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## The Role of Hope and Resilience in Pediatric Obesity Intervention Outcomes

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**THE ROLE OF HOPE AND RESILIENCE IN PEDIATRIC OBESITY  
INTERVENTION OUTCOMES**

**PROFESSIONAL DISSERTATION**

**SUBMITTED TO THE FACULTY**

**OF**

**THE SCHOOL OF PROFESSIONAL PSYCHOLOGY  
WRIGHT STATE UNIVERSITY**

**BY**

**Brigitte Dawn Beale, M.A.**

**IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE  
OF  
DOCTOR OF PSYCHOLOGY**

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July 1, 2013

I HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER MY SUPERVISION BY **BRIGITTE BEALE** ENTITLED **THE ROLE OF HOPE AND RESILIENCY IN PEDIATRIC OBESITY INTERVENTION OUTCOMES** BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PSYCHOLOGY.

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## **Abstract**

Childhood obesity is a major health concern in the United States (McClanahan, Huff, & Omar, 2009). In recent years, the prevalence of pediatric obesity has stabilized. However, a substantial decrease in obesity rates has not yet occurred, nor has the gap of health disparity been closed amongst ethnic groups experiencing obesity. African-American and Hispanic youth continue to experience obesity at substantially higher rates than other ethnic groups (Robert Wood Johnson Foundation, 2012). The purpose of this study was to examine correlations between Positive Psychology constructs and pediatric obesity intervention outcomes. A single-participant research design was utilized to compare baseline outcomes to post-intervention outcomes. Hope and resilience were considered as predictor variables in the study. The outcome variables were Body Mass Index (BMI), blood glucose levels, cholesterol levels, and waist circumference. Participants were found to have normal hope and resilience levels at the onset of the study, which did not change significantly. Participants showed meaningful decreases in waist circumference and cholesterol levels of a participation period of 12 weeks. Additionally, meaningful change occurred in psychometric data related to pathway-related hope thinking and emotional reactivity. There continues to be a need for childhood obesity intervention research. This study model needs to be replicated to establish statistical significance as it may inform future childhood obesity intervention treatments.

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developing a quality project that would be a meaningful addition to research in clinical and pediatric psychology.

## **Chapter 1: The Problem**

### **1.1 Background**

Positive psychology is an emerging psychological construct of recent interest (Linley, & Joseph, 2004). Research within the field of positive psychology represents a shift in focus from a deficit model to the perception of competencies and the enhancement of individual growth. Thus, positive psychology seeks to promote strengths and positive outcomes for youth (Brown Kirschman, Johnson, & Roberts, 2009). The term positive psychology is an all-encompassing term that includes the study of positive emotions, positive character traits, and enabling institutions (Seligman, Steen, Park, & Peterson, 2005). Positive psychology includes such themes as optimism, self-efficacy, and benefits-finding (Maddux, Snyder, & Lopez, 2004). Applied positive psychology is the utilization of positive psychology research in the facilitation of optimal functioning. Optimal functioning refers to a range of valued psychological processes and outcomes, which include both resiliency and hope (Linley & Joseph, 2004). As the positive psychology movement continues to grow, there continues to be a need to study the promotion of positive outcomes and the prevention negative outcomes with youth (Snyder, 2004).

Pediatric psychology is a newer field of clinical psychology, with the term “pediatric psychology” being first coined by Logan Wright in 1967 and the society of pediatric psychology being founded in 1969 (Society of Pediatric Psychology, n.d.). It is an interdisciplinary field of scientific research and clinical practice that focuses on

addressing a wide range of physical and psychological issues related to promoting the health and development of children, adolescents, and their families. The field was developed to address the unmet needs for psychological services in the pediatric setting (Aylward, Bender, Graves, & Roberts, 2009). One specific area of pediatric psychology with ongoing research needs is that of pediatric obesity.

Child and adolescent obesity is a major public health concern (McClanahan, Huff, & Omar, 2009). Obesity has been linked with a number of medical health and psychological health concerns, including hypertension, diabetes, depression, and anxiety issues (Huang et al., 2009; McClanahan, Huff, & Omar, 2009). Over the past thirty years, the prevalence of pediatric obesity has tripled in the United States (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Family based behavioral intervention programs for children and adolescents are effective techniques for prevention and treatment of pediatric obesity. However, there have been few studies of family-based interventions focusing upon youth (Myers, 2009). There is a current need for additional empirical research in this area in order to improve both physical and mental health outcomes within the youth population experiencing obesity (Jelalian & Hart, 2009). One such program that has been established in Dayton, Ohio is The Diabetes and Obesity Wellness Opportunity Program (DO-WOP). The program utilizes an interdisciplinary approach to intervention through the collaborative efforts of physicians, nutritionists, exercise physiologists, and psychologists.

## **1.2 Significance and Purpose**

Pediatric obesity has been labeled as a public health epidemic in the United States and is considered one of the nation's most important health issues (McClanahan, Huff, &

Omar, 2009). Over the last thirty years, the prevalence of childhood and adolescent obesity has more than tripled with the National Health and Nutrition Examination Survey (NHANES) reporting that 16.3% of United States children between the ages of 2 and 19 being obese (Ogden, Carroll, & Flegal, 2010). Additionally, pediatric obesity has been found to be correlated with a number of negative health and psychosocial outcomes in youth (Jelalian & Hart, 2009).

Though the research base in addressing diet and exercise to decrease obesity in youth has substantially increased in recent years, there continues to be a gap in pediatric obesity research that also addresses the role of positive psychology constructs in pediatric obesity intervention (Golan & Crow 2004; Saelens, Sallis, Wilfey, Cella, & Buchta, 2002; Savoye, Shaw, Sziura, Tamborlane, Rose, Guandalini, et al, 2007). There is a significant need to address this gap in order to create more comprehensive intervention methodologies for supporting this population in obtaining successful outcomes to becoming healthy.

This study sought to examine correlations between positive psychology constructs and pediatric chronic illness outcomes. Specifically, the constructs of hope and resilience were investigated in relation to pediatric obesity intervention outcomes. It was hoped that the information obtained from this study can be generalized to other pediatric populations and intervention methodology. Thus, the overarching goal of this project is to enhance the literature available that to inform treatment methodology for pediatric intervention programming.

This dissertation includes seven chapters. Chapter two provides a literature review of relevant publications pertinent to this study. A description of resilience and hope is

provided in chapter two as it relates to each construct individually to introduce the reader to components of each factor. An integrated model of resilience and hope is then proposed to serve as a tool for studying clinically significant outcomes in pediatric psychology interventions. Chapter two also contains a discussion of pediatric obesity with a focus on the history, health impact, and models of intervention. The DO-WOP program is highlighted as a model of interdisciplinary care for pediatric obesity. Chapter three focuses on specific procedures utilized in the study. Specifically, the research methodology, hypotheses, participant demographics, and study measures discussed. Chapter four addresses specific results of the study. Chapter five discusses conclusions based upon the results section and chapter six discusses plans for future work. Finally, chapter seven includes appendices highlighting study materials and measures.

## **Chapter 2: Literature Review**

This dissertation addresses a number of topics related to positive psychology and pediatric obesity with goals of studying the role of hope and resilience in relation to health outcomes as well as introducing an integrative model for studying pediatric psychology outcomes. As a result, this literature review is separated into several topics. First, the constructs of resilience and hope are discussed individually to provide the reader with a general understanding of each construct. An integrative model of resilience and hope is proposed as a potential model for studying clinically significant outcomes in pediatric psychology interventions. This will be followed by a discussion of pediatric obesity as it relates to physical health and psychological wellbeing. Finally, the Diabetes and Obesity Wellness Opportunities Program (DO-WOP) will be discussed to provide a context for multidisciplinary intervention models for pediatric obesity and a model for which the integrated model of resilience and hope can be applied.

### **2. 1 Resilience**

**2.1.1 Defining Resilience.** Resilience is generally defined as a positive adaptation in the presence of risk or adversity, which focuses upon a developmental system approach. It encompasses a range of phenomena. The most notable of these phenomena being the capacity to overcome significant challenges (Masten, Cutuli, Herbers, & Reed, 2009). Masten and colleagues (2009) noted that in order to diagnose resilience, two judgments must be considered: (1) the individual is judged to at least be “doing okay” in relation to the expectations for that behavior; (2) a significant exposure to risk of

adversity representing a threat to positive outcomes occurs. Therefore, resilience research requires researchers to define the criteria for identifying positive adaption and developments as well as the presence of conditions that threaten to disrupt positive adaption or harm development (Masten, Cutuli, Herbers, & Reed, 2009). This definition of resilience is widely accepted in the academic community. Hardiness is another psychological construct that is often considered to play a role in the development of resilience (Maddi, 2005). It is described as a set of personality factors that distinguishes managers or executives who remain healthy under distress from those who become ill. However, this construct has been primarily studied with adult populations and adult caregivers of children with chronic illness (Kobasa, 1979). As a result it was not considered as a construct of interest in this study.

Snyder (2007) highlights there is continued debate surrounding the universality of protective factors and the extent to which an individual is doing “okay.” Resilience researchers have been able to identify an extensive list of protective factors. However, there is yet to be confirmation regarding the extent that these factors serve the role of being protective for individuals. Additionally, researchers have not been able to assess the variability in which individuals are able to make use of resources when dealing with risks and advantages (Masten, Cutuli, Herbers, & Reed, 2009). As it relates to good adaptation, resilience researchers generally agree that external adaptation is critical to identify individuals who are resilient. Further, consensus has not been reached regarding the impact of internal adaptation upon resilience (Snyder & Lopez, 2007). Some of the internal resiliency factors that have been described in the literature include personality related and interpersonally related factors. Personality factors include: self-efficacy,

realistic evaluation of the environment, social problem-solving skills, sense of direction, humor, empathy, and adaptive distancing. Interpersonally related factors include: relationships that are positive and caring, positive family environment, and having expectations that are “high enough (Turner, 2000).”

**2.1.2 Models of Resilience.** Research on resilience development has focused upon two major approaches: (1) variable-focused approaches, and (2) person-focused approaches (Masten et al., 2009). Variable-focused approaches examine the statistical patterns within measures of characteristics of individuals, environments, and experiences to determine the cause of positive outcomes when there is a high risk for adversity. This method effectively utilizes the power of the entire sample or risk group in addition to the strengths of multivariate statistics to identify clues to resilience processes. These types of approaches are more fitting for researching specific protective factors or influences for specific aspects of adaptation (Masten & Reed, 2002). Person-focused approaches identify resilient people and seek to understand how they differ from other people who are not doing well when faced with adversity or those who have not been challenged by major threats to development. This approach argues resilience is usually judged in terms of the whole person as well as in terms of multiple dimensions of adaptive functioning simultaneously (Masten & Reed, 2002).

**2.1.3 Resilience Core Constructs.** Based upon developmental theory and research in the area of personal resilience it has been suggested that there are three core constructs of resiliency: (1) sense of mastery, (2) sense of relatedness, and (3) emotional reactivity (Prince-Embury & Courville, 2008). Research by Prince-Embury and Courville (2008) with three groups of youth (children age 9-11, children age 12-14, and children

age 15-18) representative of the U.S. population found that there are 10 resiliency subscales being optimism, self-efficacy, adaptability, trust, access to support, social comfort, tolerance to difference, sensitivity, recovery, and impairment that are related to the three core factors of resilience (Prince-Embury & Courville, 2008).

Sense of mastery exists as a sense of efficacy in children and youth that allows for them to interact with and enjoy interactions with their environment (White, 1959). This sense of mastery is driven by an innate curiosity that is intrinsically rewarding and becomes the source of problem-solving skills. Overall, this sense of mastery is correlated with optimism, self-efficacy, and adaptability (Prince-Embury & Courville, 2008).

Resilience is also correlated to a sense of relatedness. There is a growing body of literature that links relational experience and ability in youth with resilience in the presence of adversity (Prince-Embury & Courville, 2008). The literature suggests social relatedness enhances resiliency through youth viewing relationships as specific supports in specific situations (Bowen, 1978; Thomas & Chess, 1977; Werner & Smith, 1982). Additionally, the literature suggests the internal mechanisms reflecting the overall experience of previous support may protect the child from negative psychological impact. These aspects are considered to be related to trust, access to support, social comfort, and tolerance difference (Prince-Embury & Courville, 2008).

Finally, research within developmental psychopathology suggests that a determinant in the development of psychopathology in children and youth experiencing adversity is related to emotional reactivity and the child's ability to regulate the reactivity (Davidson, 2000). Strong emotional reactivity has been associated with behavioral

difficulty and vulnerability to pathology. Additionally, emotional reactivity is related to the factors of sensitivity, recovery, and impairment (Prince-Embury & Courville, 2008).

**2.1.4 Enhancing Resilience.** The developmental periods of childhood and adolescence have the potential to be a period of resilience enhancement through protective factors. However, it can also be a time of developing increased vulnerability if there are instances of extreme distress (Turner, 2000). Research findings suggest the greatest threats to youth are those that diminish basic human protective systems (Masten & Reed, 2002). As a result, researchers recommend that efforts to promote competence and resilience in at-risk youth should focus on strategies to prevent damage, restore, or compensate for threats to this system. It is also evident that programs will be most effective when intervention focuses upon reducing risk, increasing strength, and encouraging adaptive systems that have the potential to protect and restore positive human development (Masten & Reed, 2002).

Anderson-Butcher and Cash (2010), studied the correlates of vulnerability and self-concept. The study utilized 297 youth between the ages of nine and sixteen years of age participating in activities at an urban intermountain west Boys and Girls Club. The research model followed a risk and resiliency framework which provides a method for investigating the benefits of participating in youth programming through a theory-based view of the relationship between specific experiences or conditions and healthy youth outcomes. The results of the study found poor self-concept to be related to increased vulnerability to negative outcomes. Additionally, they found that participation in activities was correlated with maintaining a general or normal level of self-concept and decreased vulnerability (Anderson-Butcher & Cash, 2010).

Further, Tiet and colleagues (2010) studied the longitudinal data of 877 youths involved in the Denver Youth Study to examine the predictors of resilience in youth. Results of the study found that over time, resilience can be predicted by bonding to significant others (family, teachers, etc), being involved in extracurricular activities, lower levels of adverse events, and being less involved with delinquent peers. The study also found a positive feedback loop of the presence of resilience predicting further resilience. The study stressed the importance of strengthening bonding, and reducing the effects of adverse life events in the enhancement of resiliency through early intervention (Tiet, Huizinga, & Byrnes, 2010).

Additionally, resilience models and findings suggest the utilization of adaption systems to increase effectiveness (Masten & Reed, 2002). The mastery motivation system provides such an example. In cases where development proceeds normally, humans tend to be motivated to learn about the environment and obtain pleasure from mastering new skills. As a result, children and adolescents need opportunities to experience success at all stages of development. Therefore, there is a need for families, schools and communities to provide these opportunities and encourage the development of talents within children and adolescents (Masten & Reed, 2002). One of the major differences in the lives of children growing up in middle class as opposed to poverty is the availability of opportunities for achievement that impact the mastery motivation system. Feelings of self-efficacy and self-confidence develop from mastery experiences. Children who feel effective are more likely to persist with the presence of adversity and achieve success due to their efforts (Bandura, 1997).

**2.1.5 Resilience and Pediatric Psychology.** Pediatric psychology places emphasis upon understanding resilience as it relates to protective and risk factors in the context of childhood chronic conditions. However, the majority of literature in positive psychology has occurred in the clinical child and adult health psychology arenas (Barakat, Pulgaron, & Daniel, 2009). Broad efforts have been made to evaluate resilience in clinical child literature and to study the risk and protective factors (Noll & Kupst, 2007). Current research has found that the majority of children with chronic health conditions have resilience that is just as good or sometimes better than peers without chronic illness (Eiser, Hill, & Vance, 2000; Phipps, Larson, Long, & Rai, 2006). However, the process of defining adaptation (i.e., resilience and optimal outcomes) in pediatrics populations is still in its infancy (Ahern, Kiehl, Soel, & Byers, 2006).

## **2.2 Hope**

**2.2.1 Hope Model.** Hope is defined by Snyder and colleagues (1991) as “a positive motivational state that is built upon a sense of success that is interactive in nature involving agency and pathways”. Thus, there are two components of hope: agency and pathway. These components act in concert for individuals to reach their goals. The agency component of hope addresses thoughts of initiating and maintaining motivation for using pathway thinking (Lopez et al., 2004). It provides the motivation to begin and continue using a pathway in one’s goal pursuits. Agency thinking is also important for realizing an alternate pathway to the goal when the preferred route is blocked. For example, when adolescents think to themselves “I can do it” or “I will not quit,” they are using agency thinking. Pathway thinking includes thoughts about one’s ability to pursue different means to reaching one’s goals (Chang & Banks, 2007; Snyder, McDermott,

Cook, & Rapoff, 1997). The adolescent thought process of “I will figure this out” and “I will reach my goals another way if this way does not work” illustrates the pathway component of hope. Both agency and pathway combine in a reciprocal and additive manner that is necessary for hopeful thinking (Snyder et al., 1991).

With the components of the hope model defined, it is relevant to conceptualize goals as they relate to the pathway construct of hope. There are three defining thoughts that often occur throughout the process (Edwards, Rand, Lopez, & Snyder, 2007). Initially, it is important to consider what an individual wants, or that person’s goal. Goals typify high-hope thinking and must be of value in order for people to pursue them. Next, youth must consider an effective strategy that needs to be utilized to get there. In essence, a goal is a possibility, but it cannot be reached without a path to obtain it. Having higher hope tends to be related to increased flexibility in maintaining pursuit of goals when preferred routes are blocked (Chang, 1998). Finally, the individual must consider how they will become motivated and sustain this motivation to reach the goal (Snyder 2007). Throughout adolescent development, this process is refined and developed to attain maximal goal directed behavior. Therefore, it is critical to study the construct of hope in adolescence and further develop this area of positive psychology (Jacoby, 2003).

**2.2.2 Child and Adolescent Development and Hope.** Agency and pathway-type thinking emerge throughout childhood and adolescence (Sun & Lau, 2006). The cognitive advancement that occurs during adolescent development enhances a child’s ability to utilize hopeful goal-directed thoughts and motivation. According to Piaget’s cognitive theory, adolescents are generally in the formal operational stage of development and have the ability to reason abstractly and plan more realistically for the

future as compared to earlier stages in childhood (Inhelder & Piaget, 2008). It is therefore beneficial to equip adolescents who have advancing cognitive ability with skills to evaluate goal attainment, generate alternative pathways, and modify goal planning (Sun & Lau, 2006).

Snyder (2006) noted that the cognitive foundation of hope begins developing in infants and toddlers through sensations and perceptions, linkages, goals, and self-recognition. This foundation for hope is generally set by the age of two and is hypothesized to remain stable through development without the presence of any major childhood stressors. However, children at this age lack the skills to verbally and abstractly conceptualize and self-report hope (Inhelder & Piaget, 2008). It is not until the age of seven or eight that children begin to understand and have the ability to report hopeful thinking (Snyder, 2006).

**2.2.3 Hope and Adversity.** Adversity has been previously argued to be negatively correlated with hope in a number of studies. For example, Stark and Boswell (2001) found a negative association between hope and depressive symptoms in a study of children living in the inner-city under poverty conditions. However, a number of more recent studies have found hope to be a protective factor against internalizing and externalizing problems in youth experiencing adversity (Brown Kirschman, Roberts, Shadlow, & Pelley, 2010; Hagan, Myers, & Mackintosh, 2005). A study completed by Beale (2009) found that youth experiencing academic adversity who participated in a summer intervention program experienced normal levels of hope in general.

**2.2.4 Hope and Pediatric Psychology.** The construct of hope is a factor of interest in studies of health outcomes in pediatric chronic illness populations (Barakat,

Pulgaron, & Daniel, 2009). Lewis and Kleiwer (1996) completed the first study of hope and chronic illness in youth when they studied a sample of adolescents with sickle cell disease (SCD). They found that hope had a negative relationship with anxiety. It was also found that coping moderated the relationship between hope and anxiety in SCD populations (Lewis and Kleiwer, 1996). Berg and colleagues (2007) found hope to be a significant predictor of treatment adherence in a pediatric asthma population. It has also been found that adolescent burn survivors with higher levels of hope experienced lower levels of behavior problems and that hope significantly predicted global self-worth (Bauman, Snyder, Rapoff, Mani, & Thompson, 1998). Maikrantz and colleagues (2006) studied hope, depression, and medication adherence in a sample of 70 transplant recipients between the ages of seven and eighteen. The study found that individuals experiencing high hope and low treatment uncertainty had higher rates of adherence than individuals with low hope and high treatment uncertainty (Maikranz, Steele, Dreyer, Stratman, & Bovaird, 2007). There are currently no published studies examining hope and pediatric obesity outcomes.

### **2.3 A Proposed Integrative Model of Hope and Resilience**

Resilience and hope are generally studied separately, as they are considered to be different positive psychology constructs. Taken alone, each construct explains a set of psychological outcomes. The Hope Model (Snyder et al., 1991) utilizes agency and pathway constructs of hope to explain motivation and drive in goal attainment. Since the hope model contains the construct of pathway hope, it does inherently suggest the possibility of challenges occurring when an individual strives to attain a goal. However, it does not directly address the impact of major adversity factors being present in goal

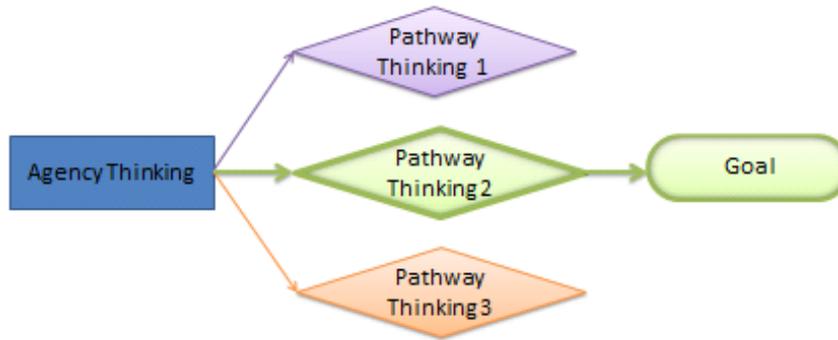
attainment. Resilience models address the ability of an individual to “bounce back” when faced with adversity (Snyder, 2007). Resilience in itself addresses the ability for an individual to overcome different levels of adversity, but does not address hopeful thinking as it relates to goal attainment.

To date, there has only been one article published considering the possibility of an integrative model of resilience and hope as a more comprehensive and complementary model for studying psychological outcomes (Margalit & Idan, 2004). However, no research has been published studying such a model. An integrative model of resilience and hope has the potential to provide better understanding for treatment outcomes in chronic illness populations and can be utilized to improve intervention models. This study proposes one such model that considers the constructs of both resilience and hope as they relate to biometric health outcomes in a pediatric obesity intervention population.

Figure 1 provides a graphic representation of the hope model as proposed by Snyder and colleagues (1991). Within this model, agency thinking is represented first as it is utilized for motivation and initiating the pursuit of goals. It is also important for the realization of alternate pathways to reach goals (Lopez et al., 2004). Pathway thinking can be likened to problem-solving to discover the most efficient and effective to reach a goal (Chang & Banks, 2007). In this diagram the chosen pathway (heavier line) is the shortest or “most efficient” path to the goal. Without adversity in the model, it is likely the goal can be easily attained.

This model (Figure 1) can be applied to a number of goal directed instances. For example, a child is diagnosed with asthma by his or her physician after experiencing an asthma attack related to over-exertion. The child experiences feelings of anxiety and fear

related to impact of his health condition creates a goal to not experience another asthma attack. Agency related hope thoughts for this child may include: “I want to live without experiencing further asthma attacks” or “if I work hard, I can prevent asthma attacks.” Physicians tell the child asthma attacks can be prevented by taking a daily preventative medication, using a rescue inhaler when symptoms of an asthma attack begin, and by avoiding certain environments (second hand smoke, poorly ventilated areas, etc.). The child and caregiver problem-solve different plans to decrease the likelihood of another asthma attack. One pathway (pathway thinking 1) is to try an alternative treatment plan of herbal medications not recommended by the doctor. Another pathway (pathway thinking 2) is to follow all of the doctor’s recommendations all of the time. A third option (pathway thinking 3) is to no longer participate in activities that may cause over-exertion and induce an asthma attack. The child decides to try the second option, because of rapport built with the doctor and it is seen as the easiest way to live without asthma attacks. After committing to the plan, the child attains the goal of not experiencing any more asthma attacks.

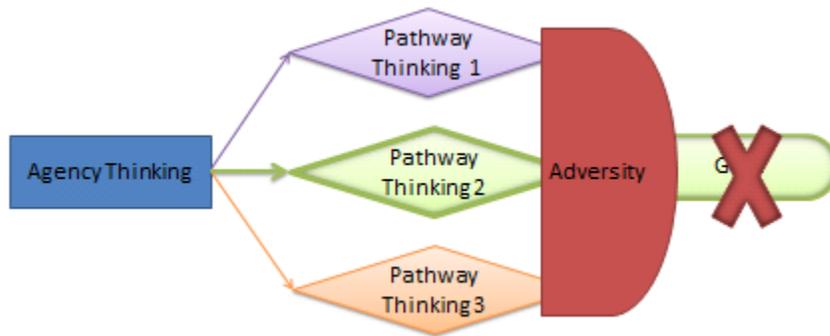


*Figure 1.* Hope Model (Snyder et al., 1991).

Figure 2 builds upon the hope model from Figure 1. In Figure 2 it is assumed that normal levels of agency and pathway hope are present. However, adversity has been inserted into the model. By the virtue of its definition, adversity increases the difficulty in attaining goals despite normal hope levels. Therefore, all routes to the goal are blocked. Notice, adversity is integrated into the hope model after pathway thinking, because these aspects of hope are not necessarily impacted by adversity.

Returning to the example from Figure 1, agency thinking and pathway thinking have not changed for the child. However, under the model of Figure 2 adversity has been added in the form of the child actually having a type of asthma that makes airways extremely sensitive to inflammation and decreases the effectiveness of treatment options originally prescribed. However, the doctor did not conduct enough tests to have evidence of this before recommending a treatment plan. In this instance, the child first commits to the first option (pathway thinking 1), but continues to experience asthma attacks. The child next tries option 2 (pathway thinking 2), but again asthma attacks are experienced.

The child then tries option 3 (pathway thinking 3), and still experiences asthma attacks. In essence, the goal was not attained despite normal levels of hope



*Figure 2. Hope and Adversity.*

In Figure 3, resilience has been added to the model from Figure 2. When resilience is present it acts as a buffering agent or catalyst that reduces the impact of adversity upon goal attainment. Resilience also increases the likelihood of goal attainment. In essence resilience becomes the factor that allows for perseverance in the face of adversity and enhances the ability to maintain adequate hope for goal attainment (Snyder, 2007).

Considering the example of the child living with sensitive and treatment resistant asthma from Figure 2, resilience is now represented in the model (Figure 3). This allows for the child to continue believing that goal attainment is possible despite the presence of challenging adversity. As a result of this belief the child continues to persevere to reach this goal. In this case, the child shares with the doctor the treatments tried and the results. Based upon this information, the doctor runs additional tests and modifies the medical treatment plan to increase effectiveness. When the child returns to acting on the second option of following the doctor's recommended treatment plan, the asthma attacks stop and the goal is reached. It is important to note that the child's resilience allowed for further investigation and modifications to the items (prescription medication) in pathway thinking 2, the impact of adversity was decreased or buffered. This allowed for the child

to reach the goal of not experiencing asthma attacks. However, adversity is still present in the diagram in that the other pathways to the goal are still blocked and would not be effective for the child. Additionally, the child’s agency thinking or belief in living without experiencing asthma attacks was indirectly protected by resilience. Through this process, the child is transformed from a passive role to an active role in goal attainment. Further, the child maintained a belief in reaching the goal of not experiencing asthma attacks due to the presence of resilience.

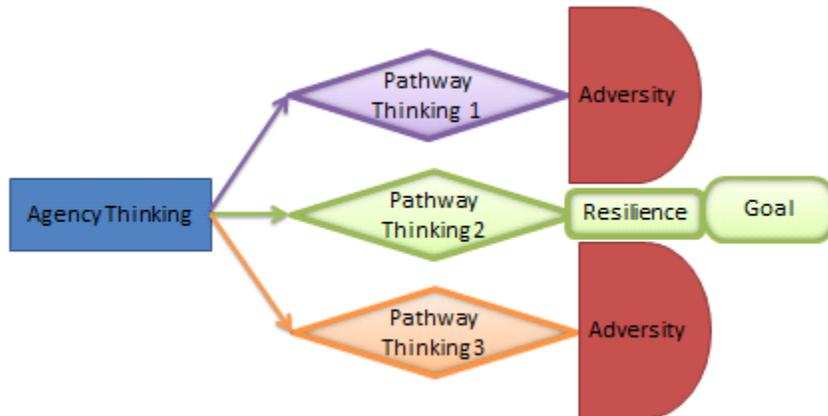


Figure 3. Hope, Adversity and Resilience.

Table 1 provides expected goal attainment outcomes for the proposed integrated model of hope and resilience under the condition of minimal adversity. Anytime there is low hope in the system, the individual is not likely to reach goal attainment. This occurs because insufficient agency and pathway thinking does not allow for motivation or initiation to foster goal attainment (Stark & Boswell, 2001). If agency thinking is sufficient, but pathway thinking is insufficient, goal directed thinking is still interrupted and it is not likely that goals will be attained. In these instances, resilience level is not a critical factor since the hope level is insufficient. Since both aspects of hope work in

concert, they will be addressed together as hope in the proceeding discussion. In cases of minimal to no adversity and normal to high hope, individuals are likely to be successful in goal attainment regardless of their level of resilience. In these instances, hope alone is sufficient for goal attainment. This model of goal attainment in the presence of normal hope follows the general hope model from Figure 1.

Table 1

*Expected Goal Attainment Outcomes with Minimal Adversity*

	High Resiliency	Low Resiliency
Normal Hope	Adequately prepared and likely to attain goals or desired outcomes	Adequately prepared and likely to attain goals or desired outcomes
Low Hope	Not likely to attain goals or desired outcome	Not likely to attain goals or desired outcome

Table 2 re-examines goal attainment outcomes of the integrated hope and resiliency model under the condition of substantial adversity. Under instances of low hope, goal attainment remains unlikely, due to the lack of motivation and initiation provided by agency and pathway thinking (Stark & Boswell, 2001). When there is normal hope levels, but low resiliency, goal attainment likelihood remains low. However, under these circumstances, the lack of goal attainment is not due to a lack of motivation or initiation. This lack of goal of attainment occurs as a result of adversity preventing goal attainment and a lack of ability to “bounce back” or overcome the adversity (Masten et al., 2009). This is consistent with the description of the hope model in the presence of adversity (Figure 2). When high resilience is considered in this model, the likelihood for goal attainment increases because resilience enhances perseverance to continue working

toward the goal and decreases the impact of adversity. This is consistent with the description of the hope model in the presence of adversity and resilience (Figure 3).

Table 2

*Expected Goal Attainment Outcomes with Substantial Adversity*

	High Resiliency	Low Resiliency
Normal Hope	Adequately prepared and more likely to attain goals or desired outcomes	Will likely strive to meet goals, but will fall short of meeting goals as a result of adversity
Low Hope	Not likely to attain goals or desired outcome	Not likely to attain goals or desired outcome

## 2.4 Obesity in Youth

**2.4.1 Youth Obesity Health Statistics.** Body mass index (BMI) is a measure of height and weight that is used to define obesity in adolescents. Specifically, BMI is a measure of weight in relation to height that is used to determine weight status. According to the Center for Disease Control (CDC), BMI is the most widely used method to screen for overweight and obesity in children and adolescents because it can be obtained quickly and easily, as the measurements are non-invasive and BMI correlates with body fat percentages. However, it is important to note that BMI can only be used as a screening tool for the initial assessment of body fatness in children and adolescents, and not a diagnostic tool, since it is not a direct measure of body fatness. Previously, the CDC labeled children and adolescents classified as being between the 85<sup>th</sup> and 94<sup>th</sup> percentile BMI rankings for age and sex as “at risk for overweight.” Children whose weight was at the 95<sup>th</sup> percentile or greater were labeled as “overweight (<http://www.cdc.gov/obesity/childhood/basics.html>).” More recently, children who fall between the 85<sup>th</sup>, but below the 95<sup>th</sup> percentile of weight for age and gender are classified

as overweight, while children who are the 95<sup>th</sup> percentile or higher are classified as obese (Barlow, 2007). For the purposes of consistency, the terms overweight and obese will be used in this manuscript.

As previously stated, obesity has been labeled as a public health epidemic in the United States and is considered one of the nation's most important health issues. More specifically, the prevalence of childhood and adolescent obesity has gained a great deal of attention in the literature (Huang et al., 2009; Pratt, 2009). Over the last thirty years, the prevalence of childhood and adolescent obesity has more than tripled. Between the years of 1980 and 2008, the prevalence of obesity among children between the ages of 6 and 11 years increased from 6.5% to 19.6%, respectively. The prevalence of obesity among adolescents between the ages of 12 and 19 years has also increased from 5.0% to 18.1% (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010); National Center for Health Statistics, 2004). The National Health and Nutrition Examination Survey (NHANES) data for the year 2010 found 19.5% of adolescent males and 16.8% of adolescent females aged 12-19 are obese with a Body Mass Index (BMI) greater than the 95<sup>th</sup> percentile.

More recently, the Robert Wood Johnson Foundation (2012) foundation reported that the rates of obesity in youth has stabilized and even decreased in some cities and states. National data from 2009-2010 found that 16.9% of US children between the ages of 2 and 19 are obese (Ogden, Carroll, Kit, & Flegal, 2012). More specifically, 18% of children between the ages of 6 and 11 are obese and 18.4% of children between of 12 and 19 are obese. Additionally, no significant change occurred in obesity prevalence among male youth with an overall obesity prevalence rate of 20.1% amongst 6 to 11 year olds and 19.6% amongst 12-19 year olds. Female youth did not show a significant change in

obesity prevalence, either with an obesity prevalence rate of 15.7% amongst 6 to 11 year olds and 17.1% amongst 12-19 year olds (Ogden, Carroll, Kit, & Flegal 2012).

Philadelphia, New York City, Mississippi, and California have attracted national attention as leaders in combatting the childhood obesity epidemic (Robert Wood Johnson Foundation, 2012). Philadelphia has enacted programs to improve access to fresh foods through corner stores, connect schools with local farms, and increase the number of supermarkets in underserved areas since 1992 (Robbins, Mallya, Polansky, & Schwarz, 2012). Through these initiatives, Philadelphia has successfully decreased the rate of obesity amongst school age children from 21.5% during the 2006-2007 school year to 20.5% in the 2009-2010 school year (Robert Wood Johnson Foundation, 2012). Within this study, it was found that Latino males (25.6%) and African American females (22%) had the highest prevalence of obesity in comparison to other same aged ethnic groups. Additionally, groups with the highest rates of obesity showed the smallest amount of decline. Though the data suggests that childhood obesity is showing a meaningful amount of decline in Philadelphia, there continues to be epidemic levels of childhood obesity that are disproportionately impacting minority populations (Robbins, Mallya, Polansky, & Schwarz, 2012).

New York City has worked to decrease obesity rates in the city by requiring restaurants to post calorie information and day care centers to offer daily physical activity, limit screen time, and utilize healthy nutrition standards (Robert Wood Johnson Foundation, 2012). The CDC (2011) reported that the rate of childhood obesity decreased from 21.9% during the 2006-2007 school to 20.7% during the 2009-2010 school year.

Latino and African American groups maintained the highest rate of obesity in children and lowest amounts of decrease.

Mississippi and California have showed the greatest overall progress in decreasing childhood obesity. Both states have utilized interventions to create healthier schools (Robert Wood Johnson and Bower Foundation, 2012). Both states also support programs and policies that encourage physical activity and healthy eating in communities. Overall, obesity rate in Mississippi youth has decreased from 43% in 2005 to 37.3% in 2011. However, the obesity rate amongst youth in Mississippi has only decreased among Caucasian students (Robert Wood Johnson Foundation, 2012). In California, the obesity rate has decreased from 38.44% in 2005 to 38% in 2010 (Robert Wood Johnson Foundation, 2012).

There is also a significant racial and ethnic disparity of adolescent obesity. African American, Hispanic, American Indian, and Pacific Islander youth are impacted at much higher rates than other youth (Yano, 2009). Specifically, Mexican-American adolescent boys and African-American adolescent females are significantly more likely to be obese than non-Hispanic Caucasian adolescents for either gender. Between 1988-1994 and 2007-2008 the prevalence of obesity among Mexican American adolescent boys increased from 14.1% to 26.8%, while the prevalence for Caucasian adolescent boys increased from 11.6% to 16.7%. Over the same time period, the prevalence of obesity in African-American adolescent girls increased from 16.3% to 29.2% and increased from 8.9% to 14.5% in Caucasian adolescent girls (Ogden & Carroll et al., 2010). Reports from 2009-2010 indicate that the significant racial disparity continues to persist. The obesity prevalence amongst Mexican American adolescent males has increased to 28.9%,

while the obesity prevalence has also increased to 17.5% amongst Caucasian males. African American female youth has shown a slight decrease in obesity prevalence to 24.8%, while the prevalence of obesity has decreased to 14.7% amongst Caucasian adolescent females (Ogden, Carroll, Kit, & Flegal, 2012).

Children and adolescents who are obese are at risk for physical health problems during their youth. In adulthood they are at a higher risk for cardiovascular, insulin resistance-associated, respiratory, or musculoskeletal conditions (Ward-Begnoche, 2009). Some of these conditions include: hypertension, type II diabetes, and obstructive sleep apnea (Huang et al., 2009). Children and adolescents that experience obesity are more likely to experience obesity as adults (<http://www.cdc.gov/obesity/childhood/index.html>). Youth who remain obese in adulthood, have a life expectancy that can be shorter than adults who do not experience obesity by as many as 20 years (Huang et al., 2009).

**2.4.2 Youth Obesity and Psychological Wellbeing.** Beyond the physical health risks associated with adolescent obesity, there are also a number of psycho-social risks associated with obesity. Children living with obesity are more likely to experience negative psychological consequences, which include poor self-concept (French, Story, & Perry, 1995; Wardle & Cooke, 2005), depression (Crow, Eisenberg, Story & Neumark-Sztainer, 2006; Zeller & Modi, 2006), and be at a higher risk to experience bullying (Neumark-Sztainer, Falkner, Story, Perry, Hannan, & Mulert, 2002; McClanahan, Huff, & Omar, 2009).

Pinhas-Hamiel and colleagues (2006) noted that silhouettes of obese children are more likely to be stereotyped as unhealthy, academically unsuccessful, socially incompetent, unhygienic, and lazy. Beyond these stereotypes, negative self-image has

been documented within this population as early as 5 years of age, and obese adolescents are more likely to show decreases in self-esteem over time. This decrease in self-esteem is associated with sadness, loneliness, nervousness, and certain high-risk behaviors (Pinhas-Hamiel et al., 2006).

**2.4.3 Youth Obesity and Resilience.** Pratt (2009) argues that adolescents are generally resilient and have the ability to overcome challenging environmental events with the assistance of their family and community. Even with this resilience, adolescents are still vulnerable based upon their stage of development. Adolescents lack a history of success with interpersonal relationships to overcome negative views about obesity that are expressed to them by family members and peers. It is due to their feedback from their environment that adolescents develop self-views of who they are, what makes them unique, and assess their strengths and weaknesses (Pratt, 2009).

As a result of these discoveries, youth will develop healthy or unhealthy self-esteem and negative or positive perceptions of their self-worth. If the environment of the adolescent provides negative feedback, the adolescent is more likely to develop poor self-esteem, an unhealthy self-image, and develop body dissatisfaction (Eisenberg, Neumark-Sztainer, Haines, & Wall, 2006). When a dangerous combination of negative cognitions, emotions and negative feedback from multiple sources regarding obesity occurs, adolescents are at high risk of experiencing negative affective states that can negatively impact the adolescent's ability to be resilient. Therefore, youth need protection and nurturing experiences from family, and peers to overcome negative situations. In the absence of such support, adolescents become high-risk for developing extreme sadness,

distress, or depression due to harassment, bullying, and peer rejection (Ereemmis et al., 2004; Puhl & Latner, 2007).

## **2.5 Obesity Intervention: Diabetes and Obesity Wellness Opportunity Program (DO-WOP)**

As a result of the epidemic prevalence of obesity and the physical and psychological impact of obesity upon children and adolescents a number of multi-disciplinary intervention programs have been created targeted at this population. One such program that has been established in Dayton, Ohio is the Diabetes and Obesity Wellness Opportunity Program (DO-WOP). The program was established in 2007 by a pediatrician and nutritionist to decrease the prevalence and medically related consequences of adolescent obesity. The program was developed as a collaborative effort between the Grandview Hospital Foundation, Victor J. Cassano Health Center, Joslin Diabetes Center Affiliate at Southview Hospital, Wright State University School of Professional Psychology and the Dayton Contemporary Dance Company<sup>2</sup> (DCDC<sup>2</sup>) and later Zumba ® and exercise physiology.

The DO-WOP program utilizes a community based and family inclusive approach to intervention. The program meets for one and a half hours, weekly for 12 weeks at the Cassano Health Center in Dayton Ohio, serving all participants free of cost. The DO-WOP program targets youth from lower SES and marginalized groups who are overweight, obese, or who are at risk for type II diabetes or hypertension. The program model incorporates nutrition education, psychological change, and physical activity into the curriculum for both the youth and their families. The first thirty minutes of each class is dedicating to providing nutritional education to participants and their families along

with behavior change education. The second hour of each class is dedicated to physical exercise through Zumba ® or exercise physiology. The program requires a parent to be present with their youth for each scheduled lesson. Program coordinators obtain blood draws, measurements, and psychological data at three points during the course of the program (pre-program, mid-program, and post-program) to track changes over time with participants and make adjustments if needed. Additionally, participants have the opportunity to earn DO-WOP dollars throughout the course of the program that can be traded in for rewards at the end of the program. At the end of the program all participants who commit to the program will graduate and earn a certificate of completion during a graduation ceremony for the program.

The DO-WOP model is representative of a culturally inclusive family-based behavioral intervention, in that the program encourages family cohesion, collaborative goal setting, and teamwork in an environment that is sensitive to the cultural needs of the family. In addition, the program encourages families to develop goals specific to lifestyle behaviors and coping skills. In essence there is a focus upon overall health and well-being and not a focus upon weight loss (Yano, 2009).

This chapter defined hope and resilience as these constructs relate to a number of factors including development and adversity. An integrative model of hope and resilience was proposed after explaining the general concepts of these constructs. Additionally, the history and impact of pediatric obesity was explained and the Diabetes and Obesity Wellness Opportunity Program (DO-WOP) was highlighted as a model of pediatric obesity.

## **Chapter 3: Procedures**

The proceeding chapter will highlight the procedures utilized to study the proposed integrative model of hope and adversity. First, study methodology will be discussed. Next study objectives and hypotheses will be defined. Demographics of participants will then be presented. Finally, the measures used for the study will be defined in detail.

### **3.1 Research Methodology**

Methodology was approved by the Institutional Review Board of Wright State University and the Kettering Medical Network. For the purposes of the study, only Diabetes and Obesity Wellness Opportunity Program (DO-WOP) participants were recruited. All participants in the DO-WOP program between the ages of eight and fifteen were given the opportunity to participate in the project. Initial study information was communicated to parents and youth during the orientation meeting for the DO-WOP program before program measures were completed. Written consent (see Appendix B) was obtained from interested parents during the initial meeting and written assent (see Appendix C) was obtained from youth at the same meeting. In addition to consenting to the study, parents were also required to sign an informed consent and permission form for the DO-WOP program that discussed the limits of confidentiality (i.e., abuse, neglect, or risks of self-harm). Demographic information was obtained from parent self-report forms and health information was obtained from the DO-WOP program staff during the same

day as the orientation. Participants were administered the CHS and the RSCA on the day of orientation (pre-intervention), during week 5 (midpoint), and during week 11 (post-intervention). This study utilized a single-participant research design to compare baseline outcomes to post-intervention outcomes. Hope and resilience were considered as predictor variables in the study. The outcome variables were Body Mass Index (BMI), blood glucose levels, cholesterol levels, and waist circumference. There are several advantages to utilizing this type of research design in pediatric psychological research. For example, single-participant designs allow for interparticipant and intraparticipant variability in outcomes. Additionally, these types of studies are able to accommodate small sample sizes. Further, these designs have the ability to enhance clinical practice since clinicians are able to monitor and assess real-time change and modify interventions accordingly (Holmbeck, Zebracki, & McGoron, 2009).

### **3.2 Objectives**

This study examined the correlation of resilience and hope levels with physical and psychological health outcomes. Specifically, resilience and hope levels were studied in a group of youth participating in the DO-WOP program, an intervention program for youth who were overweight or experiencing obesity. The objectives of this study were: (1) examine the levels of hope and resilience experienced by youth living with obesity participating in the DO-WOP program; (2) study hope and resiliency levels as they relate to physical health outcomes over time; and (3) to test a proposed integrative model of hope and resiliency.

The following hypotheses were chosen to investigate these objectives.

### **3.3 Hypotheses**

The following hypotheses were studied as they relate to youth hope and resiliency levels:

**3.3.1 Hypothesis 1.** Participant mean hope scores based upon the Children's Hope Scale (CHS; Snyder, Hoza et al., 1997) will be within normal range at Time 1 (pre-intervention), Time 2 (midpoint), and Time 3 (post-intervention). Descriptive analysis of mean hope scores was completed to assess this hypothesis.

**3.3.2 Hypothesis 2.** Self-reported hope scores and resiliency scores will differ between Time 1 (pre-intervention) and Time 3 (post-intervention). Specifically, participants will show an increase in their mean hope scores and resiliency scores. A repeated measures t-test was utilized to examine changes in hope and resiliency levels over time.

**3.3.3 Hypothesis 3.** Participants with normal hope scores and higher resiliency scores will show a greater correlation with healthier biometrics (i.e., normal BMI, blood glucose, and cholesterol levels) over time (from pre-intervention to post-intervention) than participants with normal hope scores and lower resiliency scores. Analysis of this hypothesis was dependent upon the results of the second hypothesis. If the second hypothesis was accepted, a within groups repeated measures Analysis of Variance (ANOVA) would be completed to assess the interaction between these variables. If the second hypothesis was not accepted, the third hypothesis could not be examined on the basis of regression analysis and correlation studies would be used to examine the relationship between the predictor variables and the outcome variables over time.

### **3.4 Participants**

This study recruited 16 participants from the Diabetes and Obesity Wellness Opportunity Program (DO-WOP) at the Victor J. Cassano Health Center. Ten participants completed measurements at all three time points. Data from two participants only included the pre-program measurements as they withdrew from the program before the midpoint measurement. An additional two participants only completed the initial and midpoint measurements before withdrawing from the program. There were also two participants who only completed the initial and post measurements only as a result of not being present for midpoint measurements. The data for one participant was not used as part of the study as a result of their biometric information results significantly differing from all other participants.

The DO-WOP program is free of charge and open to any youth between the ages of 9 and 15 years of age who are at or above the 85<sup>th</sup> percentile ranking or higher for age and weight upon enrollment into the program and their family members. Children whose percentile ranking for age and weight is at or above the 85<sup>th</sup> percentile, but below the 95<sup>th</sup> percentile meet criteria to be classified as overweight according to the Center for Disease Control (CDC). Children whose percentile ranking for age and weight is at the 95<sup>th</sup> percentile ranking or greater are classified as obese.

All participants in the study were between the ages of nine and fifteen and around the age of eleven. Eleven of the participants in the study were female, while four were male. Eleven participants were African American, three were Caucasian, and one was Biracial. General demographics for participants are summarized in Table 3

Table 3

*Demographic Information for DO-WOP Study Participants*

Measure	Frequency	Percentage	Mean	SD
Age			11.40	2.16
9	3	20		
10	5	33.33		
12	2	13.33		
13	2	13.33		
14	1	6.67		
15	2	13.33		
Gender				
Male	4	26.67		
Female	11	73.33		
Race				
African-American	11	73.33		
Caucasian	3	20		
Biracial	1	6.67		

### **3.5 Measures**

**3.5.1 Demographic Information and Health Measures.** For the purposes of this study, demographic information was compiled from DO-WOP paperwork completed by parents of the participants before beginning the DO-WOP program that consisted of basic information including: gender, age, race, and date of birth. Additionally, health measures were obtained by program staff from each participant that includes measures of body mass index (BMI), weight, height, waist circumference, blood glucose, and blood pressure measurements at before beginning DO-WOP , midway through the program, and finally at the end of the program.

**3.5.2 Children's Hope Scale.** A substantial proportion of research studies examining the role of positive appraisals or expectations in promoting resilience in chronic illness have utilized the Children's Hope Scale (CHS; Snyder et al., 1997). The Children's Hope Scale (CHS; Snyder et al., 1997) is a six-item questionnaire used to evaluate hope levels in children aged eight to sixteen. This scale was developed based upon the assumption that the acquisition and usage of goal-directed thinking is critical for effective functioning in children and adolescents. The purpose of this measure is to identify children who need additional nurturing and education to improve their hopeful thinking, and to identify children who exhibit high hope and may be able to serve as models for other children (Snyder, Hoza et al., 1997).

The CHS has shown acceptable internal reliability across many youth samples, including pediatric chronic health populations such as sickle cell anemia, arthritis, and cancer. The Cronbach alphas have ranged from .72 to .86 (Edwards et al., 2007). Since

the scale is only intended to measure overall hope, reliabilities for the individual components were not assessed. Convergent validity of the CHS was assessed in a variety of ways. First, scores on the CHS were correlated significantly and positively with knowledgeable observers' judgments of their hope levels and the beginning and end of a 1-month interval ( $r = .37$  and  $.38$ ). Next, CHS scores were positively correlated with scores of various measures of children's self-perceived competence and control, including self-perceptions in areas of scholastics, social acceptance, athletics, physical appearance, and behavioral conduct (Edwards et al., 2007). Finally, CHS scores correlated positively with an index of self-worth and correlated negatively with scores on an inventory of depression.

Response options on the CHS are scored from 1 to 6 with higher scores being indicative of higher hope (see Appendix A). Response options correspond with Likert scale values as follows: (1) none of the time, (2) a little of the time, (3) some of the time, (4) a lot of the time, (5) most of the time and (6) all of the time. The average level of hope on this measure is 25. Additionally, the odd numbered questions (1, 3, and 5) address agency, while the even numbered questions address pathway (2, 4, and 6) (Snyder et al., 1997).

**3.5.3 Resiliency Scales for Children and Adolescents.** The Resiliency Scales for Children and Adolescents (RSCA; (Prince Embury, 2006) is a suite of three self-report scales based developmental theory that includes: Sense of Mastery, Sense of Relatedness, and Emotional Reactivity. The Sense of Mastery and Sense of Relatedness constructs assess protective factors, while the Emotional Reactivity construct is proposed to be a personal risk factor (Prince-Embury & Courville, 2008). The Scales include a total of 64

items that are in a likert-type format, written at a third grade reading level (Prince Embury, 2006). Scale scores on the RSCA at 39 or below fall in the low range, while scores between 40 and 44 fall in the below average range. Scores between 45 and 54 are in the average range. RSCA scores between 55 and 59 are in the above average range while scores of 60 or greater are in the high range.

Internal consistency estimates for the RSCA (Prince-Embury, 2006) with a normed population was representative of the US census by race and parent education was considered good to excellent for all three global scales across the age bands of 9 to 11, 12 to 14, and 15 to 18. Alpha coefficients for Sense of Mastery were .85, .89, and .90 respectively. Alpha coefficients for Sense of Relatedness were .89, .91, and .90. Finally, alpha coefficients for Emotional Reactivity were .95, .95, and .94 (Prince-Embury & Courville, 2008).

With regards to test-retest reliability, coefficients were good for all three scales across the age bands of 9 to 14 years of age and 15 to 18 years of age. Across these age bands, Sense of Mastery coefficients were .79 and .86, Sense of Relatedness coefficients were .84 and .86, and Emotional Reactivity coefficients were .88 and .88 (Prince-Embury & Courville, 2008).

The preceding chapter highlighted the procedures utilized in the study. Specifically, study methodology was explained, followed by a description of study objectives and hypotheses. Participant demographic information was provided and the study measures were defined

## **Chapter 4: Results**

This chapter seeks to define the results of the preceding study. The chapter begins with providing a reference point of the data through a descriptive analysis. After which, each individual hypothesis is examined.

### **4.1 Descriptive Analysis**

Measurements for weight, height, body mass index, (BMI), and waist circumference were obtained at the time of enrollment (pre), at the midpoint of the DO-WOP program (mid), and at the end of the program (post). BMI is a measure of weight in relation to height and is the primary methodology utilized to classify weight status (underweight, normal, overweight, obese, etc. in adults. It is important to note that BMI is not considered an accurate measure of weight status for youth. BMI actually fluctuates with age and varies by gender and is not considered an accurate measure of weight in children according to the Center for Disease Control (CDC). As previously discussed, weight status in children is determined by BMI percentile scores based upon age and gender. Children with a BMI at or above the 85<sup>th</sup> percentile, but less than the 95<sup>th</sup> percentile are considered overweight. Children with a BMI at or above the 95<sup>th</sup> percentile are considered obese according to the CDC (Barlow, 2007). For purposes of data consistency, the study utilized BMI cutoff ranges consistent with DO-WOP program guidelines. Individuals with a BMI of 18.5 or less were classified as underweight while individuals with a BMI between 18.5 and 24.9 were classified as being of normal weight. Individuals with a BMI between 25 and 29.9 were classified as being overweight and

individuals with a BMI of 30 or greater were classified as obese. Upon review of biometric data a number of inconsistencies were noted related to height measurements, in which a total of four participants were recorded at lower heights than their initial heights. In order to minimize the impact of this error, the same height was used at all data points for those four participants at the risk of decreasing the likelihood of obtaining significant results. Therefore, height and BMI data should be interpreted with caution. However, it is important to note that errors in height measurement often occur in medical settings. In a 2006 study of 34 general pediatric practitioners, it was found that only one physician had received anthropometry training in stadiometer use and nine of the 34 practitioners employed improper stadiometer practice that could result in inaccurate height measurements (Gerner, McCallum, Sheehan, Harris, & Wake, 2006). An audit study of pediatric obesity interventions also found that discrepancy often occurs in data reporting of height and weight measurements for BMI determination (Upton, Taylor, Peters, Erol, & Upton, 2012). At the time of enrollment mean participant weight was 165.21 pounds, while the mean participant height was 61.53 inches. Mean BMI at the time of enrollment was 31.20. Eight participants met criteria for being considered obese. Two participants met criteria for being overweight, while five participants were at a normal weight.

Midpoint measurements obtained a mean participant weight of 164.20 pounds. Mean participant height was 60.88 inches. Mean BMI at midpoint was 31. Five participants met criteria for being considered obese. One participant went from meeting criteria for obesity to meeting criteria for overweight. There were a total of three participants that met criteria for being overweight. Three participants met criteria for being at a normal weight. Four participants did not complete measurements at this time

point. Two of those individuals met criteria for obesity and the other two were within the normal weight range.

Post-program measurements obtained a mean participant weight of 156.34 pounds, while mean participant height was 61.25 inches. Mean BMI at the time of the last measurements was 29.30. Eight participants met criteria for being considered obese, while one participant met criteria for being overweight. Four participants met criteria for being at a normal weight. No additional participant attrition occurred. However, two participants who were of normal weight at the time of initial measurements that did not complete midpoint measurements returned.

Waist circumference provides a measure of central adiposity. According to the National Heart Lung and Blood Institute (NHLBI), waist circumference and BMI are interrelated. However, waist circumference is a better independent prediction of risk measurement ([http://www.nhlbi.nih.gov/guidelines/obesity/e\\_txtbk/txgd/4142.htm](http://www.nhlbi.nih.gov/guidelines/obesity/e_txtbk/txgd/4142.htm)). This measurement is particularly useful when BMI is less than 35. There is minimal added predictive value of health risk when BMI is greater than 35. Studies completed by Janssen and colleagues (2005) found that waist circumference provided information on coronary artery risk disease beyond that of BMI alone in populations of children and adolescents. In a study of 1000 adolescents, Cummings and colleagues (2010) found that waist circumference can be used to predict insulin resistance, which is linked to the development of diabetes. At the onset of participation, mean participant waist circumference was 35.77 inches. Mean waist circumference at midpoint measurements was 34.06, while post waist circumference was 33.20 inches.

As described in the literature review, pediatric obesity negatively impacts numerous body systems, including the cardiovascular, metabolic, pulmonary, and skeletal systems (Daniels et al., 2005). Pediatric obesity is also considered a risk factor for adult obesity (Jelalian & Hart, 2009). Though one participant successfully decreased their BMI percentile from being in the overweight range to being a healthy weight, it is important to note that all other participants maintained a weight status of being obese or overweight.

Blood pressure measurements were obtained at the time of enrollment, at the midpoint, and at the end of the DO-WOP program. The NHLBI defines blood pressure as “the force of blood pushing against the walls of arteries as the heart pumps blood (<http://www.nhlbi.nih.gov/health/health-topics/topics/hbp/>). “ The systolic pressure is the pressure of the blood when the heart beats while pumping blood. Diastolic pressure is the pressure of the blood when the heart is at rest. The normal blood pressure for people is less than 120 millimeters of mercury (mmHg) systolic blood pressure and less than 80 mmHg. When systolic blood pressure exceeds 140 mmHg and diastolic blood pressure exceeds 90 mmHg, individuals are classified as having high blood pressure. At the time of enrollment, the mean systolic blood pressure was 110.93 mmHg and the mean diastolic blood pressure was 67.07 mmHg. No participants met criteria for hypertension based upon this data.

Midpoint mean systolic blood pressure was 107.64 mmHg and the mean diastolic blood pressure was 72.36 mmHg. No participants met criteria for hypertension based upon this data. Post-program measurements obtained a mean systolic blood pressure was 106.31 mmHg and the mean diastolic blood pressure was 69.23 mmHg. No participants met criteria for hypertension based upon this data. Though none of the participants met

criteria for experiencing hypertension, it is important to note that being overweight or obese as a child is associated with a higher risk for the development of hypertension in life. Further, hypertension is associated with the development of cardiovascular disease, which includes an increased risk for heart attack and stroke (Dietz & Robinson, 2005).

Non-fasting Blood glucose and cholesterol measurements were obtained from participants at the onset of the DO-WOP program and at the end of the program. Non-fasting glucose levels were obtained in the study, because labs were not taken until after 5 PM and it was not reasonable or safe to request that participants fast for such a prolonged period of time. These measures were only taken twice, because they require venipuncture which may result in discomfort. Blood glucose is utilized as an indicator for the presence or absence of diabetes. In youth, there are four diabetic variants: Types 1a and 1b (DM1); Type 2 (DM2), maturity-onset diabetes of youth (MODY), and cystic fibrosis related diabetes (CFRD) (Wysocki, Buchloh, & Greco, 2009). Living with DM1 or DM2 increases the long-term risk for heart, kidney, eye, and nerve disease (Diabetes Control and Complications Trial Research Group, 1994). According to the Joslin Diabetes Center (2012), normal fasting glucose levels should be below 126 mg/dL. Blood glucose levels above 160 mg/dL meet criteria for high blood sugar or hyperglycemia. Blood glucose data should be interpreted with caution, since the measurements were non-fasting levels. Mean blood glucose level of participants before beginning DO-WOP was 85.92 mg/dL. This mean blood glucose level was considered within normal limits for youth and no participants were found to be experiencing diabetes at the onset of the DO-WOP program. Upon completion of the program, the mean blood glucose level was 84.44

mg/dL. This suggested that participants did not meet criteria for diabetes and there was no significant change in blood sugar levels over the time of measurement.

The American Heart Association reports cholesterol levels of 200 mg/dL or lower as desirable and cholesterol levels above 240 mg/dL to have high cholesterol. Individuals with high cholesterol have an increased risk for cardiovascular disease. Mean cholesterol level of participants at the time of enrollment was 165.31 mg/dL and one participant met criteria for hypercholesterolemia at the time of enrollment. Upon completion of the program, the mean cholesterol level of participants was 152.33 mg/dL and no participants met criteria for hypercholesterolemia. Despite there being no participants meeting criteria for diabetes or hypercholesterolemia, all participants were at an increased risk for the development of diabetes and high cholesterol later in life based upon their initial weight statuses of being overweight or obese (Ward-Begnoche, 2009). Therefore, working with participants to learn healthy habits to facilitate maintenance of healthy cholesterol and glucose levels is critical in order to reduce the likelihood of onset of hypercholesterolemia and diabetes.

In addition to the physical impact, there are also a number of psychological correlates for pediatric obesity. As previously stated, some of the major psycho-social risks for adolescents who are overweight include depression, lower self-esteem, eating disorders, body image concerns, and stigmatization (McClanahan, Huff, & Omar, 2009). The constructs of hope and resiliency were studied as they relate to health outcomes in youth populations experiencing obesity participating in the DO-WOP program as a model for multidisciplinary pediatric obesity intervention. These constructs were studied because there are a number of previous research studies that note children

living with obesity are more likely to experience negative psychological consequences (French, Story, & Perry, 1995; Zeller, Roehrig, Modi, Daniels, & Inge, 2006). However, no previous research studies were found that examined the impact of positive psychological constructs such as hope and resilience in relation to pediatric obesity intervention outcomes.

Scores on the Children's Hope Scale (CHS; Snyder et al., 1997) of 25 or higher indicate normal hope levels in youth. Scores below 25 suggest low levels of hope. At the onset of the study, the mean overall hope score on the CHS for participants was 29.60, with 10 participants having overall hope scores above 25. These results indicated that participants generally experienced normal hope levels (Snyder et al., 1997). At the midpoint measurement, the mean overall hope score was 29.55, with eight participants having overall hope scores above 25. At the time of post-program measurements, the overall mean hope score was 29.30, with eight participants having overall hope scores above 25. Respectively, overall hope scores maintained relatively constant across participants in the DO-WOP program. Further, these scores implied that youth living with obesity who participate in the DO-WOP program have normal levels of hope.

As previously noted, scale scores in the domains of resilience, which are sense of mastery, sense of relatedness, and emotional reactivity of 39 or below on the Resiliency Scale for Children and Adolescents (RSCA; Prince-Embury, 2006) fall in the low range while scores of 40 to 44 fall in the below average range. Scores between 45 and 54 fall in the average range. Scores that are between 55 and 59 are in the above average range while scores of 60 or higher are in the high range. At the beginning of the DO-WOP program, the mean mastery score on the RSCA (Prince-Embury, 2006) for participants

was 54.20 and within the average range. This suggested that study participants generally experienced a sense of optimism, self-efficacy, and adaptability that was average when compared to same aged peers (Prince-Embury, 2006). Eight participants had mastery scores that were in the high range, while three participants had mastery scores that were in the average range. Two participants had a mastery scores that were in the below average range and two participants had mastery scores that were in the low range. There were considerable differences (range = 47) across mastery scores. At the time of midpoint measurements, the mean mastery score for participants was 55.27. The mean mastery score was in the above average range (Prince-Embury, 2006). Five of twelve participants had mastery scores that were in the High range, while two participants had mastery scores that were in the above average range. One participant had a mastery score that was in the average range. One participant had a mastery score that was in the below average range and two participants had mastery scores that were in the low range. Again, there was considerable variability (range = 35) across mastery scores amongst participants at the midpoint. At the time of post-measurement, the mean mastery score for participants was 51.30. Despite the decline in the average mastery score, it continued to be in the average range. Four of ten participants had mastery scores that were in the high range, while no participants had mastery scores that were in the above average range. One participant had a mastery score that was in the average range. Two participants had mastery scores that were in the below average range and three participants had mastery scores that were in the low range (Prince-Embury, 2006). There continued to be considerable variability (range = 18) across mastery scores amongst participants. These

results showed that participants experienced different levels of mastery based resiliency, but scores were generally within normal limits.

At the time of pre-participation measurements, the mean sense of relatedness score on the RSCA for participants was 50.40 and was in the average range (Prince-Embury, 2006). This suggested that study participants in general experienced a sense of trust, support, comfort, and tolerance that was average when compared to same aged peers (Prince-Embury, 2006). Two of sixteen participants had a sense of relatedness score that was in the high range, while three participants had sense of relatedness scores that were in the above average range. Six participants had sense of mastery scores that were in the average range. One participant had a sense of relatedness score that was in the below average range and three participants had mastery scores that were in the low range. Overall, there was considerable variability (range = 52) across sense of mastery scores.

At the time of midpoint measurements, the mean sense of relatedness score for participants was 50.55 and was in the average range (Prince-Embury, 2006). Three of twelve participants had a sense or relatedness score that was in the high range. Two participants had sense of relatedness scores that were in the above average range. Four participants had sense of relatedness scores that were in the average range. Two participants had sense of relatedness scores that were in the low range. There was considerable variability (range = 51) across sense of relatedness scores. At the time of post-measurement, the mean sense of relatedness score for participants was 47.60 and was within the average range (Prince-Embury, 2006). Two of ten participants had sense of relatedness scores that was in the High range, while one participant had sense of relatedness score that were in the above average range. Two participants had sense of

relatedness scores that were in the average range while another two participants had sense of relatedness scores that were in the below average range and three participants had sense of relatedness scores that were in the low range. Variability (range = 43) across sense of relatedness scores persisted across participants. These results indicated that participants experienced different levels of relatedness based resilience.

At the onset of participation in the DO-WOP program, the mean emotional reactivity score on the RSCA for participants was 48.60 and was in the average range (Prince-Embury, 2006). It is important to note that lower scores on the emotional reactivity scales are considered protective or adaptive. This suggested that participants were experiencing emotional sensitivity, recovery and impairment at similar levels to their same aged peers based upon measure norms. Three of fifteen participants had an emotional reactivity score that was in the high range, while four participants had emotional reactivity scores that were in the average range. Four participants had emotional reactivity scores that were in the below average range and four participants had emotional reactivity scores that were in the Low range. Overall, there was considerable variability (range = 45) across emotional reactivity scores amongst participants, initially. At the time of midpoint measurements, the mean emotional reactivity score for participants was 42.73 and was in the below average range (Prince-Embury, 2006). This suggested that participants were experiencing levels of emotional reactivity that were slightly less than their same aged peers. Two of eleven participants had emotional reactivity scores that were in the high range, while one participant had an emotional reactivity score that was in the average range. One participant had an emotional reactivity score that was in the below average range and six participants had emotional reactivity

scores that were in the low range. Again, there was considerable variability (range = 35) across emotional reactivity scores amongst participants at the midpoint. At the time of post-measurement, the mean emotional reactivity score for participants was 41.20 and was in the below average range (Prince-Embury, 2006). One of ten participants had an emotional reactivity scores that was in the high range. Two participants had emotional reactivity scores that were in the average range. One participant had an emotional reactivity score that was in the below average range and six participants had emotional reactivity scores that were in the low range. Overall, there continued to be considerable variability (range = 31) across emotional reactivity scores amongst participants. These results suggested participants experienced different levels of emotional reactivity as it relates to resiliency.

The preceding information represents a general description of participants in the Diabetes and Obesity Wellness Opportunities Program (DO-WOP) program. A majority of the participants met criteria for being overweight or obese, but no participants met criteria for hypertension or diabetes. One participant met criteria for hypercholesterolemia. Additionally, participants generally reported normal levels of hope throughout the program. Resiliency scores in the area of mastery and relatedness were generally in the average range. Emotional reactivity scores were generally in the average to below average range as it decreased over time. These results implied that the participant ability to effectively manage negative emotions improved during the study. However, a significant amount of variability was noted across the major domains of resiliency: sense of mastery, sense of relatedness, and emotional reactivity.

## **4.2 Analysis of Hypotheses**

Clinical research with pediatric populations has been criticized for relying upon research methodologies that summarize findings from interventions based upon statistical significance instead of effect size (Drotar, 2002). It is recommended that researchers in pediatric psychology include effect size and confidence intervals in their studies. This recommendation is particularly relevant since most pediatric psychology studies have small sample sizes (Holmbeck et al., 2009). Even though larger sample sizes are more likely to produce greater statistically significant findings than smaller samples, it does not necessarily mean that the findings are more powerful or clinically significant. However, interventions with larger effect sizes are more likely to meaningfully affect children in ways that are valuable to parents, medical providers, and the children themselves (McCartney & Rosenthal, 2000).

Analyses were conducted with the Statistical Package for the Social Sciences (SPSS). Descriptive analyses, paired t-tests, and effect size studies were utilized to examine the study hypotheses.

**4.2.1 Hypothesis 1 Analysis.** Hypothesis one stated that DO-WOP participants would enter the program with total hope levels that were in the normal range. To examine hypothesis one, descriptive analyses were utilized to examine mean hope levels. Results indicated that mean overall hope level were within the normal range at all points of measurement in the study. Mean total hope, agency hope, and pathway hope scores can be seen in Table 4.

Table 4

*Hope Scores for DO-WOP Study Participants*

	Initial	Midpoint	Post
Total Hope <sup>a</sup>	29.60 (SD=6.15)	29.55 (SD=5.79)	29.10 (SD=6.20)
Agency Hope	15.21 (SD=2.66)	15.09 (SD=3.18)	14.91 (SD=3.08)
Pathway Hope	13.86 (SD=4.20)	14.45 (SD=3.14)	14.82 (SD=3.36)

a: Total hope scores range from 6-36 with higher scores indicating greater hope. A score of 25 or greater is considered “normal hope.”

**4.2.2 Hypothesis 2 Analysis.** The second hypothesis stated that hope and resiliency scores would increase between pre-intervention and post-intervention measurements. A paired sample t-test was conducted to examine changes in total hope as well as agency and pathway hope over time. All hope score means showed a slight increase over time. Mean resilience scores in the areas of mastery showed some decrease but remained in the average or normal range. The mean emotional reactivity score decreased from the average range to the below average range over time. However, results indicated that the effect of time was not statistically significant for total hope ( $t_{(1,10)} = .493, p=.63$ ), agency hope ( $t_{(1,10)} = 1.79, p=.11$ ) or pathway hope ( $t_{(1,10)} = -.557, p=.59$ ). Results also indicated that the effect of time was not statistically significant for resilience in the areas of mastery ( $t_{(1,10)} = 1.017, p=.37$ ), relatedness ( $t_{(1,10)} = -.129, p=.9$ ), or emotional reactivity ( $t_{(1,10)} = 1.251, p=.243$ ). Mean resilience scores related to mastery, relatedness, and emotional reactivity can be seen in table 5, below while the results of the paired t-test can be found in table 6.

To assess clinical significance, a Cohen’s d for sample sizes was calculated to provide an estimate of effect size for hope and resiliency. Participants showed a minimal

increase in their ability to think of multiple ways to reach their goal or pathway thinking with a small within-groups effect size ( $d = -.25$ ). Over the time of the intervention, participants also showed a small decrease in optimism, self-efficacy, and adaptability or mastery related resilience with a small within-groups effect size ( $d = .20$ ). Participants demonstrated a significantly greater ability to tolerate adversity or negative challenges. Overall, a large within-groups effect size ( $d = -.59$ ) was found in the area of emotional reactivity.

Table 5

*Resilience T-Score Means for DO-WOP Study Participants*

	Initial	Midpoint	Post
Mastery <sup>a</sup>	54.20 (SD=13.94)	55.27 (SD=12.23)	51.30 (SD=14.86)
Relatedness <sup>a</sup>	50.40 (SD=13.95)	50.55 (SD=15.36)	47.60 (SD=14.21)
Reactivity <sup>b</sup>	48.60 (SD=12.53)	42.73 (SD=10.86)	41.20 (SD=10.53)

a: Mastery and Relatedness t-scores range from 1-80 and 1-96, respectively with higher scores indicating greater resilience. Scores of 40 or below are considered “low,” while scores of 41-45 are considered “below average.” Scores of 46-55 are in the “average” range. Scores of 56-59 are in the “above average” range while scores of 60 or higher are considered “high.”

b: Emotional Reactivity (Reactivity) t-scores range from 1-80, respectively with lower scores indicating greater resilience. Scores of 40 or below are considered “low,” while scores of 41-45 are considered “below average.” Scores of 46-55 are in the “average” range. Scores of 56-59 are in the “above average” range while scores of 60 or higher are considered “high.”

**4.2.3 Hypothesis 3 Analysis.** The third hypothesis stated hope and resiliency scores would show a greater correlation with physical health outcomes at higher levels of these constructs. A two-way repeated measure Analysis of Variance (ANOVA) was initially planned to evaluate this relationship. However, due to the low sample size and lack of statistical significance in the second hypothesis it was determined that power was not sufficient to complete this analysis. As a result, the ANOVA was not conducted and this hypothesis could not be fully tested. Instead, a paired t-test was completed to assess

the significance of change across each variable. It was found that time had no significant impact upon any of the study measures. Results of the t-test can be found in table 5.

Cohen's *d* measurements were calculated for biometric data provide an estimate of effect size. A small but clinically significant decrease in BMI, ( $d = .21$ ), cholesterol levels ( $d = .38$ ) and waist circumference ( $d = .39$ ) occurred over the time of the study.

Table 6

*Mean Measurement Change Over Time*

Measure	Pre	Post	Change	p-value
BMI	31.20	29.30	-1.90	0.245
Waist Circumference	35.77	33.2	-2.57	0.117
Cholesterol <sup>a</sup>	165.31	152.33	-12.98	0.318
Glucose <sup>a</sup>	83.22	84.44	1.22	0.818
Total Hope	29.6	29.1	-0.5	0.634
Agency Hope	15.6	14.6	-1	0.107
Pathway Hope	14	14.5	0.5	0.591
Mastery	55.9	51.3	-4.6	0.336
Relatedness	46.8	47.6	0.8	0.9
Emotional Reactivity	45.3	41.2	-4.1	0.243

a: Non-fasting

## **Chapter 5: Discussion**

This study was designed to examine hope and resilience in youth participating in a pediatric obesity intervention program. Previous research on hope in pediatric populations has shown correlations between hope and various physical health outcomes (Lewis & Kleiwer, 1996; Maikrantz et al., 2006). Research in the area of resilience has found that youth with higher levels of resilience are better prepared to overcome instances of adversity (Bandura 1997; Masten et al., 2009). The study was also designed to test an integrative model of hope and resiliency. It was predicted that youth who participated in the DO-WOP intervention would have normal levels of hope at the onset of the program and throughout participation in the program. It was hypothesized that both self-reported hope and resilience scores would increase over time. It was also hypothesized that participants with normal levels of hope and higher levels of resilience would have better physical health outcomes. The proceeding discussion will cover the results of each individual hypothesis for the study.

### **5. 1 Discussion of Hypotheses**

**5.1.1 Hypothesis 1.** Pediatric psychology researchers are highly interested in examining the construct of hope as a factor in pediatric health outcomes (Barakat, Pulgaron, & Daniel, 2009). Berg and colleagues (2007) found hope to be a significant predictor of treatment adherence in a pediatric asthma population. It has also been found that adolescent burn survivors with higher levels of hope experienced lower levels of

behavior problems and that hope significantly predicted global self-worth (Bauman, Snyder, Rapoff, Mani, & Thompson, 1998). Maikrantz and colleagues (2006) studied hope, depression, and medication adherence and found that individuals experiencing high hope and low treatment uncertainty had higher rates of adherence than individuals with low hope and high treatment uncertainty.

The overall hope levels for participants at the onset of the program was normal ( $M = 29.6$ ,  $SD = 6.15$ ). These results are consistent with other recent studies that have found hope to be normal in youth participating in intervention programs (Beale, 2009; Brown Kirschman, Roberts, Shadlow, & Pelley, 2010; Hagan, Myers, & Mackintosh, 2005). It is of clinical significance to note that based upon Snyder's (1991) model of hope, there needs to be a sufficient level present in order to drive the agency and pathway components needed for goal attainment. Results of this study suggested that DO-WOP participants tend to have sufficient hope levels for goal attainment in the absence of adversity as described in Snyder's (1991) Hope Model (figure 1). Specifically, it can be inferred that participants have a sufficient level of self-belief that they can reach their goals and an effective level of problem-solving skills to consider multiple reasonable strategies for goal attainment. Even though this study evaluated hope levels related to goal oriented thinking, it did not assess if the goals of the participants were health related. It can be inferred from the voluntary nature of the program that participants and their families had goals related to being healthy and that participants believed they could reach goals of becoming healthier.

**5.1.2 Hypothesis 2.** The second hypothesis predicted that hope and resilience would significantly increase over the time of intervention. There were no statistically

significant changes in hope or resilience over time. These results were consistent with a six-week study examining hope and academic achievement (Beale, 2009). Though the previous study utilized a shorter intervention time frame, the sample size was comparable to the current study. However, the results were not consistent with study of approximately 440 youth investigating changes in hope over a six-week dance camp intervention in which participants did show a significant increase in hope over the participation period (Brown Kirschman, Roberts, Shadlow, & Pelley, 2010).

When hope was considered under the constraints of effect size through Cohen's *d* measurements, a small clinically significant increase in pathway hope or hopeful thinking related to one's ability to think of multiple ways to reach goals was found. This result indicates that over the time of participating in the DO-WOP program, participants enhanced problem-solving skills that improved their ability to think of more than one way to reach goals. It can also be inferred that participants gained additional skills related to healthy lifestyle changes through both physical (i.e., diet and exercise) and psychological means (i.e., mindful eating practices, avoiding emotional eating).

Overall, hope levels were found to be normal in study participants and did not show a statistical change over time. The lack of change in hope actually supports research suggesting that hope is predictive of treatment adherence (Berg et. al., 2007). If treatment adherence was viewed as function of involvement in the intervention through graduation, it was observed that seven of fifteen initial participants maintained a normal hope level and one participant went from a low level of hope to normal hope. Additionally, of the two participants who left the program one began with a low hope level and the other began with a normal hope level. Since the overall mean hope level of participants was

normal and stayed within the normal range the results also suggest that normal hope levels are less susceptible to being impacted by adversity. Despite there being no statistically significant change in hope, there was small level of clinical change in pathway hope. This change is suggestive of participants increasing problem-solving skills or developing additional ways to think about reaching their goals per the Snyder (1991) Hope Model.

With regards to resilience, results of the study suggested that participants had resilience levels that were normal over time and consistent with findings that youth with chronic health conditions have just as good or better resilience than peers without chronic illness (Eiser, Hill, & Vance, 2000; Phipps, Larson, Long, & Rai, 2006). Participants showed small clinically significant decreases in resilience related to sense of optimism, self-efficacy, and adaptability or mastery hope. There are a number of reasons why this change may have occurred including an increased awareness of challenges in their life, experiencing greater comfort in reporting accurate responses, or having an environmental experience that may have challenged resilience. There was also a clinically moderate decrease in resilience related emotional reactivity or experiencing difficulties with managing negative emotions. Mean emotional reactivity levels decreased from the average to below average, which is protective. In essence, participants became better equipped to manage negative emotions and overcome negative experiences.

**5.1.3 Hypothesis 3.** The goal of the third hypothesis was to test a theoretical interaction model of hope and resilience in relation to pediatric obesity outcomes. The third hypothesis predicted that participants with normal hope scores and higher resiliency scores would show a greater correlation with healthier biometrics (i.e., normal BMI,

blood glucose, and cholesterol levels) over time (from pre-intervention to post-intervention) than participants with normal hope scores and lower resiliency scores. Since, this hypothesis was dependent upon the second hypothesis being clinically significant, the third hypothesis could not be evaluated specifically. A paired sample t-test was utilized to evaluate overall change in study variables over the time of participation in the study.

Results of the paired sample t-test showed no significant changes in any study variable over time. This information can be found in table 6. Though not significant, the paired t-test showed that BMI, waist circumference, and cholesterol did decrease in the study sample. Additionally, as previously noted pathway hope increased and emotional reactivity resilience decreased. With regards to clinical significance a small but clinically significant decrease in BMI ( $d = .21$ ), cholesterol ( $d = .38$ ) and waist circumference ( $d = .39$ ) occurred in study participants. Though not statistically significant, results indicate that participants became healthier as evidenced by clinically significant decreases in BMI, cholesterol and waist circumference (Reilly, et al., 2010).

Additionally, results found a small clinically significant increase in hope related pathway thinking ( $d = -.21$ ). This result indicated that over the time of involvement in the study, participants enhanced their problem-solving skills related to their ability to think of multiple ways to reach their goals. This aspect of pathway hope is helpful in that it increases the likelihood that individuals will reach their goals.

With regards to resilience, a small clinically significant decrease in mastery was found ( $d = .20$ ). However, a there was a large clinically significant decrease in emotional reactivity ( $d = .59$ ). Though mastery is considered a protective aspect of resilience, it was

possible that participants were experiencing less optimism, self-efficacy, or adaptability. It is more likely that the results were inflated initially as participants may have felt the need to respond in a favorable manner and become a more accurate representation of actual mastery related resilience. With regards to emotional reactivity related resilience or the ability to manage negative emotions related to adversity it is likely that participants enhanced the skills needed to manage negative emotions over the time of participation in the DO-WOP program.

## **5.2 Study Limitations and Recommendations**

**5.2.1 Sample Size.** A major limitation of this study was sample size. The initial recruitment projection for this study was to obtain 25 participants from the DO-WOP program. Participants were recruited over three cycles of the DO-WOP program and enrollment of participants who met criteria for the study was lower than expected. A total of 16 participants were consented and assented for the study. Of those 16 participants, 2 left the program before midpoint measurements and two participants missed the midpoint measurement but returned to the program in time for final measurements.

Additionally, all participants who were of Latino/a decent were excluded from the study due to IRB restrictions preventing these families from participating. As a result, the number of participants was lower than expected. With such a small sample size, the power of the study became constrained and ability of the study to detect significant results was limited. Further, the small sample size raises concern related to external validity in that the study may not be representative of pediatric obesity populations. Further, the small sample size of the study enhanced the effect of skew upon study results. Study results found significant differences in measurement values across study

participants. The results of one participant were excluded from data analysis due to significant measurement differences from the rest of the study participants.

To overcome sample size constraints it is recommended that in future studies a larger sample size is utilized with at least 50 participants. It is also recommended that considerations be made for including participants of Latino/a descent as well as other diverse groups to create a study design that is more representative of the US population. Latino and African American youth continue to experience obesity at a disproportionate rate to Caucasian youth (Ogden, Carroll, Kit, & Flegal, 2012). Therefore, there is a critical need to include these populations in obesity intervention research. It is critical for researchers to petition Institution Review Boards for the inclusion of Spanish speaking groups in future studies for the reason of health disparity amongst these groups and the limited number of research studies that have been completed to address this disparity (Perez-Morales, Bacardi-Gascon, & Jimenez-Cruz, 2012).

**5.2.2 Study Design.** The study utilized a single-participant design to study pediatric obesity. Single-participant design studies are considered a valid methodology in pediatric psychology research studies (Holmbeck, Zebracki, & McGoron, 2009). However, a major limitation of the study was that there was no true control group. In essence, the study did not measure hope or resilience levels in other pediatric obesity populations that were not participating in intervention. The presence of a control group would have provided a comparison group with which study participant data could be compared and would have also increased the power of the study. Additionally, it would have created a study design that may have been more representative of pediatric obesity populations. Further, the study did not utilize follow-up measurements at time points

further out from completion of the study to evaluate for maintained change after study participation.

Future studies should include a control group of obese youth not participating in obesity intervention to provide a true baseline comparison to the study group. The utilization of a control group will also increase the strength of the study to examine differences in change over time both across and within groups. There are a number of ethical concerns based upon the Ethical Principles of Psychologists and Code of Conduct from the American Psychological Association (APA, 2002) that must be addressed in the design of a control group. Ethical Principle A (beneficence and nonmaleficence) stresses doing no harm while Principle B (fidelity and responsibility) describes the responsibility of psychologists to avoid conflicts of interest that could cause harm. It can be argued that excluding a participant with a diagnosis of obesity from intervention could potentially cause harm to that individual at the expense of the researcher's desire to obtain significant results.

It is recommended to utilize a control group that receives "usual care" for the treatment of obesity. DeBar and colleagues (2012) effectively utilized a research model to test pediatric obesity intervention outcomes in adolescent females to show that participants assigned to the study group experienced greater decreases in BMI than those assigned to a usual care group. Additionally, screening methods could be used to identify a control group of individuals who do not have sufficient commitment to an obesity intervention that focuses upon improving readiness for change before offering an obesity intervention.

It will be important to include participant long-term follow-up as part of future study design. Jones and colleagues (2011) highlighted a number of reasons to encourage youth obesity interventions to include long-term follow-up as part of the study design. Specifically, it was noted that long-term follow-up provides information regarding the sustainability of intervention effects, the opportunity to refine interventions in response to outcomes, allows changes in cognitions and behaviors over time to be determined, allows for distal impacts of intervention to be determined, and provides evidence of critical times for intervention to prevent adult obesity (Jones, et al., 2011).

**5.2.3 Measurement Error and Unavailable Data Points.** It should be noted that weight loss was not a goal of the DO-WOP program. Instead the goal was to be healthy. In addition, since data was collected over a period of 12 weeks, it was unlikely that a statistically significant amount of weight could be lost in a healthy manner. It is also important to consider the possibility that participants may not have lost weight as a function of growing taller. Since errors were made in height measurement, height was held constant for participants who were measured to decrease in height. By making this adjustment to minimize the height error, the likelihood of obtaining significant results related to BMI measurement was minimized as BMI is a product of both weight and height. A total of four participant heights were measured as decreasing over time, but were not re-measured. Height measurements for these individuals were held constant for these individuals were held constant to decrease the impact of error at the risk of decreasing the likelihood of obtaining statistically significant results related to BMI measurements.

It is also important to note the limitations in the value of glucose measurements in this study as non-fasting glucose levels were utilized for study measurement. The Joslin Diabetes Center (2012) recommends utilization of hemoglobin A1C levels to diagnose diabetes as this measurement provides an overall blood glucose mean for a period of 90 days as opposed to the blood glucose measurement which is a measurement of blood glucose at the time of measurement.

Additionally, a number of data points that were part of the study were unavailable for individual study participants and could not be evaluated. With regards to biometric data, one participant initially consented to venipuncture at the onset of the study, but later declined venipuncture at the time of post measurement. This resulted in no post glucose or cholesterol lab values being available for this participant. Two additional participants did not have glucose or cholesterol values due to absence at the time of post-measurement and phlebotomy not being available to complete these measures upon their return.

With regards to hope and resilience measures, there were also a number of unavailable data points. Two participants left the DO-WOP program before the time of post-measurement attainment. One participant declined completing all post measurements. The administration of the Children's Hope Scale was not completed at the onset of the study for one participant due to staff error. Additionally, hope and resilience measures were not administered to one participant for post measurement due to error.

To minimize errors in biometric measurement, especially as it relates to height it is recommended that all medical staff participate in a standardized measurement training that includes standardized stadiometer use training (Gerner, McCallum, Sheehan, Harris,

& Wake, 2006). It is also recommended that biometric data be reviewed by the program physician and any outlying measurements be identified for repeat measurement on that same day. Additionally, it is recommended that Hemoglobin A1C levels be used in the future instead of non-fasting glucose levels, because this measurement provides a more accurate measure of blood glucose and does not require an individual to fast in order to obtain reliable results (Joslin Diabetes Center, 2012). With regards to hope and resilience measures, it is recommended that the principal investigator review all psychometric data for completeness on the day measurements are obtained to verify that all study participants were administered appropriate measures

## **Chapter 6: Ongoing Research**

### **6.1 Considerations for Future Directions**

Childhood obesity continues to be a major health concern in the United States (McClanahan, Huff, & Omar, 2009). Though the prevalence of pediatric obesity has stabilized, substantial improvement has not yet occurred, nor has the gap of health disparity been closed amongst ethnic groups experiencing obesity. African-American and Hispanic youth continue to experience obesity at substantially higher rates than other ethnic groups (Robert Wood Johnson Foundation, 2012). Therefore, the need for ongoing pediatric obesity intervention research continues to persist.

There are few published studies examining the potential of interdisciplinary approaches to pediatric obesity intervention that include psychological intervention as part of an effective treatment model (Golan & Crow 2004; Saelens, Sallis, Wilfey, Cella, & Buchta, 2002; Savoye, Shaw, Sziura, Tamborlane, Rose, Guandalini, et al, 2007). The preceding study provided a meaningful examination of positive psychology constructs (hope and resilience) in pediatric obesity intervention. Though the results did not show statistically significant change, relevant clinical significance was found across a number of factors examined in the study. Participants showed meaningful decreases in BMI, waist circumference and cholesterol levels of a participation period of 12 weeks. Additionally, meaningful change occurred in psychometric data that suggested enhanced problem-solving skills (pathway hope) and improved ability to manage negative emotions (emotional reactivity resilience)

The results of this study represent meaningful clinically significant change for participants and effectiveness of a pediatric obesity intervention for a number of reasons. With regards to the biometric measurements of the decreases BMI, waist circumference, and cholesterol levels, indicated that participants became healthier over the time of participation in the intervention (Reilly et al., 2010). Both BMI and waist circumference are interrelated indicators of health. However, waist circumference is considered to be the most effective measure of health risk according to the National Heart Lung and Blood Institute. The clinically significant decreases in BMI and waist circumference are indicative of participants decreasing their risk for negative health consequences of obesity.

The meaningful changes that occurred in psychometric data over the time of participation in the study showed effectiveness in the program model to enhance both hope and resilience. The clinically significant increase in pathway hope indicated that participants increased the number of ways they thought about reaching their goals or enhanced their problem solving skills to reach their goals. The clinically significant decrease in emotional reactivity is also of value as it represents an enhanced ability to manage negative emotions and overcome environmental challenges (i.e., bullying, lack of support). Given that participants became healthier even though agency related hope (goal directed thinking related to motivation) and mastery related resilience (sense of optimism, self-efficacy, and adaptability) it is likely that the change in emotional reactivity has provided a buffering effect as described in the proposed integrated model of resilience and shown in figure 3 of this document.

The results of this study provide evidence for the value of expanding and replicating the study model for a number of reasons. First, it will be important to replicate this study model to test the proposed integrative model of hope and resilience that could not be tested due to sample size. Once the validity of the hypothesized model is verified, it has the potential to be utilized for informing treatment recommendations for pediatric obesity and may later be generalized for other chronic health conditions.

The program model also shows promise as an effective model of obesity intervention for African American youth. It's effectiveness with Latino youth has not yet been studied due to study limitations. Given that both of these groups continue to be disproportionately impacted by pediatric obesity it would be meaningful to study the effectiveness and enhance the cultural competency of the program model. Enhancing the culturally competency of the program model can be accomplished by reviewing participant comments regarding cultural concerns within the program model, increasing the number of culturally diverse examples in program materials, considering culturally relevant food options in nutrition lessons, and providing diverse exercise options. Modifying outcome measures to include racial identity and quality of life measures to evaluate the effectiveness of the program model to be culturally competent would also be beneficial.

In closing, this study sought to address a number of relevant topics related to addressing the intersection of positive psychology constructs (hope and resilience) and pediatric obesity. The work included in this document shows promise that integrative models of intervention can be effective and that the constructs of hope and resilience are meaningful in considering treatment approaches to pediatric obesity. There continues to

be a need for research and improved intervention in this area, especially as it relates to addressing ongoing health disparities in childhood obesity rates. The impact of enhanced obesity intervention has the potential to not only decrease the risk of physical consequences of long-term obesity, but to also improve the psychological wellbeing of youth who are overweight or obese. The future of our children depends on our diligence in developing evidence based programs. We must continue our efforts.

## Chapter 7: Appendices

### Appendix A: The Children's Hope Scale (CHS)

Directions: The six sentences below describe how children think about themselves and how they do things in general. Read each sentence below carefully. For each sentence, please think about how you are in most situations. Place a check inside of the circle that describes YOU the best. For example, place a check ( ) in the circle ( ) above "None of the time," if this describes you. Or, if you are this way "All of the time," check this circle. Please answer every question by putting a check in one of the circles. There are no right or wrong answers.

1. I think I am doing pretty well.  
 None of the time       A little of the time       Some of the time       A lot of the time       Most of the time       All of the time
2. I can think of many ways to get the things in life that are most important to me.  
 None of the time       A little of the time       Some of the time       A lot of the time       Most of the time       All of the time
3. I am doing just as well as other kids my age.  
 None of the time       A little of the time       Some of the time       A lot of the time       Most of the time       All of the time
4. When I have a problem, I can come up with lots of ways to solve it.  
 None of the time       A little of the time       Some of the time       A lot of the time       Most of the time       All of the time
5. I think the things I have done in the past will help me in the future.  
 None of the time       A little of the time       Some of the time       A lot of the time       Most of the time       All of the time
6. Even when others want to quit, I know that I can find ways to solve the problem.  
 None of the time       A little of the time       Some of the time       A lot of the time       Most of the time       All of the time

## Appendix B: Informed Consent Form

### ***CONSENT TO PARTICIPATE IN RESEARCH***

#### Hope and Resiliency in the DO-WOP Program

##### Introduction

You are being asked to volunteer for this research study because your child has enrolled in the Victor J. Cassano Health Center or Southview Diabetic and Obesity Wellness Opportunity Intervention Program (DO-WOP). Please take your time to make your decision. Discuss it with others.

The research investigator in charge of this study is:

Brigitte D. Beale, M.A.  
3640 Colonel Glenn Hwy.  
Dayton, Ohio 45435  
(937)775-2780

You and your child's participation in the study will last throughout the duration of the program, which lasts 12 weeks. By signing this consent, you are also allowing the investigators to use some of your child's health information collected as part of the Cassano Health Center's or Southview's DO-WOP program. This health information includes: lab results (blood glucose levels), blood pressure, physical measurements (height, weight, and waist circumference), and results of the nutrition quiz.

This study is taking place at Victor J. Cassano Health Center and the Southview Hospital and about 50 children and 100 parent(s) or Legal Guardian(s) are expected to take part in the study.

Spanish translations/translator(s) will not be made available to you during the course of this study. You may still participate if you wish and may use your own translator, at no cost to the study's PI."

##### Purpose of This Research Study

The purpose of this research is to investigate the role of hope and resiliency in relationship to health related outcomes in DO-WOP participants.

##### Study Procedures and Subject Involvement

Before taking part in this research study, the investigator will explain the research study to you and your child and you and your child must be given the chance to ask questions. You must also sign this consent document before you and your child's participation begins. If you and your child agree to take part in this study, you and your child will be asked to do the following:

Visit 1: During the first week of the program

- Conduct Children's Hope Scale
- Conduct Resiliency Scales for Children and Adolescents
- Conduct the Beck Youth Inventory (BYI) for Children

The surveys will take approximately 20 minutes to complete.

Visit 6: Midpoint of the program

- Conduct Children's Hope Scale
- Conduct Resiliency Scales for Children and Adolescents
- Conduct the Beck Youth Inventory (BYI) for Children

The surveys will take approximately 20 minutes to complete.

Visit 12: Final week of the program

- Conduct Children's Hope Scale
- Conduct Resiliency Scales for Children and Adolescents
- Conduct the Beck Youth Inventory (BYI) for Children

The surveys will take approximately 20 minutes to complete.

Note: Your child's DO-WOP record will be reviewed to obtain background information and your child's DO-WOP measurements

The surveys are composed of questions that are answered by circling a letter or marking a checkbox. There are also some general questions that require a written answer. Each survey is about 3 pages long.

If you or your child does not understand some of the questions, the investigator will take time to explain them to you. Additionally, a counselor will be available if you or your child becomes upset.

### Potential Risks/Discomforts

The study has the following potential risk(s): There is a potential for discomfort related to answering questions that may remind children of previous negative experiences. Julie Williams, Psy.D., ABPP, CRC and Marisa Borgert, Psy.D. will counsel subjects who may become emotional or upset as a result of the survey questions. Subjects will be advised that they may withdraw at any time if the survey questions cause undue discomfort

The treatment or procedure may involve risk(s) that are currently not known.

### Possible Benefits of Taking Part In This Study

There are no direct benefits to you for participating in this study. However, your participation in this study may add to the knowledge about the role of hope and resiliency in health related outcomes for adolescents participating in outreach programs.

### Other Options or Treatments

You and your child do not have to take part in this study. You and your child may take part in the DO-WOP program without being in the study.

### Costs for Taking Part in the Study

There will be no cost to you or your child for taking part in this research study.

### Payment for Taking Part in This Study

Neither you nor your child will be paid for participating in this research study.

### Payment for Research Related Injury

KHN will not pay for the natural course of any underlying disease or treatment procedure. You will be responsible for any costs not related to this study.

Brigitte Beale, M.A. or an independent party chosen by KHN will decide whether the injury or harmful effect is related to the research study.

If you have medical insurance, your insurance company may be billed. Any cost of treatment that is not covered by your insurance will be paid by KHN. The costs for medical treatment not related to this study will be your responsibility. KHN will not pay for lost wages, disability or discomfort.

### Confidentiality of Research Study Records

Efforts will be made to keep your personal information confidential. We cannot guarantee absolute confidentiality. Your personal information may be released if required by law. Information that would make it possible to identify you will not be included in any reports or publications of this study. Organizations that may inspect and/or copy research records include:

U.S. Food and Drug Administration (FDA)

Individuals identified as key personnel for this study, and any KHN department with appropriate mandatory oversight may inspect your records.

### Withdrawal of Participation by the Research Investigator in Charge

You and your child may be taken off the research study if you do not follow the instructions of the investigator in charge or other research team members.

### Your Rights as a Research Subject

Taking part in this study is voluntary. You and your child may stop participating at any time. Your decision not to take part in this study will not affect your medical care or any benefits to which you and your child are entitled. If you and your child decide to stop taking part in this study, you should tell the investigator in charge.

If you and your child have any questions about your rights as a research subject you may call the Kettering Health Network Institutional Review Board (IRB) at 937.395.8309 or the Kettering Health Office of Corporate Integrity and Ethics at 937.395.8032. *You may also contact the IRB in writing at Kettering Medical Center, Institutional Review Board, 3535 Southern Boulevard, Kettering, Ohio 45429.*

### Names of Contacts for Questions About the Study

If you have any questions or concerns about taking part in this study, or if you think you may have been injured because of the study, call Brigitte Beale, M.A. at 937.775.2780 or the Institutional Review Board (IRB) at 937.395.8309.

**NEW FINDINGS**

If during the course of the research study significant new findings (either good or bad) develop, you will be informed of such findings and you will have the option of withdrawing from or continuing to participate in this research study.

***SIGNATURES***

**I have read this consent document. I have had the opportunity to discuss the information contained in the document with a member of the research team and all my immediate questions have been answered. I have been told that I can ask other questions at any time. I have been told that I will be given a copy of this signed document.**

**SIGNATURES**

**I voluntarily agree to participate in this research study.**

\_\_\_\_\_  
Subject Name (Print or Type)

\_\_\_\_\_  
Signature of Subject

\_\_\_\_\_  
Date

**You will not give up any of your legal rights by signing this consent form.**

**Legally Authorized Representative Signature** (if needed):

\_\_\_\_\_  
Subject's Legally Authorized Representative (Print or Type)

\_\_\_\_\_  
Signature of Legally Authorized Representative

\_\_\_\_\_  
Date

**Witness Signature** (Use only if reading of the Consent is required):

I attest that this document was read to the individual signing this consent.

\_\_\_\_\_  
Name of Individual Witnessing the Consent Process (Print or Type)

\_\_\_\_\_  
Signature of Individual Witnessing the Consent Process

\_\_\_\_\_  
Date

**Appendix C: Assent Form**

**ASSENT TO PARTICIPATE IN RESEARCH**

My name is Brigitte Beale. I am doing a study to see if the thoughts and feelings you have while participating in DO-WOP play a role in the physical changes you experience. A research study is a way to learn more about people. If you would like, you can be in my study.

If you decide you want to be in my study, the first thing you will do is sign this form. During the first week, the middle, and the end of the program, you will be asked some questions about thoughts and feelings that you may experience or have experienced in the past.

You might not understand all the questions that are being asked. You may be upset by some of the questions that are asked. If you get upset, you can tell me and I can help you. If you are upset and do not want to continue in the study, you are allowed to say that you want to stop.

Other people will not know if you are in my study. I will put things I learn about you together with things I learn about other children so no one can tell what things came from you. When I tell other people about my study, I will not use your name, so no one can tell who I am talking about.

Your parent or guardian has to say it's OK for you to be in my study. After they decide, you get to choose if you want to do it too. If you don't want to be in the study, no one will be mad at you. If you want to be in the study now, and change your mind later, that's OK. You can stop at any time.

You can call me if you have questions about the study or if you decide you don't want to be in the study any more. You can call me at 937-775-2780. I will give you a signed copy of this form in case you want to ask questions later.

**AGREEMENT**

I have decided to be in the study even though I know I don't have to do it. Brigitte Beale has answered all my questions.

\_\_\_\_\_  
Child's Name (*please print*)

\_\_\_\_\_  
Age

\_\_\_\_\_  
Signature of Child

\_\_\_\_\_  
Date / Time

\_\_\_\_\_  
Printed Name of Investigator/Person  
Explaining Assent Form

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Investigator/Person  
Explaining Assent Form

\_\_\_\_\_  
Date

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