

## RELATIONSHIP OF PARENTAL EFFICACY AND EFFECTS OF A PILOT YOUTH WEIGHT MANAGEMENT PROGRAM ON HEALTH AND FITNESS OF OVERWEIGHT AND OBESE CHILDREN

David Bellar, Charity Bryan and Lisa Broussard

Department of Kinesiology, University of Louisiana at Lafayette, USA

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### Abstract

*This study was designed to pilot test a paediatric weight management program. Fourteen parents and children (Male n=5, Female n=9, Age: 11.0±2.0yrs, Height 152.5±12.3cm, BMI 34.75±10.3) volunteered to participate. Parents completed a modified version of the Self Efficacy Scale for Exercise. Youth were tested for cardiovascular fitness, body composition, body mass index, muscular endurance, and flexibility. In general the youth were classified in poor health based on BMI, body composition, muscular endurance and aerobic capacity. Overall the program was successful in increasing health, and a significant correlation was revealed for efficacy of provision of exercise by parents and the BMI of children ( $r=-0.522$ ,  $p=0.05$ ). The results suggest that parental efficacy may be a discriminating factor within a population of overweight/obese, low fitness youth. Parental involvement and empowerment may be a key to weight management within this population.*

**Keywords:** childhood obesity, physical activity, parental influence, intervention

### Introduction

Childhood obesity and overweight are at epidemic proportions in the United States and better understanding of the predictors of childhood obesity and overweight are necessary to effectively combat this problem. The National Health and Nutrition Examination Survey (NHANES) indicated that 16.9% of boys and 14.7% of girls ages 6-11 are classified as overweight (National Center for Health Statistics, 2008). While this is a critical problem in childhood, the likelihood of "growing out of" overweight or obesity is low. For children ages 10-13 who are obese, 80% of them will grow up into obese adults (American Academy of Child & Adolescent Psychiatry, 2008). Children who are obese have higher incidents of insulin resistance and dyslipidemia, and are also at higher risk for asthma, diabetes and hypertension (Hodges, 2003; Ruxton, 2004). Numerous studies indicate that physical activity is one mechanism by which we can improve children's health and decrease their likelihood for overweight and obesity (Froberg & Andersen, 2005; Must & Tybor, 2005; Yin et al., 2005). Louisiana fares poorly when compared to other states within the nation for obesity and overweight for both children and adults. Adult obesity rates have increased and currently, Louisiana ranks 8<sup>th</sup> in the nation in adult obesity with an adult obesity rate of 28.9%. In addition, 35.9% of Louisiana children, ages 10-17, are classified as either overweight or obese, which ranks 7<sup>th</sup> nationally (Trust for America's Health Report, 2009). Health related issues such as hypertension, diabetes, sleep apnea and asthma can be linked to obesity (Transdale, 2008) and the cost of these illnesses is skyrocketing. Nationally, from 2001-2005, obesity related illness increased \$64.4 million dollars according to Medicaid data (Transdale, 2008).

Also on the rise from 2001 to 2005 were hospitalizations for children. In 2001, children between the ages of 2-19 and who were diagnosed as "obese" were hospitalized 21,743 times. By 2005, that number had risen to 42,429 nationally (Transdale, 2008).

### Theoretical Framework

The importance of understanding and interpreting how new behaviors and learning are mediated are important when trying to establish behavior change. The mediating processes paradigm explains behavior change and is a "response oriented" framework (Doyle, p. 170, 1977). Constructs such as personal interest, prior knowledge, personal beliefs and social background, and the environmental context have been examined in order to try and explain more specifically how learning occurs and the cognitive mediational paradigm provides a framework for the study of efficacy which has a powerful influence on healthy choices and adopting positive lifestyle habits. Self-efficacy is regarded as a specific type of self-confidence that is relative to a particular situation (Bandura, 1986).

Individuals, who demonstrate higher levels of efficacy, are more likely to persevere in the face of difficulty, exert greater effort and attempt novel tasks (Wise & Trunnell, 2003). Self-efficacy has also been found to be a predictor of exercise participation and adherence across multiple populations (McAuley & Blissmer, 2000). According to Wise and Trunnell (2003), the most effective way to strengthen self-efficacy is to provide opportunities for individuals to succeed at a task.

In the context of this study, the research team provided physical activities in which participants could be involved regardless of their skill or fitness level, and parental efficacy was examined in the context of providing physical activity opportunities for their overweight/obese children.

### Need for the Program

For overweight and obese youth in the local area, only one program existed to address their particular health related needs. However, the program was cost prohibitive for many families. Based on the statistics for children's health in Louisiana, it was necessary to better understand how parental efficacy and an intervention program can affect levels of fitness and in children and adolescents. Through this pilot study, the research team was able to deliver a program for this special population and their parents at a very low cost. This study also allowed for the opportunity to gain a greater understanding of these constructs through actual interaction and dialogue with children and parents and gain useful information by examining self-efficacy in this context.

### Purpose

The present investigation was designed to assess the efficacy of parental provision of exercise for children and its relationship to health and fitness in a group of overweight and obese youth. The program was called "Kids on the Geaux" and weekly sessions consisted of 1.5 hour meetings on Mondays and Thursdays for 12 weeks in the summer. The Monday sessions included 45 minutes of nutrition education (by Pediatric Certified Dietician and Nutritionist as well as local university students) and 45 minutes of physical activity (delivered by local university professors of kinesiology and students).

The Thursday sessions included 45 minutes of behavioral education (by a certified physical therapist with pediatric experience) and 45 minutes of physical activity. A local community health promotion organization provided an incentive "surprise" (i.e. water bottle, workout bag, jump ropes, etc.) for the participants each week during the program. Participants were rewarded weekly for their attendance/participation in the program. A total of 12 children completed the program and, during the last session of Kids on the Geaux, mp3 players were given to each child. A method of follow-up with both participants and their parents was provided by faculty of the local University's Department of Nursing. A graduate nursing student contacted participants and parents regularly for three months following the conclusion of the program. The graduate nursing student also met with participants and their parents once a month for three months to collect follow up BMI scores and to check in with participants regarding their weight management progress since school was in session again.

### Methods

#### Participants

Participants were recruited from the local community to enroll in a pilot test of a pediatric weight management program that was a collaborative effort among local university researchers, a community health organization, and a local hospital with a specialization in pediatrics. Parents gave consent to participate in survey data collection as well as for their children to participate in the pilot program to obtain fitness measures. Children gave assent after demonstrating an understanding of the requirements of the protocol. Characteristics of participating children can be found in Table 1.

Table 1. Participant characteristics

Variables	Female (n=9)	Male (n=5)
Age	11.±2yrs	10.6±2.1yrs
Height	1.54±0.13m	1.50±0.13m
Weight	74.5±26.2kg	96.9±35.3kg
Body Mass Index	30.8±6.3	41.9±12.9
20m Progressive Shuttle Run	9.8±5.8 lengths	5.8±3.5 lengths
Curl-Up Assessment	30.3±28.5	12.2±14.8
Push-Up Assessment	3.3±4.7	2.2±4.9
Left Side Sit and Reach	33.0±6.5 cm	26.4±7.1 cm
Right Side Sit and Reach	33.2±7.9 cm	26.2±7.3 cm
Participant Characteristics given in means ± SD		

#### Pediatric Weight Management Pilot Program

The pilot program consisted of 12 weeks of instruction in which both parents and children were involved. Each week parents and children received a 45 minute dietary education session from a registered dietician that encompassed topics such as portion size control, healthy choices, and nutritional snacks. In addition to dietary education each week a 45 minute healthy behaviors session was conducted for both parents and children by a licensed physical therapist with pediatric experience. These lessons focused on making choices that reinforced both physical activity and proper diet. The sessions also addressed emotional issues and self image of the participants as well as the ability to express feeling and emotions productively. The physical activity component was conducted twice weekly for 45 minutes per session involving only the children. The session included components designed to target aerobic capacity as well as musculoskeletal fitness. General biomotor abilities, including general strength, balance, coordination, flexibility and endurance received the greatest preference in the design given the 12 week length of the program. Fitness activities were most often incorporated into the framework of games to keep the participating children engaged in the activities. Self-efficacy of the parents for the provision of exercise to their children was assessed at the onset of the program. Pre and post fitness and health measures were assessed on the children during the first and last week of the pilot program.

### *Self-Efficacy Measure*

Parents were asked to complete a self-efficacy survey designed to assess their beliefs about providing opportunities to exercise for their children. The instrument consisted of nine items each with a ten point likert scale anchored at the low point 0 by 'not confident' and the high point 10 by 'very confident'. The scoring of the instrument was the summation of responses to the nine items, ranging from 0 to 90. The instrument is a minimally modified version of the Self-Efficacy for Exercise Scale, which has been demonstrated as both valid and reliable (Resnick and Jenkins, 2000). Retest of the parents was conducted during the investigation to assess the reliability of the modified instrument. There was no difference in reported efficacy for either administration ( $F=0.612$ ,  $p=0.989$ ,  $ICC=0.635$ ) suggesting the instrument was reliable.

### *Health and Fitness Assessments*

Body mass index was calculated after testing for height and mass, which were measured using a standard physician's triple beam balance and stadiometer (Health-O-Meter, Alsip, IL). Aerobic capacity was assessed with a 20 meter multistage shuttle run test according to the methods of Leger et al. (1988). The test is progressive in nature and is scored based upon the number of successfully completed 20 meter segments. Musculoskeletal fitness was assessed with curl ups and push-ups. These tests were conducted with cadences played from a pre-recorded audio compact disc that included the commands "ready, begin" and "up, down" at a frequency of 1/3 Hz. The push-up was conducted similarly for male and female participants from the up position to an elbow flexion of 90 degrees with the knees off the floor. The curl-up was assessed with the children's hands moving along the ground, from a predetermined starting point, a distance of either 7.6 (<10 yrs of age) or 11.5 cm ( $\geq 10$  yrs of age). Participants were monitored closely for compliance on all testing procedures. Flexibility was assessed unilaterally for both the right and left posterior chain using a standard sit and reach box that measured in centimeters. The test began with the leg assessed in a straight position, with the foot dorsiflexed and placed flat against the edge of the sit and reach box. The contra-lateral leg was placed in a position which allowed an unobstructed trunk flexion with the foot placed flat against the floor with the instep aligned opposite the knee of the measured leg. The participant was instructed to lean forward three times in a slow and controlled fashion and on the final attempt to hold the position so that a measurement could be recorded.

### *Statistical Analysis*

Parental efficacy for provision of exercise was compared to initial data collected during the first week of the pilot program via bivariate correlations. Pre-post fitness and health measures were compared using paired samples t-tests as well and using the methods of Hopkins (2007) to determine clinical inferences based upon the sample size and nature of the pilot program.

Effect sizes and power for calculated results were determined through the use of G\*Power 3.0 software (Faul et al., 2007). All other analyses were conducted with the use of a modern commercial statistical software package (SPSS 17.0).

## **Results**

### *Self Efficacy*

A significant correlation was found between the reported efficacy of provision of exercise by the parents and the body mass index of the children ( $r=0.522$ ,  $p=0.05$ ,  $Power=0.70$ , see Figure 1). Self efficacy for provision of exercise also demonstrated a significant correlation to the flexibility in the left leg ( $r=0.488$ ,  $p=0.038$ ,  $Power=0.63$ ) as well as a similar trend in the data for the right leg ( $r=0.345$ ,  $p=0.114$ ) although non-significant.

### *Pre-Post Pilot Program Fitness Measures*

Paired samples T-test revealed that curl up (mean diff: 26,  $t=4.749$ ,  $p=0.001$ ,  $ES=1.43$ ), push up (mean diff: 5,  $t=3.418$ ,  $p=0.007$ ,  $ES=1.03$ ), left sit and reach (mean diff: 4.8cm,  $t=2.567$ ,  $p=0.014$ ,  $ES=0.773$ ) and right sit and reach (mean diff: 3.5cm,  $t=2.083$ ,  $p=0.032$ ,  $ES=0.628$ ) were different from pre-post. The body mass index, when examined with paired samples analysis, trended towards difference (mean diff: 0.72,  $t=1.576$ ,  $p=0.073$ ,  $ES=0.475$ ). Results can be seen in Figure 2. Based upon the pilot program and the nature of the data collected inferential statistics were calculated for these measures resulting in classification of the program as likely beneficial for the improvement of all measures including body mass index (Table 2).

## **Discussion**

The results of the present investigation are beneficial for those people who are involved in small community based programs that aim to address childhood obesity. One issue with any community based weight management program is retention of participants. Zeller et al. (2004) reported that markers of socioeconomic status, age, depression, and ethnicity were related to attrition rates from a community weight loss program. In that study it was concluded that counseling should be included within a pediatric weight management program to reduce the chances of participant attrition. The current study was focused on a program that incorporated dietary information, physical activity and behavior modification counseling. As such the majority of the participants reported enjoying the program and only 2 participants did not attend the program for the majority of the 12-week period. The success of the present pilot test may be in part due to the inclusion of many key factors identified by Barlow and Dietz (2002) as important components for management of childhood obesity. Barlow and Dietz (2002) summarized recommendations from pediatricians, pediatric nurse practitioners and registered dietitians developed guidelines for best practice in which medical, emotional and behavioral evaluations preceded treatment for weight control.

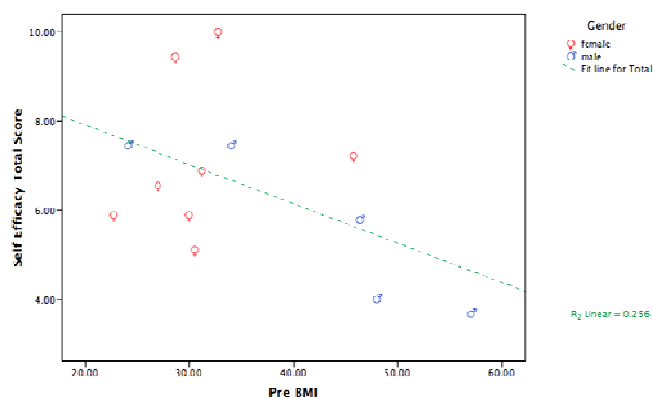


Figure 1: Relationship of Self Efficacy for the provision of exercise for children by parents to the body mass index of children at the onset of a pediatric weight management pilot program.

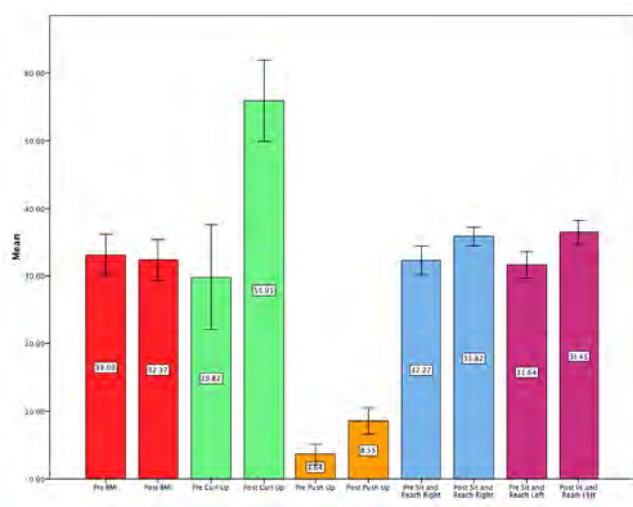


Figure 2: Pre and post measures from a pilot pediatric weight management program. Means are displayed within each bar and error bars depict the standard error of the mean.

Table 2. Inferential Statistics on Pre-Post Change

Measure:	Beneficial	Negligible	Harmful
<b>BMI</b>	<b>45.90%</b>	<b>54.00%</b>	<b>0.10%</b>
<i>Clinical Inference: possibly beneficial, most unlikely harmful: use</i>			
<b>Push-Up</b>	<b>94.40%</b>	<b>5.60%</b>	<b>0.00%</b>
<i>Clinical Inference: likely beneficial, most unlikely harmful: use</i>			
<b>Curl-Up</b>	<b>99.30%</b>	<b>0.70%</b>	<b>0.00%</b>
<i>Clinical Inference: very likely beneficial, most unlikely harmful: use</i>			
<b>Sit and Reach Right Leg</b>	<b>68.90%</b>	<b>31.10%</b>	<b>0.10%</b>
<i>Clinical Inference: possibly beneficial, most unlikely harmful: use</i>			
<b>Sit and Reach Left Leg</b>	<b>84.10%</b>	<b>15.90%</b>	<b>0.00%</b>
<i>Clinical Inference: likely beneficial, most unlikely harmful: use</i>			

Table 2: Inferential statistics (Hopkins, 2007) for pre-post changes in health and fitness measures during pilot program for pediatric weight management.

The pilot test for the current investigation was not preceded by dietary and behavioral evaluations, but incorporated those elements within the 12 weeks of planned activities.

These activities, including lessons on emotions and self-image for children and parents based upon the aforementioned recommendations in Barlow and Dietz (2002), may be largely responsible for the success of the program. Recent reviews of the literature in pediatric weight management (Epstein, Myers, Raynor, Saelens, 1998; Glenny & O'Meara, 1997) have suggested similarly that a balance of dietary and behavioral counseling is critical to the success of pediatric weight management programs. Both reviews concluded that the prescription of activity both supervised and unsupervised improved the chances of success over time. Edmunds, Waters, Elliot (2001) also concluded that the inclusion of exercise leads to a greater effect in treatment. In the current pilot test changes in physical capacity were seen in the children. Increases were particularly noted in musculoskeletal fitness tests. These increases could potentially lead to an increased ability to remain active outside the program, and potentially to engage in activities that were difficult or physically impossible prior to the program. One particular participant at the onset of the program was unable to walk up a flight of stairs in a normal fashion; instead he had to step up onto each successive riser with both feet often taking a rest prior to each riser. At the end of the program this individual was able to ambulate up a flight of stairs with alternate feet (right then left) on each successive riser as well as complete a lap around a 200 meter track at a slow jog. There was little doubt to any involved in the program that this young person left with greater ability to remain active during the day. Predictors of physical activity and exercise among children are complicated and sometimes involve factors from both parents and children. DiLorenzo, Stucky-Ropp, Vander, and Gotham (1998) concluded that in a sample of younger children (5th and 6th grade) the child's enjoyment of physical activity was the only predictor of engagement in physical activity. The same study revealed different predictors for older children (8th and 9th grade) similar in age to the children in the pilot program. For the older girls, exercise, knowledge, mother's physical activity and child's and mother's friends modeling/support were predictors. For the older boys in this study, exercise, knowledge, and parental modeling were predictors of exercise behavior. The present study examined the efficacy of the parents in the provision of exercise. The revealed relationship suggested that parents' feelings of efficacy for providing exercise were related to the health status of the children. In light of previous findings that parental behavior and modeling of exercise predicted behavior in older children (DiLorenzo et al., 1998) it is not surprising that parents' feelings about providing exercise for children is a predictor of health status. Parents' views have been studied in conjunction with childhood obesity treatment (Turner, Salisbury, Shield, 2011) and it was revealed that parents are concerned with being blamed about the health of their child, and questioned the ability of primary care providers to have the time and knowledge to effectively treat their child.

Based upon the findings from the present pilot study, as well as previous works, it appears that simply treating children for obesity may be a gross oversimplification of the problem as there are links between efficacy of provision of exercise, modeling of behaviors and barriers to treatment that all involve the parent. Another reason, therefore, for the success of the present pilot investigation may be the involvement of the parents in both the dietary and behavior modification components of the program. Although the parents were not directly involved with the physical activity component of the program, as it was designed to be child specific, many of the parents choose to exercise by walking around the indoor track or outdoor walking path during that time. A few of the parents signed up for an aerobics course that was occurring simultaneously in the same building. These anecdotes suggest that the pilot program was, at least for a few parents, effective in changing the modeling behavior they provided to their children. Parents of children engaged in weight management have also reported that general practitioners and school nurses offer different types of support for weight loss (Turner, Salisbury, Shield, 2011). This same study concluded that a team approach to treatment might represent the best option for pediatric weight management.

The pilot test in the present study was successful in demonstrating changes in physical capacity and health in the children, and qualitative observations that suggest positive changes in parental behavior, that support the team approach to comprehensive pediatric weight management is a viable and effective option.

### Conclusions

Based upon the evidence presented, it appears that a pediatric weight management program that involves dietary and behavioral education for both parent and offspring and physical activity prescription for the children is effective for improving health status in overweight or obese youth. The components for the program are supported by previous research that suggests a multidisciplinary approach is likely the best. In pilot testing the program, new information regarding the relationship of parental efficacy of provision of exercise and health of children has been revealed. This finding adds more information to the inter-relationship of the parents' views and behaviors and the effects on the weight of children. It can be suggested that personnel in healthcare, school or dietary clinics examine the components of this pilot program for the design of any future pediatric weight loss programs.

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## RELACIJE UTJECAJA RODITELJA I EFIKASNOSTI PILOT PROGRAMA UPRAVLJANJA TEŽINOM NA ZDRAVLJE I FITNESS KOD PRETILE DJECE

### Sažetak

Ovo istraživanje je dizajnirano da nadzire pedijatrijski program upravljanja težinom djece. Četrnaest roditelja i djece (muški  $n=5$ , curice  $n=9$ , uzrasta  $11.0 \pm 2.0$  g., visine  $152.5 \pm 12.3$  cm, BMI  $34.75 \pm 10.3$ ) dragovoljno je sudjelovalo. Roditelji su ispunili modificiranu verziju Skale samoprocjene vježbanja. Mladi su testirani u cardio fitnessu, sastavu tijela, indeksu tjelesne mase, mišićnoj izdržljivosti i gibljivosti. Općenito, mladi su klasificirani kao slabog zdravlja temeljeno na BMI, sastavu tijela, mišićnoj izdržljivosti i aerobnom kapacitetu. Prosječno je program bio uspješan u povećanju zdravlja i značajna korelacija je utvrđena za efikasnost potpore vježbanju od strane roditelja i BMI indeksa djece ( $r=-0.522$ ,  $p=0.05$ ). Rezultati sugeriraju da roditeljska efikasnost može biti diskriminirajući factor unutar populacije pretile, u fitnessu nisko sposobne djece. Roditeljsko uključivanje i osnaživanje može biti ključ za upravljanje težinom kod ove populacije.

**Ključne riječi:** djetinjstvo, pretilost, tjelesna aktivnost, roditeljski utjecaj, intervencija

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Correspondence to:

Endow.Prof.David Bellar, Ph.D.

University of Louisiana at Lafayette

Human Performance Lab Director

104 University Circle, Lafayette LA 70504

Phone: +(216) 374 2590

E-mail: [dmb1527@louisiana.edu](mailto:dmb1527@louisiana.edu)