second issue discovered during data analysis was that the question “Are you Hispanic?” did not export to the CSV file. These responses to this question were able to be retrieved by the University IT Staff using the code source and added to the Excel spreadsheet.

Conclusion

The results of the investigator’s vision and the development of the ADPoSQ are a boy tested, theory driven, developmentally appropriate, and culturally neutral instrument. The ADPoSQ was mostly glitch-free after numerous revisions and testing. It is internally consistent. Test-retest reliability overall indicated adequate stability of the attitude items and the avatars but further development may be necessary in the measurement of control. The boys could clearly complete the ADPoSQ with minimal issues. The conclusion about the feasibility of the ADPoSQ is that it can be administered online without problem and the boys overall were positive about it.

Chapter 6

Discussion

The purpose of this chapter is to examine the results within the current literature, make future recommendations, consider limitations, and present a conclusion. To begin, this study was designed to develop and initially test the Adolescent Digital Perception of Self Questionnaire (ADPoSQ), an instrument to document boys' perceptions of their bodies and body parts. Five research questions were posed and guide the discussion below.

Research Question One

How do middle school adolescent boys describe their feelings and beliefs about, other people's thoughts about, how much control they have over changing, and intentions of changing their bodies and body parts? The constructs that formed this first question were derived from the IBM (Montano & Kasprzyk, 2008). The findings show that the constructs, as measured by the ADPoSQ were meaningful to the boys.

Attitude (Feelings and beliefs). Boys' attitudes about their bodies varied. There were boys who did not like certain body parts, thought it important to change their body parts, and indicated, using their Preferred Avatar, that they wanted smaller or bigger body parts. Yet almost three quarters indicated they are a good weight for their height. For most of these boys, weight is not what they were trying to change but instead they wanted to gain muscle by eating more nutritious/healthy foods, eating more fruit, exercising more, and lifting weights for the reasons of the sports they play, they want to be more healthy, and to be competitive. Less than a third indicated the boys or girls around them or those on TV or in movies are the reasons they want to change their bodies. The boys desire to change body parts but not necessarily their weight because of sports and inner feelings of health and energy as opposed to how they see themselves or others see them.

Bearman and colleagues (2006) suggest that boys desire to gain weight and lose weight and that one's perception of weight may be of greater psychological relevance than one's

physical dimensions. These ADPoSQ items focus on how a boy feels about his body and body parts. The avatars are used in conjunction with the items to further demonstrate to the boy and researcher or provider the likes/dislikes and importance to change certain body parts. The ADPoSQ and the use of the avatars provide the boys with a personal standard of how they perceive their current body and how they prefer their body to be. The avatars and items provide a detailed and comprehensive report of the boy's perceptions allowing for future discussions with researchers, providers, and/or school nurses on changing the body and body parts.

Boys tended to overestimate their body parts when their accurate measurements were compared to their Current Avatar measurements. They preferred to have bigger body parts as indicated by the difference between the Accurate Avatar and the Preferred Avatar. Most boys perceived their body parts as bigger than what they actually are and also prefer their body parts to be bigger than they actually are. In addition, there was a minimal difference between how they currently perceive their body parts and how they prefer to be. However, there were outliers who indicated they wanted their body parts to be smaller (positive end) and outliers who indicated they wanted their body parts to be bigger (negative end). Varied perceptions existed among the adolescent boys.

Yan and colleagues (2009) reported that adolescent boys misperceived their weight status by misclassifying their weight status i.e. underweight when healthy weight, or healthy weight when overweight. This is the first study to begin looking at the difference in perceptions using individual body parts in addition to weight. Providers can continue the current practice of using the BMI to screen adolescents at risk. However, using the survey items and avatars from the ADPoSQ allow the provider to assess for accurate perceptions and preferences the boys have about certain body parts. Primary care remains underutilized for providing preventive services (Melnyk et al., 2012). There is a need to assess obesity risk for all children and adolescents while providing guidance on health behaviors to minimize the risk (Barlow, 2007).

The provider's assessment can include using the ADPoSQ to screen all adolescent's perceptions of self for proper referral to appropriate interventions.

The researcher, too, can continue to use the BMI to screen for overweight and obesity risk. However, BMI, in conjunction with the ADPoSQ, to further study how the boys' attitudes, perceived norm, and personal agency determine their intention to change their bodies, will provide more complete information. These constructs, upon further testing, have potential to guide future obesity prevention interventions. Researchers can further study the chief support, and lack of perception that weight is a problem (Barlow et al., 2006). It has been suggested that obesity prevention intervention may have limited success due to misperception of overweight (Maximova et al., 2008). Researchers can further test the ADPoSQ in conjunction with the BMI to depict the risks overweight and obesity pose to adolescents.

Using the ADPoSQ avatars and items may be sensitive to change and as a result determine the effectiveness of existing and future interventions. Interventions may change an adolescent's body a certain way however the digital weight scale or BMI may not indicate a significant change. When change is not recognized the adolescents may view that as failure of their efforts and cease all efforts to continue changing their body. Their intentions to change their bodies may then be compromised. The ADPoSQ avatars can be further tested to establish how adolescents' manipulations of their avatars compared to their actual measurements determine their intentions and actions to change their bodies. When the adolescent indicates he prefers to have a smaller abdomen, has intentions to change his abdomen, takes action to change his abdomen, does his abdomen become smaller? The items and avatars of the ADPoSQ can provide a way to assess these constructs. In the future, interventions may be developed to assist boys to change their bodies, as they desire. For example, an intervention may be designed to increase physical activity outside of the school so to decrease the waist to hip ratio of adolescents and the ADPoSQ avatars and items may be used to measure the outcomes of the interventions.

Perceived Norm (Other people's thoughts). Regarding what other people think about the boy's body, over half of the boys indicated that no one thought they should change their body. Almost one quarter indicated their coaches thought they should change their body. This finding is interesting as the sports they play and wanting to be competitive were chosen when asked the reasons they want to change their bodies. Mom, dad, and friends were people the boys chose who said good things about their bodies. "No one" was the most often chosen response for who said bad things about their body. Twelve percent of the boys indicated they did not want to answer this item; the highest percentage of all the items. What was it about this item that they did not want to answer? Did the boys view changing their bodies as negative and something that should not be shared? Though it is not possible to go back to the boys in this study to find out, as the ADPoSQ undergoes future development, it would be noteworthy to explore why this item is potentially sensitive.

McCabe and colleagues (2005) found that fathers were the most important influence for boys when losing weight and increasing muscle mass. Similar to this study, they also found that messages from opposite sex peers played a limited role in the adolescent boy changing his body (McCabe et al., 2005). This finding from the current study adds to existing evidence that involving coaches, sports, and being competitive may serve as motivating factors to boys' attaining and maintaining a healthy self. Additional, similar factors should be the focus of further research.

Personal Agency (How much control they have). The boys also indicated how much control they have over changing their bodies with over three quarters saying they are 100% in charge of changing their bodies and are certain they could change their bodies with help from family, friends, coaches, and doctors or nurses. Even though they were 100% in charge and were certain they could change their bodies with help, almost half indicated they have already changed their body, the other half did not already change their body. Less than half were able

to reach a goal and more than one-fifth thought it was hard, wish they had more help, or did not want to answer what happened when they tried to change their body in the past.

Thunfors and colleagues (2009) found that self-efficacy did not play a predominant role in the lack of physical activity or healthy diet and suggested that perhaps self-efficacy is more important in sustaining health behavior change efforts instead of initiating participation or promoting initial interest. Moreover, adolescents can be motivated to exercise when given appropriate opportunities and support to do so (Daley et al., 2008). Contento and colleagues (2010) found the middle school students in their intervention group, when compared to those in their comparison group, increased their sense of autonomy to take control and make good decisions about food and physical activity choices and were more competent in being able to set goals and carry through with them.

When asked about how they are currently trying to change their body, only 4 (6.8%) boys indicated they are not trying to change their body. That leaves the other 55 boys wanting to change their body in some way. With almost half indicating they have already changed their body and half not indicating change to their body, it seems that the boys have the desire but have not been able to see results. What are they using as a measure of change? Has their weight not changed? Did they gain muscle? Do they have more energy? Did their ability to compete change? Have other around them made comments about their bodies? Measuring how much control an adolescent has to make changes and establishing how to measure this change is important for attaining and maintaining a healthy self and will need to be studied further.

According to the Integrated Behavior Model, the most important determinant of behavior is intention to perform the behavior and is determined by three constructs: attitude (feelings and beliefs), perceived norm (what other people think), and personal agency (perceived control and self-efficacy). Overweight and obesity is a complex problem. Adolescents may want to feel they have control over changing their bodies and are certain they can, however, as with any

complex problem one cannot conquer it alone. Help from family members and/or coaches should be embraced and solicited when necessary. In practice, it may be advantageous to assess perceived control and self-efficacy when first attempting to change the body, during the process, and while sustaining the successfully changed body. Moreover, instead of solely using the digital scale to measure weight and BMI, the ADPoSQ avatars and items can be used upon further development as a measure of change.

Research Question Two

How do middle school adolescent boys use avatars to describe their perceptions of their bodies and body parts? The individual case examples reflect that, regardless of what weight category as determined using BMI the boy was labeled, they all indicated a difference between their current perception and preferred perception with at least one body part. These five boys indicated they are currently trying to change their body and have not already changed their body. They provided examples of how they have feelings and beliefs about their bodies, want to change their body, and are currently taking action to change their body. In addition, all the boys had perception differences of at least 10 cm (bigger or smaller) for at least four body parts when their Current Avatar measurements were compared to their Accurate Avatar measurements. The box plots of the entire sample also revealed mean differences of at least 15 centimeters. The Current Avatar measurements were bigger than the Accurate Avatar measurements for at least four body parts. Why did these adolescent boys misperceive their body parts when asked to create an avatar of their current selves? Most of these boys indicated feelings and beliefs such as being more healthy, of the sports played, and having more energy as reasons to change their bodies instead of others around them, TV or movies, or others making fun of them.

These inner feelings instead of outward appearance may be a reason why these boys had misperceptions. They may focus more on how they feel instead of how they look. So when asked to represent themselves using avatars, a reference point was not there. Had it been feasible, it would have helped to be able to go back and ask these boys why they perceived

their body parts the way they did. As this instrument is further developed, it will be important to ask the boys why they create their Current Avatars and Preferred Avatars a certain way. Body image requires understanding how the adolescents feel about themselves (Markey, 2010). It is imperative in future studies to include longitudinal designs to clarify which constructs help adolescents improve body image.

Research Question Three

To what extent are the constructs, avatars, and instrument internally consistent? There is adequate internal with the personal agency questions, and with the survey as a whole. The attitude items had a low internal consistency. The boys did indicate on note cards after the study was complete that they did not like some of the items or would change some of the items. It would be beneficial in future studies to get direct feedback from the boys about the items especially in the attitude section of the ADPoSQ.

Research Question Four

To what extent is the instrument stable as indicated by a re-test? The items and avatars used in the ADPoSQ from time 1 to time 2 generated varied stability. Throughout the ADPoSQ, there were lower correlation co-efficients for: size of the legs/thighs; liking their head/neck; liking their arms; importance of changing their head/neck and butt; certain they can change their body with help from family, friends, and boys their age; and not trying to change their body now, but have tried to change their body in the past. In addition, the preferred avatar measurements yielded low correlation co-efficients for the head, neck, forearm, waist, mid-thigh, and calf. These findings may be the result of the topic of weight and body image being unique and rarely discussed by boys. This may be the first time the boys of this middle school have expressed their thoughts about themselves using the survey items and avatars. Therefore, when the boys responded to the same questions two weeks later, they may have seen their body, body parts, and weight in a different way and indicated such with different responses. Again, it would

benefit future research to ask the boys why their responses changed over the two week time period.

Research Question Five

How feasible is it for boys to complete the ADPoSQ online? When assessing for usability of a universal screening instrument, the instrument should be feasible (Glover and Albers, 2007). Feasibility is defined as: completion of the ADPoSQ by the boys in the allotted time, clear instructions and items, and data entered by the boys can be managed and interpreted by the investigator. The boys could clearly complete the ADPoSQ online and have their measurements taken in a 40-minute time period (class period) with minimal glitches. There were minimal questions asked by the boys while completing the ADPoSQ. Comments were made by some boys that they liked how the questions were asked, but some boys commented some questions were confusing. Several boys indicated they liked the ADPoSQ and a few found it simple. Including more boys to provide feedback of the items in the future should strengthen the clarity of the instructions and items.

The investigator was able to export the data easily with only a few issues. The teacher section and administrator sections of the ADPoSQ application allow for the data to be collected at different sites and time points. The data can also be exported to a CSV file for data management and data analysis.

There was an issue with the ethnicity item not being exported. It will need to be coded differently for future use so to be exported with all the other items. A second issue was the range of possible heights that the boys can enter in the beginning of the survey. It will have to be broadened to include boys of all heights. These are two adjustments that should not be problematic. It was necessary to manually link the boys from time 1 and time 2, thus, this feature will need to be adjusted so the investigator can compare data on the same boy across time points. Because the ADPoSQ is web-based, the investigator has access to the instrument at any time.

Glover and Albers (2007) also discuss five other considerations when evaluating the usability of a universal screening instrument: (1) the instrument should not place unreasonable burden on human or fiscal resources, (2) should be acceptable to multiple stakeholders, (3) necessary framework should be considered for collecting, managing, and interpreting screening assessment data, (4) appropriate accommodations for the targeted populations should be considered, and (5) information from a screening assessment's completion should be useful to the stakeholders and result in improved treatment.

The ADPoSQ will be evaluated according to these additional considerations. First, the ADPoSQ did cost a considerable amount of money to develop, however, there is minimal cost to use the ADPoSQ. Now that the ADPoSQ has been developed and source code provided, changes to the instrument should be of minimal costs. The instrument is currently being hosted for an annual fee on the University of Wisconsin – Madison School of Nursing website for use by the investigator. The health care costs of adolescent overweight and obesity continue to rise especially as adolescents become overweight and obese adults. The ADPoSQ would not be expensive for providers and other researchers to use and further test. Decreasing child and adolescent overweight and obesity as the result of comprehensive screening and appropriate intervention will affect health care costs.

Second, the school personnel, school nurse, physical education teachers, boys, and investigator found the ADPoSQ acceptable. The boys indicated the ADPoSQ was creative and they liked the use of the avatars. Almost all the boys (93%), except those absent from school, were willing to complete the ADPoSQ again 2 weeks later. The boys demonstrated the ease and desire to complete the ADPoSQ at two different time points.

Others including providers, parents, and other researchers can also appreciate the benefits of the ADPoSQ in the future. After demonstrating the ADPoSQ, the school personnel, school nurse, PE teachers, IT staff, and colleagues acknowledged how innovative the ADPoSQ is and its ability to capture adolescent boys' perceptions of self including body, body parts, and

weight. Once given the opportunity to demonstrate the ADPoSQ to providers, parents, and other researchers it is possible they too can realize how innovative and appropriate the ADPoSQ is for use with adolescent boys to attain and maintain a healthy self.

Third, when the ADPoSQ was developed, consideration was taken to have a framework for collecting, managing, and interpreting data. The investigator intends that others use the ADPoSQ to comprehensively screen boys for perceptions of their bodies and body parts. Others in the field such as researchers, providers, school nurses, public health nurses, health instructors, and dieticians may be the ones collecting, managing, and interpreting the data. The process needs to be easily facilitated. The process for collecting the data has been documented in detail for others to use. Teacher and administrator sections exist for easier data management. The ability to export the data allows for interpretation of the data. Currently there is no way to score the ADPoSQ. In order for the ADPoSQ to be used by others in the field, there is a need to create an instructor's manual and eventually include how to score the ADPoSQ. This detailed manual will provide a reference for all who collect, manage, and interpret data using the ADPoSQ.

Fourth, the target population was adolescent boys 11 to 14 years of age. In the pre-development phase of the ADPoSQ, individual interviews were conducted to further understand what boys thought of their weight. When asked, boys indicated that they liked and disliked certain parts of their body. They also indicated it was important to change certain body parts. Using their feedback, the ADPoSQ items were created for use with the avatars. Other boys 11 to 14 years of age were asked to provide feedback on the clarity and comprehensiveness of the ADPoSQ. Even after having 59 boys complete the ADPoSQ, some boys did not like certain items such as those about the butt or thought some questions or options did not make sense. The ADPoSQ will need to be tested further with other boys of this age and other ages as well of boys of all races and ethnicities to obtain their feedback on the different parts of the ADPoSQ. Adaptations will be made to the ADPoSQ to accommodate their thoughts and suggestions.

Lastly, the ADPoSQ is initially being tested and will need to be further tested to assess how the ADPoSQ will guide treatment decisions. In the future, as interventions are generated as a result of the screening from the ADPoSQ, the screening outcomes should be relevant and feasible (Glover and Albers, 2007). The scores or written reports should not be used for labeling purposes but rather used with intervention planning and delivery in mind. Identifying adolescent boys that have body image issues will need to be followed up with proper counseling. Body image and weight are sensitive issues that will need to be treated as such. The ADPoSQ as a screening instrument could bring awareness to an adolescent who may not have been aware of his actual measurements prior to the screening. As the ADPoSQ continues to develop as a screening instrument, it is imperative to document in the future the benefits of the treatments being administered or the decisions made regarding intervention planning as a result of the usefulness of the ADPoSQ.

Other issues

There was a concern about the response rate of 17.6%. This low rate was unexpected because another investigator, on the same research team, was able to recruit 220 girls to complete an online survey from the same school. Her topic, however, was physical activity and no measurements were taken. The PE teacher for these girls and who was the contact for that survey was very assertive in promoting that study. Weight and body image among boys may be a more sensitive topic than we realized. Perhaps the boys did not want to miss PE class.

Moreover, recruitment was much more difficult than anticipated based on the research team's prior experience. There were six school districts that were contacted to collaborate with the investigator. Even with the school nurse as a supportive liaison, the school review boards did not approve the study for the following reasons: the study would take away from instructional time and there were no direct benefits to the school. There is a definite need to have multiple sites when attempting to recruit large samples. In addition, it is necessary to have

investigators and those in the community collaborate whenever possible so all stakeholders are invested.

Future recommendations

The future recommendations are discussed within three categories: instrument features, further testing, and target populations.

Instrument Features. To begin, there are several instrument features that can enhance the ADPoSQ further. The boys using the ADPoSQ can benefit from having the accurate measurements taken and an Accurate Avatar created using those measurements. This will allow the boy, provider, and researcher to visualize further the differences among three avatars. In addition, 3-Dimension avatars can be of great use. With 3-Dimensional avatars, the boy, provider, and researcher can visualize how big or small certain body parts such as the stomach, butt, and chest are from the side view in addition to the frontal view. The accurate measurements taken are circumferences; therefore a frontal and side view would provide more accuracy when comparing the avatars.

It may increase utility if the ADPoSQ were a scored instrument. It is foreseeable that a boy could have a score for feelings and beliefs, self-efficacy, and social norms. Upon further testing, each subscale can indicate whether or not there is a need for change: are they overestimating or underestimating their body parts, are they wanting to make changes (survey questions of size of body parts, survey questions of it is important to change body parts, and Current Avatar is different by a certain number of centimeters than the Preferred Avatar), do they have the necessary support to make the changes, how much control do they have and are they certain they can change their body, and how are they trying to change their body. As guided by the IBM, the boy has intentions to make a change to his body that is determined by the three constructs of attitude, perceived norm, and personal agency. The scores of the subscales can be calculated each time he completes the ADPoSQ to assess a need and/or desire to change. The scores could be compared across time and across samples.

Further Testing. To begin, the next step is to publish this work so that others will be aware of the ADPoSQ and its beginning psychometric properties. In the future, it will be necessary to develop relationships with colleagues who can consult on sampling. Larger samples will be necessary to conduct exploratory and confirmatory factor analysis, establish construct validity, and examine the constructs of attitude, perceived norm, personal agency, and intentions (Devillis, 2003, Trochim, 2006). Exploratory factor analysis can be used to determine the underlying structure of the IBM constructs while confirmatory factor analysis can confirm a particular pattern of relationships based on the IBM constructs. Construct validity will need to be established to determine the degree to which the ADPoSQ measures the IBM constructs (Devillis, 2003). The ADPoSQ is accessed using a hyperlink and therefore can be tested by other providers and researchers across sites and populations.

Existing interventions or future interventions can use the ADPoSQ as a measurement. Assessing adolescent perceptions of self using the ADPoSQ can be an initial universal screen for classification of those adolescent boys who need or desire to change their self including body, body parts, and weight. Once classified, then a selective approach for counseling and targeting interventions will be initiated. A possible target intervention could have a nutritional component and sport-like activity component that uses the ADPoSQ as a measure of change. For example, the adolescent boys that desire to change or need to change their bodies could demonstrate satisfaction as exhibited by their Preferred Avatar measurements being identical to their Accurate Avatar measurements pre-test/post-test ADPoSQ. For those with inaccurate perceptions of themselves, their Current Avatar measurements could be compared to their Accurate Avatar measurements pre-test/post-test ADPoSQ. The survey items can be used with the avatars when measuring outcomes such as satisfaction and accuracy.

Target Populations. Finally, it will be necessary to recruit and get feedback from boys of different races and ethnicities and also boys older and younger than 6th and 8th graders regarding the questions asked and use of the avatars. It would be beneficial to create a

research design committee comprised of male and female children and adolescents of all sizes, races, and ethnicities that can be used as an expert committee for quarterly communication with the investigator as the ADPoSQ continues to develop and adapt. They can indicate the necessary changes to make regarding appropriate language to use and what graphics will capture the attention of different age groups, boys versus girls, and races and ethnicities.

In addition, the ADPoSQ can be used in a clinical practice or in larger samples for research studies. The ADPoSQ does not require a prescription and can be administered by trained professionals. The ADPoSQ can also be used in the school setting where school nurses, nursing aids, and counselors can be trained to administer the ADPoSQ and take measurements. Public health nurses, registered dieticians, and exercise counselors can also use the ADPoSQ to initially screen and appropriately refer adolescents of all sizes.

Limitations

While this study is original and innovative, there are several limitations. The ADPoSQ costs money to create and will require more money to continue development and testing. The sample size for this study was small in size and comprised of predominantly Caucasian/White boys. There was also no component included in the study that captured an in depth understanding of why the boys responded a certain way to the questions and why they created avatars the way they did.

Conclusion

The ADPoSQ is boy tested, theory-driven, developmentally appropriate, and culturally neutral. The ADPoSQ has adequate internally consistency and is clearly feasible for the boys to use as well as the investigator to collect, manage, and interpret the data. It is necessary to understand why the boys responded they way they responded to the attitude, perceived norm, personal agency, and intentions questions and why they created the avatars in the manner they did. In addition, leading focus groups with boys, school nurses, clinic providers, public health nurses, parents, and Informational technologists will provide a better awareness of how to

further enhance the ADPoSQ. As the ADPoSQ is further improved, it can be evaluated on how effective it is in guiding treatment decisions for boys of all sizes. The ADPoSQ is a promising instrument to utilize in helping adolescent boys attain and maintain a healthy self.

Clinic nurses, school nurses, and public health nurses can champion the movement to toward ending adolescent overweight and obesity by using the ADPoSQ to assess adolescent boys' perceptions of themselves including their body, body parts, and weight and appropriately counsel and refer them. Nurses can also collaborate with parents, registered dieticians, exercise therapists, and school administrators to screen all adolescents. The ADPoSQ has demonstrated that adolescent boys want to change their bodies. It is necessary to understand further what other factors of change besides making body parts bigger or smaller define their perceptions of change. The ADPoSQ has real potential for providers in schools, clinics, and in the community as it develops.

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Appendix A

Materials used for semi-structured interviews

Study 1 Interview Questions

“I am interested in learning what boys think and feel about weight. You can share with me what is comfortable for you. There are no right or wrong answers to these questions. Your answers are private and secret. I will only tell your parents or guardian about your answers if I think they need to know something you have told me. I would tell them if you say something about harming yourself or others or doing something illegal. If you want to skip a question or come back to it at the end that is okay too. Do you have any questions for me? Let's start with your height and weight.”

1. "What is your height and weight?

2. "How do you describe your weight in relation to what the medical community recommends for weight?" (underweight, about right weight, overweight, slightly overweight, or very overweight).

3. " Some boys may not be in the weight category they want to be but are satisfied with how their body looks. What weight do you want to be? Tell me how you feel about the way your body looks. What parts do you like/dislike?"

4. "How important is it that you are in a certain weight category or look a certain way?"

5. "How do your parents or relatives talk to you about weight? How do your friends talk to you about weight? Is there anyone else that talks to you about weight? What do they say, are they positive or negative comments? What are others' expectations about your weight? Do they pressure you to be a certain weight?"

6. “How much do you think you are in charge of your weight… (1) not at all, (2) a little bit, (3) somewhat or (4) very much?” How much are you certain that you can be in charge of your weight? Can you give me an example of what you think or an incident about being in charge of your weight?"

7. "What would you like to do about your body weight?"

8. “Are you currently trying to… (1) lose weight, (2) stay the same weight, (3) gain weight or (4) not trying to do anything about weight? How are you trying to…

Family ID #_____

Demographic Form (to be filled out by caregiver)

1. Please circle your gender M F
2. Are you Hispanic? Yes No
3. Is your son Hispanic? Yes No
4. Please circle the race(s) YOU are. (Circle all that apply)

African American/ Black
Caucasian/ White
Asian American or Pacific Islander
Native American/ First Nation/ Alaskan Native/ American Indian

5. Please circle the race(s) of YOUR SON. (Circle all that apply)

African American/ Black
Caucasian/ White
Asian American or Pacific Islander
Native American/ First Nation/ Alaskan Native/ American Indian

6. What is your child's age? _____
7. Please circle your marital status

Married
Single
Divorced
Widowed

8. Please circle your occupation status

Full-time
Part-time
Homemaker
Unemployed
Retired
On disability

9. Please circle how many adults there are in your household?

1 2 3 4 5 6 7 8

10. Please circle how many children (18 years of age and under) there are in your household?

1 2 3 4 5 6 7 8

11. Please circle which range your family's income falls into

$10,830 - $14, 569

$14,570 - $18, 309

$18,310 - $22, 049

$22,050 - $25, 789

$25,790 - $29, 529

$29,530 - $33, 269

$33,270 - $37, 009

$37,010 +

12. Please list the highest grade you completed _____.

Appendix B

Tables of the findings from the semi-structured interviews

Table 3. Description of the sample.

Number	Age	Parent rpt wt	Actual wt	Self report ht (in)	Actual ht (in)	Self rpt BMI	Actual BMI	% body fat	Wt categ report	Wt categ actual	Want to do
101	12yrs 10mos	94	92.8	58	59.5	19.6	19.7	13.1	68th AR	50th AR	Stay same
102	14yrs 2mos	82	87.8	60.5	62.5	15.8	15.8	2.7	3rd U	3rd U	Stay same
103	12yrs 4 mos	110	109.6	63	65.25	19.7	18.2	8.2	74th AR	50th AR	Stay same
104	14yrs 4mos	130	125.4	72	73	18.1	16.5	4.5	34th AR	7th AR	Stay same
105	11yrs 5mos	75	96	61	59	14.2	19.4	17.7	1st U	76th AR	Lose
106	12yrs 4 mos	111	99	57	59	24	20	19.4	94th Ov	75th AR	Lose
107	14yrs 11mos	125	122	73.5	71	16.3	17	9	3rd U	9th AR	Stay same
108	12yrs 4 mos	80	84.8	58.5	58.5	16.4	17.4	12.6	22nd AR	39th AR	Stay same
109	12yrs 11mos	169	169.8	69	70	25	24.4	17.2	94th Ov	91st Ov	Lose
110	12yrs 2mos	164	159	62	62	30	29.1	34.1	98th BMI	98th BMI	Stay same
111	14yrs	176	173.6	67	67	27.6	27.2	19.8	96th Ob	96th Ob	Stay same
112	14yrs 1mo	136	136.2	64	66	23.3	22	22.5	88th Ov	81st AR	Gain
113	13yrs 5mos	160	153.4	63	64	28.3	26.3	26.8	97th BMI	95th Ob	Lose
114	12yrs 3mos	203	203.8	67.5	69	31	30.1	24.3	98th BMI	98th BMI	Lose
115	12yrs 5mos	110	100.4	60	61	21.5	19	21.9	85th Ov	63rd AR	Lose
116	13yrs 1mo	184	181.2	70.75	71	26.2	25.3	18.8	95th Ob	95th Ob	Lose
117	12yrs 11mos	155	161.6	66.5	66.75	24.6	25.3	27	94th Ov	95th Ob	Lose
118	14yrs 10mos	190	184.4	72	71	25.8	25.7	27.6	93rd Ov	93rd Ov	Stay same
119	12yrs 5mos	140	142.4	66	67	22.6	22.3	22.7	90th Ov	89th Ov	Lose
120	13yrs 4mos	155	162	67	67.5	24.3	25	27.3	92nd Ov	94th Ov	Lose
Mean			**137.3**		**65.5**		**22.3**	**18.9**	**Totals**	**Totals**	**Totals**
Min			**84.8**		**58.5**		**15.8**	**2.7**	**U=3**	**U=1**	**Lose=10**
Max			**203.8**		**73**		**30.1**	**34.1**	**AR=4**	**AR=9**	**Stay same=9**
									Ov=8	**Ov=4**	**Gain=1**
									Ob=2	**Ob=4**	
U=Under, AR=About Right (Healthy), Ov=Overweight, Ob=Obese, BMI=High BMI									**BMI=3**	**BMI=2**	

Table 4. Demographics of participants and their parent (AA is African American, C is Caucasian)

Par # (All boys)	Parent Gender	Parent Hispanic	Boy Hispanic	Parent Race	Boy Race	Marital Status	Occupation	Highest grade	Considered poverty
101	Female	No	No	C	C	Married	Homemaker	Master's	No
102									
103	Female	No	No	C	C	Single	Unemployed	12+1	Yes
104	Male	No	No	C	AA	Married	Full-time	Bachelor's	No
105	Female	No	No	AA, C	AA	Single	Full-time	12+	Yes
106	Male	No	No	C	C	Married	Full-time	Bachelor's	No
107			No						
108			No						
109	Female	No	No	C	AA, C	Divorced	Full-time	Bachelor's	No
110	Female	No	No	AA	AA	Single	Part-time	12	Yes
111	Male	No	No	AA	AA	Single	Part-time	12	No
112	Female	Yes	Yes	C	C	Married	Full-time	12	No
113	Female	No	No	C	AA, C	Widowed	Full-time	15	No
114	Female	No	No	C	C	Divorced	Full-time	Bachelor's	No
115	Female	No	No	C	C	Married	Part-time, Homemaker	Bachelor's	No
116	Female	No	No	C	AA	Married	Full-time	13.5	No
117	Female	No	No	C	AA	Married	Part-time	Master's	No
118	Female	No	Yes	C	C	Divorced	Unemployed	14	Yes
119	Female	No	No	C	C	Married	Part-time	Bachelor's	No
120	Male	No	No	AA	AA	Married	Retired	Bachelor's	No

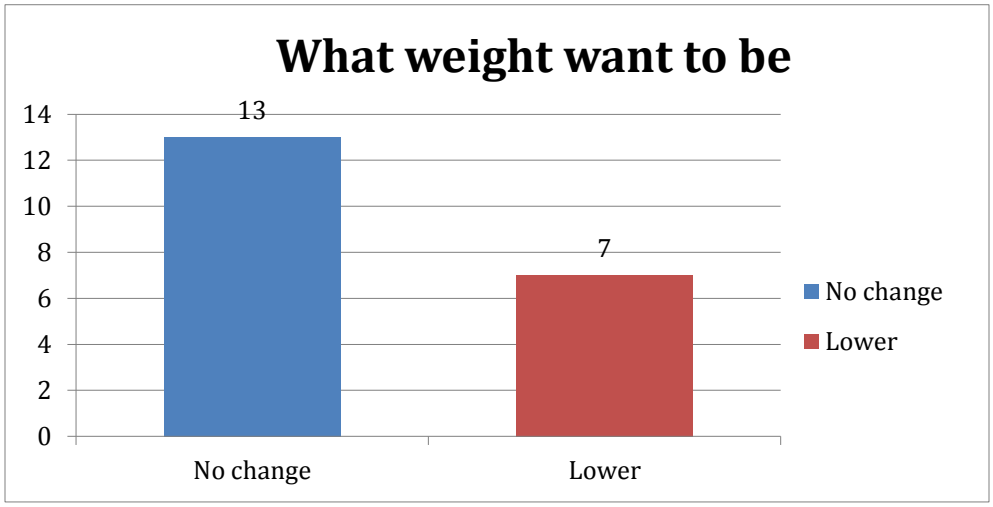
Table 5: Final categorization matrix from research team

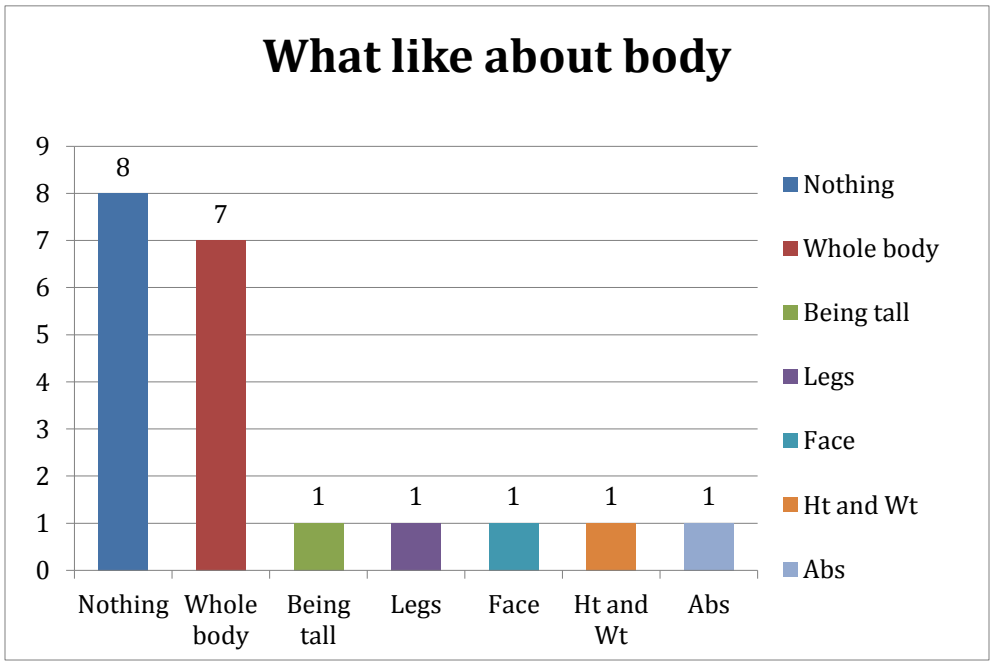
Participant # Percentile (wt category)	Medical community (describe self)	What weight want to be	Like	Dislike	How important	Others talk about weight	How much in charge	Examples of being in charge	Do about weight/ Currently trying to
101 50th (AR)	About right	-----	-----	-----	Not very	No pressure	100%	Exercise Eat	Same
102 3rd (U)	About right	-----	-----	-----	Not very	Eat more, no pressure	All of it	Eat	Same
103 50th (AR)	About right	-----	Body	Stomach	Not very	-----	Yeah, can change	Exercise	Same
104 7th (AR)	About right	-----	-----	-----	Not very	-----	Pretty	Exercise Eat	Same
105 76th (AR)	Underweight	Lower	-----	Stomach	A lot	Doctors, no pressure	Half	Exercise	Lose
106 75th (AR)	About right	Skinnier (lower)	-----	Belt tight (Stomach)	Little	Brothers, no pressure	Yes, solely	Exercise Eat	Lose
107 9th (AR)	Underweight	Comfortable now	-----	Keel Chest	Not	Don't overeat	Somewhat	Exercise Eat	Same
108 39th (AR)	About right	Ok	All of it	-----	Very	Doctors Health instructors	A lot	Exercise Eat	Same
109 95th (Ob)	Slightly overweight	Fine	Legs	Stomach	Not that	No	A lot	Exercise Eat	Lose
110 98th (BMI)	Overweight	Normal, less	Face	Butt	Not that	Doctors	Somewhat	Exercise Eat	Same
111 96th (Ob)	Slightly overweight	-----	-----	-----	Not very	No	100%	Exercise Eat	Same
112 81st (AR)	About right	Just right	Everything	-----	A lot	Dad	Very much	Exercise Eat	Bigger
113 95th (Ob)	Slightly overweight	Less	All	Stomach	Less chance get bullied if smaller	No	Full	Exercise	Lose
114 98th (BMI)	Slightly overweight	Normal	Tall	Not really	Pretty, made fun of	No	Very	Exercise Eat	Lose
115 63rd (AR)	Slightly overweight	Average, normal (less)	Everything	Stomach	Little bit, kind of	Friends, say too heavy when tackle	100%	Exercise Eat	Lose

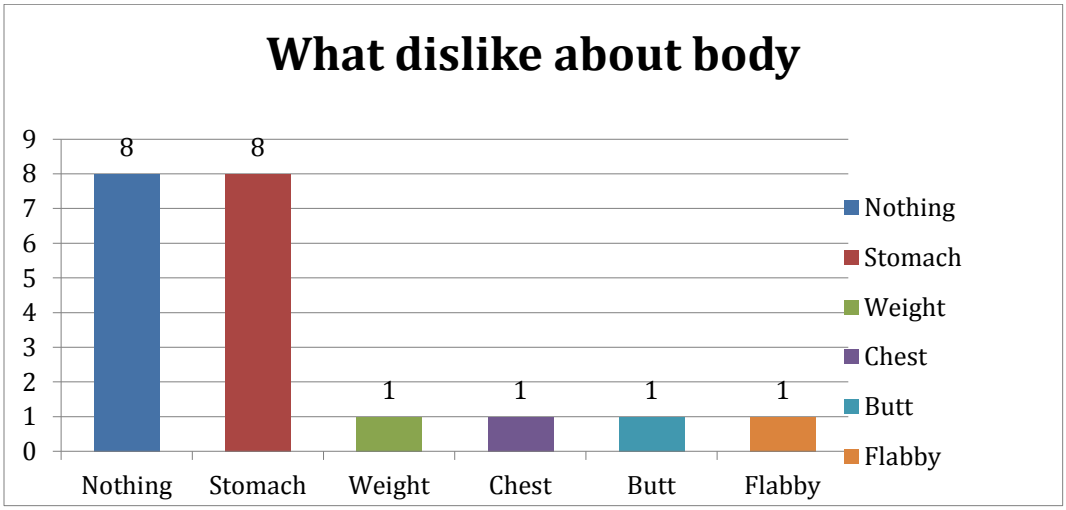
116 95th (Ob)	Slightly overweight	Fine	Height and weight	Flabby	Not that	Coaches	Fully	Exercise Eat	Lose
117 95th (Ob)	Overweight	Less	-----	Weight	For sports	Doctors	Very much	Exercise Eat	Lose
118 93rd (Ov)	About right	Same	My body	-----	Not extremely	Teachers	Almost completely	Exercise Eat	Same
119 89th (Ov)	Overweight	Lower	Abs	Belly button	Important	Friends	Half	Exercise Eat	Lose
120 94th (Ov)	About right	Same	Thick body	Belly	Not that	No	100%	Exercise Eat	Lose

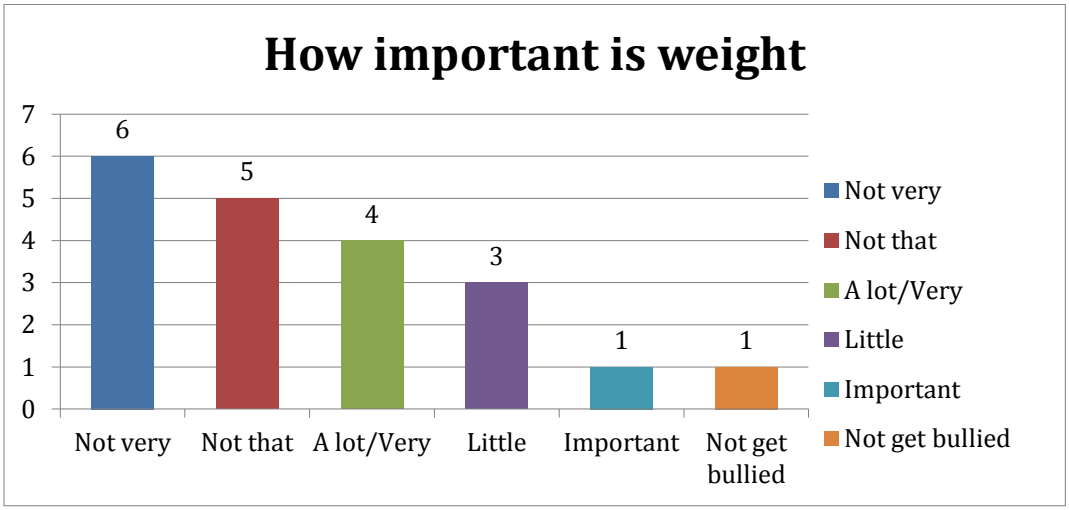
Appendix C

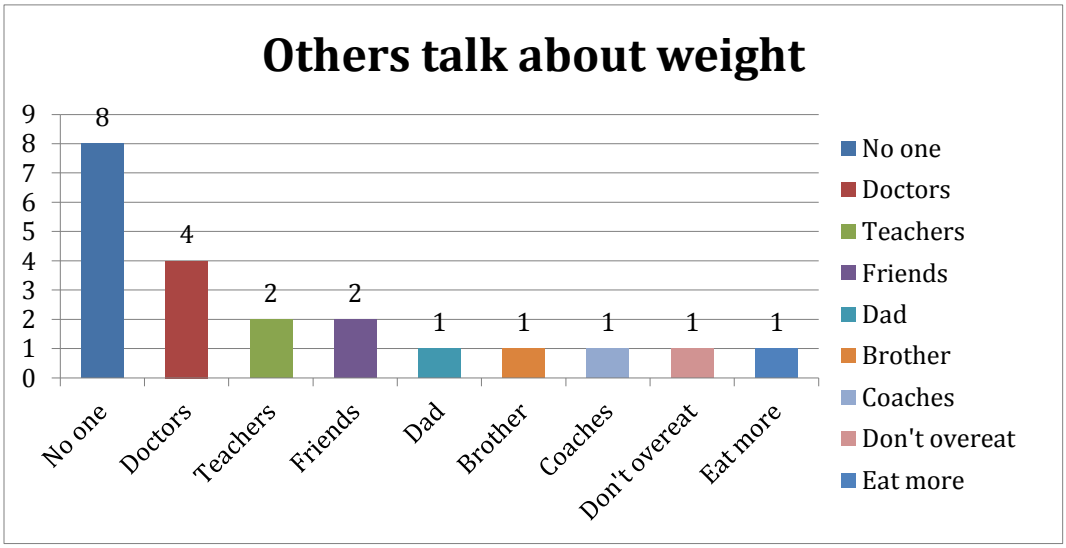
Bar graphs of semi-structured interview responses

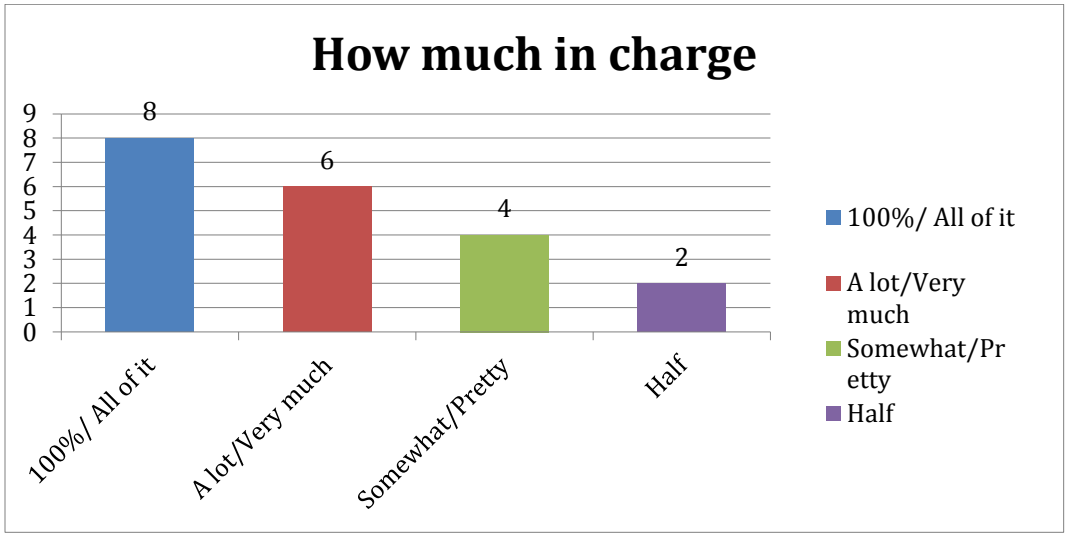


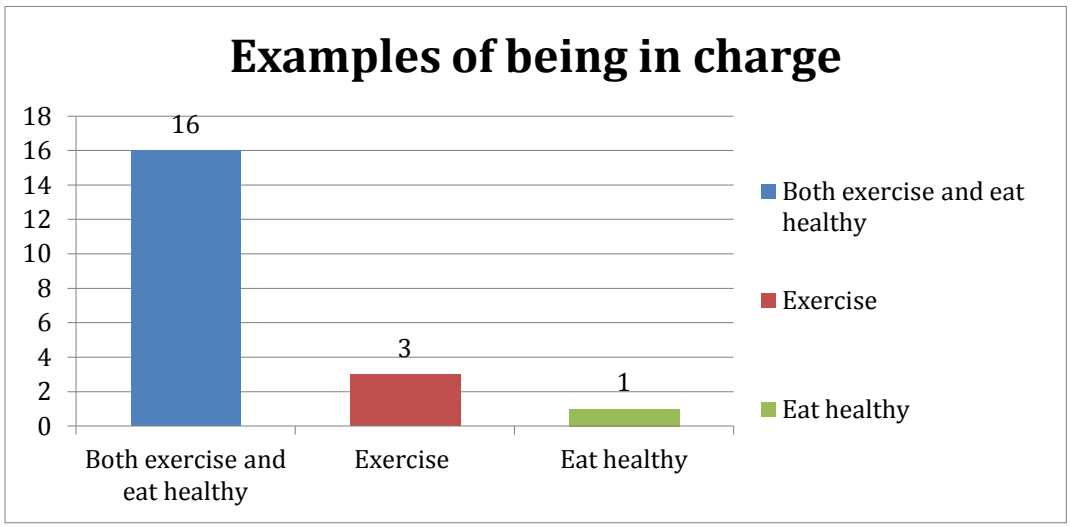



What dislike about body
9
8
7
6
5
4
3
2
1
0
8
8
1
1
1
1
Nothing
Stomach
Weight
Chest
Butt
Flabby
Nothing
Stomach
Weight
Chest
Butt
Flabby


How important is weight
7
6
5
4
3
2
1
0
6
5
4
3
1
1
Not very
Not that
A lot/Very
Little
Important
Not get bullied
Not very
Not that
A lot/Very
Little
Important
Not get bullied


Others talk about weight
9
8
7
6
5
4
3
2
1
0
8
4
2
2
1
1
1
1
1
No one
Doctors
Teachers
Friends
Dad
Brother
Coaches
Don't overeat
Eat more
No one
Doctors
Teachers
Friends
Dad
Brother
Coaches
Don't overeat
Eat more





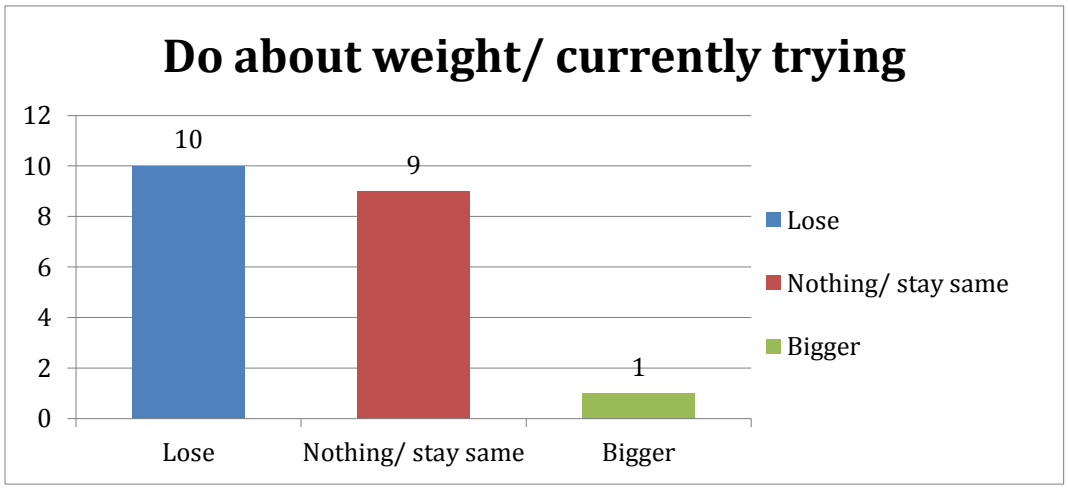


Figure 3. Frequencies of responses

Appendix D

Materials used for establishing content validity

Table 6. Instructions and questionnaire for health professionals to complete.

As part of my dissertation research under the direction of Professor Susan Riesch, I am developing an instrument to measure adolescent boys 11 to 14 years of age perception of self where self includes weight, body, and body parts. It is guided by selected constructs of the Integrated Behavior Model (Montano & Kasprzyk, 2008). The multidimensional instrument is entitled Adolescents' Digital Perception of Self Questionnaire (ADPoSQ). I am developing this instrument to be used in conjunction with BMI as a screening mechanism for appropriate treatment referral. BMI is a common, inexpensive method used to identify adolescents who are overweight and obese however it is simply a measure of weight. The ADPoSQ will be used to identify boys' perception, accuracy, satisfaction, height, weight and body composition that merit intervention. There has been some attention given to adolescent girls' satisfaction with body weight, but boys have been virtually ignored. For this reason I have chosen to develop and test the ADPoSQ with a focus on young adolescent boys.

The long-term goal of my research program is to help adolescent boys attain and maintain a healthy weight and body composition. Current instruments such as figure drawings that range from extremely thin to extremely fat are uni-dimensional do not identify the true difference between a current and ideal body. The boy may be selecting a "compromise" image that does not fully expose the difference from one body part to another. In addition, existing questionnaires measure only one or two of the IBM constructs and are not focused on early adolescent boys 11 to 14 years of age. One important step toward combatting obesity is to examine boys' perceptions of self and how they relate to one's intention and action to change weight. There is a need for a valid and reliable measure of perception of self among adolescent boys to be used among researchers and clinicians. For this reason the ADPoSQ has been developed and will be evaluated.

The Integrated Behavior Model (IBM) proposes that the most important determinant of behavior is intention (motivation) to perform the behavior. Behavioral intention, which leads to action to carry out the behavior, is determined by three constructs: (1) Attitude, (2) Perceived Norm, (3) and Personal Agency. I have modified the construct of behavior to be boys' perception of self where self includes weight, body and body parts. I have developed items based on interviews with 20 boys to measure their attitude, perceived norm, and personal agency toward their weight, bodies, and body parts, such as head/neck, arms, and such.

Attitude: defined as a boy's overall favorableness or unfavorableness toward their self. Factors that determine attitude include feelings and beliefs about self.

- *Feelings*: whether he is satisfied or dissatisfied with his current, weight, height, and body composition.
- *Beliefs*: whether he believes weight is important or not and perceptions of his weight, height, and body composition, including both accurate and inaccurate perceptions.

Perceived norm: reflects the social pressure the boy feels about himself.

Factors that determine perceived norm include normative beliefs and normative beliefs about other's perceptions of themselves.

Personal agency: consists of both self-efficacy and perceived control.

Factors that determine personal agency include beliefs about perceived control and self-efficacy.

- *Perceived control* is the perception of the degree to which various environmental factors make it easy or difficult to carry out the behavior the boy may need to perform to bring his self within the perceived ideal.
- *Self-efficacy* is the degree of confidence in the boy has in his ability to perform the behavior to bring his self within the perceived ideal in the face of various obstacles and challenges

You are asked to be a content expert because of your own research in health behaviors among adolescents at risk for overweight. The first step in the instrument review process involves your valuable participation to assess content validity. The instrument consists of items related to the dimensions of perception of self as guided by the IBM. The content of the ADPoSQ will be assessed with a rating scale that ranges from strongly disagree to strongly agree for each item.

As a content expert, you will be asked to judge how **representative** items are of the content domain of boys' perception of self where self includes weight, body, and body parts. In judging representativeness of the content items, please evaluate whether the items are appropriate for adolescent boys 11 to 14 years of age. After evaluating representativeness, you will be asked to rate the **clarity** of each item on the questionnaire. In addition, you will be evaluating the **comprehensiveness** of the ADPoSQ. By providing revisions related to representativeness, clarity, and comprehensiveness you are helping to define the ADPoSQ. Lastly, at the end of the form, you will be asked to respond to questions related to deletion and/or addition of any items as well as how clear the instructions, rating scales, and formatting is.

Content domain:
Concept definition: Perception is a way of regarding, understanding, or interpreting something, in this case, one's self including weight, body, and body parts. Perceptions include attitude, perceived norm, and personal agency (as defined above).
Definitions:
Representativeness: the item reflects, samples, and measures the concept of perception of self among adolescent boys 11 to 14 years of age.
Clarity: item is well-written, distinct, and at an appropriate reading level for adolescent boys 11 to 14 years of age.
Comprehensiveness: all dimensions of the content domain are included in the instrument.

Rating scale:
SD: Strongly disagree
D: Disagree
A: Agree
SA: Strongly agree

Instructions:
In the following table, please circle whether you strongly disagree, disagree, agree, or strongly agree. Also provide feedback on how to make an item clearer if not clear. After completing the table, please answer the questions about deleting and/or adding any items as well as how clear these instructions, rating scales, and formatting have been.

Attitude (feelings and beliefs)			
Following questions (1-6) have the response choices of • too small • just right • too big	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.
1. My head/neck is	SD D A SA	SD D A SA	
2. My chest is	SD D A SA	SD D A SA	
3. My stomach is	SD D A SA	SD D A SA	
4. My arms are	SD D A SA	SD D A SA	
5. My butt is	SD D A SA	SD D A SA	
6. My legs/thighs are	SD D A SA	SD D A SA	
Following questions (7-18) have the response choices of • strongly disagree • disagree • agree • strongly agree	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.
7. I like my head/neck	SD D A SA	SD D A SA	
8. I like my chest	SD D A SA	SD D A SA	
9. I like my stomach	SD D A SA	SD D A SA	
10. I like my arms	SD D A SA	SD D A SA	
11. I like my butt	SD D A SA	SD D A SA	
12. I like my legs/thighs	SD D A SA	SD D A SA	
13. It is important for me to change my **head/ neck**	SD D A SA	SD D A SA	
14. It is important for me to change my **chest**	SD D A SA	SD D A SA	
15. It is important for me to change my **stomach**	SD D A SA	SD D A SA	
16. It is important for me to change my **arms**	SD D A SA	SD D A SA	
17. It is important for me to change my **butt**	SD D A SA	SD D A SA	
18. It is important for me to change my **legs/thighs**	SD D A SA	SD D A SA	
Following questions have the response	Representativeness	Clarity	If item not clear, please provide

choices as shown			feedback on how to make clearer.
19. How do you think of yourself in terms of weight O underweight O about right weight O overweight O a little bit overweight O very overweight	SD D A SA	SD D A SA	
20. I am a good weight for my height O strongly disagree O disagree O agree O strongly agree	SD D A SA	SD D A SA	
Perceived norm (what other people think)	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.
21**.** Click on the circle to show which **person (if any) thinks you should change your body** (you can click on more than one person) O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Healthcare provider O Other_____ (fill in who is other) O No one	SD D A SA	SD D A SA	
22. Click on the circle to show which **person (if any) says good things about your body**	SD D A SA	SD D A SA	

(you can click on more than one person) O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Healthcare provider O Other_____ (fill in who is other) O No one			
23. Click on the circle to show which **person (if any) says bad things about your body** (you can click on more than one person) O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Healthcare provider O Other_____ (fill in who is other) O No one	SD D A SA	SD D A SA	
Personal Agency (perceived control and self-efficacy)			
Following questions (24-32) have the	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.

response choices of ○ strongly disagree ○ disagree ○ agree ○ strongly agree			
24. I am 100% in charge of changing my body	SD D A SA	SD D A SA	
25. I am certain I can change my body	SD D A SA	SD D A SA	
26. I am certain I can change my body with help from my **family**	SD D A SA	SD D A SA	
27. I am certain I can change my body with help from my **friends**	SD D A SA	SD D A SA	
28. I am certain I can change my body with help from **boys my age**	SD D A SA	SD D A SA	
29. I am certain I can change my body with help from **girls my age**	SD D A SA	SD D A SA	
30. I am certain I can change my body with help from **coaches**	SD D A SA	SD D A SA	
31. I am certain I can change my body with help from **teachers**	SD D A SA	SD D A SA	
32. I am certain I can change my body with help from **healthcare providers**	SD D A SA	SD D A SA	
Intentions (motivation)			
Following questions have response choices as shown	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.
33. I am currently trying to change my body by ○ losing weight ○ losing fat ○ staying the same ○ gaining weight ○ gaining fat ○ gaining muscle	SD D A SA	SD D A SA	

34. I am currently trying to change my body by (click on as many circles as needed) O eating less food at each meal O eating less junk food O eating less fast food O eating more vegetables O eating more fruit O eating more protein O eating more nutritious/healthy foods (if choose this give an example_____) O exercising more O exercising less O lifting weights	SD D A SA	SD D A SA	
35. I have successfully changed my body O strongly disagree O disagree O agree O strongly agree	SD D A SA	SD D A SA	
36. I have tried to change my body in the past but am not currently trying to change my body O strongly disagree O disagree O agree O strongly agree	SD D A SA	SD D A SA	
37. When I have tried to change my body in the past (click on as many circles as needed) O I was able to reach a goal O I stopped trying because I was not able to change my body O I stopped because I did not have	SD D A SA	SD D A SA	

time O I thought it was easy O I thought it was hard O I wish I had more help O I got too tired O I did not believe in myself			
38. The reason I want to change my body is because (click on as many circles as needed) O Of how others look on TV or in movies O Of girls around me O Of boys around me O I want to be competitive O I do not want to be out of breath O I want to have more energy O Of the sports I play O Others make fun of me	SD D A SA	SD D A SA	
39. I play sports O Yes O No	SD D A SA	SD D A SA	
40. Please list what sports you play throughout the year_____	SD D A SA	SD D A SA	
Perception of Self (weight, body, and body parts)	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.
Current Avatar	SD D A SA	SD D A SA	
Preferred Avatar	SD D A SA	SD D A SA	
Accurate Avatar (For Accurate Avatar, we are planning on measuring the boys' body parts and populating an avatar using those measurements) Body parts include: Head, neck, chest, waist, hips, arms, and legs. Height and weight will also be measured.	SD D A SA	SD D A SA	
The instrument is comprehensive.			SD D A SA

Please provide feedback of items that need to be deleted and/or added.

Please provide feedback on the clarity of the instructions.

These instructions are clear.	SD	D	A	SA
The rating scales are clear.	SD	D	A	SA
The formatting is clear.	SD	D	A	SA

If any parts of the instructions are unclear please provide suggestions on how to make the instructions clearer.

Thank you for your time and feedback!!

Table 7. Responses and feedback from health experts and boys including rationale for changing or not changing questions.

Attitude (feelings and beliefs)				Investigator's rationale
Following questions (1-6) have the response choices of • too small • just right • too big	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.	
1. My head/neck is	SD D A SA	SD D A SA	5SA. 1A/ 5SA, 1A	
2. My chest is	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
3. My stomach is	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1A	
4. My arms are	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
5. My butt is	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
6. My legs/thighs are	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
Following questions (7-18) have the response choices of • strongly disagree • disagree • agree • strongly agree	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.	
7. I like my head/neck	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1A	
8. I like my chest	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
9. I like my stomach	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1A	
10. I like my arms	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
11. I like my butt	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
12. I like my legs/thighs	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1A	
13. It is important for me to change my **head/ neck**	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1D	
14. It is important for me to change my **chest**	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1D	
15. It is important for me to change my **stomach**	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1D	
16. It is important for me to change my **arms**	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1D	
17. It is important for me to change my **butt**	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1D	
18. It is important for me to change my **legs/thighs**	SD D A SA	SD D A SA	4SA, 2A/ 5SA, 1D	

Following questions have the response choices as shown	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.	
19. How do you think of yourself in terms of weight ○ underweight ○ about right weight ○ overweight ○ a little bit overweight ○ very overweight	SD D A SA	SD D A SA	4SA, 2A /2D 3A, 1SA I am not sure if adolescent boys will understand the phrase "in terms of" could you substitute "about"? For instance, "How do you think of yourself about your weight?" It may not be as "pretty" but it may be more basic language. The order of the sequence does not quite make sense to me. I would think that "a little bit overweight" and "overweight" * I would change the order of these responses to be: underweight about right weight a little bit overweight overweight very overweight	Another expert made this comment. "When you look at yourself, how do you describe your weight?" ***I will make this change*** ***I agree to change the order***
20. I am a good weight for my height ○ strongly disagree ○ disagree ○ agree ○ strongly agree	SD D A SA	SD D A SA	5SA, 1D/ 5SA, 1D How is this question different from the first one? Is it just meant to be another check on perception? It may be confusing, do you want to ask specifically about their satisfaction with	This question is taken from the preliminary study. A boy may think he is overweight in terms of the scale but actually may think that he is tall and have muscles which make him overweight.

			their height?	*** I will not make this change***
Perceived norm (what other people think)	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.	
21. Click on the circle to show which **person (if any) thinks you should change your body** (you can click on more than one person) O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Healthcare provider O Other_____ (fill in who is other) O No one	SD D A SA	SD D A SA	4SA, 1A, 1D/ 2SA, 2A, 2D What is the exact difference between "boys my age" and "my friends?" Will an 11 year old understand 'healthcare provider' as opposed to "doctors", "school nurse"? * maybe there should be a me/ myself response Which of these people thinks that you should change your body? (You can click on more than one) Maybe move "No one" to the top of the list? Instead of healthcare provider may want to say doctor or nurse	I do think there is a difference ***I will not make this change*** The boys interviewed also suggested changing this. Suggestions were to use doctors or nurses. ***I agree with this change*** This construct is about others ***I will not make this change*** These suggestions make sense ***I agree with these changes***
22. Click on the circle to show which **person (if any) says good things about your body** (you can click on more than one person)	SD D A SA	SD D A SA	4SA, 2A/ 3SA, 1A, 2D See above comment + Coaches – does this age	The boys in the preliminary study

○ My mom ○ My dad ○ My brother ○ My sister ○ My friends ○ Boys my age ○ Girls my age ○ Coaches ○ Teachers ○ Healthcare provider ○ Other_____ (fill in who is other) ○ No one			group typically just have coaches that are teachers, or are they outside people that coach. This question could get a little confusing with the response "teacher" and "coaches" Will an 11 year old understand 'healthcare provider' as opposed to "doctors", "school nurse"? Which of these people thinks that you should change your body? (You can click on more than one) Maybe move "No one" to the top of the list? Instead of healthcare provider may want to say doctor or nurse	indicated there is a difference ***I will not make this change*** The boys interviewed also suggested changing this to doctors or nurses. ***I agree with tis change*** These suggestions make sense ***I agree with these changes***
23. Click on the circle to show which **person (if any) says bad things about your body** (you can click on more than one person) ○ My mom ○ My dad ○ My brother ○ My sister ○ My friends ○ Boys my age ○ Girls my age	SD D A SA	SD D A SA	4SA, 2A/ 3SA, 1A, 2D See above comment about teachers and coaches Will an 11 year old understand 'healthcare provider' as opposed to "doctors", "school nurse"?	 The boys in the preliminary study indicated there is a difference ***I will not make this change*** The boys interviewed also suggested changing this to doctors or nurses. ***I agree with this change***

○ Coaches ○ Teachers ○ Healthcare provider ○ Other_____ (fill in who is other) ○ No one			Which of these people thinks that you should change your body? (You can click on more than one) Maybe move "No one" to the top of the list? Instead of healthcare provider may want to say doctor or nurse	These suggestions make sense ***I agree with these changes***
Personal Agency (perceived control and self-efficacy)				
Following questions (24-32) have the response choices of ○ strongly disagree ○ disagree ○ agree ○ strongly agree	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.	
24. I am 100% in charge of changing my body	SD D A SA	SD D A SA	4SA, 2A/ 4SA, 2A I think 100% may be confusing, I am *completely* in charge.	The boys in the prelimnary study used 100% several times ***I will not make this change***
25. I am certain I can change my body	SD D A SA	SD D A SA	4SA, 2A/ 4SA, 2A	
26. I am certain I can change my body with help from my **family**	SD D A SA	SD D A SA	4SA, 2A/ 4SA, 2A	
27. I am certain I can change my body with help from my **friends**	SD D A SA	SD D A SA	4SA, 2A/ 4SA, 2A	
28. I am certain I can change my body with help from **boys my age**	SD D A SA	SD D A SA	3SA, 3A/ 4SA, 2A	
29. I am certain I can change my body with help from **girls my age**	SD D A SA	SD D A SA	3SA, 3A/ 4SA, 2A	
30. I am certain I can change my body with help from **coaches**	SD D A SA	SD D A SA	3SA, 3A/ 4SA, 2A	
31. I am certain I can change my body with help from **teachers**	SD D A SA	SD D A SA	3SA, 3A/ 4SA, 2A	

32. I am certain I can change my body with help from **healthcare providers**	SD D A SA	SD D A SA	4SA, 1A,1D/ 4SA, 2D Will adolescent boys know who healthcare providers are? I realize you have used this in several places and was just curious. If you think there may be confusion, you could provide a definition in the directions. Will an 11 year old know who a HCP is (school nurse, doctors…) and what they can do to help? Change to my doctor or nurse	The boys interviewed also suggested changing this to doctors or nurses. ***I agree with this change***
Intentions (motivation)				
Following questions have response choices as shown	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.	
33. I am currently trying to change my body by o losing weight o losing fat o staying the same o gaining weight o gaining fat o gaining muscle	SD D A SA	SD D A SA	4SA, 1A, 1D/ 4SA, 2D I think in the actual instrument you instruct participants to choose as many as needed- I like how you phrase it in questions 21-23, and you could say "you can click more than one answer" (this may apply to questions 34, 37 & 38) What is the difference	Good suggestion ***I will make this change*** There is a difference between

			between losing wt and losing fat? Staying the same should be changed to: I am not trying to change my body and maybe put in the last position	losing weight and losing fat ***I will not make this change*** Good suggestion ***I agree with this change***
34. I am currently trying to change my body by (click on as many circles as needed) O eating less food at each meal O eating less junk food O eating less fast food O eating more vegetables O eating more fruit O eating more protein O eating more nutritious/healthy foods (if choose this give an example_____) O exercising more O exercising less O lifting weights	SD D A SA	SD D A SA	5SA, 1A / 5SA, 1D I think this is fine, but I wonder if changing this phrase and phrasing in #36 for consistency to " I am trying to change my body right now" or "..trying to change my body now" and for question #36 " I am not trying to change my body now"- again, I think these are probably fine as written, but changing them might make the wording more age-appropriate? Again, give them the choice that they are not trying to change their body	Good suggestion ***I will change to "I am trying to change my body now by"*** Good suggestion ***I agree with the change***
35. I have successfully changed my body O strongly disagree O disagree O agree O strongly agree	SD D A SA	SD D A SA	3SA, 3A/ 3SA, 2A, 1D Is this mean now (currently) or in the past? I have already changed my body?	I do not want to specify now or in the past. I want to know if they have at anytime successfully changed their body ***I agree with changing to "I have already changed my body"***

36. I have tried to change my body in the past but am not currently trying to change my body O strongly disagree O disagree O agree O strongly agree	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1D See comments above	***I will change to "I am not trying to change my body now, but I have tried to change my body in the past"***
37. When I have tried to change my body in the past (click on as many circles as needed) O I was able to reach a goal O I stopped trying because I was not able to change my body O I stopped because I did not have time O I thought it was easy O I thought it was hard O I wish I had more help O I got too tired O I did not believe in myself	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1A What about I stopped because I did not have help? Do you want a fill in the blank here? You may come up with answers that surprise you.	Good suggestion ***I agree with the change*** ***I agree with a fill in the blank***
38. The reason I want to change my body is because (click on as many circles as needed) O Of how others look on TV or in movies O Of girls around me O Of boys around me O I want to be competitive O I do not want to be out of breath O I want to have more energy O Of the sports I play O Others make fun of me	SD D A SA	SD D A SA	4SA, 2A/ 4SA, 2A I want to be competitive ….add "for sports"? * I would include an option of something like: "I want to be more healthy" or "for myself." Fill in blank	The boys in the preliminary study indicated that it wsa because the sport required a certain weight (ex wrestling, football). It was not necessarily because they wanted to be competitive. *** I would not make this change*** Good suggestions *** I will add "I want to be more healthy*** ***I agree with a fill in the blank***
39. I play sports O Yes O No	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1A Outside of school? They may count sports in gym	Good suggestion ***I agree with this change***

		class.	
40. Please list what sports you play throughout the year_____	SD D A SA	SD D A SA	5SA/ 5SA	
Perception of Self (weight, body, and body parts)	Representativeness	Clarity	If item not clear, please provide feedback on how to make clearer.	
Current Avatar	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1A	
Preferred Avatar	SD D A SA	SD D A SA	5SA, 1A/ 5SA, 1A	
Accurate Avatar (For Accurate Avatar, we are planning on measuring the boys' body parts and populating an avatar using those measurements) Body parts include: Head, neck, chest, waist, hips, arms, and legs. Height and weight will also be measured. 2SA, 1A/ 2SA, 1A	SD D A SA	SD D A SA		
The instrument is comprehensive.			SD D A SA 3SA, 2A	

Table 8. Changes made to ADPoSQ following feedback from health professional experts and adolescent boys.

Original Question:	Revised Question:
Demographics: Are you Hispanic? O Yes O No Please click on which race you are (you can click on more than one if needed) O White/ Caucasian O Black/ African American O Asian American/ Pacific Islander O Native American/ First Nation/ Alaskan Native/ American Indian	 Are you Hispanic? O Yes O No O I do not want to answer Please click on which race you are (you can click on more than one if needed) O White/ Caucasian O Black/ African American O Asian American/ Pacific Islander O Native American/ First Nation/ Alaskan Native/ American Indian O I do not want to answer
Attitude (feelings and beliefs)	
Following questions (1-6) have the response choices of O too small O just right O too big	
1. My head/neck is	No change
2. My chest is	No change
3. My stomach is	No change
4. My arms are	No change
5. My butt is	No change
6. My legs/thighs are	No change
Following questions (7-18) have the response choices of O strongly disagree O disagree O agree O strongly agree	
7. I like my head/neck	No change
8. I like my chest	No change
9. I like my stomach	No change
10. I like my arms	No change
11. I like my butt	No change
12. I like my legs/thighs	No change
13. It is important for me to change my **head/ neck**	No change

14. It is important for me to change my **chest**	No change
15. It is important for me to change my **stomach**	No change
16. It is important for me to change my **arms**	No change
17. It is important for me to change my **butt**	No change
18. It is important for me to change my **legs/thighs**	No change
Following questions have the response choices as shown	
19. How do you think of yourself in terms of weight O underweight O about right weight O overweight O a little bit overweight O very overweight	Change to: 19. When you look at yourself, how do you describe your weight? O underweight O about right weight O a little bit overweight O overweight O very overweight O I do not want to answer
20. I am a good weight for my height O strongly disagree O disagree O agree O strongly agree O I do not want to answer	No change
Perceived norm (what other people think)	
21. Click on the circle to show which **person (if any) thinks you should change your body** (you can click on more than one person) O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Healthcare provider O Other_____ (fill in who is other) O No one	Change to: 21. Which of these people **thinks you should CHANGE your body**? (You can click on more than one) O No one O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Doctors or nurses O Other_____ (fill in other) O I do not want to answer
22. Click on the circle to show which **person (if any) says good**	Change to:

things about your body (you can click on more than one person) O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Healthcare provider O Other_____ (fill in who is other) O No one	22. Which of these people **says GOOD things about your body**? (You can click on more than one) O No one O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Doctors or nurses O Other_____ (fill in other) O I do not want to answer
23. Click on the circle to show which **person (if any) says bad things about your body** (you can click on more than one person) O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Healthcare provider O Other_____ (fill in who is other) O No one	Change to: 23. Which of these people **says BAD things about your body**? (You can click on more than one) O No one O My mom O My dad O My brother O My sister O My friends O Boys my age O Girls my age O Coaches O Teachers O Doctors or nurses O Other_____ (fill in who is other) O I do not want to answer
Personal Agency (perceived control and self-efficacy)	
Following questions (24-32) have the response choices of O strongly disagree O disagree O agree O strongly agree	
24. I am 100% in charge of changing my body	Add:

	O I do not want to answer
25. I am certain I can change my body	Add: O I do not want to answer
26. I am certain I can change my body with help from my **family**	Add: O I do not want to answer
27. I am certain I can change my body with help from my **friends**	Add: O I do not want to answer
28. I am certain I can change my body with help from **boys my age**	Add: O I do not want to answer
29. I am certain I can change my body with help from **girls my age**	Add: O I do not want to answer
30. I am certain I can change my body with help from **coaches**	Add: O I do not want to answer
31. I am certain I can change my body with help from **teachers**	Add: O I do not want to answer
32. I am certain I can change my body with help from **healthcare providers**	Change to: 32. I am certain I can change my body with help from **my doctors or nurses.**
Intentions (motivation) Following questions have response choices as shown	
33. I am currently trying to change my body by O losing weight O losing fat O staying the same O gaining weight O gaining fat O gaining muscle	Change to: 33. I am currently trying to change my body by (you can click on more than one) O losing weight O losing fat O gaining weight O gaining fat O gaining muscle O I am not trying to change my body O Other_____ (fill in other) O I do not want to answer
34. I am currently trying to change my body by (click on as many circles as needed) O eating less food at each meal O eating less junk food O eating less fast food O eating more vegetables O eating more fruit	Change to: 34. I am trying to change my body now by (you can click on more than one) O eating less food at each meal O eating less junk food O eating less fast food

○ eating more protein ○ eating more nutritious/healthy foods (if choose this give an example_____) ○ exercising more ○ exercising less ○ lifting weights	○ eating more vegetables ○ eating more fruit ○ eating more protein ○ eating more nutritious/healthy foods (if choose this give an example_____) ○ exercising more ○ exercising less ○ lifting weights ○ I am not trying to change my body ○ Other_____ (fill in other) ○ I do not want to answer
35. I have successfully changed my body ○ strongly disagree ○ disagree ○ agree ○ strongly agree	Change to: 35. I have already changed my body ○ strongly disagree ○ disagree ○ agree ○ strongly agree ○ I do not want to answer
36. I have tried to change my body in the past but am not currently trying to change my body ○ strongly disagree ○ disagree ○ agree ○ strongly agree	Change to: 36. I am not trying to change my body now, but have tried to change my body in the past. ○ strongly disagree ○ disagree ○ agree ○ strongly agree ○ I do not want to answer
37. When I have tried to change my body in the past (click on as many circles as needed) ○ I was able to reach a goal ○ I stopped trying because I was not able to change my body ○ I stopped because I did not have time ○ I thought it was easy ○ I thought it was hard ○ I wish I had more help ○ I got too tired ○ I did not believe in myself	Change to: 37. When I have tried to change my body in the past (you can click on more than one) ○ I was able to reach a goal ○ I stopped trying because I was not able to change my body ○ I stopped because I did not have time ○ I thought it was easy ○ I thought it was hard ○ I did not have help ○ I wish I had more help ○ I got too tired

	○ I did not believe in myself ○ Other_____(fill in other) ○ I do not want to answer
38. The reason I want to change my body is because (click on as many circles as needed) ○ Of how others look on TV or in movies ○ Of girls around me ○ Of boys around me ○ I want to be competitive ○ I do not want to be out of breath ○ I want to have more energy ○ Of the sports I play ○ Others make fun of me	Change to: 38. The reason I want to change my body is because (you can click on more than one) ○ Of how others look on TV or in movies ○ Of girls around me ○ Of boys around me ○ Others make fun of me ○ I do not want to be out of breath ○ I want to be more healthy ○ I want to have more energy ○ I want to be competitive ○ Of the sports I play ○ Other_____(fill in other) ○ I do not want to answer
39. I play sports ○ Yes ○ No	Change to: 39. I play sports outside of school ○ Yes ○ No
40. Please list what sports you play throughout the year_____	No change

Appendix E

ADPoSQ Survey Items

Are you Hispanic?
O Yes O No O I do not want to answer

Please click on which race you are (you can click on more than one if needed)
O White/ Caucasian
O Black/ African American
O Asian American/ Pacific Islander
O Native American/ First Nation/ Alaskan Native/ American Indian
O I do not want to answer

Part I. The next questions are about your feelings and beliefs about your body

1.	My head/neck is	O too small	O just right	O too big	O I do not want to answer	
2.	My chest is	O too small	O just right	O too big	O I do not want to answer	
3.	My stomach is	O too small	O just right	O too big	O I do not want to answer	
4.	My arms are	O too small	O just right	O too big	O I do not want to answer	
5.	My butt is	O too small	O just right	O too big	O I do not want to answer	
6.	My legs/thighs are	O too small	O just right	O too big	O I do not want to answer	

7.	I like my head/neck	O strongly disagree	O disagree	O agree	O strongly agree	O I do not want to answer
8.	I like my chest	O strongly disagree	O disagree	O agree	O strongly agree	O I do not want to answer
9.	I like my stomach	O strongly disagree	O disagree	O agree	O strongly agree	O I do not want to answer
10.	I like my arms	O strongly disagree	O disagree	O agree	O strongly agree	O I do not want to answer
11.	I like my butt	O strongly disagree	O disagree	O agree	O strongly agree	O I do not want to answer
12.	I like my legs/thighs	O strongly disagree	O disagree	O agree	O strongly agree	O I do not want to answer

13. It is important for me to change my **head/neck**
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

14. It is important for me to change my **chest**
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

15. It is important for me to change my **stomach**
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

16. It is important for me to change my **arms**
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

17. It is important for me to change my **butt**
    O strongly disagree O disagree O agree O strongly agree O I do not want to answer

18. It is important for me to change my **legs/thighs**
    O strongly disagree O disagree O agree O strongly agree O I do not want to answer

19. When you look at yourself, how do you describe your weight?
    O underweight O about right weight O a little bit overweight O overweight O very overweight O I do not want to answer

20. I am a good weight for my height
    O strongly disagree O disagree O agree O strongly agree O I do not want to answer

Part 2: The next questions are what other people think about your body:

21. Which of these people **thinks you should CHANGE your body**? (You can click on more than one)

- O No one
- O My mom
- O My dad
- O My brother
- O My sister
- O My friends
- O Boys my age
- O Girls my age
- O Coaches
- O Teachers
- O Doctors or nurses
- O Other_____ (fill in who is other)
- O I do not want to answer

22. Which of these people **says GOOD things about your body**? (You can click on more than one)

- O No one
- O My mom
- O My dad
- O My brother
- O My sister
- O My friends
- O Boys my age
- O Girls my age
- O Coaches
- O Teachers

- Doctors or nurses
- Other_____ (fill in who is other)
- I do not want to answer

23. Which of these people **says BAD things about your body**? (You can click on more than one)

- No one
- My mom
- My dad
- My brother
- My sister
- My friends
- Boys my age
- Girls my age
- Coaches
- Teachers
- Doctors or nurses
- Other_____ (fill in who is other)
- I do not want to answer

Part 3: The next questions are about how much control you have over changing your body:

24. I am 100% in charge of changing my body
strongly disagree disagree agree strongly agree I do not want to answer

25. I am certain I can change my body
strongly disagree disagree agree strongly agree I do not want to answer

26. I am certain I can change my body with help from my **family**
strongly disagree disagree agree strongly agree I do not want to answer

27. I am certain I can change my body with help from my **friends**
strongly disagree disagree agree strongly agree I do not want to answer

28. I am certain I can change my body with help from **boys my age**
strongly disagree disagree agree strongly agree I do not want to answer

29. I am certain I can change my body with help from **girls my age**
strongly disagree disagree agree strongly agree I do not want to answer

30. I am certain I can change my body with help from **coaches**
strongly disagree disagree agree strongly agree I do not want to answer

31. I am certain I can change my body with help from **teachers**
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

32. I am certain I can change my body with help from **my doctors or nurses**
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

Part 4: The next questions are about you trying to change your body:

33. I am currently trying to change my body by (you can click on more than one)
O losing weight O losing fat O gaining weight O gaining fat O gaining muscle O I am not trying to change my body O Other_____(fill in) O I do not want to answer

34. I am trying to change my body now by (you can click on more than one)
- O eating less food at each meal
- O eating less junk food
- O eating less fast food
- O eating more vegetables
- O eating more fruit
- O eating more protein
- O eating more nutritious/healthy foods (if choose this give an example_____)
- O exercising more
- O exercising less
- O lifting weights
- O I am not trying to change my body
- O Other_____(fill in)
- O I do not want to answer

35. I have already changed my body
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

36. I am not trying to change my body now, but have tried to change my body in the past.
O strongly disagree O disagree O agree O strongly agree O I do not want to answer

37. When I have tried to change my body in the past (you can click on more than one)
- O I was able to reach a goal
- O I stopped trying because I was not able to change my body
- O I stopped because I did not have time
- O I thought it was easy
- O I thought it was hard
- O I wish I had more help
- O I did not have help
- O I got too tired
- O I did not believe in myself

- Other_____(fill in)
- I do not want to answer

38. The reason I want to change my body is because (you can click on more than one)
    - Of how others look on TV or in movies
    - Of girls around me
    - Of boys around me
    - I want to be competitive
    - I do not want to be out of breath
    - I want to have more energy
    - I want to be more healthy
    - Of the sports I play
    - Others make fun of me
    - Other_____(fill in)
    - I do not want to answer

39. I play sports outside of school
    - Yes
    - No

40. Please list what sports you play throughout the year_____

Part 5: The next part of the survey is where you will create 2 avatars. The *first avatar (CURRENT AVATAR)* shows how you think your body looks like *now* and the *second avatar (PREFERRED AVATAR)* that shows how you *prefer (or want)* your body to look like.
After you are done creating your 2 avatars please see the instructor to have your measurements taken.

Part 6: Measurements.
Thank you! You have now completed the online questionnaire. There is one more part to complete. Please see the instructor to have your measurements taken.

Appendix F

Materials included in packet

The packet consists of the following:

1) Letter that summarizes the study
2) The survey items included in the first part of the ADPoSQ (Appendix E)
3) Parent consent form
4) Boy assent form

Summary Letter

GET INVOLVED!

Hello my name is Annmarie Lyles and I am a UW School of Nursing graduate student. I am interested in finding out what middle school boys think about their bodies. Your school has agreed to have me come to your school and conduct a study. The study will last about 30 to 45 minutes and will consist of 5 steps.

Step 1: You and your son will sign the consent and assent forms agreeing for your son to be in the study
Step 2: Your son will return the signed forms (one from you and one from your son) to his teacher
Step 3: During the day, depending on when the school decides, your son will complete an online survey
Step 4: After the online survey, your son will have his height, weight, head, neck, chest, waist, hips, arms, and legs measured by a registered nurse
Step 5: Your son can submit his name into a drawing for an iPod Touch

Online Survey consists of 3 sections:
Section 1: Your son will answer 30 survey questions (see attached for the questions that will be asked)
Section 2: Your son will create an avatar* of himself (Current Avatar) of what he thinks he looks like (* An avatar is a computerized version of a person)
Section 3: Your son will create an avatar of himself (Preferred Avatar) of what he prefers/ wants to look like

THE UNIVERSITY of WISCONSIN MADISON

This study has been approved by the Institional Review Board. If any questions or concerns please contact Annmarie Lyles, MS, RN at 608-219-7331 or alyles@wisc.edu or Susan Riesch, PhD, RN, FAAN (Supervising Professor) at skriesch@wisc.edu.

PARENT CONSENT
Parent Consent

UNIVERSITY OF WISCONSIN-MADISON
Subject CONSENT to Participate in Research
And
AUTHORIZATION to Use and/or Disclose Identifiable Health information for Research

Title of the Study: Development and testing of Adolescents' Digital Perception of Self Questionnaire (ADPoSQ)

Principal Investigator: Susan Riesch, PhD, RN, FAAN (phone: 608-263-5169)
Student Researcher: Annmarie Lyles, MS, RN (phone: 608-219-7331)
(email: alyles@wisc.edu**),**

Mailing Address: 600 Highland Ave. CSC H6/238 Madison, WI 53792

INVITATION

You are invited to be a part of a study about what boys think about their bodies. You are invited to take part because you have a son between the ages of 11 and 14 years-old. At least 200 boys will take part in this study.

You and your son can be a part of this study by your own choice. You or he can decide to stop the study at anytime.

A. WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of the study is to find out what boys think about their bodies.

B. WHAT IS MY PART OF THE STUDY?

Your part of the study is to give permission for your son to complete a survey on the computer. After he completes the survey he will have measurements taken. His height, weight, head, neck, chest, waist, hips, arms, and legs will be measured. A male student nurse will be helping me take measurements.

We will collect the following information about your son for this research study:

Son: Birthdate, age, race, ethnicity and questions regarding weight. Your son's height, weight, head, neck, chest, waist, hips, arms and legs will be measured. At the end, your son will be able to submit on a separate note card, his name, address, and phone number for a chance to win an iPod Touch.

A certain number of boys (25%) will be asked to complete the survey again in 2 weeks. If you and your son want to maybe be contacted to complete the survey in 2 weeks, there will be a place to indicate that at the end of this form.

C. ARE THERE ANY BENEFITS TO ME?

You and your son are not expected to benefit directly from being a part of this study. It may benefit other people in the future by helping us learn more about what boys think about their bodies

D. WILL WE BE PAID FOR WHAT WE DO?

Your son will have a chance to win an iPod Touch.

If your son is picked to complete the survey 2 weeks later, he will have a chance to win an iPod Nano.

E. ARE THERE ANY SIDE EFFECTS OR RISKS TO ME?

The main risk of your son taking part in this study is that someone not part of the study may see your son's name, height, and weight. The chance that this will happen is very small. During the survey, if discomfort or uneasiness occurs, the student researcher, an experienced Registered Nurse will counsel your son, and you as the parent will be notified. If brief counseling is not effective, your son will be referred to his primary care provider. Your son will be given the choice of continuing on or not and receive payment regardless of his choice.

F. HOW WILL MY INFORMATION BE KEPT PRIVATE?

Your son will be entering a number when completing the survey. His name will not be used. The online survey is on a secure website. The notecards that your son fills out for the iPod Touch drawing will be shredded as soon as the online survey is completed two weeks later.

The information collected from you and your son during this study will be used by the researchers and research staff of the UW-Madison and its affiliates (the University of Wisconsin Hospital and Clinics and the University of Wisconsin Medical Foundation) for this study. It may also be shared with others at the UW-Madison.

Others at the UW-Madison and its affiliates who may need to use your health information in the course of this research:

- UW-Madison regulatory and research oversight boards and offices
- Accounting and billing personnel at the UW-Madison
- Research support services staff at the UW-Madison and its affiliates

Others outside of UW-Madison and its affiliates who may receive your health information in the course of this research: NONE

G. IS MY PERMISSION MY CHOICE AND MAY I CHANGE MY MIND?

Your permission is your choice. You do not have to sign this form and you may refuse to do so. If you refuse to sign this form, you and your son cannot take part in this study.

You may drop out from the study at any time. Your son also may choose to stop the session or skip any questions that he does not want to answer.

IF YOU DECIDE NOT TO PARTICIPATE IN THIS STUDY OR IF YOU STOP WHILE THE STUDY IS STILL GOING, ANY SERVICES THAT YOU AND YOUR SON RECEIVE AT HIS SCHOOL WILL NOT BE AFFECTED IN ANY WAY.

H. HOW LONG WILL YOU USE MY HEALTH INFORMATION?

By signing this form you are giving permission for your health information to be used by and shared with the individuals, companies, or institutions described in this form. You may withdraw your permission at any time by writing to:
Susan Riesch, PhD, RN, FAAN (phone: 608-263-5169)
600 Highland Ave. CSC H6/238 Madison, WI 53792
Or sending an email to: skriesch@wisc.edu

Beginning on the date you withdraw your permission, no new information about you will be used. Any information that was shared before you withdrew your permission will continue to be used. If you withdraw your permission, you can no longer actively take part in this research study.

I. WHO SHOULD I CONTACT IF I HAVE QUESTIONS?

Please take as much time as you need to think over whether or not you and your son wish to be a part of the study. If you have any questions about this study at any time, contact the Principal Investigator Susan Riesch at 608-263-5169

If you are not satisfied with the response of the research team, have more questions, or want to talk with someone about your rights as a research participant, contact the UWHC Patient Relations Representative at 608-263-8009 or University of Wisconsin Medical Foundation Patient Relations Representative at 800-552-4255 or 608-821-4819.

AGREEMENT TO PARTICIPATE IN THIS STUDY AND PERMISSION TO USE AND/OR DISCLOSE MY HEALTH INFORMATION

I have read this consent and authorization form describing the research study procedures, risks, and benefits, what health information will be used, and how my health

information will be used. I have had a chance to ask questions about the research study, including the use of my health information, and I have received answers to my questions. I agree to participate in this research study, and permit the student researcher to use my health information as described above.

Name of Parent (please print):_____

_____ _____
Signature of Parent Date

THERE ARE TWO COPIES, one for you to keep and one for you to sign and return to your son's school if you agree for your son to participate.

Signature of person obtaining consent and authorization:

_____ _____
Signature of researcher Date

PLEASE return a signed copy to your son's school by Wednesday

If you give permission for your son to complete the survey again in 2 weeks please indicate here.

YES ☐ NO ☐

If YES, please sign below

Name of Parent (please print):_____

_____ _____
Signature of Parent Date

Checklist:

1. If you agree to your son being part of the study, did you sign page 3?
2. Did you check YES or NO for your son being part of the study in 2 to 3 weeks?
3. If you checked YES did you sign page 4 to give your son permission to be part of the study in 2 to 3 weeks?
4. Lastly, please give the 4 pages for your son to bring back to school.
5. Please keep a copy for yourself

THANK YOU!!!

Annmarie Lyles, MS, RN 608-219-7331 alyles@wisc.edu

Boy Assent

UNIVERSITY OF WISCONSIN MADISON
Subject ASSENT to Participate in Research

Research Study Title: Development and testing of Adolescents' Digital Perception of Self Questionnaire (ADPoSQ)
Research Team Names Susan Riesch PhD, RN, FAAN and Annmarie Lyles MS, RN

What is this study about?
We are doing a research study. A research study is a way to find out about something. This study is being done to find out what boys think about their bodies. You are being asked if you want to be in this study because you are a boy between the ages of 11 and 14.

What will I need to do if I am in this study? If you want to be in the study, this is what will happen. A nurse graduate student will come to your school. You will sit by a computer and complete a survey online. These are the five (5) things you need to do:

1. Answer about 30 questions on the computer
2. Create an avatar of what you look like (An avatar is a computer image of yourself)
3. Create an avatar of what you prefer (want) to look like
4. Have height, weight, head, neck, chest, waist, hips, arms, and legs measured
5. Enter your name, address, and phone number on a note card if you want to be entered in a drawing to win an iPod Touch

Can I stop being in the study? You may stop being in the study at any time and no one will be mad at or upset with you if you do not want to complete the survey.

Will anything bad happen to me if I am in the study? You may feel uncomfortable making an avatar of yourself. The topic may make you feel angry, sad, or upset. If the researcher thinks that you are angry, sad, or upset, she will talk to you in private. She will make sure you feel better before you leave or find the care for whatever is bothering you.

What good things might happen to me if I am in the study? Being in this study may not help you. You may feel good knowing that what we find out from this study may help other people someday.

Will I be given anything for being in this study? If you decide to be in this study, you will have a chance to win an iPod Touch. If you are chosen to complete the survey again in 2 weeks you will have another chance to win an iPod Nano.

Will anyone know I am in the study? Your answers are private and secret. Your answers will be grouped with all the other boys in the study. Your name will not be used in any way. You can keep your answers private by not giving out information about yourself or about being in this research study. Your name will not be said aloud or recorded on paper. No one will know these answers came from you. The online site

where your answers are stored is secure. Boys will sit every other seat in the computer lab so that other boys cannot see one another's answers.

Whom can I talk to about the study? If you have any questions about the study or any problems, you can talk to your parents, guardian or anyone on the research team. You can contact the research team at alyles@wisc.edu or 608-219-7331 or UW School of Nursing, Clinical Sciences Center 600 Highland Ave K6/117 Madison, WI 53792.
What if I do not want to do this? You do not have to be in this study. It is your choice. You can decide that you want to be in this study, and you can stop being in it if you want to. It is okay to say yes now and change your mind later. Just let us know at any time.

Child Authorization:
Your mom or dad (or guardian) has to give permission for you to be in this study if you decide you want to be in this study

I have been told about the study and what I will need to do if I agree to be a part of it. I agree to be in this study. I have been told that I can stop at any time. I asked and got answers to my questions. If I have any questions, at any time, they will be answered. I can keep a copy of this paper.

If you would like to be in the study, please fill out the lines below.

THERE ARE TWO COPIES, one for you to keep and one for you to sign and return to your school if you agree to be part of the study.

Boy's Printed Name: _____

Boy's Signature or Initials: _____Date: _____

Parent's Printed Name: _____

Researcher Obtaining Assent/Consent:

I have discussed this research study with the child using language that is understandable and appropriate. I believe I have fully informed the participant of the nature of the study and its possible risks and benefits. I believe the participant understood this explanation and assented to participate in this study.

Researcher obtaining Assent/Consent: _____

Researcher's Signature: _____

PLEASE return a signed copy to your school by Wednesday

If you want to complete the survey again in 2 weeks please indicate here.

YES ☐ NO ☐

If YES, please sign below

Name of boy (please print):_____

_____ _____

Signature of boy Date

Appendix G

Procedure for measuring body parts

The following body parts are measured (cm) using a tape measure according to the Certification Review (Tucker, 2011):

****Tape measure should always be pulled snug not tight****

Head

- Just above the eyebrows.
- Make sure the tape measure is flat. You can use the occipital bone on the back of the head as a reference point.

Neck

- Just above the shoulders.
- Palpate where the shoulder ends and the neck starts. If the tape measure is not lying flat you might be including the trapezius muscle in your measurements. Be sure to only be measuring the neck.

Chest

- Directly underneath the armpits (highest part of the chest)
- With the arms at the side, wrap the measure tape around the chest.

Waist

- At the narrowest part of the torso, usually falls right beneath the rib cage and slightly higher than the belly button.
- Have the boy bend to the left and mark with a sticker where the bend is located. Have the boy bend to the right and mark with a sticker where the bend is located. Wrap the tape measure around the boy using the stickers as reference points.

Hips

- Widest part of the hips and buttocks
- Tape measure should be even at the maximum circumference, located above the gluteal fold. To find where the gluteal fold is have the boy bend backward. Place a sticker where the bend is located. Palpate for the iliac crests or have the boy indicate where they are and mark with stickers. Wrap the tape measure around the hips using the stickers as reference points.

Upper Arm

- Midway between the elbow (acromion process) and shoulder (olecranon process)
- Mark with stickers the elbow and the shoulder of the right arm. Measure the distance from sticker to sticker. Mark with a sticker the half way point between the elbow sticker and shoulder sticker. Measure the circumference of the arm using the midway sticker as the reference point.

Forearm

- At the maximum circumference of the forearm (about 2.5 inches below elbow)
- Mark with a sticker 2.5 inches below the elbow. Measure the circumference of the forearm using the sticker as the reference point

Thigh

- At the maximum circumference beneath the gluteal fold.
- Have the boy indicate where his buttock ends and mark with a sticker. Wrap the tape measure around the thigh using the sticker as the reference point.

Calf

- Have the boy lift up his pant leg on his right leg. Look at the calf and determine which is the widest part (usually 4 inches down below the knee)
- Mark with a sticker the widest part (use 4 inches as a reference point if needed). Wrap the tape measure around the calf using the sticker as the reference point.

All measurements are taken on the right side of the body. Each site is measured two times and the average is recorded.

Appendix H

Consort diagram

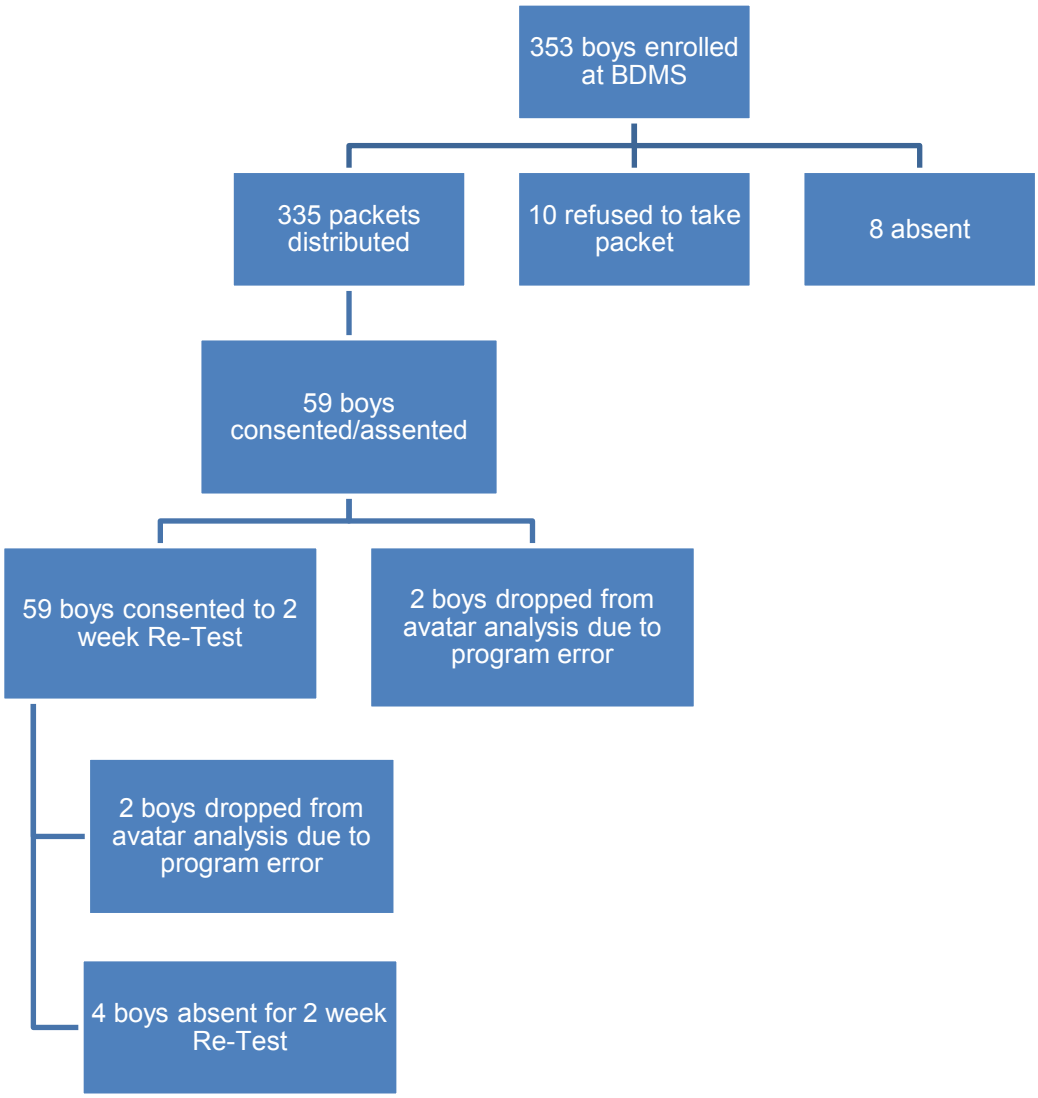


Figure 5. Consort diagram of consented/assented boys

Appendix I

Tables of the ADPoSQ findings

Table 9. Demographics of sample.

Demographics						
Age in years	11 N (%)	12 N (%)	13 N (%)	14 N (%)	Mean	Std Deviation
	5 (8.5)	20 (33.9)	26 (44.1)	8 (13.6)	12.6	0.83
Race	White N (%)	Black N (%)	Asian N (%)	Native American N (%)	White & Native American N (%)	I do not want to answer N (%)
	46 (78)	1 (1.7)	3 (5.1)	0	2 (3.4)	7 (11.9)
Hispanic	No N (%)	Yes N (%)	I do not want to answer N (%)			
	53 (89.8)	6 (10.2)	0			
	Minimum	Maximum	Mean	Std Deviation		
Height (Inches)	54	72	63.1	4.23		
Weight (Pounds)	69	291	122.7	36.65		
BMI	14.8	43.0	21.1	4.69		
CDC BMI-for-age Percentile	6^{th}	99^{th}	63.0	29.43		
Weight Category	Underweight N (%)	Healthy N (%)	Overweight N (%)	Obese N (%)	High BMI N (%)	
	0	38 (64.4)	11 (18.6)	6 (10.2)	4 (6.8)	

Table 10. Frequencies, Test Re-Test Reliability, and Internal Consistencies of survey items and avatars.

Part I. Questions about feelings and beliefs about your body (ATTITUDE)							
	Test Re-Test Reliability (Spearman Rho Correlation)	Too small N (%)	Just right N (%)	Too big N (%)	I do not want to answer N (%)		
20. My head/neck is	0.70**	0	58 (98.3)	1 (1.7)	0		
21. My chest is	0.59**	9 (15.3)	4 (72.9)	7 (11.9)	0		
22. My stomach is	0.65**	3 (5.1)	31 (52.5)	24 (40.7)	1 (1.7)		
23. My arms are	0.57**	17 (28.8)	40 (67.8)	1 (1.7)	1 (1.7)		
24. My butt is	0.67**	2 (3.4)	49 (83.1)	2 (3.4)	6 (10.2)		
25. My legs/thighs are	0.40**	2 (3.4)	41 (69.5)	13 (22.0)	3 (5.1)		
	Test Re-Test Reliability (Spearman Rho Correlation)	Strongly disagree N (%)	Disagree N (%)	Agree N (%)	Strongly agree N (%)	I do not want to answer N (%)	
26. I like my head/neck	0.22	0	5 (8.5)	38 (64.4)	16 (27.1)	0	
27. I like my chest	0.51**	0	14 (23.7)	36 (61.0)	9 (15.3)	0	
28. I like my stomach	0.59**	3 (5.1)	18 (30.5)	31 (52.5)	6 (10.2)	1 (1.7)	
29. I like my arms	0.47**	1 (1.7)	12 (20.3)	31 (52.5)	14 (23.7)	1 (1.7)	
30. I like my butt	0.50**	0	5 (8.5)	42 (71.2)	9 (15.8)	3 (5.1)	
31. I like my legs/thighs	0.52**	0	12 (20.3)	29 (49.2)	17 (28.8)	1 (1.7)	
32. It is important for me to change my **head/ neck**	0.31*	10 (16.9)	42 (71.2)	6 (10.2)	0	1 (1.7)	
33. It is important for me to change my **chest**	0.52**	4 (6.8)	26 (44.1)	23 (39.0)	6 (10.2)	0	
34. It is important for me to change my **stomach**	0.71**	6 (10.2)	15 (25.4)	21 (35.6)	17 (28.8)	0	
35. It is important for me to change my **arms**	0.71**	5 (8.5)	18 (30.5)	29 (49.2)	7 (11.9)	0	
36. It is important for me to change my **butt**	0.27	13 (22.0)	33 (55.9)	8 (13.6)	1 (1.7)	4 (6.8)	
37. It is important for me to change my **legs/thighs**	0.65**	10 (16.9)	20 (33.9)	20 (33.9)	8 (13.6)	1 (1.7)	
	Test Re-Test Reliability	Underweight	About right weight	A little bit overweight	Overweight	Very overweight	I do not want to answer

	(Spearman Rho Correlation)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
19. When you look at yourself, how do you describe your weight?	0.90**	5 (8.5)	33 (55.9)	13 (22.0)	6 (10.2)	2 (3.4)	0
	Test Re-Test Reliability (Spearman Rho Correlation)	Strongly disagree N (%)	Disagree N (%)	Agree N (%)	Strongly agree N (%)	I do not want to answer N (%)	
20. I am a good weight for my height	0.52**	1 (1.7)	15 (25.4)	32(54.2)	11 (18.6)	0	
Part 2: The next questions are what other people think about your body							
21. Which of these people thinks you should CHANGE your body?	No one: 31 (52.5) Coaches: 13 (22.0) My dad: 12 (20.3) My brother: 9 (15.3) Boys my age: 9 (15.3) My friends: 7 (11.9) Doctors or nurses: 7 (11.9) My mom: 6 (10.2) I do not want to answer: 5 (8.5) My sister: 2 (3.4) Girls my age: 2 (3.4) Teachers: 0		Others: Me Grandparents In laws Grandpa Grandma Uncles				
22. Which of these people says GOOD things about your body?	My mom: 45 (76.3) My dad: 42 (71.2) My friends: 30 (50.8) Doctors or nurses: 21 (35.6) Coaches: 19 (32.2) My sister: 16 (27.1) My brother: 15 (25.4) Girls my age: 14 (23.7) Boys my age: 13 (22.0) Teachers: 9 (15.3) I do not want to answer: 4 (6.8) No one: 3 (5.1)		Others: One of my bro Dentists Grandparents Lady at Walgreens				
23. Which of these people says BAD things about your body?	No one: 42 (71.2) I do not want to answer: 7 (11.9) Boys my age: 5 (8.5) My dad: 3 (5.1)		Other: Me				

	Doctors or nurses: 3 (5.1) My mom: 2 (3.4) My brother: 2 (3.4) My sister: 2 (3.4) My friends: 2 (3.4) Girls my age: 2 (3.4) Coaches: 0 Teachers: 0						
Part 3. Questions about how much control you have over changing your body (PERSONAL AGENCY, perceived control and self-efficacy)							
	Test Re-Test Reliability (Spearman Rho Correlation)	Strongly disagree N (%)	Disagree N (%)	Agree N (%)	Strongly agree N (%)	I do not want to answer N (%)	
24. I am 100% in charge of changing my body	0.63**	2 (3.4)	11 (18.6)	23 (39.0)	23 (39.0)	0	
25. I am certain I can change my body	0.55**	1 (1.7)	4 (6.8)	28 (47.5)	26 (44.1)	0	
26. I am certain I can change my body with help from my **family**	0.39**	1 (1.7)	8 (13.6)	32 (54.2)	17 (28.8)	1 (1.7)	
27. I am certain I can change my body with help from my **friends**	0.39**	2 (3.4)	11 (18.6)	30 (50.8)	16 (27.1)	0	
28. I am certain I can change my body with help from **boys my age**	0.36**	5 (8.5)	14 (23.7)	29 (49.2)	9 (15.3)	2 (3.4)	
29. I am certain I can change my body with help from **girls my age**	0.63**	15 (25.4)	19 (32.2)	16 (27.1)	6 (10.2)	3 (5.1)	
30. I am certain I can change my body with help from **coaches**	0.66**	5 (8.5)	9 (15.3)	21 (35.6)	24 (40.7)	0	
31. I am certain I can change my body with help from **teachers**	0.53**	12 (20.3)	25 (42.4)	15 (25.4)	6 (10.2)	1 (1.7)	
32. I am certain I can change my body with help from **my doctors and nurses**	0.53**	0	13 (22.0)	29 (49.2)	17 (28.8)	0	
Part 4. Questions about you trying to change your body (INTENTIONS)							

33. I am currently trying to change my body by	Gaining muscle: 43 (72.9) Losing weight: 20 (33.9) Losing fat: 19 (32.2) Gaining weight: 6 (10.2) I am not trying to change my body: 4 (6.8) I do not want to answer: 1 (1.7) Gaining fat: 0		Other: Eat healthy Abbs Get more muscular Stay in good conditioning				
34. I am trying to change my body now by	Eating more nutritious/healthy foods: 55 (93.2) Eating more fruit: 43 (72.9) Exercising more: 42 (71.2) Lifting weights: 39 (66.1) Eating more protein: 37 (62.7) Eating less junk food: 33 (55.9) Eating more vegetables: 28 (47.5) Eating less fast food: 24 (40.7) Eating less food at each meal: 10 (16.9) I am not trying to change my body: 2 (3.4) Exercising less: 1 (1.7) I do not want to answer: 1 (1.7)		Other: Playing sports		Nutritious/Healthy foods examples: Apples Oranges Bananas Grains Vegetables Less sodium Sub Picking better foods and drinks instead of candy and soda		
	Test Re-Test Reliability (Spearman Rho Correlation)	Strongly disagree N (%)	Disagree N (%)	Agree N (%)	Strongly agree N (%)	I do not want to answer N (%)	
35. I have already changed my body	0.58**	4 (6.8)	26 (44.1)	24 (40.7)	5 (8.5)	0	
36. I am not trying to change my body now, but have tried to change my body in the past.	0.24	8 (13.6)	35 (59.3)	12 (20.3)	2 (3.4)	2 (3.4)	
37. When I have tried to change my body in the past	I was able to reach a goal: 27 (45.8) I thought it was hard: 16 (27.1) I wish I had more help: 14 (23.7) I do not want to answer: 12 (20.3)		Other: I did believe in myself Didn't try in the past I didn't try to change body in the past but am currently I haven't before				

	I stopped trying because I was not able to change my body: 9 (15.3) I stopped because I did not have time: 9 (15.3) I did not have help: 9 (15.3) I thought it was easy: 8 (13.6) I got too tired: 5 (8.5) I did not believe in myself: 4 (6.8)						
38. The reason I want to change my body is because	Of the sports I play: 40 (67.8) I want to be more healthy: 34 (57.6) I want to be competitive: 30 (50.8) I want to have more energy: 24 (40.7) Of girls around me: 20 (33.9) Of boys around me: 19 (32.2) Others make fun of me: 6 (10.2) I do not want to answer: 5 (8.5) Of how others look on TV or in movies: 4 (6.8)		Other: I don't like the way I think I look.				
	Test Re-Test Reliability (Spearman Rho Correlation)	No N (%)	Yes N (%)	Yes (no example)			
39. I play sports outside of school	0.95**	12 (20.3)	46 (78.0)	1 (1.7)			
Current Avatar Measurements (Time 1 and Time 2)							
Head	0.55**						
Neck	0.66**						
Upper arm	0.75**						
Forearm	0.72**						
Chest	0.59**						
Waist	0.73**						
Hip	0.53**						
Mid-thigh	0.83**						
Calf	0.67**						
Preferred Avatar Measurements (Time 1 and Time 2)							

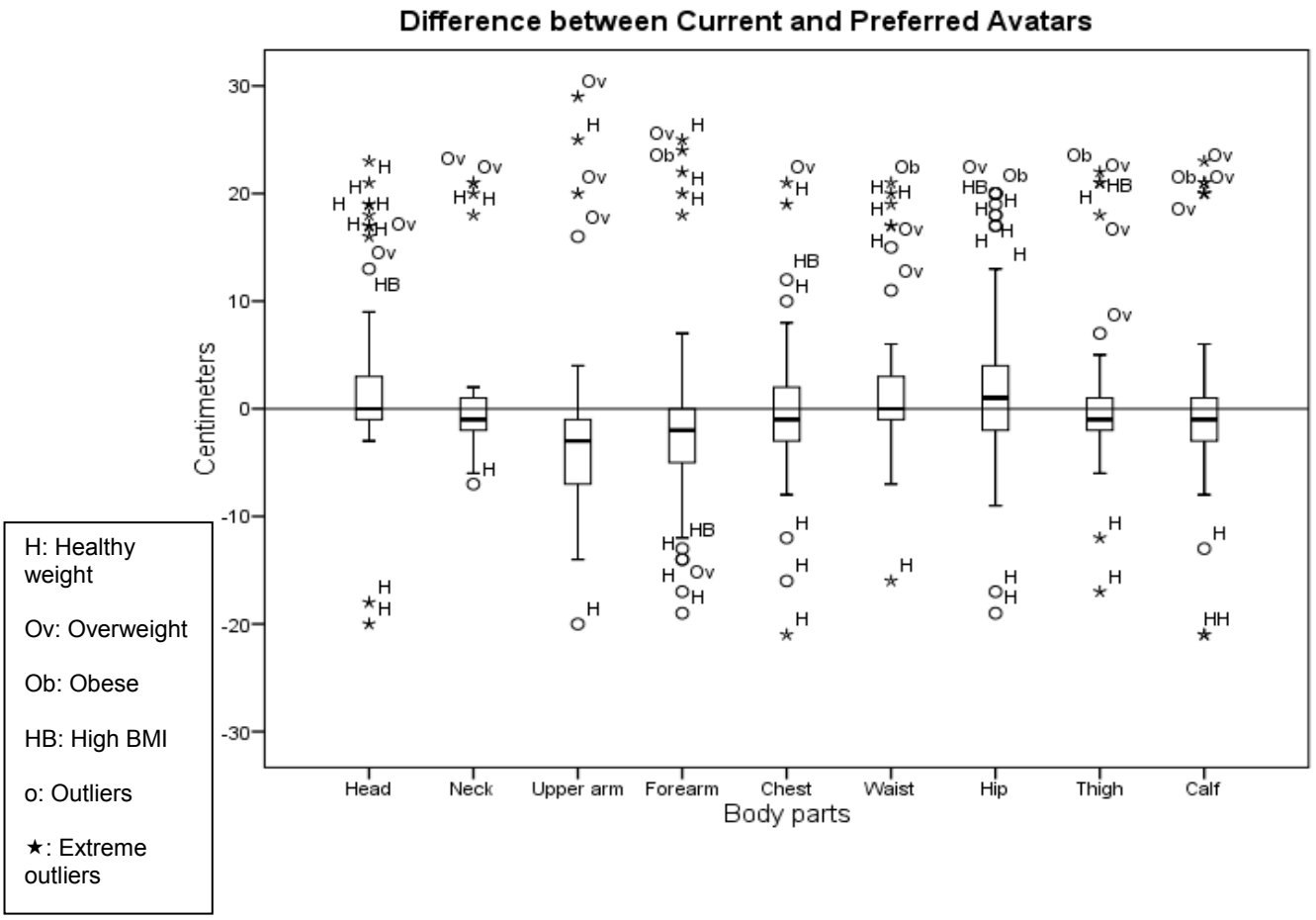
Head	0.45**	
Neck	0.48**	
Upper arm	0.74**	
Forearm	0.45**	
Chest	0.72**	
Waist	0.47**	
Hip	0.53**	
Mid-thigh	0.45**	
Calf	0.42**	
	Internal Consistency (Cronbach's alpha)	
Attitude (feelings and beliefs)	0.62	
Personal agency (control and self efficacy)	0.85	
Total survey questions	0.79	

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

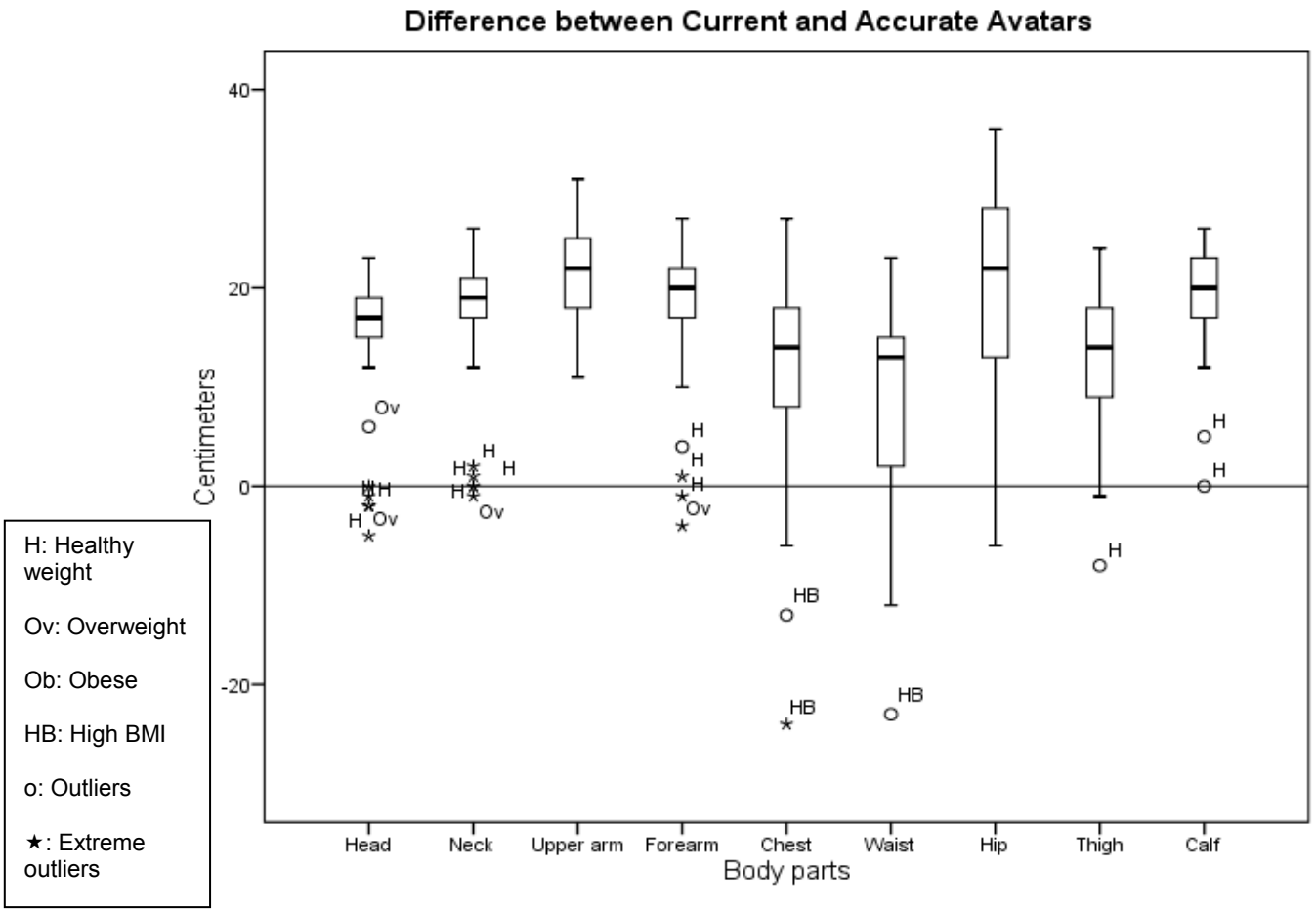
Appendix J

Box plots of the Avatar differences



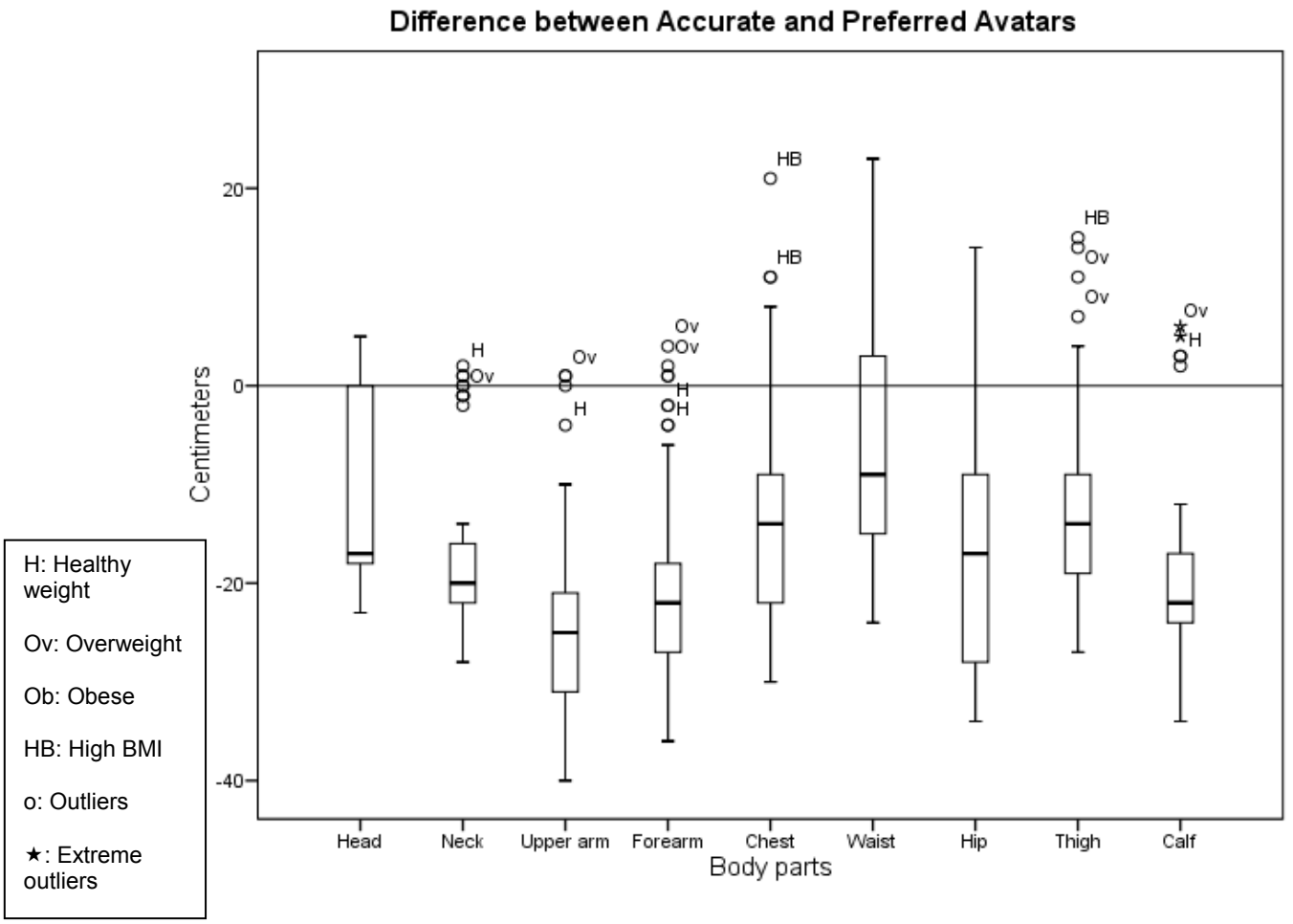
	Mean	Median	Std. deviation	25th percentile	75th percentile	Minimum	Maximum
Head	2.84	0.0	8.60	-1.0	3.0	-20	23
Neck	.32	-1.0	5.77	-2.0	1.0	-7	21
Upper arm	-1.81	-3.0	9.56	-7.0	-1.0	-20	29
Forearm	-1.75	-2.0	8.89	-5.5	0.0	-19	25
Chest	-.32	-1.0	6.67	-3.0	2.5	-21	21
Waist	2.12	0.0	6.69	-1.0	3.5	-16	21
Hip	3.16	1.0	9.01	-2.0	5.5	-19	23
Thigh	1.23	-1.0	7.62	-2.0	1.0	-17	22
Calf	.89	-1.0	9.31	-3.0	1.0	-21	23

Figure 6. Box plot of the difference between the Current and Preferred Avatars' measurements.



	Mean	Median	Std. deviation	25th percentile	75th percentile	Minimum	Maximum
Head	14.81	17.0	6.86	15.0	19.0	-5	23
Neck	17.68	19.0	5.96	17.0	21.0	-1	26
Upper arm	21.70	22.0	5.24	18.0	25.0	11	31
Forearm	18.04	20.0	6.56	15.5	22.0	-4	27
Chest	11.63	14.0	9.28	8.0	18.0	-24	27
Waist	8.68	11.0	9.90	2.0	15.0	-23	23
Hip	19.37	22.0	10.12	11.5	28.0	-6	36
Thigh	12.91	14.0	6.32	8.5	17.5	-8	24
Calf	18.96	20.0	4.91	16	23.0	0	26

Figure 7. Box plot of the difference between the Current and Accurate Avatars' measurements

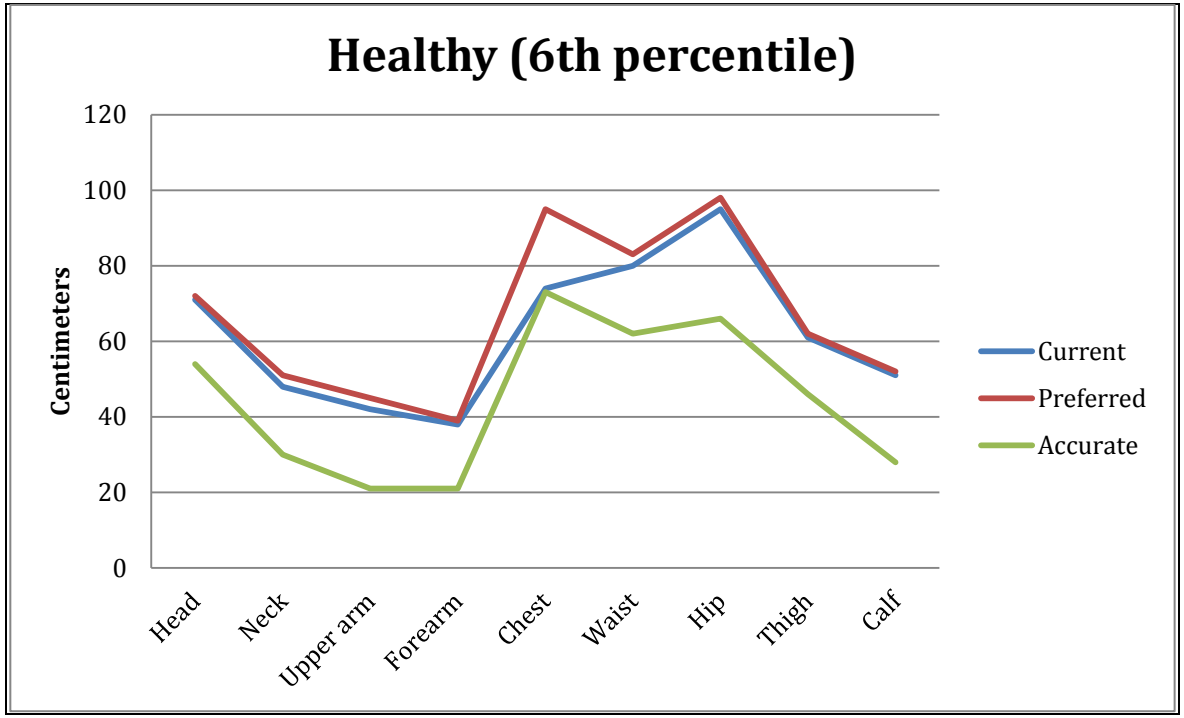


	Mean	Median	Std. deviation	25th percentile	75th percentile	Minimum	Maximum
Head	-11.96	-17.0	9.24	-18.0	0.0	-23.0	5.0
Neck	-17.37	20.0	8.04	-22.0	-16.5	-28.0	2.0
Upper arm	-23.51	-25.0	9.72	-30.5	-20.5	-40	3
Forearm	-19.79	-22.0	9.75	-27.0	-17.5	-36	4
Chest	-11.95	-13.0	11.38	-21.5	-7.0	-30	21
Waist	-6.56	-9.0	11.75	-15.0	3.5	-24	23
Hip	-16.21	-16.0	12.58	-27.5	-6.5	-34	14
Thigh	-11.68	-13.0	9.80	-19.0	-6.5	-27	15
Calf	-18.07	-21.0	10.18	-24.0	-15.5	-34	6

Figure 8. Box plot of the difference between the Accurate and Preferred Avatars' measurements

Appendix K

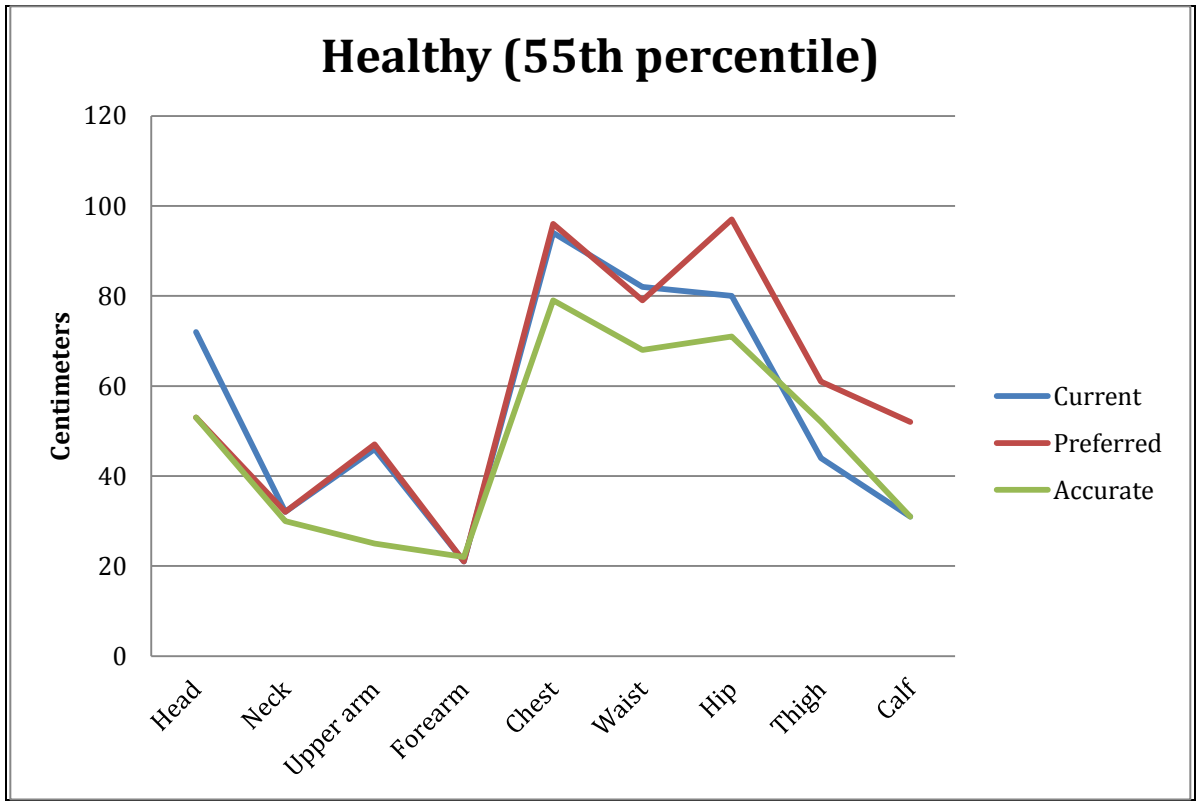
Individual case examples displaying the Avatar differences



Difference in measurements between avatars

	Head	Neck	Upper arm	Forearm	Chest	Waist	Hip	Thigh	Calf
Current and Preferred	-1	-3	-3	-1	-21	-3	-3	-1	-1
Current and Accurate	17	18	21	17	1	18	29	15	23
Accurate and Preferred	-18	-21	-24	-18	-22	-21	-32	-16	-24

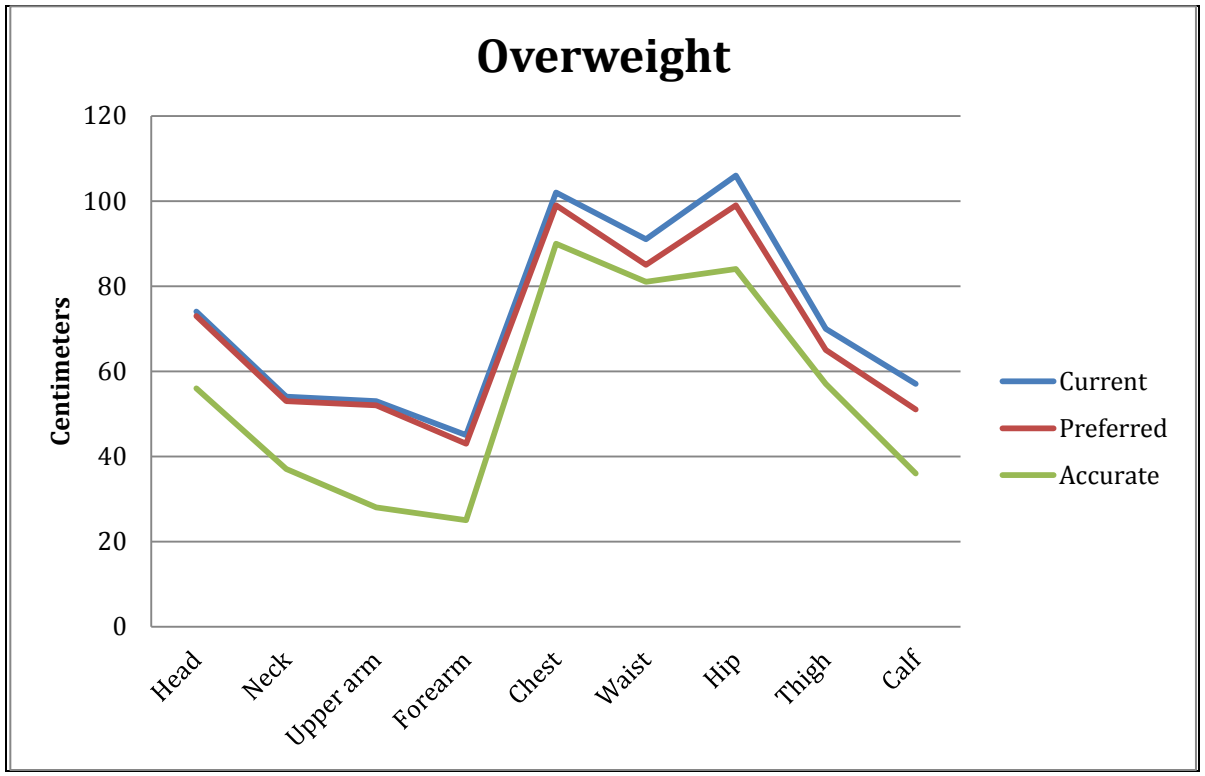
Figure 9. Example of healthy weight (6th percentile) boy's avatar measurements.



Difference in measurements between avatars

	Head	Neck	Upper arm	Forearm	Chest	Waist	Hip	Thigh	Calf
Current and Preferred	19	0	-1	0	-2	3	-17	-17	-21
Current and Accurate	19	2	21	-1	15	14	9	-8	0
Accurate and Preferred	0	-2	-22	1	-17	-11	-26	-9	-21

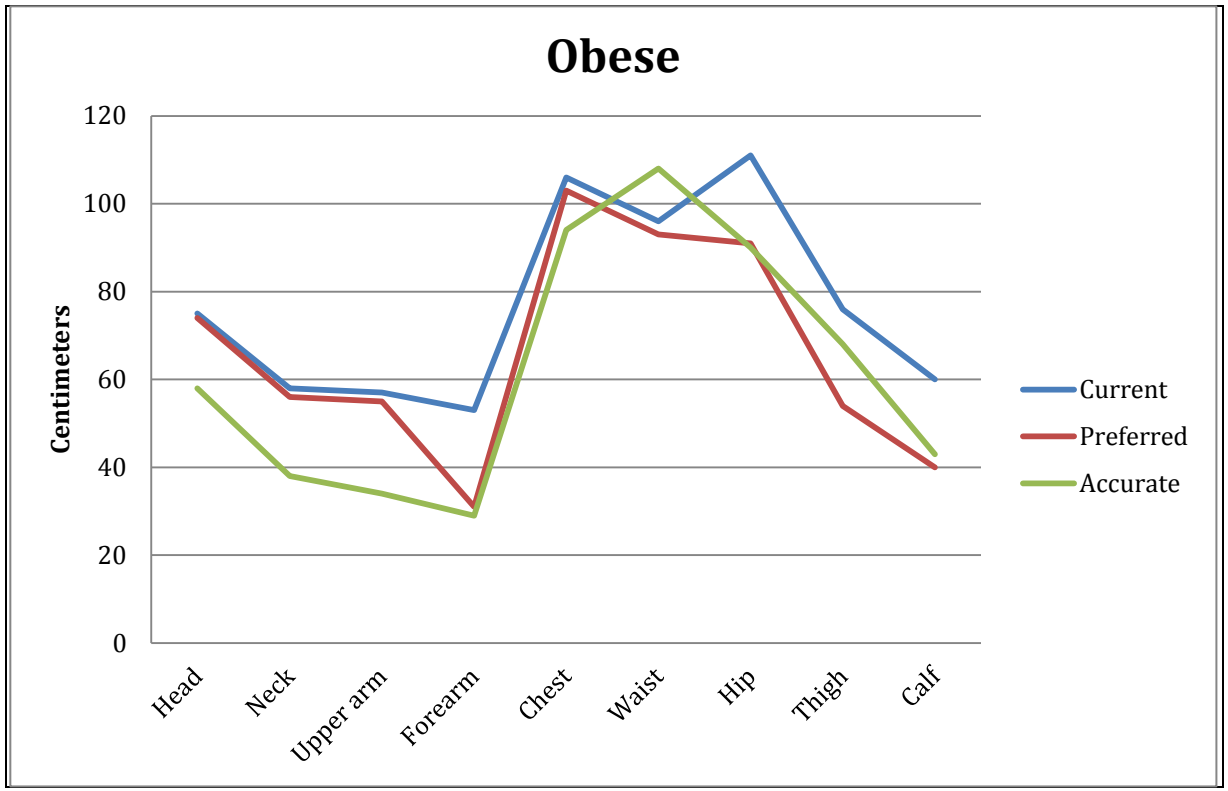
Figure 10. Example of healthy weight (55thth percentile) boy's avatar measurements



Difference in measurements between avatars

	Head	Neck	Upper arm	Forearm	Chest	Waist	Hip	Thigh	Calf
Current and Preferred	1	1	1	2	3	6	7	5	6
Current and Accurate	18	17	25	20	12	10	22	13	21
Accurate and Preferred	-17	-16	-24	-18	-9	-4	-15	-8	-15

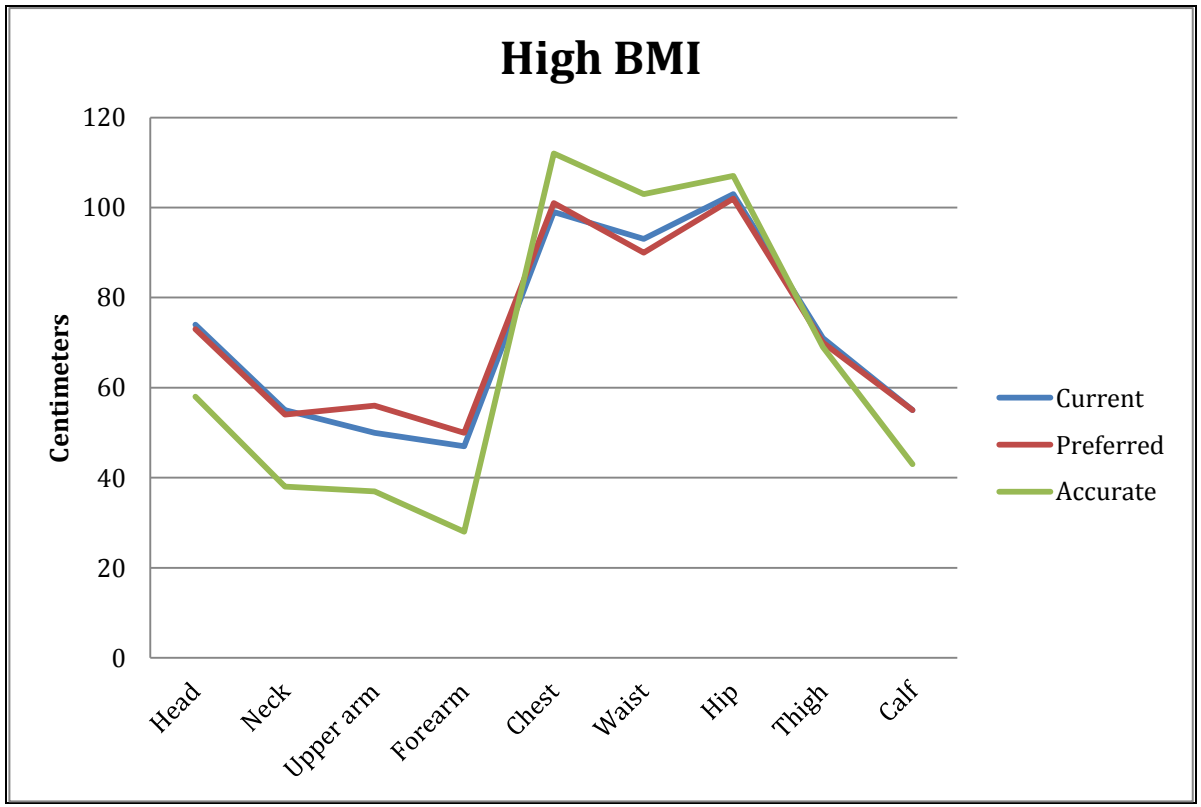
Figure 11. Example of overweight boy's avatar measurements.



Difference in measurements between avatars

	Head	Neck	Upper arm	Forearm	Chest	Waist	Hip	Thigh	Calf
Current and Preferred	1	2	2	22	3	3	20	22	20
Current and Accurate	17	20	23	24	12	-12	21	8	17
Accurate and Preferred	-16	-18	-21	-2	-9	15	-1	14	3

Figure 12. Example of obese boy's avatar measurements.



Difference in measurements between avatars

	Head	Neck	Upper arm	Forearm	Chest	Waist	Hip	Thigh	Calf
Current and Preferred	1	1	-6	-3	-2	3	1	1	0
Current and Accurate	16	17	13	19	-13	-10	-4	2	12
Accurate and Preferred	-15	-16	-19	-22	11	13	5	-1	-12

Figure 13. Example of high BMI boy's avatar measurements.

Table 11. Survey items responses of the individual case examples.

Participant example weight category	Healthy weight (6th percentile)	Healthy weight (55th percentile)	Overweight	Obese	High BMI
Part I. Questions about feelings and beliefs about your body (ATTITUDE)					
1. My head/neck is	Just right	Just right	Just right	Just right	Just right
2. My chest is	Just right	Just right	Just right	Too big	Just right
3. My stomach is	Just right	Too big	Too big	Too big	Too big
4. My arms are	Just right	Just right	Just right	Just right	Just right
5. My butt is	Just right	Just right	Just right	Just right	Just right
6. My legs/thighs are	Just right	Too big	Too big	Too small	Too big
7. I like my head/neck	Agree	Agree	Strongly Agree	Agree	Agree
8. I like my chest	Agree	Agree	Agree	Disagree	Agree
9. I like my stomach	Agree	Disagree	Disagree	Disagree	Strongly Disagree
10. I like my arms	Agree	Agree	Strongly Agree	Agree	Agree
11. I like my butt	Agree	Agree	Agree	Agree	Agree
12. I like my legs/thighs	Agree	Disagree	Disagree	Agree	Disagree
13. It is important for me to change my **head/ neck**	Strongly Disagree	Disagree	Disagree	Disagree	Disagree
14. It is important for me to change my **chest**	Disagree	Disagree	Agree	Agree	Disagree
15. It is important for me to change my **stomach**	Strongly Disagree	Strongly Agree	Strongly Agree	Agree	Strongly Agree
16. It is important for me to change my **arms**	Strongly Disagree	Disagree	Disagree	Disagree	Agree
17. It is important for me to change my **butt**	Strongly Disagree	Disagree	Disagree	Strongly Agree	Disagree
18. It is important for me to change my **legs/thighs**	Strongly Disagree	Strongly Agree	Agree	Disagree	Agree
19. When you look at yourself, how do you describe your weight?	About right weight	About right weight	A little bit overweight	A little bit overweight	Overweight
20. I am a good weight for my height	Agree	Agree	Agree	Disagree	Disagree
Part 2: The next questions are what other people think about your body					
21. Which of these people thinks you should CHANGE your body?	No one	No one	No one	No one	Boys my age
22. Which of these people says GOOD things about your body?	Mom, Dad, Brother, Sister, Friends, Coaches, Teachers, Doctors or nurses	No one	Mom, Dad, Doctors or nurses	Mom	No one
23. Which of these people says BAD things about your body?	No one	No one	No one	Do not want to answer	Boys my age, girls my age

Part 3. Questions about how much control you have over changing your body (PERSONAL AGENCY, perceived control and self-efficacy)					
24. I am 100% in charge of changing my body	Disagree	Agree	Strongly Agree	Agree	Strongly Disagree
25. I am certain I can change my body	Disagree	Agree	Strongly Agree	Agree	Agree
26. I am certain I can change my body with help from my **family**	Disagree	Strongly Agree	Agree	Agree	Agree
27. I am certain I can change my body with help from my **friends**	Disagree	Strongly Agree	Strongly Disagree	Agree	Agree
28. I am certain I can change my body with help from **boys my age**	Strongly Disagree	Strongly Agree	Strongly Disagree	Agree	Strongly Disagree
29. I am certain I can change my body with help from **girls my age**	Strongly Disagree	Strongly Agree	Strongly Disagree	Agree	Strongly Disagree
30. I am certain I can change my body with help from **coaches**	Strongly Agree	Agree	Agree	Disagree	Disagree
31. I am certain I can change my body with help from **teachers**	Disagree	Agree	Strongly Disagree	Disagree	Disagree
32. I am certain I can change my body with help from **my doctors and nurses**	Strongly Agree	Strongly Agree	Agree	Agree	Disagree
Part 4. Questions about you trying to change your body (INTENTIONS)					
33. I am currently trying to change my body by	Gaining weight	Losing weight, gaining muscle	Losing weight, losing fat	Losing weight, losing fat	Losing weight, losing fat, gaining muscle
34. I am trying to change my body now by	Less junk food, less fast food, more protein, more nutritious/healthy foods, lifting weights	Less junk food, more vegetables, more fruit, more nutritious/healthy foods.	Less junk food, less fast food, more vegetables, more fruit, more protein, more nutritious/healthy foods, exercising more, lifting weights	Less food at each meal, less junk food, less fast food, eating more nutritious/healthy foods	Less junk food, less fast food, more fruit, more protein, more nutritious/healthy foods, exercising more, lifting weights
35. I have already changed my body	Strongly Disagree	Disagree	Disagree	Disagree	Strongly Disagree
36. I am not trying to change my body now, but have tried to change my body in the past.	Strongly Disagree	Disagree	Disagree	Disagree	Disagree
37. When I have tried to change my body in the past	Able to reach goal	I wish I had more help	Other: I haven't before	Did not believe in myself	Able to reach a goal, thought it was hard, wish I had more help, did

					not have help, got too tired,
38. The reason I want to change my body is because	Of the sports I play	Do not want to be out of breath, want to have more energy, want to be more healthy	Other: I do not like the way I think I look	Want to have more energy, want to be more healthy	Girls around me, boys around me, do not want to be out of breath, want to have more energy, want to be more healthy, of the sports I play, others make fun of me
39. I play sports outside of school	Yes	No	Yes	Yes	Yes

Appendix L

Adolescent boys' comments

Table 12. Comments made by adolescent boys following second administration of ADPoSQ application

Comments about	What boys like about ADPoSQ study	What boys don't like about the ADPoSQ study	Changes the boys would make to the ADPoSQ study
Questions	Questions	Too many questions/repeat questions (7)	Add "I don't care"
	That you can put don't want to answer for some questions	Questions about our butt because most boys don't really talk about their butt (5)	Reduce amount of questions/shorter (7)
	Multiple choice brings out your thoughts, very helpful (2)	Some questions/ choices don't make sense (3)	Some of questions
	I like the survey. It asked a lot of questions that could help people	Some questions and answers were strange	Take out the who likes body questions
	The questions about what other people think about you	Uncomfortable questions	More comfortable questions
	Asking about people making fun of you	Questions about what people think about your body	Should be in between answers besides "I don't wish to answer"
	Good questions	Too much questions around one topic	
	Where it says what you eat more and eat less	Some of the questions	
Avatars	Avatars (16)	How avatar was set up	In avatar portion, define whether it's muscle or just size changing
		Avatar (want more options)	Change the avatar to be more like Xbox 360
			Better avatar with more options
Body	They give you help to lose weight	When you tell who change your body or not (2)	Bigger arms and body
	That I could see how I think of myself		
	That I can say what I think about my body		
Layout of ADPoSQ	All of it (4)	Kept glitching	All in one
	It was easy/ simple survey (2)		Fix glitching
	On computer		
	Quickness		
	Was creative		
	Win and Ipod (2)		
Setting	Got out of gym	Missing gym/ both days (4)	Do it during science
		In library	