The Impact of a Dance Aerobics Program on Middle School Girls' Physical Activity Level, Self-Efficacy, and Decisional Balance

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THE IMPACT OF A DANCE AEROBICS PROGRAM ON MIDDLE SCHOOL GIRLS’ PHYSICAL ACTIVITY LEVEL, SELF-EFFICACY, AND DECISIONAL BALANCE

by

Alexis Suozzi Bridley

Abstract of a Dissertation Submitted to the Graduate School of The University of Southern Mississippi in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy
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Rates of childhood obesity have increased dramatically in recent years. Decrease in physical activity is among the leading causes, with adolescent females at greatest risk for obesity. School-based interventions have shown promise; however, few studies have considered the type of activity on physical activity level. According to the Transtheoretical Model (TTM), intrinsic readiness, self-efficacy, and perceived risks and benefits regarding change contribute to behavior change. Yet no known studies have considered the impact of intervention with a traditionally preferred activity on self-efficacy and decisional balance. Therefore, this study aimed to explore the impact of a 2-week dance aerobics program on adolescent females’ physical activity level, self-efficacy, and decisional balance.

Participants included 69 female adolescents enrolled in physical education class at a public middle school, and their parent/guardian. The study consisted of four (baseline, intervention, follow-up one and follow-up two) two-week phases. Physical activity was obtained by daily pedometer readings, and self-efficacy and decisional balance questionnaires were completed on the last day of each phase. The standard physical education curriculum was in place throughout all phases of the study for both groups, with the exception of the intervention phase for the intervention group, which completed a dance aerobics module.
A series of multilevel models were used to determine impact of the intervention on participants’ physical activity level, self-efficacy, and decisional balance. Models for physical activity, self-efficacy, and decisional balance pros did not reveal significant differences although trends based off of the regression equation supported change in physical activity. The final model for decisional balance cons indicated a significant difference between group trajectories, but it was not in the predicted direction.

The study provides evidence that a preferred physical activity (dance aerobics) program can be implemented within the standard physical education curriculum for middle school girls. Despite low power, trends suggest that the intervention can increase physical activity in adolescent females. Furthermore, findings add to the literature on physical activity intervention and adolescent females’ self-efficacy and decisional balance. Future studies should build upon the study design and address limitations in a larger, more representative sample.
The University of Southern Mississippi

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# TABLE OF CONTENTS

ABSTRACT .............................................................................................................. ii

ACKNOWLEDGMENTS ................................................................................................ iv

LIST OF TABLES ..................................................................................................... vii

LIST OF ILLUSTRATIONS ......................................................................................... ix

CHAPTER

I. INTRODUCTION ..................................................................................................... 1

  Risk Factors for Childhood Obesity
  Physical Activity Interventions
  The Adolescent Female
  Transtheoretical Model (TTM)
  Self-Efficacy
  Self-Efficacy and Physical Activity in Youth
  Decisional Balance
  Decisional Balance and Physical Activity in Youth
  Summary and Proposed Study

II. METHODOLOGY .................................................................................................. 33

  Participants
  Power
  Procedure
  Study Design
  Conditions
  Study Phases and Physical Education Curriculum
  Treatment Integrity
  Measures
  Analysis Procedure

III. RESULTS ........................................................................................................... 52

  Descriptive Analyses
  Preliminary Analyses to Evaluate Group Equivalence
  Preliminary Analyses to Identify Covariate Relationships
  Background for Main Analyses
  Treatment Integrity
  Satisfaction
IV. DISCUSSION .................................................................................................................. 85

Physical Activity
Self-Efficacy
Decisional Balance Pro
Decisional Balance Con
Stages of Change
Treatment Integrity
Satisfaction
Study Limitations
Directions for Future Directions
Conclusion

APPENDIXES .................................................................................................................. 105

REFERENCES .................................................................................................................. 137
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Demographic Descriptives</td>
<td>34</td>
</tr>
<tr>
<td>2.</td>
<td>Baseline Number and Percentage of Students in Each Stage of Change by Condition</td>
<td>54</td>
</tr>
<tr>
<td>3.</td>
<td>Correlation Between Demographic Variables and Dependent Variables</td>
<td>55</td>
</tr>
<tr>
<td>4.</td>
<td>Baseline Model Examining the Intercept and Slope of Physical Activity Level</td>
<td>58</td>
</tr>
<tr>
<td>5.</td>
<td>Random Coefficient Model Examining the Association Between Physical Activity and Phase, with Phase as a Fixed and Random Effect</td>
<td>59</td>
</tr>
<tr>
<td>6.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Physical Activity, Phase, and Phase²</td>
<td>60</td>
</tr>
<tr>
<td>7.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Physical Activity, Group, Phase, and Phase³</td>
<td>61</td>
</tr>
<tr>
<td>8.</td>
<td>Baseline Model Examining the Intercept and Slope of Self-Efficacy</td>
<td>63</td>
</tr>
<tr>
<td>9.</td>
<td>Random Coefficient Model Examining the Association Between Self-Efficacy and Phase, with Phase as a Fixed and Random Effect</td>
<td>63</td>
</tr>
<tr>
<td>10.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Self-Efficacy, Phase, and Phase²</td>
<td>64</td>
</tr>
<tr>
<td>11.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Self-Efficacy, Group, Phase, and Phase²</td>
<td>65</td>
</tr>
<tr>
<td>12.</td>
<td>Baseline Model Examining the Intercept and Slope of Decisional Balance-Pro</td>
<td>67</td>
</tr>
<tr>
<td>13.</td>
<td>Random Coefficient Model Examining the Association Between Decisional Balance-Pro and Phase, with Phase as a Fixed and Random Effect</td>
<td>68</td>
</tr>
<tr>
<td>14.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Decisional Balance-Pro, Phase, and Phase²</td>
<td>69</td>
</tr>
<tr>
<td>No.</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-----</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>15.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Decisional Balance-Pro, Group, Phase, and Phase$^2$</td>
<td>70</td>
</tr>
<tr>
<td>16.</td>
<td>Baseline Model Examining the Intercept and Slope of Decisional Balance-Con</td>
<td>72</td>
</tr>
<tr>
<td>17.</td>
<td>Random Coefficient Model Examining the Association Between Decisional Balance-Con and Phase, with Phase as a Fixed and Random Effect</td>
<td>73</td>
</tr>
<tr>
<td>18.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Decisional Balance-Con, Phase, and Phase$^2$</td>
<td>74</td>
</tr>
<tr>
<td>19.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Decisional Balance-Con, Group, Phase, and Phase$^2$</td>
<td>75</td>
</tr>
<tr>
<td>20.</td>
<td>Number and Percentage of Students in Each Stage- Intervention Condition</td>
<td>77</td>
</tr>
<tr>
<td>21.</td>
<td>Number and Percentage of Students in Each Stage- Control Condition</td>
<td>77</td>
</tr>
<tr>
<td>22.</td>
<td>Baseline Model Examining the Intercept and Slope of Class Satisfaction</td>
<td>80</td>
</tr>
<tr>
<td>23.</td>
<td>Random Coefficient Model Examining the Association Between Class Satisfaction and Phase, with Phase as a Fixed and Random Effect</td>
<td>81</td>
</tr>
<tr>
<td>24.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Class Satisfaction, Phase, and Phase$^2$</td>
<td>82</td>
</tr>
<tr>
<td>25.</td>
<td>Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Class Satisfaction and Group</td>
<td>83</td>
</tr>
</tbody>
</table>
LIST OF ILLUSTRATIONS

Figure

1. Power Analysis Curve

2. Mean Physical Activity Level by Phase and Group

3. Mean Self-Efficacy Scores by Phase and Group

4. Mean Decisional Balance-Pro Scores by Phase and Group

5. Mean Decisional Balance-Con Scores by Phase and Group

6. Mean Class Satisfaction Scores by Phase and Group
CHAPTER I
INTRODUCTION

The prevalence of childhood obesity in the United States has steadily increased over the past two decades. According to the Center for Disease Control’s (CDC) 2008 U.S. statistics on childhood obesity prevalence rates, 19.6% of six-11 year olds and 18.1% of 12-19 year olds were classified as obese, a 2.6% and 0.5% increase from the 2003-2006 statistics, respectively (Ogden & Carroll, 2010). Furthermore, the 2009 National Youth Risk Behavior Survey reported that 12% of school-aged children were obese (BMI \( \geq 95\text{th} \) percentile) and 15.8% of school-aged children were overweight (BMI \( \geq 85\text{th} \) and < 95\text{th} percentile).

Although childhood obesity is on the rise across age, gender, and ethnicity, certain ethnic groups are disproportionately affected by childhood obesity. More specifically, childhood obesity has risen more steeply among African American and Hispanic children, with Mexican American children having the highest rates of obesity in ages two to five years, and African American adolescent females having the highest rates of obesity in ages 12-19 (Ogden et al., 2006; Salsberry & Reagan, 2005). Additionally, children in low-income households are also at increased risk for becoming overweight. According to the National Health and Nutrition Education Survey (Ogden et al., 2006) report, 22.4% of children are overweight who live in households with incomes at 100% below the federal poverty level. Furthermore, 19.2% and 13.5% of children living in families reporting incomes between 100-199% and 200-399% of the federal poverty level, respectively, are overweight. In addition to income, family structure is also related...
to obesity rates, with single mother households reporting the highest prevalence rates (Ogden et al., 2006).

The U.S. Department of Health and Human Services created *Healthy People 2010* (CDC, 2010) as a disease prevention and health objective guideline that aimed to increase quality and years of healthy life, as well as eliminate health disparities among Americans. Among the 28 focus areas targeted by the *Healthy People 2010* initiative are physical activity and fitness. Objectives for adolescents’ physical activity include, but are not limited to: increasing the proportion of adolescents engaging in moderately physical activity for at least 30 minutes, five times a week, increasing student participation in school physical education class, and increasing the proportion of students participating in at least 50% of their physical education classes. These guidelines are particularly important for African American and Hispanic children who continually report less time spent engaged in physical activity (Sulemana, Smolensky, & Lai, 2006). Additionally, recent findings suggest both African American and Hispanic adolescent girls report engaging in significantly less physical activity than White adolescent girls. Therefore, it is important that programs like *Healthy People 2010* are implemented to educate and increase physical activity level among the minority American youth, as well as female adolescents, due to the rapid decrease in physical activity during the middle school years (McKenzie, Marshall, Sallis, & Conway, 2000).

Increasing daily participation in physical activity, along with dietary changes, are the two most important behavior changes associated with reduction in obesity. For children and adolescents, these changes can easily be implemented within school-based interventions. Several studies have supported school-based interventions as an effective
method to increase children and adolescents’ time spent in physical activity; however, no known studies have implemented an intervention based on children and adolescents’ activity preferences (Jamner, Spruit-Metz, Bassin, & Cooper, 2004; McKenzie et al., 2004; Sallis et al., 1997; Webber et al., 2008). Adolescent females have identified cycling, aerobics, dance, and basketball as preferential activities, yet these activities are very rarely included in intervention programs (Barr-Anderson et al., 2007; Rees et al., 2006). It is important that these activities are included in intervention programs as they may increase adolescents’ physical activity related self-efficacy by providing positive, successful experiences, and developing physical and behavioral skills that they can maintain into adulthood (Dishman et al., 2004).

Unfortunately, without motivation to change (Miller & Rollnick, 2002) and belief in one’s ability to change (Bandura, 1982), change in physical activity may be less likely to occur. The Transtheoretical Model (TTM) of behavior change created by Prochaska (1979), integrates Bandura’s (1982) Social Cognitive Theory and Jannis and Manns’ (1968) decision-making theories to explain an individual’s readiness to change a given behavior (DiClemente & Prochaska, 1985).

Several studies have supported the relationship between stage of change and physical activity level, with individuals in more advanced stages of change reporting higher physical activities than those at the earlier stages of change (Prochaska et al., 1994). Furthermore, decisional balance and self-efficacy, components of TTM, have also demonstrated significant relationships with stages of change and physical activity levels in both adults and adolescents. More specifically, individuals in later stages of change report an increase in physical activity-related pros and a decrease in physical activity-
related cons, whereas those in earlier stages of change report fewer pros and more cons of physical activity (Nigg, 2001; Nigg & Courneya, 1998). Similarly, individuals in earlier stages of change report lower ratings of physical activity related self-efficacy than those in more advanced stages (Bungum, Pate, Dowda, & Vincent, 1999; Dwyer, Allison, & Makin, 1998).

The purpose of the current study was to explore the impact of a previously identified enjoyable physical activity, dance aerobics, on adolescent females’ physical activity level as adjunct to a standard physical education curriculum. In addition, the current study also aimed to explore the impact of the brief dance aerobics intervention on students’ physical activity self-efficacy and decisional balance.

Risk Factors for Childhood Obesity

There are several risk factors for childhood obesity that can be divided into two groups: genetic and environmental. Genetically, researchers have found at least seven genes and 60 additional chromosomal regions that have been associated with an individual’s fat mass, adipose tissue distribution, resting energy expenditure, and circulating leptin and insulin (Clement, 2006). This polygenetic interaction combined with additional environmental influences may place a child at risk for becoming overweight or obese.

Environmentally, parental obesity has been identified as one of the strongest predictors of childhood obesity, likely because in addition to the genetic similarities between child and parent, there are the strong environmental influences of modeling, food preferences, and beliefs about food and weight (Agras & Mascola, 2005; Eneli & Davies, 2008). Children with one obese parent are at greater risk of becoming overweight
than children with lean parents. Furthermore, this probability is even higher when both parents are obese (Safer, Agras, Bryson, & Hammer, 2001). Several findings have also suggested that parental obesity is a strong predictor of obesity in adulthood if the child’s parent is identified as obese before the child is 10 years of age (Klesges, Klesges, Eck, & Shelton, 1995; Safer et al., 2001).

Children’s dietary patterns are also significantly related to obesity. More specifically, parental feeding styles such as restrictive behaviors (controlling children’s food intake) and pressure to eat (requiring or pressuring children to complete meals) have both been shown to increase children’s likelihood of becoming obese (Eneli & Davies, 2008). In addition to parental feeding styles, children’s diet in general has also impacted the prevalence rate of childhood obesity. Milk consumption, which has been shown to reduce BMI, has decreased, whereas soft drink consumption has significantly increased over the last 50 years, especially in adolescence (Putnam & Allshouse, 1999). Additionally, fast food accounts for approximately 10% of food intake among children in the U.S. (Speiser et al., 2005). The increase of fast foods consumption is related to a decrease in fruits and vegetables, fiber, and an increase in sugar consumption, as well as a direct cause of increases in children’s weight.

In addition to dietary changes, sedentary behaviors and physical activity are also related to the increase in childhood obesity rates. Children today spend more time engaged in sedentary activities such as television watching and video/computer game playing than time engaged in physical activities. Andersen, Crespo, Bartlett, Cheskin, and Pratt (1998) found that children who watched four or more hours of television daily had a greater BMI than children who watched less than two hours daily. Furthermore, the
National Youth Risk Behavior Survey (NYRBS) (CDC, 2010) reported that 24.9% and 32.8% of youth engaged in at least three hours a day on a school day of video/computer games and television watching, respectively.

Additionally, children are spending less time engaged in physical activities, with only 25% of adolescents reporting engaging in regular exercise and 14% reporting they do not exercise at all (Speiser et al., 2005). Additionally, the NYRBS (CDC, 2010) study also reported 23.1% of youth do not participate in 60 minutes of physical activity at least one day a week. A National Center for Health Statistics (NCHS) study evaluated the relationship between time spent in physical activity and children’s weight. Findings reported that 13.8% of children who were physically active at least three times a week were overweight versus 17.1% who were not (CDC, 2001).

Physical Activity Interventions

In efforts to help reduce obesity and obesity-related health and psychiatric problems, researchers have suggested interventions targeting an increase in physical activity, a decrease in sedentary activities, a change in negative eating habits, and educating children about the relationship between food, exercise, and health. Researchers in the field of psychology have emphasized the re-evaluation of school-based physical education programs to increase time spent in moderately vigorous physical activity.

According to the Task Force on Community Preventive Service, school-based physical education is one of five strongly recommended interventions for increasing time children spend engaging in physical activity (CDC, 2001; Kahn et al., 2002). More recent meta-analytic studies indicate that school-based interventions are among the most effective methods to increase children’s overall physical activity (Kitzmann et al., 2010;
Michie, Abraham, Whittington, McAteer, & Gupta, 2009; Strong, et al., 2005). It has been stated that “school physical education is the primary societal institution with the responsibility for promoting physical activity in youth” (Sallis et al., 1997, p. 1328). Sallis and colleagues (1997) argue that because not all students receive physical education classes every day, physical education classes cannot be relied on as the sole method of meeting the recommended daily physical activity time; therefore, in addition to increasing physical activity in the school, educators should also promote generalizability of physical activity outside the school environment.

Although there have only been a few randomized controlled trials on school-based physical activity interventions, results appear promising. Luepker and colleagues (1996) developed the Child and Adolescent Trial for Cardiovascular Health (CATCH) to increase physical activity and modify dietary patterns in children across the US. The goal of the CATCH program was to reduce the total fat content of food service and to increase time engaged in moderately vigorous physical activity.

The interventions occurred at four different geographically diverse sites, each of which recruited local schools to participate in the three-year longitudinal study. A total of 5,106 initially third grade students in 96 public schools from 12 school districts participated. Each school was randomly assigned to either the intervention or control group. Schools participating in the intervention programs were further randomized to one of two conditions: CATCH or CATCH plus family-based program. The CATCH intervention addressed eating habits, physical activity, and cigarette smoking. The eating habits component involved providing children with school meals that were lower in fat and sodium, as well as a school-based learning component, teaching students the
importance of healthy living. The physical activity intervention targeted children’s time spent in moderately vigorous physical activity during their physical education class. The family-based program required students to complete activity packets (worksheets) with their parents that reiterated the physical and nutritional lessons the children were taught at school. Additionally, students involved in the family-based program were also encouraged to participate in family fun night, at the school where students performed dances and were exposed to healthy food booths and healthy snacks. The control group did not receive any components of the intervention and consisted of the usual health curricula, physical education, and food service provided at the school.

After implementation of the program for three years, results indicated that there were no significant differences in total time engaged in physical activity during physical education class across the groups; however, the intensity of the physical activity increased significantly more in both the intervention groups relative to the control group (Luepker et al., 1996). The intervention groups spent more time engaged in both moderately vigorous physical activity and vigorous activity during their scheduled physical education class.

One major accomplishment of the CATCH program was that the authors demonstrated that a school-based program involving physical education and family programs can be easily and successfully implemented in several geographic populations across the country. Although this was one of the first randomized controlled trials exploring school-based changes in physical activity, it’s not without limitations. The CATCH study did not report the number of children that actually participated in the various treatment components (e.g., family fun night) or the dose of intervention received
by each participant. Future studies should include measures of treatment integrity to ensure the treatment is delivered with fidelity and measures of participation rates to determine how much of the intervention the treatment group received, while also ensuring that students in the control condition did not receive treatment components. Such measures would bolster significant findings, and aid in interpretation of non-significant findings.

Sallis and colleagues (1997) developed a physical education program targeting physical activity and fitness in elementary school students known as Sports, Play, and Active Recreation for Kids (SPARK). Program SPARK involved the development of a physical education program to promote high levels of physical activity in physical education classes, at least three days a week for 30 minutes in fourth and fifth grade elementary students. The health-related activities included aerobic dance, aerobic games, walking/jogging, and jump rope. In addition, a self-management program involving teaching behavior change skills to help generalize physical activity outside of school was also taught once a week during a 30-minute classroom session. The seven participating schools were randomly assigned to one of three conditions: the SPARK program led by a specialist, the SPARK program led by a trained teacher, or the control group taught by an untrained teacher that consisted of the school’s usual physical education program.

Two consecutive cohorts ($n = 1,538$ year one; $n = 955$ year two) were followed for two years on measures of physical activity via self-report and electronic instrument (accelerometer), both in and out of school. Additionally, observer ratings of participation during physical education class were reported as a measure of physical activity in school. Findings revealed significant differences by condition with respect to physical activity
(Sallis et al., 1997). More specifically, the control group participated in physical education less frequently and spent significantly fewer minutes per week in physical education classes than both the intervention groups, indicating that teachers who received additional training engaged students in physical activity more frequently than teachers who did not receive any additional training. Furthermore, the intervention group participated in twice as much moderate to vigorous physical activity and energy expenditure than the control group. Additionally, the specialist-led group reported that moderate to vigorous physical activity and energy expenditure was significantly higher than that of the teacher-led group. Outside of school physical activity, measured via a self-report physical activity checklist, did not significantly differ among the three groups. These findings suggest that a school-based intervention can be successful in increasing moderately vigorous physical activity at school in school-aged children; however, additional teacher expertise in physical activity intervention is necessary to maximize benefits.

Another physical education intervention study in middle school students examined the impact of an intervention (M-SPAN: Middle School Physical Activity and Nutrition) providing sample materials and assisting middle-school physical education teachers with design and implementation of active physical education curricula on middle school students’ physical activity levels (McKenzie et al., 2004). The goal of the study was to provide physical education teachers with materials and instructional strategies to increase students’ moderately vigorous physical activity. A total of 24 public middle schools (per school \( M = 1,109, \ SD = 356 \) students) were randomly assigned to either the intervention or control group and evaluated on physical activity measures at baseline, and
years one and two. Results indicated that the intervention group significantly increased time spent in moderately vigorous physical activity from baseline to year two. Furthermore, when broken down by gender, effect sizes for moderately vigorous physical activity in boys ($d = .98$) and girls ($d = .68$) were large. Interestingly, girls in the intervention group engaged in moderately vigorous physical activity at a level similar to that of boys in the control condition. This finding is of great importance because female adolescents are among those at greatest risk for a decrease in physical activity and an increase in weight gain and sedentary activities (Neumark-Sztainer, Story, Hannan, Tharp, & Rex, 2003).

In sum, school-based interventions have been successful in increasing children and adolescent’s physical activity level during physical education class; however, these studies evaluated physical activity level as part of a multicomponent or packaged intervention. One important aspect of the current study is that it aimed to evaluate a school-based physical activity program on students’ physical activity level without including additional components. The single component methodology allowed for examination of the impact of the intervention program on adolescent females’ physical activity level without confounds from other treatment components. Furthermore, by implementing the physical activity interventions through school-based physical education classes, children of all races, gender, and socioeconomic background can access and benefit from the necessary physical activity programs. This is particularly important because children who are most at risk for obesity (e.g. low SES, rural locations) are often the children who do not have access to programs targeting physical activity levels. Therefore, another potential benefit of the current study is its implementation in a low
SES, predominantly Black middle school, a population that is at-risk for obesity but often without positive health and physical activity resources.

The Adolescent Female

Although limited participation in physical activity is an issue among the general youth population, it is particularly problematic for adolescent females, with only eight percent meeting the recommended levels of physical activity level (Troiano et al., 2008). According to McKenzie and colleagues (2000), girls participate in physical education classes less frequently and with less intensity than their male peers. This lack of participation may be attributed to motivational changes, societal expectations, and differences in skill development (Cox, Smith, & Williams, 2008; McKenzie et al., 2000). Rowland (1999) also suggested that additional physiological and psychological changes that occur during adolescence may place girls at a greater risk for adopting more sedentary behaviors.

Structured activities taking place inside and outside of school have been suggested as methods of intervention to increase adolescent females’ daily physical activity levels. Barr-Anderson and colleagues (2007) evaluated 2791 sixth-grade girls from six geographical locations on participation in sports teams and activity classes in and out of school, in addition to several psychosocial constructs. The study found that 89.5% of the girls participated in some type of physical activity, with 39% participating in school-based activities and 86% participating in non-school-based activities. Although these numbers are high, several other studies suggest these statistics may over represent actual participation rates due to sampling restrictions. For example, Barr-Anderson et al. (2007) recruited schools in large suburban areas; however, students in lower SES and
rural communities are less likely to participate in physical activities as a whole, as well as less likely to participate in research studies. Therefore, with limited data, less information is available about this population.

Jamner and colleagues (2004) developed a school-based intervention to promote physical activity among sedentary adolescent females in response to the Task Force on Community Preventive Services’ recommendation to work through physical education (PE) classes to promote physical activity in school-aged youth. A total of 47 high school females (22 control and 25 intervention groups) participated in the study. Participant inclusion criteria consisted of “(a) enrolled in 10th or 11th grade of the participating schools; (b) sedentary (i.e., fewer than three 20-minute bouts of vigorous exercise per week and fewer than five 30-minute bouts of moderate exercise per week); (c) at or below 75th percentile of predicted cardiovascular fitness (based on age and gender); (d) physically able to exercise without restrictions” (Jamner et al., 2004, pp. 280-281). The females in the intervention group were enrolled in a special PE class that met five days a week for 60 minutes each day. Activities were selected based on focus groups and included aerobic dance, basketball, swimming, and Tae Bo. Additionally, one day a week was devoted to a lecture or discussion focusing on health benefits of physical activity, as well as strategies for becoming more physically active. Females in the control condition received the standard PE class. Details of the standard PE class were not reported.

After four months of participation, results indicated that the intervention group maintained their cardiovascular fitness whereas the control group declined in cardiovascular fitness. Furthermore, the intervention group reported greater total energy expenditure at the end of the intervention than that of the control group. The fact that
cardiovascular fitness was maintained for adolescent females in the intervention group is of great importance because this is typically the age where cardiovascular decline is most prominent (Jamner et al., 2004). Although not reported by Jamner and colleagues (2004), one additional possible explanation for intervention students maintaining their physical activity level is the type of physical activity. Aerobic dance, basketball, and swimming have been identified as preferred and enjoyable activities for adolescent girls; however, without information about the standard physical education curriculum, it is difficult to determine if a preferable activity was the cause for maintaining physical activity.

Webber and colleagues (2008) also evaluated the effectiveness of community/school-based intervention to promote physical activity in middle school girls over the course of three years via a repeated cross-sectional design. The researchers linked intervention schools with various community based programs (YMCA, YWCA) to implement programs both on and off school property; control schools did not receive any additional programs other than those that were already implemented in their school prior to beginning the study. Among the physical activity programs were lunch-time Dance Dance Revolution, after-school step-aerobics class, before-school open gym basketball camp, touch football, and weekend canoe programs (Webber et al., 2008). In addition, participants received six health education lessons designed to enhance physical activity participation. Although the intervention was not implemented in physical education classes, participants’ physical education teachers were encouraged to promote physical activity both in and outside the class.

Results indicated that there was no difference between the intervention and control groups on minutes of moderate-vigorous physical activity until the third year of
treatment implementation. Furthermore, there was no difference between groups for minutes of total physical activity (Webber et al., 2008). The lack of significant findings may be explained by the lack of structure within the intervention design. By not requiring students to participate in a structured physical activity program (e.g., physical education class), students were less likely to engage in the intervention physical activity as often as those participants in other studies for whom the intervention was during physical education class, thus possibly explaining the reduced magnitude of an intervention effect.

Although the above studies have demonstrated some benefits in increasing girls’ participation in physical activities, researchers have yet to determine the components most effective in increasing overall physical activity. One possible method to increase females’ physical activity level is a change in type of activity. Barr-Anderson and colleagues (2007) reported that among all racial/ethnic groups, adolescent girls reported engaging most often in basketball, cheerleading/dance, or swimming. Additionally, Rees and colleagues (2006) conducted a systematic review examining barriers to and facilitators of physical activity among young people. Through a review of various studies, they concluded that young women preferred activities such as cycling and aerobics to that of tennis, football, and basketball. Additionally, they found that young women and young men with self-reported low activity levels expressed a dislike for competitive types of physical activities. Furthermore, lack of competence, negative reactions from peers about skill level, and self-consciousness about physical appearance are barriers to physical education identified by young people (Rees et al., 2006).

Another study conducted by researchers in Norway reported that female adolescents are more concerned with a slender physical appearance and appearing
feminine when participating in physical education class, whereas adolescent males reported preferring having sports competence and displaying physical endurance and strength when participating in physical education class (Kломsten, Marsh, & Skaalvik, 2005). Furthermore, when participants were asked to choose in which sports they were most likely to engage, the majority of males reported soccer, whereas the majority of females reported more traditionally feminine sports such as dance.

These findings are important with respect to increasing physical activity in girls because the typical physical education class in the U.S. often involves competitive sports (e.g., basketball, dodge-ball), where competency largely determines performance. This type of physical activity may contribute to girls’ lack of participation, as well as a decrease in their physical activity-related self-efficacy. Another potential problem with the current physical education classes is the lack of student input in type of activities engaged in during physical education classes (Rees et al., 2006), which may partially account for students’ negative perceptions of physical education in school (Rees et al., 2006). Requiring students to participate in non-preferred activities that emphasize competency may reduce self-efficacy to engage in physical activity, as well as shift decisional balance to a point where negatives of class participation outweigh the positives.

Prior research suggests one way to increase female participation in physical education is to provide students access to the activities they prefer. As previously stated, females prefer noncompetitive activities that maintain femininity such as aerobics, dance, and swimming. To date, there are no known studies evaluating the effectiveness of a female dance aerobics class on rates of participation in physical education classes;
however, there is one study that explored the effects of a six-weeks dance aerobics intervention on adolescent girls’ body image and physical self-perception (Burgess, Grogan, & Burwitz, 2006). Results indicated that participation in six weeks of aerobic dance significantly decreased body image dissatisfaction and enhanced physical self-perception. Although this study did not evaluate female participation rates, it did provide preliminary evidence that dance aerobics, as a form of physical activity for adolescent females, improves body image and physical self-perception. One limitation of the study is the dance aerobics intervention was not compared to a control group; therefore, it is unclear as to whether the intervention in fact was responsible for the change in adolescents’ reported body image and physical self-perception.

The current study aimed to build on Burgess and colleagues’ (2006) study to determine the impact of a brief all-girls’ aerobics class on physical activity level in physical education class. Consistent with the current physical education class curriculum at the participating school, a two-week dance aerobics program was implemented into the standard physical education class curriculum rotation for the intervention group, while the control group maintained the standard curriculum. It was expected that the students participating in the aerobics intervention program would demonstrate greater physical activity during the intervention phase than the control group. Furthermore, it was also expected that participants in the intervention classes would continue to exhibit more physical activity than the control classes during the follow-up phases.

Transtheoretical Model (TTM)

Although physical activity is one of the most important contributors to weight reduction and management (Jakicic, Marcus, Gallagher, Napolitano, & Lang, 2003;
Steinbeck, 2001), psychological characteristics such as intrinsic motivation to change (Miller & Rollnick, 2002) and belief in the ability to change (Bandura, 1982) are fundamental to individuals’ ability to change and maintain physical activity behavior. The TTM of behavior change (Prochaska & DiClemente, 1986) is one theory that integrates processes and principals of behavior change from several behavioral theories, to better understand and explain motivational readiness for change. Although originally developed from a combination of an empirical analysis based on individuals who smoke (Prochaska, 1979) and a comparative analysis of major theories of psychotherapy and behavior change (Prochaska & Norcross, 1999), the TTM has been used to understand change in various health behaviors, including physical activity and healthy eating (Jones et al., 2003; Prochaska et al., 1994; Riebe et al., 2003).

According to the TTM, at any given time, individuals’ ability to change a given behavior (physical activity level) can be categorized by their readiness to change (DiClemente & Prochaska, 1985). This readiness to change is described in five stages, and represents an individual’s readiness to take and sustain action. The five stages include: precontemplation (unaware or unwilling to change), contemplation (thinking about change but no action; action within six months), preparation (planning to change within the next 30 days), action (overtly changing for six months or less), and maintenance (act of changing for six months, resisting relapse). Progress through the five stages is often described as cyclical or spiraling, with individual progress through the stages occurring at various rates, and often moving back and forth along the continuum several times before reaching the maintenance phase.
In addition to the five stages of change, Prochaska and colleagues included previously established concepts of decisional balance and self-efficacy within TTM. Decisional balance, the importance of an individual’s perceived pros and cons for the behavior, was borrowed from Jannis and Mann’s (1968) decision making theories, whereas self-efficacy, an individual’s confidence to engage in a given behavior, was borrowed from Bandura’s self-efficacy theory (Bandura & Simon, 1977; Bandura, 1982). TTM assumes that behavior change is moderated by these two constructs, as well as a third construct, temptations/barriers to behavior change. Furthermore, Prochaska and colleagues argue that decisional balance is important for progression of behavior change for those individuals within the early stages of change, whereas self-efficacy appears to be more important for individuals in the later stages of change (Plummer et al., 2001; Prochaska & Velicer, 1997).

**Self-Efficacy**

Self-efficacy, as defined by Bandura (1998), refers to “beliefs in one’s capabilities to organize and execute the courses of action required to produce given levels of attainments” (p. 3). Therefore, according to Bandura (1998), an individual will not engage in a specific behavior unless one believes that he/she can produce the desired effect or goal by engaging in said behavior. Empirical studies have shown that efficacy beliefs are major motivators and predictors of behavior change.

There are four main sources of influences on individual’s personal self-efficacy beliefs: mastery experiences, vicarious experiences, social persuasion, and physiological states (Bandura, 1998). Mastery experiences, arguably the most effective way of creating a strong sense of self-efficacy, suggest that individuals’ self-efficacy beliefs are
strengthened through successes and weakened through failures. In physically active behaviors, *mastery* of a given exercise program or successful performance of specific physical movements beyond one’s perceived capabilities is associated with an increase of self-efficacy (McAuley & Courneya, 1993).

The second source of self-efficacy increase is through vicarious experiences. More specifically, seeing an individual similar to oneself succeed in a given activity increases an individual’s belief that they, too, can master and succeed in similar activities. McAuley and Courneya (1993) argue that with regards to physical activity, this source is the most effective method in behavior change for sedentary and/or older individuals.

Social persuasion, the third method used to increase self-efficacy, involves verbal persuasion that the individual possesses the characteristics to master and succeed in a given activity. These persuasions bolster self-efficacy by providing resistance against harboring self-doubts and personal deficiencies when problems arise. Social persuasion is most effective when combined with vicarious experiences (McAuley & Courneya, 1993).

The final method, psychological states, suggests that individuals rely on somatic and emotional states in determining whether or not they will be successful in a given activity. Positive moods enhance self-efficacy, whereas negative moods diminish self-efficacy. This method arguably has the greatest impact on individuals’ changing physical activity levels. For example, sedentary individuals who begin an exercise program may misinterpret physiological stress as a negative consequence, thus reinforcing their sedentary behaviors. McAuley and Courneya (1993) suggest teaching individuals to anticipate these symptoms, and to use them as markers of improved cardiovascular health rather than negative consequences of physical activity.
Self-Efficacy and Physical Activity in Youth

Several studies have supported the positive relationship between self-efficacy and physical activity level in adults. More specifically, Bawel, Keck, Topp, and Mikesky (1996) reported a positive relationship between self-efficacy beliefs and exercise adherence behaviors in older adults. Similarly, McAuley (1992) reported that self-efficacy beliefs were predictive of exercise participation, especially during the initial stages of exercise adoption, as well as in long-term maintenance in a sample of older adults (McAuley, Lox, & Duncan, 1993). Additional studies have also supported a more generalized importance of self-efficacy, with self-efficacy beliefs as the single best predictor of health regimen behaviors in adults with diabetes and other health-related problems (Maddux, Brawley, & Boykin, 1995; Marsh, Richards, Johnson, Roche, & Tremayne, 1994).

More recently, the relationship between self-efficacy and physical activity has been evaluated in youth. Several findings support self-efficacy beliefs as a significant predictor in the adoption, adherence, and performance of exercise-related activities in youth (Bungum et al., 1999; Dwyer et al., 1998). Furthermore, Bungum and colleagues (1999) found self-efficacy and participation in school physical activity predicted outside-of-school physical activity level in both African American and Caucasian adolescent females. According to recent longitudinal studies examining adolescent girls’ decline in physical activity, both self-efficacy for overcoming barriers to physical activity and perceived social support mitigated the decrease in physical activity level during late middle-school and early high school, suggesting these two constructs are important in
buffering the decrease in physical activity level during the adolescent years (Dishman, Saunders, Motl, Dowda & Pate, 2009; Dowda, Dishman, Pfeiffer, & Pate, 2007).

Dishman and colleagues (2009) evaluated social-cognitive correlates of physical activity level through the Trial of Activity for Adolescent Girls multi-ethnic study. More specifically, the relationship between adolescent girls’ self-reported self-efficacy and perceived social support with physical activity level measured via individual accelerometers was examined. Results indicated that self-efficacy was both directly related to adolescent females’ physical activity level, as well as indirectly related to adolescent females’ activity level through an inverse relation with perceived barriers. Furthermore, findings indicated that girls who reported low levels of social support reported more barriers to physical activity than girls who reported high levels of social support but only if they also reported low self-efficacy. With regards to ethnicity and physical activity level, White girls reported higher initial levels of self-efficacy and perceived social support than Hispanic and African American girls; however, only change in perceived social support was related to ethnicity. There were no significant differences in change in self-efficacy across ethnicities, suggesting that self-efficacy is less likely to be impacted by cultural environments.

The literature on the relationship between adolescents’ self-efficacy and stages of change with regard to physical activity is limited; however, similar to decisional balance, results appear to mirror the adult literature. For example, exercise self-efficacy has been shown to increase across stages of behavior change in both adults and adolescents (Herrick, Stone, & Mettler, 1997; Nigg & Courneya, 1998). More specifically, Berry, Naylor, and Warf-Higgins (2005) reported that self-efficacy was the strongest predictor
of stage and discriminated between individuals in the precontemplation stage and all other stages, as well as the maintenance stage and all other stages. Although not statistically significant, individuals in the contemplation stage reported lower self-efficacy than those in the preparation and action stages. The lack of significant differences in self-efficacy between those in the contemplation, preparation, and action phase suggests that individuals at the two extremes have significantly higher and lower levels of self-efficacy than those in the intermediate stages.

Berry and colleagues’ (2005) results replicated Nigg and Courneya’s (1998) reported findings of lower self-efficacy scores for adolescents in the precontemplation stage compared to those in all other stages. Furthermore, similar to decisional balance, as self-efficacy increased, so did reported stage of change. Nigg (2001) also evaluated the relationship between self-efficacy and exercise behavior via a three-year longitudinal study in a sample of adolescents. Results supported self-efficacy as a predictor of exercise behavior three years later, with an increase in self-efficacy being associated with an increase in exercise behavior.

While the research examining self-efficacy as a predictor of physical activity and motivation to change appears promising, no known studies have explored the impact of a dance aerobics intervention on youth’s self-efficacy (Annesi, Faigenbaum, Westcott & Smith, 2008; Lubans & Sylva, 2006; Taymoori & Lubans, 2008). Given the strong relationship between self-efficacy and children’s physical activity level, it is important that researchers begin to explore a variety of physical activity interventions aimed at increasing self-efficacy to better understand the mechanisms involved in changing youth’s self-efficacy. Seeing as this is the first known study to examine self-efficacy
following an intervention, this study also aims to examine the longitudinal impact of a brief dance aerobics intervention on adolescents’ self-efficacy. More specifically, it is expected that by engaging in a preferable activity that provides successful and mastery physical activity experiences, participants in the intervention condition will report an increase in self-efficacy immediately following the intervention. Similarly, it is expected that the increase in self-efficacy will be maintained during follow-up one, but decrease after follow-up two.

Decisional Balance

Decisional balance is defined as potential benefits (pros) and costs (cons) of behavior change. Prochaska and colleagues (1994) analyzed the relationship between decisional balance and the various stages of change, and found that for those in the precontemplation stage, the cons of changing behavior outweighed the pros. Conversely, for those in the active stage, the pros of changing behavior outweighed the cons. Thus, as an individual moves through the stages of change, the importance of the cons decreases while the importance of the pros increases. More specifically, somewhere between the pre-action phases (precontemplation, contemplation, and preparation) and the action phases (action and maintenance), a shift in the decisional balance occurs between the pros and cons. Although this theory was originally developed regarding adults, similar findings have been reported in an adolescent sample (Nigg & Courneya, 1998).

Within decisional balance theory, the balance of the pros and cons is an important concept in explaining an individual’s willingness and readiness to change. For example, depending on an individual’s stage of change, an individual can be aware of and knowledgeable about the personal benefits of engaging in a specific behavior change (e.g.
physical activity decreases blood pressure); however, he/she will not engage in the behavior if something associated with the behavior change (e.g. increased sweating, increased heart rate) is perceived as more negative than the benefits are perceived as positive. In this case, the negative experiences of increased sweating and increased heart rate are more important in terms of influencing one’s decision than the potential health benefits. Thus, examining the balance of an individual’s perception of pros and cons together is more informative than examining his or her perception of either pros or cons alone.

Although the majority of the research on decisional balance is with adult samples, recently there has been an influx of research examining decisional balance in adolescents. Among the behaviors studied in adolescents are smoking (Chen, Horner, & Percy, 2003; Otake & Shimai, 2001; Plummer et al., 2001), sun exposure (Maddock et al., 1998), alcohol use (Pallonen et al., 1998), sexual decision-making (Hanna, 1994; Hulton, 2001), exercise (Hausenblas, Nigg, Downs, Fleming, & Connaughton, 2002; Nigg, 2001; Nigg & Courneya, 1998), and dietary fat reduction (Rossi et al., 2001). Consistent with the adult literature on decisional balance, the majority of the studies evaluated internal and external validity of the decisional balance model with measures of stages of change, as well as other self-reported measures of behavior. Although the exercise studies will be described in further detail, studies of decisional balance in youth were generally consistent with findings of the adult literature, suggesting that the decisional balance model and measures can be applied to adolescents across a variety of health behaviors.
Decisional Balance and Physical Activity in Youth

The current literature well documents the decline of adolescent’s physical activity level; however, relatively little is known about the motivators and mechanisms underlying physical activity during adolescence. The TTM, and more specifically, decisional balance, aim to better understand these mechanisms and motivators through the various stages of change and the specific perceived pros and cons associated with one’s decision to change his/her behavior.

Nigg and Courneya (1998) examined application of TTM to adolescent exercise behavior. More specifically, they predicted that similar to the adult literature, decisional balance would change with respect to the stages of change. A total of 819 students from five different high schools completed a series of questionnaires on stages of change, self-efficacy, process of change, and decisional balance. Findings indicated a significant interaction for the pros-minus-cons difference across stages, and therefore, were further analyzed at each stage. Follow up analyses for each of the stages of change indicated a significant difference in the negative direction for precontemplation, contemplation, and preparation, indicating that the cons were more prevalent than the pros for individuals during the pre-action phases. There was not a significant difference for the action phase; however, there was a significant difference indicating that the pros were more prevalent than the cons during the maintenance phase. The lack of significant findings during the action phase indicates that the change in decisional balance occurred during the action phase. The authors argue that although the adolescent sample appeared to be more active than that of studies using adults, the process of change between the two age groups is similar in fashion (Nigg & Courneya, 1998).
With the knowledge that adolescents and adults progress through the stages of change similarly, Nigg (2001) further explored which of TTM variables drive exercise behavior in adolescents via a naturalistic longitudinal design. High school students \((N = 819)\) initially completed measures of stages of change, processes of change, self-efficacy, and decisional balance. Participants were contacted three years later for reassessment. A total of 400 participants completed assessments at both time points; there were no differences between completers and noncompleters on demographic and baseline data.

Results at the two assessment points indicate that strenuous and moderate exercise behaviors decreased from baseline to follow-up; however, mild exercise levels remained the same between the two time points. Similarly, participants identified themselves at more advanced stages at baseline (Nigg, 2001).

However, findings regarding decisional balance indicate that there was a significant increase in pros and a significant decrease in cons (Nigg, 2001) from baseline to follow-up. According to Prochaska and Marcus (1994), these changes would suggest that there was a significant change in individuals’ stages of change from a pre-action phase where emphasis is more largely placed on cons, to an action phase where emphasis is more largely placed on pros. Unfortunately, Nigg’s (2001) results failed to support Prochaska and Marcus’ (1994) suggestion; however, the authors argue that the large number of participants in the action phases at both time points (action and maintenance) may have skewed the results (Nigg, 2001) by increasing the number of participants reporting a higher frequency of pros and lower frequency of cons.

A more recent study looking at the relationship between the stages of change and self-reported pros and cons of adolescents revealed that adolescents who identified
themselves in the preparation stage with regards to physical activity level reported a significantly lower frequency of pros than those in any other stage (Berry et al., 2005). Furthermore, adolescents who identified themselves in the preparation stage with regards to physical activity level reported significantly more cons than those in the maintenance stage. Reported levels of cons for the precontemplation and contemplation phases were similar to that of the preparation phase; however, significant differences between precontemplation, contemplation, and maintenance were not reported.

As evidenced from the reviewed studies, the relation between physical activity and both decisional balance and stages of change in adolescents is similar to that of adults; however, with only three studies available for review, further work in these areas is needed. Similarly, with only a limited number of studies exploring the decisional balance construct with regards to physical activity level, the mechanisms in which the two constructs relate in largely unknown. Of the available studies exploring decisional balance, most have used naturalistic longitudinal designs, and no known studies have explored decisional balance following an intervention. Therefore, similarly to self-efficacy, another aim of the current study is to explore the longitudinal impact of a dance aerobics intervention on students’ pros and cons of exercising. Whereas this study is largely exploratory, it is expected that by engaging in a school-based physical activity intervention that incorporates components previously identified as enjoyable, the positives (pros) of engaging in physical activity will increase for participants in the intervention condition immediately following the intervention, whereas the negatives associated with engaging in physical activity (cons) will decrease. Similarly, it is
expected that these changes with be maintained after follow-up one, but will return toward baseline after follow-up two.

Summary and Proposed Study

The U.S. has observed a steady rise of child and adolescent obesity over the past two decades (Ogden & Carroll, 2010). This increase in obesity has also come with an increase in time spent in sedentary activities (e.g. television watching, video/computer game playing) and a decrease in the amount of time children and adolescents spend engaging in physical activity. Research has shown that this decrease in physical activity levels is most prominent in adolescent females. Findings have suggested several factors such as motivational changes, societal expectations, and differences in skill development account for the rapid decrease in physical activity participation among adolescent females (Cox et al., 2008; McKenzie et al., 2000).

The Task Force on Community Preventive Service argues that school-based physical education is one of five strongly recommended interventions for increasing children’s physical activity time (CDC, 2001). Several studies have offered support that implementation of a school-based intervention increases children and adolescents’ time spent in moderately vigorous physical activity, as well as overall participation in physical education classes (Luepker et al., 1996; McKenzie et al., 2004; Sallis et al., 1997). Although overall participation increases, females’ participation still lags behind that of their male peers (Sallis et al., 1997). One explanation for the lack of participation by adolescent females is the type of activities implemented in these programs.

Several researchers have found that girls prefer more traditionally feminine activities such as dance, swimming, and aerobics, whereas males prefer more competitive
sports such as soccer, tennis, and football (Barr-Anderson et al., 2007; Rees et al., 2006). Additionally, girls report lack of competence, negative reactions from peers over skill level, and self-consciousness about physical appearance as barriers to participation in physical education (Rees et al., 2006). Unfortunately, no known studies have examined the impact of a dance aerobics program on adolescent females’ physical activity level. Furthermore, those studies that have examined change in physical activity level generally focused on students’ change in physical activity level as a whole, rather than focusing on the female population who is at greatest risk for decline in physical activity.

Therefore, the first aim of the current study is to take into consideration the above barriers to girls’ participation in physical education classes, and provide a sample of female adolescents with a physical education module that allows them to participate in an all-girls dance aerobics unit. It is expected that the participation in the dance aerobics unit will increase students’ physical activity level, whereas the physical activity level for those participating in the standard physical education curriculum will remain the same. Furthermore, it is expected that during the two follow-up phases, intervention students’ physical activity level will remain higher than that of students’ in the control condition (standard physical education curriculum).

The literature suggests that despite the positive health benefits of physical activity, unless individuals have an intrinsic motivation to change their behavior and believe in their ability to change, behavior change will not occur. Prochaska and DiClemente (1986) developed the TTM in efforts to better explain an individual’s motivational readiness to change any given behavior. In addition to describing the stage of change (precontemplation, contemplation, preparation, action, and maintenance) an
individual identifies with at any given moment, the TTM also consists of several cognitive and behavioral constructs through which the process of behavior change is understood. Among those constructs are self-efficacy and decisional balance.

Originally established by Bandura (1982), self-efficacy theory was also adopted into TTM to explain why individuals do or do not engage in a given behavior. If individuals are not confident in their capabilities or do not believe they can obtain a given goal, self-efficacy theory suggests that behavior change will not occur (Bandura, 1998). The literature examining self-efficacy with respect to physical activity has identified positive relationships between self-efficacy and exercise adherence, as well as exercise participation in both children and adults (Bawel et al., 1996; McAuley, 1992; McAuley & Courneya, 1993). More recently, self-efficacy was also found to predict outside of school physical activity level in youth, with higher self-efficacy scores predicting more frequent physical activity (Bungum et al., 1999).

In addition to self-efficacy, decisional balance, the weighing of pros and cons of behavior change, has also been explored as a mechanism of change for physical activity. Unfortunately, the literature on decisional balance is very limited, with only a few studies exploring the relationship between decisional balance and stage of change. The literature in both adults and adolescents suggests that for individuals in the pre-action stages, the cons out-weigh the pros, thus obstructing behavior change, whereas for individuals in the action stages, the pros out-weigh the cons, thus supporting maintenance of behavior change (Berry et al., 2005; Nigg, 2001; Nigg & Courneya, 1998; Prochaska et al., 1994).

Although the literature on the relationship between physical activity, self-efficacy, and decisional balance in adolescents is growing, no known studies have examined these
constructs with respect to a brief dance aerobics intervention. Therefore, the second aim of the study is to conduct a preliminary examination of the impact of a two-week dance aerobics intervention on adolescent females’ self-efficacy and decisional balance. As previously stated, it is predicted that by providing students a physical activity (dance aerobics) that has been previously reported as *more enjoyable*, as well as providing students with opportunities to engage in successful physical activity activities, intervention participants will report an increase in physical activity related self-efficacy and decisional balance pros, as well as a decrease in decisional balance cons, immediately following the intervention phase, whereas the control condition will not report any changes. Finally, it is expected that these changes for the intervention condition participants will be maintained at the first follow-up evaluation; however, will decrease (toward baseline) by the second follow-up evaluation (Perri, 1998; Perri & Corsica, 2002; Shadish, Cook, & Campbell, 2001). Given the complex and time intensive nature of an intervention study, findings from this preliminary study can provide researchers with initial evidence to inform larger scale investigations.
CHAPTER II

METHODOLOGY

Participants

Participants included 69 female adolescents in grades seven (n = 43) and eight (n = 26) from Hattiesburg Public School District’s N. R. Burger Middle School who were enrolled in physical education class during the 2009-2010 school year, as well as their parent/guardian. Participants’ ages were between 12 and 14 (M = 12.77, SD = 0.70) and 89% of the participants self-identified as African American.

Of the participant caregivers, 89.3% were the child’s biological parent, 6.2% were grandparents, 3.1% were an aunt or uncle, and 1.5% reported other relationships. Caregiver ages ranged from 28 to 62 years (M = 37.51, SD = 7.69) and 29.2% were married. In reference to the caregiver’s highest level of education, 32.3% reported receiving some college or specialized training and 17.1% reported earning a high school diploma. Regarding total family income, the mean family Hollingshead (1975) four-factor Index of Social position was 29.33 (SD = 12.3), which is considered to be at the upper end of the social strata of machine operators and semi-skilled workers. Consistent with the sample’s total family income, 86% of the N. R. Burger student body receives free or reduced lunch. See Table 1 for complete demographic breakdown.

Power

In a cluster randomized trial, power is influenced by four components: cluster size (the number of students assigned to each condition), number of clusters (the number of classes per condition), intraclass correlation (magnitude of between class differences),
Table 1

Demographic Descriptives

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control ($n = 31$)</th>
<th>Intervention ($n = 34$)</th>
<th>Total ($N = 65$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M (SD)</td>
<td>12.77 (0.67)</td>
<td>12.76 (0.74)</td>
<td>12.77 (0.70)</td>
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<tr>
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<td></td>
<td></td>
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<tr>
<td>7</td>
<td>20 (64.5)</td>
<td>21 (61.8)</td>
<td>41 (63.1)</td>
</tr>
<tr>
<td>8</td>
<td>11 (35.5)</td>
<td>13 (38.2)</td>
<td>24 (36.9)</td>
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<tr>
<td>Race of Child</td>
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</tr>
<tr>
<td>Caucasian/White</td>
<td>1 (3.2)</td>
<td>0</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>African American/Black</td>
<td>28 (90.3)</td>
<td>31 (91.2)</td>
<td>59 (90.8)</td>
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<tr>
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<td>1 (1.5)</td>
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<tr>
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<td>3 (4.6)</td>
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<tr>
<td>Relationship to Child</td>
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<td></td>
</tr>
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<td>25 (80.6)</td>
<td>31 (91.2)</td>
<td>56 (86.2)</td>
</tr>
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<td>2 (5.9)</td>
<td>4 (6.2)</td>
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<td>4 (6.2)</td>
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<td>16 (24.6)</td>
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and effect size (Raudenbush, Martinez, & Spybrook, 2007). As cluster size increases, power increases; however, there is a point in time that increasing the cluster size without increasing the number of clusters does not benefit power. Similarly, as the number of clusters increases, power increases. The number of clusters has a stronger influence on power than the cluster size; however, resources and financial obligations may prevent researchers from obtaining large numbers of clusters. Conversely, an increase in intraclass correlation, decreases power. Finally, the greater the effect size between conditions, the greater the power.

Power, with respect to the current study, was compromised by both numbers of clusters and cluster size. With the limited available resources for the current study, six clusters (classes) was the maximum number of clusters available. Additionally, with only six clusters, the number of participants was also compromised. Number of participants varied between classes. A power analysis curve for the current study indicated that with six clusters and 11 students in each class (on average), the power for the current study was roughly 0.2 (α = 0.5; ICC = 0.2). Furthermore, the power analysis graph also indicated that to reach acceptable power of 0.8 with on average 11 students in each class, one would need to recruit roughly 24 classes (see Figure 1). Despite the small number of clusters in the current study and the varying number of participants in each cluster, baseline differences between control and intervention classrooms were not significant; therefore, propensity score matching (Foster, 2003) and covariate adjustments, additional methods to increase similarity between groups, were not needed to improve baseline equivalence on the dependent variables.
Procedure

The primary investigator obtained approval from Hattiesburg Public School District’s Superintendent’s office, as well as the interim principal at N. R. Burger Middle School, to recruit female students from N. R. Burger Middle School’s physical education class. Upon IRB approval, the primary investigator met with the physical education instructor to discuss the components, as well as her role, in the study. Furthermore, the primary investigator educated the physical education instructor about the dance aerobics intervention.

Every week, for three weeks prior to the semester break, the primary investigator attended every physical education class, once a week, to recruit students to participate in the study. Additionally, the first week after semester break was also used as a final recruitment period. During the recruitment phase, students were provided, and asked to
return, a consent form that was attached to a participation registration form and included demographic information. Students who returned signed consent forms were then asked to sign a child assent form. Students who returned a signed parental consent, as well as a signed child assent received a Girls Exercising Together t-shirt.

Study Design

Participants were randomly assigned by classroom to either the control condition (three classes, combined n = 33) or intervention condition (three classes, combined n = 36). Randomization was determined by drawing three class period numbers (two [n = 9], five [n = 13], and six [n = 14]) from a hat for the intervention condition. The remaining three class periods (one [n = 2], three [n = 6], and seven [n = 25]) were assigned to the control condition. Both conditions participated in eight weeks of physical activity (see Appendix D for study breakdown). The first phase (week one and two) was used to obtain baseline data of student’s physical activity level and perception of physical activity. The second phase (week three and four) was the intervention phase where the control condition continued with the standard physical education class curriculum, and the intervention condition participated in the dance aerobics intervention. The third (week five and six) and fourth (week seven and eight) phases were used as follow-up phases to obtain data on student’s physical activity level and perception of physical activity post-intervention. During these two phases, the control condition continued, and the intervention condition resumed standard physical education curriculum.

Within each phase, students were required to wear a pedometer Monday through Friday of the first week, and Monday through Thursday of the second week to obtain a measure of physical activity level during their physical education class (the second Friday
was used for students to complete measures). Students obtained their assigned pedometer upon entering the classroom and returned the pedometer prior to changing or with five minutes left in the class period. The primary investigator and/or a research assistant recorded every student’s pedometer recording during the eight-week study. To minimize instrumental error, every pedometer was painted with a number, and every student was assigned a pedometer number to ensure the same pedometer was used everyday. Students that did not participate in class received a zero for their physical activity on that day. In addition to physical activity, students were evaluated on weight, decisional balance, self-efficacy, stages of change, and physical activity class satisfaction on the second Friday of every phase. Students were instructed to answer questionnaires based on their feelings of physical activity over the course of the past two weeks. Additionally, observer ratings via the modified SOFIT program were obtained to ensure similarity between physical education lesson context and teacher interactions between conditions.

Conditions

_Dance Aerobics Module (Intervention)_

The intervention condition was taught by the regular physical education instructor and the primary investigator during the students’ assigned 50-minute class period, five days a week, for a two-week period. The students were provided roughly a total of 15-minutes for changing (seven- minutes before, eight-minutes after), leaving a total of 35-minutes for actual physical activity. The students began class with a five-minute warm-up, which included a brief cardiovascular exercise (three laps around the gym), followed by several large muscle stretches. The dance aerobics component was then implemented for roughly 25-minutes (see manual in Appendix E for specific instructions). Students
were then provided a five-minute cool down period where students were directed through a series of stretches to lengthen the muscles.

The dance aerobics component consisted of rhythmic steps of aerobics and dance, at both low and high impact. Low impact aerobics involved an emphasis on footwork, whereas high impact aerobics involved more physically active movements such as jumping and jogging. The goal of the dance aerobics intervention was for the students to be able to participate in a large series of rhythmic steps. Therefore, everyday the students were required to learn one component of a large aerobics routine, slowly building to the final large routine performed on the last day of the intervention. Progression of the routine began with learning simple steps during the beginning of the intervention, followed by more complicated steps toward the end of the intervention. See manual in Appendix E for a more detailed description.

Standard Physical Education (Control)

The control condition was primarily taught by the physical education instructor during the student’s assigned 50-minute class period, five days a week. It should be noted that although the primary investigator was not involved in the curriculum planning, she was present and active for all control condition’s physical education classes. Similar to the students in the intervention condition, students in the control condition were provided roughly 15-minutes for changing, leaving approximately 35-minutes for actual physical activity. During the course of the intervention, students’ physical education curriculum varied weekly as described below in Study Phases. Despite the activity of the week, Friday’s consisted of free days, where students had open gym and were allowed to participate in any type of physical activity.
Study Phases and Physical Education Curriculum

**Baseline**

During the baseline phase, students in both conditions spent one week learning the history and rules/regulations of the standard curriculum activity for that physical education module (i.e., floor hockey). Additionally, students participated in several types of drills throughout the week, learning the basic skills necessary to participate in floor hockey (e.g., running with the puck, passing, shooting, etc.). Students were also quizzed on the rules of floor hockey and were required to pass the quiz before participating to ensure proper safety rules were understood. The second week of the baseline phase was spent playing floor hockey games, alternating teams in a round robin tournament structure.

**Intervention**

The intervention phase consisted of the intervention curriculum explained above for the intervention classes and two weeks of standard physical education curriculum for the control classes. The curriculum for the control classes consisted of one week of informal hockey games followed by another week of open gym. During the open gym period, students were required to participate in some form of physical activity. Available options for students during open gym were half-court basketball games, walking outside around the football field, playing with jump ropes, or walking around the gym. Despite the lack of curriculum structure during the second week within the intervention phase, students were still required to engage in activity for the standard 35 minutes.
Follow-up One and Two

The curriculum for the two follow-up phases were essentially the same for both the intervention and control groups; however, due to a school-wide assembly during seventh period in follow-up one, one control condition class’ physical activity data was not obtained. Average physical activity level for students in this class during this phase was based on eight days, whereas the remaining five classes data were based on nine days of data. During the first follow-up phase (total of two weeks), all classes alternated between playing floor hockey and flag football. Daily activity was determined by the students and, therefore, different class periods participated in different activities. According to the physical education teacher, flag football rules, and drills were incorporated into the physical education curriculum during the previous semester.

The final follow-up phase consisted of one week of flag football/open gym and another week of basketball. The flag football/open gym week consisted of 35 minutes of physical activity for every student; however, specific physical activity was determined by individual classes. The second week was used to prepare students for the March Madness basketball tournament. Students participated in a series of basketball drills to familiarize students with a variety of skills necessary to excel in a basketball game, followed by brief half-court basketball games.

Treatment Integrity

Two different methods of treatment integrity were performed. The Aerobics Checklist was used during the intervention phase to verify that the treatment components were administered to the intervention condition (i.e., dance aerobics), but not to the control condition. The second method of treatment integrity, the modified SOFIT
program, was used to determine similarity between intervention and control conditions on both lesson context and teacher interaction. Twice a week throughout the entire study a research assistant completed two SOFIT observations (one control and one intervention session), thus equaling a total of four class period observations per week. Additionally, 25% of the observed assessments (one control and one intervention period per phase) were also observed by a second research assistant to ensure treatment integrity.

The research assistants were trained on the modified SOFIT program. The modified SOFIT program provides measurement of lesson context and teacher interactions (additional detail in Measures section). Prior to assessment of the current study’s PE classes, research assistants performed practice evaluations of PE classes to ensure proper coding. For the purpose of the current study, reliability for test observations was established if the interobserver agreement calculation (IOA) on both lesson context and teacher involvement was 80%. IOA was calculated as the total number of agreements (occurrence and nonoccurrence) divided by the total number of agreements plus disagreements and multiplied by 100. IOA for the current study ranged from 92.1% to 100% for both lesson context and teacher involvement; thus, no retraining of research assistants was necessary.

Measures

Descriptive measures

Demographic form. Parents/guardians completed a demographic form including information about themselves and the child’s home environment. Information about the parent/guardian included age, sex, race, marital status, educational background, occupation, and household income. Additionally, information on child’s age, birth date,
grade, extracurricular activities during the current semester, and health problems were also obtained.

**Physical Measures.** An Omron Full Body Sensor Body Composition Monitor and Scale was used to determine participants’ weight. A stadiometer was used to determine participants’ height. Body Mass Index percentiles were calculated based on the Centers for Disease Control National Center for Health Statistics recently published standards determined by the child’s age and gender.

**Modified Physical Activity Questionnaire (MPAQ)** (Brener et al., 2002). Students completed a 5-item multiple-choice questionnaire during the initial assessment, assessing their attitude about their weight and their current level of physical activity. The questions were obtained from two modules of the 2009 Middle School Youth Risk Behavior Survey (Brener et al., 2001), which was developed by the CDC and Prevention to monitor health-risk behaviors and the prevalence of obesity among youth. The original modules contained a total of 12 questions, however, seven questions were removed from the questionnaire due to the sensitivity of the subject (i.e. fasting and vomiting to lose weight). Items were multiple choice and children were asked to choose the most accurate response (e.g., “How many days do you participate in PE? 1, 2, 3, 4, or 5”; see Appendix G). No psychometric data were reported for the instrument. Select items were used to obtain additional descriptive information about student’s current physical activity level (e.g. sports played, time spent exercising, time spent watching television, etc.) and their attitude about weight as reported in descriptive analyses (see Results).

**Stages of Change Measure (SOC)** (Driskell, Dyment, Mauriello, Castle, & Sherman, 2008). The SOC measure consisted of one stem question assessing the number
of days a week the student engaged in 60 minutes or more of physical activity. Student’s who responded with *five days or more* were then asked if they had been physical active for six months or more (Maintenance) or less than six months (Active). Similarly, students who responded with *fewer than five times a week* were asked if they would start getting one hour or more of exercise each day. Students responded with either No (Precontemplation); Yes, I will start this in a while (Contemplation); or Yes, I will start this soon (Preparedness). No psychometric data were reported for this measure.

**Dependent measures**

*Physical Activity.* Participant physical activity level was defined as number of steps taken as measured via Sportline 330 pedometers. Each student was assigned a pedometer number and was required to wear the pedometer on their right hip (attached at the waist) from the beginning to the end of every physical education class. Approximately five minutes prior to the end of class, students returned their pedometer to the primary investigator or the research assistant who recorded the number of steps for the class period. Pedometers were then cleared for the next physical education class.

*Self Efficacy (SE)* (Dwyer, Allison, & Makin, 1998). The SE measure is a 21-item measure of exercise self-efficacy that provided information about how confident students were in their physical activity. Participants rated how confident they were to participate in vigorous physical activity on a scale of 1 (“not at all confident”) to 5 (“very confident”), and the overall score reflected an average of the scale’s items. The measure contained two factors that assessed self-efficacy in overcoming internal and external barriers to physical activity. Both the internal and external factors have demonstrated high internal consistency, with coefficient alphas of 0.88 and 0.87, respectively.
Additionally, external validity of both the external and internal factors has been demonstrated with significant correlations with other measures of self-efficacy ($p's < .01$). Furthermore, both factors have been shown to predict participation in vigorous physical activity in physical education class, in other school activities, and outside of school ($p's < .0001$). For the current study, coefficient alphas for the total self-efficacy scale ranged from .87 to .94 across the four administrations.

**Decisional Balance Questionnaire (DBQ)** (Marcus, Rakowski, & Rossi, 1992). The DBQ is a 16-item questionnaire that assessed student’s perception of pros (10 questions) and cons (six questions) of engaging in regular physical activity. Participants rated each item on a five-point likert scale from *not at all important* to *very important* with respect to their decision to exercise. A high score on the pros subscale indicated behavior change is important, whereas a high score on the cons subscale indicated cost of behavior change is important. Reported internal consistency (coefficient alpha) is 0.95 and 0.79 for the pro and con scales, respectively. For the purpose of the current study, both pro and con total scores were calculated and evaluated separately. Across the four administrations, coefficient alphas ranged from .87 to .91 for the pro scale, and .59 to .85 for the con scale.

**Treatment Integrity**

*System for Observing Fitness Instruction Time (SOFIT)* (McKenzie, 2002). The SOFIT program is a standardized tool for assessing physical education classes, where observers record data on student activity levels, lesson context, and teacher behavior (teacher behavior and teacher interaction). For the purpose of the current study, lesson context and teacher interaction components were used to evaluate consistency of lesson
context and teacher interaction across conditions and time periods. It was expected that teacher behavior and lesson context would remain stable across the four phases, suggesting similarity in curriculum components. Both lesson context and teacher interaction components were modified to accommodate for specific behavioral observations for the current study.

Lesson context, which refers to how physical education class information is delivered, was coded as either general content (G), which involves transitioning between tasks, management, or break times; knowledge content (K), which involves obtaining the knowledge to engage in the physical activity behavior; motor content (M), which refers to lesson time when the student is expected to engage in motor activity; or other (X), which involved any other lesson context. The teacher involvement component assessed general teacher involvement during the physical education lesson. This component was coded as either engagement in physical activity (E), where the teacher either promoted physical activity participation (via praise or reinforcement) or actively participated in the physical education lesson via demonstration of activity; observing (O), where the teacher did not actively engage with the students, but was observing the students; or other (T), which included all other behaviors during the observation.

The coding options within the lesson context and teacher involvement were mutually exclusive; thus, one code was recorded for every observation period. Each phase (lesson context, teacher involvement) was alternately observed and recorded according to a momentary time sampling procedure, with one second for observation and four seconds for recording. A total of six observations per phase per minute, and 90 observations per phase were obtained during each 15 minutes observation session.
**Aerobics Checklist.** The Aerobics Checklist was used during the intervention phase to verify that the intervention components were administered to the intervention condition (i.e. dance aerobics), but not to the control condition. The checklist consisted of each component listed in the intervention manual (see Appendix E). Similar to the SOFIT observations, the Aerobics Checklist was completed twice a week, for two class periods (one intervention and one control) during the intervention phase by a research assistant, thus equaling a total of four class period observations per week. Additionally, 25% of the observed assessments (one control and one intervention period) were also observed by a second research assistant to ensure reliability.

**Satisfaction**

*Physical Activity Class Satisfaction Questionnaire (PACSQ)* (Cunningham, 2007). The PACSQ was used to assess student’s satisfaction with physical activity in their physical education class. The PACSQ is a 40-item questionnaire that yields scores on 9 different factors: mastery experiences, cognitive development, teaching, normative success, interaction with others, fun and enjoyment, improvement of health/fitness, diversionary experiences, and relaxation. Participants were provided an eight-point Likert-type rating scale for each question ranging from 1 (no satisfaction) to 8 (very satisfying). Composite scores for each of the nine factors were obtained by averaging the participant’s responses on each item within each factor. Reported reliability coefficients for each factor range from $\alpha = .85$ to .95. Unfortunately, no other psychometric properties of the PACSQ have been evaluated to date. For the purpose of the current study, the fun and enjoyment, the improvement of health/fitness, and the normative success factors were used to examine benefits of the dance aerobics intervention. A total
score was determined by averaging the scores on each of the three factors and analyzed to evaluate class satisfaction during each of the four phases. Coefficient alphas for the current study ranged from .88 to .94 for the fun and enjoyment factor, .89 to .93 for the improvement of health/fitness, .85 to .92 for the normative success factor, and .92 to .96 for the total score.

*Dance Aerobics Rating Form.* The dance aerobics rating form consisted of seven questions to better evaluate student’s preference for the dance aerobics intervention over the standard school curriculum (See Appendix L). Each question was on a five-point Likert-scale ranging from 1 (not true at all) to 5 (very true). The questionnaire was completed immediately following the completion of the dance aerobics intervention to the intervention group. Each question was evaluated separately and interpreted as descriptive results.

**Analysis Procedures**

Prior to analyzing the data, it is important to understand the three-level longitudinal and multilevel model, which allows modeling of change in physical activity level, self-efficacy, and decisional balance pro and con ratings over repeated measurement occasions. A description of the data structure, as well as the overall model analyses will be presented in efforts to show the link between the data structure, the research questions, and the analyses.

*Data structure*

The structure of a database for a cluster randomized trial with data collected at pre-intervention, post-intervention, and at two follow-up time periods requires both a longitudinal and a multilevel feature. Since each student has a repeated measure on
dependent measures, and each student is nested within a class, data are arranged differently depending on the level of analyses. To evaluate between student variables on physical activity, self-efficacy, decisional balance, and class satisfaction, data for each participant were recorded horizontally, and included the following variables: (a) Intervention code; (b) Student ID number; (c) Classroom ID; (d) Time 1 DV score; (e) Time 2 DV score; (f) Change in DV activity for the individual; and (g) Change in DV activity for the class. To evaluate between class variables, data for each participant were recorded as a person-period data set, which arrays each individual’s scores vertically, rather than horizontally. Each participant had four horizontal lines of data, one for each time period measurements occur. Variables for this level of analyses include: (a) Intervention code; (b) Student ID number; (c) Classroom ID; (d) Time indicator; and (e) outcome variable. The intervention code was used to identify the participant as in either the control (0) or intervention (1) condition, whereas the ID number was used to identify the participant for each record. The classroom ID identified in which of the 6 physical education class periods the student was enrolled. The time indicator identified the specific occasion of measurement for each record. For the current study, time indicator was labeled 0 through 3 (0 = pretest; 1 = posttest; 2 = follow-up 1; 3 = follow-up 2).

Level-One Model: Within-Student and Within-Class

The individual growth model identifies the individual change within each student over the course of the intervention. This model is often referred to as the within-person or level-one model. The term within-person encompasses the inter-individual differences on the post-intervention dependent variable after baseline levels of the dependent variable are controlled.
**Level-Two Model: Between-Student and Within-Class**

A Level-two model is expected to determine a student’s status and growth rate via a model from both the average initial status, as well as the growth rate of the class as a function of background variables. More specifically, the Level-one component consists of the individual, and is the inter-individual differences on the post-intervention dependent variable after baseline levels of the dependent variable are controlled, and the Level-two component consists of the classroom, and explains the between-class differences. In this model at Level-one, post-intervention scores on the dependent variables are regressed on pre-intervention scores. At Level-two, the random intercepts of the post-test scores on the dependent variables are predicted by a dummy-coded intervention variable as an estimate of the intervention effect.

**Level-Three Model: Class-Level Model**

To evaluate the variation in growth parameters among classes, an additional level (i.e., level-three) is necessary. A level-three model evaluates the mean initial value and growth rate of a class as it varies from the grand mean initial value and growth rate of the whole sample as a function of the class characteristic variables. In a three-Level model, Level-one consists of time, and characterizes repeated measures on each dependent variable, Level-two consists of the individual, and Level-three consists of the classroom. The dummy-coded intervention variable at the third level is used to determine differences in the random intercepts (baseline values) and slopes (change) across classrooms. The following models are represented in the current study as followed:

\[ Y_{tij} = \pi_{oj} + \pi_{1ij} (\text{time}) + e_{tij} \quad \text{level 1} \]
\[
\pi_{oij} = \beta_{00j} + r_{0ij} \quad \text{level 2} \\
\pi_{oij} = \beta_{10j} + r_{1ij} \quad \text{level 2}
\]

\[
\beta_{00j} = \gamma_{000} + \gamma_{001} \text{ (intervention)} + u_{00j} \quad \text{level 3} \\
\beta_{10j} = \gamma_{100} + \gamma_{101} \text{ (intervention)} + u_{10j} \quad \text{level 3}
\]

where \(\pi_{oij}\) is the baseline score for individual \(i\), in class \(j\), and \(\pi_{1ij}\) is the random slope of the individual (linear trajectory). The parameter \(e_{0ij}\) represents the residual individual variance (how far each individuals’ scores are from the best fitting line). In the Level-two equations, \(\beta_{00j}\) represents the Level-three intercept (classroom average baseline value) and \(\beta_{10j}\) represents the Level-three slope (class average slope). The parameter \(r_{0ij}\) represents the residual (how far off the individual score is from the average score). In the Level-three equations, \(\gamma_{000}\) and \(\gamma_{100}\) represent the average baseline value and the average linear change of the control group, respectively; whereas the parameters \(\gamma_{001}\) and \(\gamma_{101}\) represent the average baseline value and the average linear change for the intervention group, respectively. The residual parameters represent the discrepancy between classroom values and baseline values. Similar to the two-level model, follow-up analyses for significant findings with physical activity as a Level-one time specific covariate can be conducted to examine possible mediation effects.

Curvature in trajectories (e.g., if activity increases during intervention and then levels off or drops during follow-up) can also be accounted for by adding an additional polynomial term (time squared). The suitability of these variants is determined by visual inspection of student trajectories as well as statistical tests of relative model fit with and without the additional terms.
Descriptive analyses were conducted to evaluate the body mass index ranges of participating students. Body Mass Index’s ranged from 16.1 to 38.5, with a mean BMI of 23.2 (SD = 5.2). Consistent with the Center for Disease Control’s body mass index chart for adolescent females, fifth percentile and below is considered below weight, above the fifth percentile to the 85th percentile is considered normal weight, 85th percentile to 95th percentile is considered overweight, and above the 95th percentile is considered obese. The current study identified zero participants below weight, 60.3% were within the normal weight range, 15.6% were overweight, and 24.1% were obese.

Descriptive analyses were conducted based on participants’ responses on the modified Physical Activity Questionnaire to evaluate student’s participation in extracurricular activities in efforts to evaluate physical activity level outside the physical education curriculum. A total of 59.1% of students reported that they participate in at least one physically active extracurricular activity. Extracurricular activities reported most often were basketball (30.8%), track & field (23.1%), and dance (20.5%). Additionally, student’s reported frequency of participation was nearly equivalent across three of the four options, with majority of students participating in extracurricular activities at least twice a week (twice a week, 30.8%; three to four times a week, 30.8%; and five or more times a week, 28.2%).
Preliminary Analyses to Evaluate Group Equivalence

Preliminary analyses were conducted to determine if there were differences between the control and intervention groups on demographic and baseline variables. A chi-square analysis was conducted to analyze categorical demographic variables (i.e., child race, parental marital status, and family income). Except where otherwise indicated, alpha was set at .05 for analyses. No significant differences between control and intervention groups were observed on child race, $\chi^2 (1, N = 65) = 2.34, p = .50$, or family income level, $\chi^2 (1, N = 54) = 4.07, p = .67$; however, a significant difference was observed on parental marital status, $\chi^2 (1, N = 60) = 13.65, p = .01$. Upon closer examination, the control group participants reported significantly fewer divorced and never married/living with someone relationships, whereas intervention participants reported significantly fewer never married/living alone relationships. Due to a small sample size, marital status was divided into cohabitating (married and living with someone) and non-cohabitating (separated, divorced, never married/living alone) to determine if differences between control and intervention groups remained for one and two parent households. No significant differences between control and intervention groups were observed between cohabitating and non-cohabitating relationships, $\chi^2 (1, N = 60) = 1.19, p = .28$.

In addition to chi-square analyses, an independent sample t-test (equal variances assumed) was also performed to determine differences in participants’ age. No significant differences were observed in participants’ age between the intervention and control group, $t (65) = .05, p = .96$. 
Group differences were also evaluated at baseline evaluation to determine any significant differences between groups on the dependent measures. A chi-square analysis was performed to evaluate differences on participants’ self-reported stage of change. No significant baseline differences between control and intervention groups were observed across the five stages of change, $\chi^2 (1, N = 63) = 7.67, p = .10$, indicating no significant differences in the frequency of students within each phase across groups. Table 2 provides a breakdown of the number and percentage of participants in each stage of change by condition for the baseline phase.

Table 2

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<th>Intervention n (%)</th>
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<tr>
<td>Contemplation</td>
<td>4 (13.3)</td>
<td>9 (27.3)</td>
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<td>Preparation</td>
<td>5 (16.7)</td>
<td>6 (18.2)</td>
</tr>
<tr>
<td>Action</td>
<td>9 (30.0)</td>
<td>2 (6.1)</td>
</tr>
<tr>
<td>Maintenance</td>
<td>8 (26.7)</td>
<td>8 (24.2)</td>
</tr>
</tbody>
</table>

Several independent sample t-tests (equal variances assumed) were also conducted to evaluate group differences on baseline physical activity level, self-reported pros and cons, and self-reported self-efficacy. No significant differences were observed on activity level, self-reported pros, and self-reported self-efficacy when comparing the control and intervention groups, $t (65) = .12, p = .91, t (65) = .12, p = .90$, and $t (65) = 1.48, p = .14$, respectively. Self-reported cons was significant, $t (65) = -1.97, p = .05$, with
the intervention group reporting more physical activity related cons than the control group.

Preliminary Analyses to Identify Covariate Relationships

A series of Pearson and Point biserial correlation coefficients were calculated to determine if significant covariate relationships occurred between demographic variables (age, race, weight, participation in extracurricular activities, and SES) and the five dependent measures (physical activity level, self-efficacy, pros, cons, and stages of change; see Table 3). Two demographic variables, race and extracurricular activities (ECA), were entered as dichotomous variables (i.e., African American = 1 and Other = 0; Participates in ECA = 1 and Does not Participate in ECA = 0). Results indicated that age was weakly positively correlated with self-reported cons $r = .25, p = .045$, extracurricular activities was positively correlated with self-efficacy $r_{pb} = .26 \ p = .036$, and weight was negatively correlated with physical activity level $r = -.35, p = .007$.

Table 3

<table>
<thead>
<tr>
<th></th>
<th>Stage of Change</th>
<th>Physical Activity</th>
<th>Self-Efficacy Total</th>
<th>Pro Total DB</th>
<th>Con Total DB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race†</td>
<td>.31</td>
<td>-.11</td>
<td>.14</td>
<td>-.03</td>
<td>.21</td>
</tr>
<tr>
<td>Hollingshead</td>
<td>.08</td>
<td>-.14</td>
<td>-.06</td>
<td>-.09</td>
<td>.12</td>
</tr>
<tr>
<td>Weight</td>
<td>.11</td>
<td>-.35**</td>
<td>-.02</td>
<td>.22</td>
<td>.03</td>
</tr>
<tr>
<td>ECA†</td>
<td>.29</td>
<td>-.22</td>
<td>.26*</td>
<td>.08</td>
<td>-.15</td>
</tr>
<tr>
<td>Age</td>
<td>-.18</td>
<td>-.20</td>
<td>.20</td>
<td>.00</td>
<td>.25*</td>
</tr>
</tbody>
</table>

*Note. DB = Decisional Balance †Dichotomized; * $p < .05$. ** $p < .01$. 
Background for Main Analyses

The goal of the primary analyses was to examine between-group differences (intervention vs. control) in physical activity level after a brief dance aerobics intervention, as well as stages of change, decisional balance, and self-efficacy. As previously discussed, due to the nested nature (within classes) of the study design, statistical methods accounting for hierarchical structure were necessary. Therefore, multilevel modeling was used to account for changes of students and classes on dependent variables over repeated measurements.

Model Building

The following process was used to determine the best fitting model for each of the four continuous dependent measures. First, a baseline model (fixed: intercept; random: intercept [student], intercept [class]) was analyzed to determine partition of the variation of the dependent variable into within-class and between-class components. Due to lack of significant findings between intervention and control groups on demographic variables, propensity score matching was not necessary.

A second model (fixed: intercept, phase; random: intercept (student), intercept (class), phase (student), phase (class)) was analyzed to determine trajectories (i.e. slope) at both level-two and level-three. In addition to the fixed and random effects of the baseline model, phase (slope) was also entered as a fixed effect, as well as random effects at both the subject and class level, allowing both individual slopes and intercepts to vary at both the individual and class level.

A third model (fixed: intercept, phase, phase²; random: intercept (student), intercept (class), phase (student), phase (class), phase² (student), phase² (class)) was
created to account for non-linearity in students’ performance and evaluation as needed. In addition to the fixed and random effects in the second model, another fixed effect (phase²), as well as two random effects, were added by squaring the time variable (phase) at the subject and class level to determine variability across students and classes in quadratic growth.

Estimates of covariance parameters were evaluated in each model to determine if any random effects variances trended toward zero. Models with variances approaching zero were reevaluated with the approaching zero random effect removed from the model (the corresponding fixed effect remained). The three final model’s Bayesian Information Criterion’s (BIC) were evaluated, and the model with the lowest BIC was identified as the best fitting model. The best fitting model was then reanalyzed with the group variable added as a fixed effect, as well as an interaction fixed effect with phase and phase² if needed, to determine if the trajectory of the data is different by treatment group. Again, any random effects that approach zero after accounting for the group variable were dropped as a random effect and the model was reevaluated.

**Physical Activity**

A fully unconditional model was examined to determine the between class [Intercept (class)], between subjects [Intercept (subject)], and within subject variability (Residual) in physical activity level (see Table 4). Results of hypothesis tests of a fully unconditional model indicated that the initial physical activity level was significantly different from zero ($p < .001$). The ICC, which measures the proportion of variance in physical activity that lies between class and subject, indicated that 0.16 of the variance observed occurred between classes and 0.22 occurred between students. The estimate of
the single fixed effect, the intercept, was 1323.14, which was the mean class level average of physical activity in the sample. The Schwartz’s Bayesian Criterion (BIC) for the baseline model was 3975.37.

Table 4

*Baseline Model Examining the Intercept and Slope of Physical Activity Level*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>1323.14</td>
<td>99.14</td>
<td>.00</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>69859.34</td>
<td>22383.57</td>
<td></td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>43366.39</td>
<td>38354.43</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>194334.31</td>
<td>29682.00</td>
<td></td>
</tr>
</tbody>
</table>

A random coefficient model (model two) was used to determine if the relationship between physical activity level and phase (baseline = 0, intervention = 1, follow-up 1 = 2, follow-up 2 = 3) differed between classes in a linear trajectory (see Table 5). The estimate for the fixed effect, intercept, indicated that the estimated average class mean of physical activity level controlling for phase was 1468.44 steps, and was statistically significant ($p < .001$) suggesting that the intercept is significantly different from zero. The estimate for the fixed effect, phase (i.e., the slope), indicated that the steps declined by 97.6 steps on average per phase. Although the relationship was not significant ($p = .10$), a negative trend was observed for phase indicating an overall decrease in physical activity level over the course of the study. The BIC for model two was 3941.89, indicating that model two is a better fitting model than model one.
Table 5

*Random Coefficient Model Examining the Association Between Physical Activity and Phase, with Phase as a Fixed and Random Effect*

<table>
<thead>
<tr>
<th></th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>1468.44</td>
<td>137.10</td>
<td>.00</td>
</tr>
<tr>
<td>Phase</td>
<td>-97.60</td>
<td>45.21</td>
<td>.10</td>
</tr>
<tr>
<td><strong>Covariance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>73461.51</td>
<td>26361.24</td>
<td></td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>89068.98</td>
<td>75401.59</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>1938.90</td>
<td>4898.80</td>
<td></td>
</tr>
<tr>
<td>Phase (class)</td>
<td>8237.25</td>
<td>8107.29</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>152639.87</td>
<td>16593.76</td>
<td></td>
</tr>
</tbody>
</table>

Another random coefficient model (model three) was used to determine if the relationship between physical activity level and phase (baseline, intervention, follow-up one, follow-up two) was better explained by a non-linear trajectory (see Table 6). Phase\(^2\) was entered as both a fixed effect and a random effect, at both the subject and class level. Initial examination indicated that the covariance parameter of phase\(^2\) at the subject level trended toward zero, therefore, it was removed from the model and reanalyzed. The estimate for the fixed effect, intercept, indicated that the estimated average class mean of physical activity level controlling for phase and phase\(^2\) was 1311.90 steps, and was statistically significant (p < .001) suggesting that the intercept is significantly different from zero. Although the relationship was not significant (p = .127), the negative value for phase\(^2\) indicated a negative parabola shape for participants’ physical activity level over
Table 6

*Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Physical Activity, Phase, and Phase*²

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1311.90</td>
<td>162.74</td>
</tr>
<tr>
<td>Phase</td>
<td>288.11</td>
<td>189.21</td>
</tr>
<tr>
<td>Phase²</td>
<td>-120.75</td>
<td>66.15</td>
</tr>
</tbody>
</table>

Covariance

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (subject)</td>
<td>74175.07</td>
<td>21898.32</td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>135171.22</td>
<td>100108.58</td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>5950.51</td>
<td>4049.45</td>
</tr>
<tr>
<td>Phase (class)</td>
<td>181524.57</td>
<td>130626.95</td>
</tr>
<tr>
<td>Phase² (class)</td>
<td>22900.42</td>
<td>16433.29</td>
</tr>
<tr>
<td>Residual</td>
<td>100009.54</td>
<td>11361.90</td>
</tr>
</tbody>
</table>

the course of the four time periods (see Figure 2). The BIC for model three was 3899.32, indicating that model three is a better fitting model than both models one and two.

Therefore, the group effect will be added to model three to determine if there is a difference in slope trajectory between the intervention and control groups (see Table 7).

Results for the final coefficient model evaluating group (intervention vs. control) differences indicated that neither the group by phase interaction term nor the group by phase² interaction term are statistically significant (p = .20 and p = .14, respectively).

Therefore, the trajectory of physical activity level across the phases did not significantly differ between the intervention and control group suggesting that the intervention did not significantly change participants’ physical activity level across the four time periods. The Schwarz’s Bayesian Criterion for the final model was 3849.97.
Table 7

Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Physical Activity, Group, Phase, and Phase$^2$

<table>
<thead>
<tr>
<th></th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>1176.20</td>
<td>232.93</td>
<td>.00</td>
</tr>
<tr>
<td>Group</td>
<td>272.96</td>
<td>320.28</td>
<td>.44</td>
</tr>
<tr>
<td>Phase</td>
<td>6.00</td>
<td>244.64</td>
<td>.98</td>
</tr>
<tr>
<td>Phase$^2$</td>
<td>-8.08</td>
<td>81.32</td>
<td>.93</td>
</tr>
<tr>
<td>Group*Phase</td>
<td>513.31</td>
<td>335.64</td>
<td>.20</td>
</tr>
<tr>
<td>Group*Phase$^2$</td>
<td>-208.22</td>
<td>111.83</td>
<td>.14</td>
</tr>
<tr>
<td><strong>Covariance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>73922.34</td>
<td>21844.70</td>
<td></td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>129716.19</td>
<td>104792.26</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>5940.48</td>
<td>4056.39</td>
<td></td>
</tr>
<tr>
<td>Phase (class)</td>
<td>13579.72</td>
<td>117427.35</td>
<td></td>
</tr>
<tr>
<td>Phase$^2$ (class)</td>
<td>15425.52</td>
<td>13075.08</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>100346.32</td>
<td>11460.33</td>
<td></td>
</tr>
</tbody>
</table>

Figure 2 displays the average physical activity level by group at each phase based on the regression equation established from the final model. While the overall trajectories were not statistically significant between the two groups, the graph of the regression equation suggests that the intervention curriculum was successful in increasing students’ physical activity level relative to both the intervention participants’ baseline activity, as well as the control group’s intervention activity level. Furthermore, the physical activity level for the intervention group appeared to remain higher than that of the baseline level, as well as higher than the control group’s physical activity level at follow-up one. These findings suggest a slight carryover effect of the intervention curriculum, thus encouraging
students to continue with a higher physical activity level even once they return to the standard physical activity curriculum.

![Figure 2](image2.png)

*Figure 2.* Mean physical activity level by phase and group.

**Self-Efficacy**

A fully unconditional model was examined to determine the between class [Intercept (class)], between subjects [Intercept (subject)], and within subject variability (Residual) in self-efficacy (see Table 8). Results of hypothesis tests of a fully unconditional model indicated that the initial self-efficacy level between both classes and participants was significantly different from zero \( p < .001 \). The ICC indicated that 0.03 of the variance observed occurred between classes and 0.61 occurred between students. The estimate of the single fixed effect, the intercept, was 61.10, which was the mean class level average of self-efficacy in the sample. The Schwartz’s Bayesian Criterion (BIC) for the baseline model was 2046.35.
Table 8

Baseline Model Examining the Intercept and Slope of Self-Efficacy

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>61.10</td>
<td>2.37</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>195.67</td>
<td>40.63</td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>10.16</td>
<td>16.41</td>
</tr>
<tr>
<td>Residual</td>
<td>113.54</td>
<td>11.75</td>
</tr>
</tbody>
</table>

A random coefficient model (model two) was used to determine if the relationship between self-efficacy and phase (baseline, intervention, follow-up one, follow-up two) differed between classes in a linear trajectory (see Table 9). The estimate for the fixed effect, intercept, indicated that the estimated average class mean of self-efficacy

Table 9

Random Coefficient Model Examining the Association Between Self-Efficacy and Phase, with Phase as a Fixed and Random Effect

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>59.06</td>
<td>2.75</td>
</tr>
<tr>
<td>Phase</td>
<td>1.26</td>
<td>0.87</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>182.57</td>
<td>40.33</td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>17.88</td>
<td>22.82</td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>6.49</td>
<td>4.73</td>
</tr>
<tr>
<td>Phase (class)</td>
<td>1.63</td>
<td>2.85</td>
</tr>
<tr>
<td>Residual</td>
<td>99.36</td>
<td>11.94</td>
</tr>
</tbody>
</table>
controlling for phase was 59.06, and was statistically significant ($p < .001$) suggesting that the intercept is significantly different from zero. The estimate for the fixed effect, phase (i.e., the slope), indicated that self-efficacy scores increased by 1.26 points on average per phase. Although the relationship was not significant ($p = .23$), a positive trend was observed for phase indicating an overall increase in self-efficacy scores over the course of the study. The BIC for model two was 2049.45, indicating that model one is a better fitting model than model two.

Another random coefficient model (model three) was used to determine if the relationship between self-efficacy and phase (baseline, intervention, follow-up one, follow-up two) was better explained by a non-linear trajectory (see Table 10). Phase$^2$ was entered as both a fixed effect and a random effect, at both the subject and class level.

Table 10

*Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Self-Efficacy, Phase, and Phase$^2$*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>59.28</td>
<td>2.83</td>
<td>.00</td>
</tr>
<tr>
<td>Phase</td>
<td>0.30</td>
<td>1.97</td>
<td>.88</td>
</tr>
<tr>
<td>Phase$^2$</td>
<td>0.34</td>
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<td>.62</td>
</tr>
<tr>
<td>Covariance</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>183.54</td>
<td>40.31</td>
<td></td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>18.43</td>
<td>22.46</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>6.22</td>
<td>4.56</td>
<td></td>
</tr>
<tr>
<td>Phase$^2$ (class)</td>
<td>0.44</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>97.61</td>
<td>11.78</td>
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</tbody>
</table>
Initial examination indicated that the covariance parameter of phase at the class level and phase$^2$ at the subject level trended toward zero; therefore, they were removed from the model and reanalyzed.

The estimate for the fixed effect, intercept, indicated that the estimated average class mean of self-efficacy controlling for phase and phase$^2$ was 59.28, and was statistically significant ($p < .001$) suggesting that the intercept is significantly different from zero. Although the relationship was not significant ($p = .62$), the positive value for phase$^2$ indicated a slight positive parabola shape for participants’ self-efficacy scores over the course of the four time periods (see Figure 3). The BIC for model three was Table 11

*Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Self-Efficacy, Group, Phase, and Phase$^2$

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>62.76</td>
<td>3.60</td>
<td>.00</td>
</tr>
<tr>
<td>Group</td>
<td>-5.41</td>
<td>4.85</td>
<td>.35</td>
</tr>
<tr>
<td>Phase</td>
<td>2.18</td>
<td>2.83</td>
<td>.44</td>
</tr>
<tr>
<td>Phase$^2$</td>
<td>-0.53</td>
<td>1.03</td>
<td>.61</td>
</tr>
<tr>
<td>Group*Phase</td>
<td>-3.64</td>
<td>3.93</td>
<td>.36</td>
</tr>
<tr>
<td>Group*Phase$^2$</td>
<td>1.63</td>
<td>1.41</td>
<td>.26</td>
</tr>
<tr>
<td><strong>Covariance</strong></td>
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<td></td>
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</tr>
<tr>
<td>Intercept (subject)</td>
<td>186.35</td>
<td>41.23</td>
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</tr>
<tr>
<td>Intercept (class)</td>
<td>7.15</td>
<td>22.92</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>6.32</td>
<td>4.62</td>
<td></td>
</tr>
<tr>
<td>Phase$^2$ (class)</td>
<td>0.54</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>97.56</td>
<td>11.84</td>
<td></td>
</tr>
</tbody>
</table>
2046.02, indicating that model three is a better fitting model than both models one and two. Therefore, the group effect will be added to model three (see Table 11) to determine if there is a difference in slope trajectory between the intervention and control group’s self-reported self-efficacy scores.

Results for the final coefficient model evaluating group (intervention vs. control) differences indicated that neither the group by phase interaction term nor the group by phase^2 interaction term are statistically significant (p = .36 and p = .26, respectively; See Table 11). Therefore, the trajectory of self-efficacy scores across the four time periods did not differ between the intervention and control group suggesting that the intervention did not create a significant difference in participants’ self-reported self-efficacy scores across the four time periods.

Figure 3. Mean self-efficacy scores by phase and group.
Figure 3 displays the average self-efficacy scores by group at each phase based on the regression equation established from the final model. While the overall model was not significant, a visual examination of the regression equation suggests that participants in the control group reported on average higher self-efficacy scores throughout the entire study, with most notable differences between the control and intervention group’s responses occurring after the intervention and follow-up one phase.

Decisional Balance-Pro

A fully unconditional model was examined to determine the between class [Intercept (class)], between subjects [Intercept (subject)], and within subject variability (Residual) in decisional balance pro scores (see Table 12). Results of hypothesis tests of a fully unconditional model indicated that the initial decisional balance pro scores between both classes and participants was significantly different from zero ($p < .001$). The ICC Table 12

| Baseline Model Examining the Intercept and Slope of Decisional Balance-Pro |
|-------------------------------|-----------------|-----------------|-----------|
| Parameter Estimate | Standard Error | p value |
| Fixed Effects | | |
| Intercept | 33.94 | 1.21 | .00 |
| Covariance | | |
| Intercept (subject) | 56.70 | 11.66 | |
| Intercept (class) | 2.23 | 4.53 | |
| Residual | 29.68 | 3.07 | |

indicated that 0.03 of the variance observed occurred between classes and 0.63 occurred between students. The estimate of the single fixed effect, the intercept, was 33.94, which was the mean class level average of decisional balance pro’s in the sample. The
Schwartz’s Bayesian Criterion (BIC) for the baseline model was 1716.37.

A random coefficient model (model two) was used to determine if the relationship between decisional balance pro scores and phase (baseline, intervention, follow-up one, follow-up two) differed between classes in a linear trajectory (see Table 13). Initial examination indicated that the covariance parameter of phase at the class trended toward zero, therefore, it was removed from the model and reanalyzed.

Table 13

*Random Coefficient Model Examining the Association Between Decisional Balance-Pro and Phase, with Phase as a Fixed and Random Effect*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fixed Effects</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1.29</td>
<td>.00</td>
</tr>
<tr>
<td>Phase</td>
<td>-0.12</td>
<td>0.31</td>
<td>.69</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>56.58</td>
<td>11.80</td>
<td></td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>2.25</td>
<td>4.56</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>0.08</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>29.69</td>
<td>3.58</td>
<td></td>
</tr>
</tbody>
</table>

The estimate for the fixed effect, intercept, indicated that the estimated average class mean of decisional balance pro controlling for phase was 34.11, and was statistically significant ($p < .001$) suggesting that the intercept is significantly different from zero. The estimate for the fixed effect, phase (i.e., the slope), indicated that decisional balance pro scores decreased by 0.12 points on average per phase. Although the relationship was not significant ($p = .69$), a negative trend was observed for phase indicating an overall decrease in decisional balance pro scores over the course of the
study. The BIC for model two was 1722.20, indicating that model one is a better fitting model than model two.

Another random coefficient model (model three) was used to determine if the relationship between decisional balance pro and phase (baseline, intervention, follow-up one, follow-up two) was better explained by a non-linear trajectory (see Table 14). Phase$^2$ was entered as both a fixed effect and a random effect, at both the subject and class level. Initial examination indicated that the covariance parameter of phase at the class and subject level, as well as phase$^2$ at the subject and class level trended toward zero; therefore, they were removed from the model and reanalyzed.

### Table 14

*Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Decisional Balance-Pro, Phase, and Phase$^2$*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>34.56</td>
<td>1.33</td>
<td>.00</td>
</tr>
<tr>
<td>Phase</td>
<td>-1.48</td>
<td>1.07</td>
<td>.17</td>
</tr>
<tr>
<td>Phase$^2$</td>
<td>0.46</td>
<td>0.35</td>
<td>.19</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>56.72</td>
<td>11.66</td>
<td></td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>2.22</td>
<td>4.52</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>29.70</td>
<td>3.10</td>
<td></td>
</tr>
</tbody>
</table>

The estimate for the fixed effect, intercept, indicated that the estimated average class mean of decisional balance-pro’s controlling for phase and phase$^2$ was 34.56, and was statistically significant ($p < .001$) suggesting that the intercept is significantly different from zero. Although the relationship was not significant ($p = .19$), the positive
value for phase^2 indicated a slight positive parabola shape for participants’ decisional balance pro scores over the course of the four time periods (see Figure 4). The BIC for model three was 1715.21, indicating that model three is a better fitting model than both models one and two.

Based on BIC values from model’s one, two, and three, model three best represents the relationship of participants self-reported decisional balance pro scores across the four time periods; therefore, both phase and group will be added to the final model to determine the relationship between self-reported decisional balance pros across the four time periods between the intervention and control groups (see Table 15).

Table 15

*Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Decisional Balance-Pro, Group, Phase, and Phase^2*

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>34.51</td>
<td>1.92</td>
</tr>
<tr>
<td>Group</td>
<td>0.28</td>
<td>2.61</td>
</tr>
<tr>
<td>Phase</td>
<td>-0.14</td>
<td>1.54</td>
</tr>
<tr>
<td>Phase^2</td>
<td>0.17</td>
<td>0.50</td>
</tr>
<tr>
<td>Group*Phase</td>
<td>-2.56</td>
<td>2.13</td>
</tr>
<tr>
<td>Group*Phase^2</td>
<td>0.54</td>
<td>0.69</td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>57.65</td>
<td>11.99</td>
</tr>
<tr>
<td>Intercept (class)</td>
<td>1.69</td>
<td>6.52</td>
</tr>
<tr>
<td>Residual</td>
<td>29.54</td>
<td>3.09</td>
</tr>
</tbody>
</table>

Results for the final coefficient model evaluating group (intervention vs. control) differences indicated that the group by phase interaction term was not statistically
significant \((p = .43)\). Therefore, the trajectory of decisional balance pro scores across the four time periods did not significantly differ between the intervention and control group. Thus, the intervention program did not create a significant difference in participants’ decisional balance pro scores across the four time periods. The Schwarz’s Bayesian Criterion for the final model was 1706.22.

Figure 4. Mean decisional balance-pro scores by phase and group.

Figure 4 displays the average decisional balance pro scores by group at each phase based on the regression equation established from the final model. While not significant, further examination of the regression equation indicates that control group participants’ average reported decisional balance pro scores continues to increase slightly through each of the four phases. The intervention group, however, reported a steep decrease in decisional balance pro scores after the intervention and follow-up 1 phase, followed by a slight increase after follow-up two. While overall trajectories between the
two groups are not significant, the observed trajectories are not consistent with what would have been expected given the literature on decisional balance and physical activity.

Decisional Balance-Con

A fully unconditional model was examined to determine the between class [Intercept (class)], between subjects [Intercept (subject)], and within subject variability (Residual) in decisional balance con scores (see Table 16). Results of hypothesis tests of a fully unconditional model indicated that the initial decisional balance con scores between both classes and participants was significantly different from zero (p<.001). The ICC indicated that 0.50 of the variance observed occurred between classes. The estimate of covariance for the class variable trended toward zero, therefore, an ICC for class variance is zero. The estimate of the single fixed effect, the intercept, was 15.91, which was the mean class level average of decisional balance con scores in the sample. The Schwartz’s Bayesian Criterion (BIC) for the baseline model was 1524.74.

A random coefficient model (model two) was used to determine if the relationship between decisional balance-con scores and phase (baseline, intervention, follow-up one,
follow-up two) differed between classes in a linear trajectory (see Table 17). Initial examination indicated that the covariance parameter of intercept and phase at the class level trended toward zero, therefore, they were removed from the model and reanalyzed.

Table 17

**Random Coefficient Model Examining the Association Between Decisional Balance-Con and Phase, with Phase as a Fixed and Random Effect**

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>14.49</td>
<td>0.60</td>
</tr>
<tr>
<td>Phase</td>
<td>0.99</td>
<td>0.25</td>
</tr>
<tr>
<td><strong>Covariance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>13.92</td>
<td>3.55</td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>1.18</td>
<td>0.65</td>
</tr>
<tr>
<td>Residual</td>
<td>13.11</td>
<td>1.52</td>
</tr>
</tbody>
</table>

The estimate for the fixed effect, intercept, indicated that the estimated average class mean of decisional balance-con controlling for phase was 14.49, and was statistically significant (p < .001) suggesting that the intercept is significantly different from zero. The estimate for the fixed effect, phase (i.e., the slope), indicated that decisional balance-con scores increased by 0.99 points on average per phase. This relationship was also significant (p < .001) indicating the slope of decisional balance-con scores was significantly different than zero. The BIC for model two was 1507.69, indicating that model two is a better fitting model than model one.

Another random coefficient model (model three) was used to determine if the relationship between decisional balance con and phase (baseline, intervention, follow-up one, follow-up two) was better explained by a non-linear trajectory (see Table 18).
Phase\(^2\) was entered as both a fixed effect and a random effect, at both the subject and class level. Initial examination indicated that the covariance parameter of intercept at the class level, phase at the class level, and phase\(^2\) at the class and subject level trended toward zero, therefore, they were all removed from the model and reanalyzed.

Table 18

Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Decisional Balance-Con, Phase, and Phase\(^2\)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>13.91</td>
<td>0.63</td>
<td>.00</td>
</tr>
<tr>
<td>Phase</td>
<td>2.75</td>
<td>0.71</td>
<td>.00</td>
</tr>
<tr>
<td>Phase(^2)</td>
<td>-0.60</td>
<td>0.23</td>
<td>.01</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>13.92</td>
<td>3.51</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>1.22</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>12.63</td>
<td>1.47</td>
<td></td>
</tr>
</tbody>
</table>

The estimate for the fixed effect, intercept, indicated that the estimated average class mean of decisional balance-con controlling for phase and phase\(^2\) was 13.91, and was statistically significant (\(p < .001\)) suggesting that the intercept is significantly different from zero. The relationship was significant (\(p = .01\)) indicating that the slope of the decisional balance-con scores significantly differed across the four phases (see Figure 5). The BIC for model three was 1501.96, indicating that model three is a better fitting model than both models one and two. Therefore, the group effect will be added to model three to determine if there is a difference in slope trajectory between the intervention and control group’s self-reported decisional balance-con scores (See Table 19).
Table 19

*Slopes-and-Intercepts-as-Outcome Model Examining the Association Between Decisional Balance-Con, Group, Phase, and Phase*²

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>12.71</td>
<td>0.91</td>
<td>.00</td>
</tr>
<tr>
<td>Group</td>
<td>2.31</td>
<td>1.26</td>
<td>.07</td>
</tr>
<tr>
<td>Phase</td>
<td>4.84</td>
<td>1.01</td>
<td>.00</td>
</tr>
<tr>
<td>Phase²</td>
<td>-1.22</td>
<td>0.32</td>
<td>.00</td>
</tr>
<tr>
<td>Group*Phase</td>
<td>-4.03</td>
<td>1.40</td>
<td>.00</td>
</tr>
<tr>
<td>Group*Phase²</td>
<td>1.20</td>
<td>.44</td>
<td>.01</td>
</tr>
</tbody>
</table>

Covariance

<table>
<thead>
<tr>
<th></th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept (subject)</td>
<td>14.20</td>
<td>3.55</td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>1.25</td>
<td>0.63</td>
</tr>
<tr>
<td>Residual</td>
<td>12.13</td>
<td>1.42</td>
</tr>
</tbody>
</table>

Results for the final coefficient model evaluating group (intervention vs. control) differences indicated that the group by phase interaction term was statistically significant \(p = .01\). Therefore, the trajectory of decisional balance con scores across the four time periods did significantly differ between the intervention and control group. The Schwarz’s Bayesian Criterion for the final model was 1490.71.

Figure 5 displays the average decisional balance con scores by group at each phase based on the regression equation established from the final model. The graph provides a visual representation of the significantly different decisional balance con trajectories for both the intervention and control group across the four time periods.
Stage of Change

Due to the relationship between stages of change and the other TTM constructs, descriptive (see Tables 20 and 21) and exploratory post-hoc analyses were conducted. Two (control and intervention) chi-square analyses were performed to determine differences in frequency of participants’ self-reported stage of change over the four phases. Results for the intervention condition were not significant, $\chi^2(1, N = 127) = 10.92, p = .53$, indicating no significant differences in the frequency of students within each stage across the four phases. Table 20 provides a breakdown of the number and percentage of participants in each stage of change by phase for the intervention condition.
Table 20

**Number and Percentage of Students in Each Stage- Intervention Condition**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Baseline n (%)</th>
<th>Intervention n (%)</th>
<th>Follow-up 1 n (%)</th>
<th>Follow-up 2 n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>8 (24.2)</td>
<td>5 (15.6)</td>
<td>6 (18.8)</td>
<td>5 (16.7)</td>
</tr>
<tr>
<td>Contemplation</td>
<td>9 (27.3)</td>
<td>5 (15.6)</td>
<td>7 (21.9)</td>
<td>9 (30.0)</td>
</tr>
<tr>
<td>Preparedness</td>
<td>6 (18.2)</td>
<td>5 (15.6)</td>
<td>4 (12.5)</td>
<td>4 (13.3)</td>
</tr>
<tr>
<td>Action</td>
<td>2 (6.1)</td>
<td>10 (31.3)</td>
<td>5 (15.6)</td>
<td>3 (10.0)</td>
</tr>
<tr>
<td>Maintenance</td>
<td>8 (24.2)</td>
<td>7 (21.9)</td>
<td>10 (31.3)</td>
<td>9 (30.0)</td>
</tr>
</tbody>
</table>

Similarly, results for the control condition were also not significant, $\chi^2 (1, N = 120) = 18.14, p = .11$, indicating no significant differences in the frequency of students within each stage across the four phases. Table 21 provides a breakdown of the number and percentage of participants in each stage of change by phase for the control condition.

Table 21

**Number and Percentage of Students in Each Stage- Control Condition**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Baseline n (%)</th>
<th>Intervention n (%)</th>
<th>Follow-up 1 n (%)</th>
<th>Follow-up 2 n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precontemplation</td>
<td>4 (13.3)</td>
<td>1 (3.2)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Contemplation</td>
<td>4 (13.3)</td>
<td>8 (25.8)</td>
<td>10 (32.3)</td>
<td>8 (28.6)</td>
</tr>
<tr>
<td>Preparedness</td>
<td>5 (16.7)</td>
<td>5 (16.1)</td>
<td>5 (16.1)</td>
<td>3 (10.7)</td>
</tr>
<tr>
<td>Action</td>
<td>9 (30.0)</td>
<td>3 (9.7)</td>
<td>3 (9.7)</td>
<td>5 (17.9)</td>
</tr>
<tr>
<td>Maintenance</td>
<td>8 (24.2)</td>
<td>14 (45.2)</td>
<td>13 (41.9)</td>
<td>12 (42.9)</td>
</tr>
</tbody>
</table>
Treatment Integrity

*Evaluation of Lesson Context and Teacher Interaction*

To ensure similarity between lesson context and teacher interaction between conditions (intervention and control), a research assistant observed two class sessions per condition each week during each of the two-week phases (baseline, intervention, follow-up one, follow-up two) using the modified SOFIT observation program. Within each condition (intervention and control) and time period (baseline, intervention, follow-up one, follow-up two), total frequency of occurrence for each of the four lesson context components (General Content, Knowledge Content, Motor Content, and Other Lesson Behaviors) and the three teacher interaction components (Engagement in Physical Activity, Observing, and Other Teacher Interaction) was summed. A series of two (condition) x four (phase) Chi Square analyses were performed to evaluate differences in frequency of the lesson context and teacher interaction components between the intervention and control conditions across the four phases.

The four components of Lesson Context revealed non-significant results for the Knowledge Component ($\chi^2 = 5.92, p = .12$), but significant results for the General Content ($\chi^2 = 80.3, p < .001$), Motor Content ($\chi^2 = 32.64, p < .001$), and Other Lesson Behaviors ($\chi^2 = 28.18, p < .001$). Post hoc testing was conducted to determine which phases for each component had significant differences among groups. Results indicated General Content behaviors were observed significantly more in the intervention group than the control group during both the baseline and follow-up one phase, but were observed significantly less during the intervention phase. For the Motor Content component, there were significant differences between groups during both the baseline
and intervention phases, with significantly more motor observations for the control group during the baseline phase, and significantly less motor observations during the intervention phase. For the Other Lesson Behaviors, significant differences were observed for both the intervention and follow-up two phases. During the intervention phase, the control group observed significantly more Other observations, whereas the intervention group observed significantly more Other observations during the follow-up two phase.

The three components of Teacher Interaction revealed non-significant results for the Engagement of Physical Activity Component ($\chi^2 = 6.32$, $p = .10$) and the Observing Content ($\chi^2 = 6.93$, $p = .07$), but significant results for the Other Content ($\chi^2 = 32.64$, $p = .00$). Post hoc tests for the Other component revealed significant differences between the intervention and control groups for the intervention phase, with the control group reporting a higher frequency of other teacher behaviors than the intervention group.

*Dance Aerobics Checklist*

The Dance Aerobics Checklist was used to verify that the intervention components were administered to the intervention groups during the indicated intervention weeks, as well as verify that the control groups were not administered any of the intervention components during the intervention weeks. Results indicated that every component listed in the intervention manual was administered to the intervention classes during each of the eight observed intervention classes during the two-week intervention phase (IOA of 100%). Furthermore, none of the components listed in the intervention manual were administered to the students in the control classes.
Satisfaction

*Physical Education Class Satisfaction*

A fully unconditional model was examined to determine the between class (Intercept (class)), between subjects (Intercept (subject)), and within subject variability (Residual) in physical education class satisfaction (see Table 22). Initial examination indicated that the covariance parameter of intercept at the class level trended toward zero; therefore, it was removed from the model and reanalyzed. Results of hypothesis tests of a fully unconditional model indicated that the initial class satisfaction scores between both classes and participants were significantly different from zero (*p* < .001). The estimate Table 22

**Baseline Model Examining the Intercept and Slope of Class Satisfaction**

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>73.89</td>
<td>2.40</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>326.75</td>
<td>65.78</td>
</tr>
<tr>
<td>Residual</td>
<td>175.85</td>
<td>18.30</td>
</tr>
</tbody>
</table>

of covariance for the class variable trended toward zero, therefore, an ICC for class variance is zero. The estimate of the single fixed effect, the intercept, was 73.89, which was the mean physical education class satisfaction score in the sample. The Schwartz’s Bayesian Criterion (BIC) for the baseline model was 2136.08.

A random coefficient model (model two) was used to determine if the relationship between class satisfaction scores and phase (baseline, intervention, follow-up one, follow-up two) differed between classes in a linear trajectory (see Table 23).
The estimate for the fixed effect, intercept, indicated that the estimated average class satisfaction score controlling for phase was 73.69, and was statistically significant \((p < .001)\) suggesting that the intercept is significantly different from zero. The estimate for the fixed effect, phase (i.e., the slope), indicated that class satisfaction scores decreased by 0.01 points on average per phase. This relationship was not significant \((p < 0.99)\) indicating the slope of class satisfaction scores was not significantly different than zero. The BIC for model two was 2142.72, indicating that model one is a better fitting model than model two.

Table 23

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>73.69</td>
<td>2.57</td>
<td>.00</td>
</tr>
<tr>
<td>Phase</td>
<td>-0.01</td>
<td>0.98</td>
<td>.99</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>318.09</td>
<td>66.81</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>9.93</td>
<td>7.41</td>
<td></td>
</tr>
<tr>
<td>Phase (class)</td>
<td>1.30</td>
<td>2.68</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>157.67</td>
<td>19.45</td>
<td></td>
</tr>
</tbody>
</table>

Another random coefficient model (model three) was used to determine if the relationship between class satisfaction and phase (baseline, intervention, follow-up one, follow-up two) was better explained by a non-linear trajectory (see Table 24). Phase\(^2\) was entered as both a fixed effect and a random effect, at both the subject and class level. Initial examination indicated that the covariance parameter phase\(^2\) for both class and
subject level trended toward zero, therefore, they were removed from the model and reanalyzed.

The estimate for the fixed effect, intercept, indicated that the estimated average class satisfaction controlling for phase and phase^2 was 73.44, and was statistically significant (p < .001) suggesting that the intercept is significantly different from zero.

Table 24

**Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Class Satisfaction, Phase, and Phase^2**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>73.44</td>
<td>2.69</td>
<td>.00</td>
</tr>
<tr>
<td>Phase</td>
<td>0.78</td>
<td>2.57</td>
<td>.76</td>
</tr>
<tr>
<td>Phase^2</td>
<td>-0.27</td>
<td>0.81</td>
<td>.74</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>317.81</td>
<td>66.80</td>
<td></td>
</tr>
<tr>
<td>Phase (subject)</td>
<td>9.90</td>
<td>7.45</td>
<td></td>
</tr>
<tr>
<td>Phase (class)</td>
<td>1.29</td>
<td>2.68</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>158.57</td>
<td>19.64</td>
<td></td>
</tr>
</tbody>
</table>

The estimate for the fixed effects, phase and phase^2, was not significant (p = .76 and .74, respectively) indicating that the slopes of the class satisfaction scores did not significantly differ across the four phases. The BIC for model three was 2141.19, indicating that model one is a better fitting model than both models two and three. Therefore, the group effect will be added to model one (See Table 25) to determine if there is a difference in slope trajectory between the intervention and control groups self-reported class satisfaction scores.
Results for the final coefficient model evaluating group (intervention vs. control) indicated that the class satisfaction scores did not statistically differ between groups \( (p = .45) \). The Schwarz’s Bayesian Criterion for the final model was 2130.50.

Table 25

*Slopes-and-Intercepts-as-Outcomes Model Examining the Association Between Class Satisfaction and Group*

<table>
<thead>
<tr>
<th>Parameter Estimate</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>71.97</td>
<td>3.48</td>
</tr>
<tr>
<td>Group</td>
<td>3.67</td>
<td>4.81</td>
</tr>
<tr>
<td>Covariance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept (subject)</td>
<td>329.06</td>
<td>18.30</td>
</tr>
<tr>
<td>Residual</td>
<td>175.87</td>
<td>18.30</td>
</tr>
</tbody>
</table>

Figure 6 displays the average class satisfaction scores by group. Based on previous models, differences in scores were not significant across the four phases; therefore, the slope of the scores across the four phases did not change. The graph provides a visual representation of the class satisfaction trajectories and the lack of changes across the phases suggesting that physical education class satisfaction did not significantly vary for either group across the four phases.

*Treatment Satisfaction*

Descriptive analyses were conducted based on intervention group participants’ responses on the Dance Aerobics Questionnaire to evaluate student’s preference for the dance aerobics intervention over the standard curriculum. Based on participant’s
responses, 45.2% of intervention participants rated enjoying participating in the dance aerobics class as very true (5). Similarly, 61.3% of participants reported very true on a question assessing preference of having music during class. The majority (54.5%) of participants also indicated significant interest in participating in a dance aerobics program after school if available. When asked about participating in dance aerobics rather than the standard physical education curriculum, participants were relatively even across the five rating points, with the mean score of 3.23. The remaining two questions assessed participants’ participation in a dance aerobics program in effort to increase their overall physical activity level. Participants’ responses varied across the five rating points evenly (M = 3.59, SD = 1.39 and M = 3.48, SD = 1.41) suggesting a wide variety of interest in increasing their overall physical activity level.
CHAPTER IV
DISCUSSION

National recommendations suggest that children and adolescents engage in roughly 30 minutes of moderate physical activity, five days a week. These recommendations are especially important for adolescents, who continually report a significant decrease in time spent in physical activity and an increase in rates of obesity (Sulemana et al., 2006). Therefore, one aim of this study was to explore the impact of a school-based intervention incorporating a previously identified enjoyable activity (dance aerobics) on female adolescents’ physical activity level.

In addition to change in physical activity level, the study also aimed to explore the impact of the dance aerobics program on participants’ self-efficacy and decisional balance. Through an integration of Bandura’s Social Cognitive Theory (1982) and Jannis and Manns’ (1968) decision-making theory, Prochaska’s Transtheoretical Model (TTM) of behavior change (1979) aims to identify an individual’s “readiness to change” a given behavior through self-efficacy regarding the given behavior and relative pro’s and con’s of engaging in that specific behavior (DiClemente & Prochaska, 1985).

Given the exploratory nature of the study, as well as lack of resources, it was determined that conducting the experimental design within one school as a preliminary or pilot study was most appropriate. With a small number of clusters (n = 6) and an equally small number of students within each cluster, power was unfortunately compromised, thus making it difficult to detect significant differences between the control and intervention groups among the four dependent variables. However, despite its lack of power, the study had several strengths.
First, this study is the only known study to explore the impact of a dance aerobics intervention program to a female adolescent sample. Previous findings suggest that adolescent females prefer to engage in more feminine activities such as dance, cycling, and aerobics; however, no known studies have explored these activities as mechanisms of increasing physical activity (Barr-Anderson et al., 2006; Klomsten et al., 2005; Rees et al., 2006). Therefore, this study is among the first to evaluate an intervention based on student’s activity preferences as indicated from previous findings. Participants’ responses on the treatment satisfaction measure indicated that majority of participants enjoyed the intervention and would remain after school to participate in a dance aerobics class. Thus the intervention supported previous findings supporting dance aerobics as an enjoyable activity for adolescent girls.

Another strength of the study is the sample of participants. The school in which the intervention was implemented was predominantly African American, with a significant percentage of students receiving free or reduced lunch. According to national statistics, African American adolescent girls from low-income homes are considered most at risk for becoming obese. Therefore, the current study provided initial evidence that a school-based physical activity intervention aimed to increase physical activity, self-efficacy, and decisional balance can easily be implemented in this population.

The third strength of the study is the study design. The study used repeated measures over 40 days with a nested experimental design that can provide causal evidence. In addition, the study measured behavior objectively via pedometers, and was not limited by self-reported measures of physical activity as in previous studies. In addition, the study design allotted for 10 days of baseline measure, three days longer than
Clemes and Parker (2009) identified as the recommended number of days needed to overcome reactivity to wearing a pedometer in adults participating in physical activity interventions.

A final strength of the study is the limited amount of missing data. Due to the intensive nature of this experiment, the primary investigator was heavily involved in the observation and data collection throughout the entire study. Therefore, participants were reminded daily to obtain their specified pedometers and the primary investigator recorded pedometer readings for every participant, every day. Furthermore, by implementing the experiment during the students previously scheduled physical education curriculum, no shows or conflict in schedules were easily avoided. In the rare instances that participants did not attend class, data was preserved by averaging the student’s total score for all dependent measures. Given these strengths and results from the pilot data, it is suggested that the study be replicated on a larger scale, including adolescents from across the country to better determine the effects of the intervention with an adequate sample size drawing from a diverse population.

Physical Activity

The first hypothesis that the physical activity intervention would significantly increase physical activity level in the intervention group during the intervention phase, as well as during the two follow-up phases, was not supported. While the difference between the groups physical activity across the intervention and follow-up phases was not statistically significant, the study was significantly underpowered making group differences difficult to detect. Visual examination of the regression equation determined by the fixed effects in the final model was necessary and appropriate to evaluate study
predictions in order to inform the utility of larger scale evaluation. Interpretation of the visual analysis suggests that the intervention did increase physical activity level in the intervention group during the intervention phase. Physical activity for the intervention group remained higher than the control group during the follow-up one phase suggesting a slight carryover effect of the intervention curriculum, thus encouraging students to continue with a higher physical activity level even once they return to the standard physical activity curriculum.

One explanation for not detecting significant differences is the lack of power. As previously reported, the small number of participants and clusters compromised power, thus making it difficult to detect significant differences. Another possible explanation is the length of time spent in the intervention. Previous intervention studies reporting significant findings implemented intervention programs ranging from six-weeks to three years (Burgess et al., 2006; Luepker et al., 1996; McKenzie et al., 2004; Pate et al., 2005; Sallis et al., 1997; Strong et al., 2005; Webber et al., 2008; Young et al., 2008). It is possible that by expanding the length of time within each phase, thus allowing for additional data collection, students’ physical activity levels would stabilize and provide a better representation of discrepancies between physical activity in the standard physical education curriculum and the intervention curriculum.

Despite the lack of significant findings, the final model’s regression equation provides preliminary evidence similar to results reported in larger intervention studies. The CATCH, M-SPAN, TAAG, and SPARK intervention programs all reported an increase in participants’ time spent engaging in physical activity and/or time spent in moderately vigorous physical activity (Luepker et al., 1996; McKenzie et al., 2004; Sallis
et al., 1997; Webber et al., 2008; Young et al., 2008). It is important to note, however, that these studies were also multicomponent studies, making it difficult to determine what component of the intervention was responsible for the increase in physical activity. While not statistically significant, the current study offers preliminary evidence that a brief, single component school-based intervention can increase student’s physical activity level.

Self-Efficacy

The second hypothesis that the physical activity intervention would significantly increase self-reported self-efficacy scores in the intervention group during the intervention phase, as well as during the two follow-up phases, was also not supported. These findings are not consistent with what was expected given the literature on adults’ and adolescents’ physical activity-related self-efficacy. According to key features of Social Cognitive Theory, physical activity related self-efficacy is expected to increase when individuals engage in activities that 1) provide them with successful experiences and 2) allow them to develop physical and behavioral skills that they can maintain into adulthood (Dishman et al., 2004). Despite the current dance aerobics intervention meeting the two key features, significant changes in self-efficacy scores were not observed.

One possible explanation for the lack of significant findings is the length of the intervention. It is possible that the two-week exposure to the intervention was not long enough to provide students the successful experiences and develop the appropriate skills necessary to see an increase in their self-efficacy scores. Another possible explanation is minimal exposure to behavioral skills. Previous studies that reported significant findings in self-efficacy scores had additional components where the students directly engaged in
self-regulatory behaviors such as goal setting and identifying barriers to physical activity (Bandura, 1997; Dishman et al., 2004). Future researchers should concretely incorporate these specific behavioral components aimed at increasing physical activity self-efficacy to see if the added component has an effect on students’ self-efficacy.

Future studies should also expand the current analyses and explore self-efficacy as a potential mediator and/or moderator of behavior change. Self-efficacy literature has repeatedly reported self-efficacy as one of the strongest determinants of exercise behavior (Nigg, 2001). More recent studies have also supported direct relationships between self-efficacy and physical activity following a physical activity intervention (Dishman et al., 2004; Dishman, Dunn, Sallis, Vandenbeng, & Pratt, 2010). By expanding the analyses to explore self-efficacy as a potential mediator or moderator of behavior change following an intervention, researchers may better understand the mechanisms involved in producing and maintaining successful behavior change.

**Decisional Balance Pro**

The third hypothesis that the physical activity intervention would significantly increase self-reported decisional balance pro scores in the intervention group during the intervention phase, as well as during the two follow-up phases, was also not supported. Upon closer examination of the regression equation determined by the fixed effects of the final model, the intervention group reported a minimally higher average decisional balance pro score at baseline than the control group which was neither statistically significant nor meaningful.

Considering that the trajectory of both the intervention and control group scores across the four phases did not significantly differ, it is evident that the intervention was
not successful in increasing the intervention students’ perception of the benefits of physical activity. One explanation for the lack of change in reported pros is the stability of participants’ stage of change. Previous studies have identified decisional balance pros more important to individuals in the active and maintenance stage, and less important to those in the precontemplative, contemplative, and preparation stage (Nigg, 2001; Nigg & Courneya, 1998). The distribution of participant’s stage of change remained similar throughout the four phases for both the intervention and control groups. Therefore, it is unlikely that changes in decisional balance pros would be detected if participants did not report advancement in stage of change. Based on the amount of time required to engage in an activity to progress to the next stage of change, future studies should expand the length of time of the intervention to provide participants with additional time to change their physical activity behaviors, thus allowing them to progress to advanced stages.

Future studies should also explore decisional balance pro as a mediator and/or moderator between physical activity interventions and change in adolescents’ physical activity level. It has been suggested that interventions influence a behavior change largely due to a change in a given theoretical construct, such as decisional balance (Lewis, Marcus, Pate, & Dunn, 2002). Therefore, examining these theoretical constructs may lead to a better understanding of why interventions are successful in changing behavior. Studies examining decisional balance as a mediator of behavior change are limited, and results are mixed. The adult literature has identified one intervention in which decisional balance mediated between intervention and physical activity in women; however, several other studies failed to support similar findings (Lewis et al., 2002; Pinto, Lynn, Marcus, DePue, & Goldstein, 2001). Among the child literature, Adams, Norman, Hovell, Sallis,
and Patrick (2009) supported decisional balance as a mediator of behavior change following a sun protection intervention for adolescents. By continuing to explore the involvement of decisional balance as a mechanism of behavior change in intervention studies, researchers will be able to develop successful interventions to promote and maintain behavior change.

Decisional Balance Con

The fourth hypothesis that the physical activity intervention would significantly decrease self-reported decisional balance con scores in the intervention group during the intervention phase, as well as during the two follow-up phases was not supported; however, the final model was statistically significant, indicating that the trajectory for the intervention group’s responses was significantly different than trajectory of the control groups responses across the four phases. At the baseline phase, there was a significant difference with the intervention group reporting on average significantly more decisional balance cons than the control group. Continued examination of the regression equation indicated that the intervention group reported a consistent increase in decisional balance con scores over the course of the four phases, indicating an overall increase in the perceived barriers of engaging in physical activity. The control group, however, reported a steep increase in decisional balance con scores after the intervention and follow-up one phase, followed by a slight decrease after follow-up two. Similar to the intervention group, the control group reported an overall increase in decisional balance con scores over the course of the study.

The difference in trajectories was significant, suggesting a difference in decisional balance con scores responses between the intervention and control groups over the course
of the four phases. The final model suggests that while the intervention was not successful in reducing the reported decisional balance con scores, it was successful in reducing the increase of average scores across the four phases for the intervention group. While the intervention group’s average decisional balance con scores increased just over two points across the four phases, the control group’s average decisional balance con scores increased approximately five points. These findings are important in that they are the first to suggest that a dance aerobic intervention for adolescent girls is effective in reducing participants’ increase in perceived barriers toward physical activity.

Consistent with decisional balance pro, future studies should also explore decisional balance con scores as a potential moderator or mediator between a specific physical activity intervention and adolescent’s physical activity level. While recent studies have reported mixed findings for social cognitive constructs as mediators in physical activity interventions, continued examination is necessary to determine potential targets for behavior change (Papandonatos et al., 2012). In addition, more recent studies have evaluated decisional balance as a single construct determined by subtracting the decisional balance con score from the decisional balance pro score to determine an overall decisional balance score (Napolitano et al., 2008). It has been suggested that a total decisional balance score may better capture where individuals fall on the benefit/barrier continuum.

Stages of Change

Due to the relation between stages of change and other TTM constructs, descriptive and exploratory longitudinal analyses were conducted. No significant differences were observed for neither the intervention nor the control group, thus
indicating non-significant changes in number of participants in each stage of change across the four phases. The lack of change in frequency of participants in each stage supports the earlier lack of significant findings for self-efficacy and decisional balance pros. The relationship between stages of change and self-efficacy and decisional balance suggests that individuals in advanced stages of change also report higher self-efficacy and decisional balance pro scores. Therefore, without a significant shift in student’s stage of change, one would not expect significant changes in self-efficacy and decisional balance. One possible explanation for the lack of change in stages of change scores is the length of each phase. Given the time frames associated with each stage (e.g. precontemplation is measured as no change expected in the next six months, action is measured as overt changes for less than six months) future studies may benefit from extending the length of each phase to better capture participants’ changes in stage of change.

Treatment Integrity

The modified SOFIT program indicated several significant differences for the General Content, Motor Content, and Other Lesson Behaviors between the intervention and control groups across the four phases. During the baseline phase, the intervention group’s curriculum consisted of more time spent in General Content, whereas the control group’s curriculum consisted of more time spent in Motor Content. Despite significantly more time spent moving and participating in physical activities, the control condition recorded a lower mean number of steps during the baseline phase, suggesting that when participants in the intervention condition engage in physical activity, their participation is more vigorous than participants in the control condition.
During the intervention phase, intervention participants’ curriculum involved significantly less time in General Content and Other Content and more time in Motor Content. While the main model examining the effects of the dance aerobics intervention on participant’s physical activity level was not significant, these findings suggest that during the intervention phase, participants in the intervention condition spent significantly more time engaging in motor activities than participants in the control condition.

The intervention condition’s curriculum consisted of significantly more time spent in General Content in Follow-Up One and Other Lesson Behaviors in Follow-Up Two. Difference in group curriculum during the follow-up one phase was likely due to individual classes requiring additional time spent in explanation or teaching of a new activity, as participants were introduced to a new physical activity. During follow-up two, participants were required to select teams and determine positions for every individual prior to beginning the activity, thus there was an increased time spent in other behaviors that were not specific to general content and motor activities.

As for the Teacher Interaction Component, no significant differences between conditions were observed for both the Engagement of Physical Activity Content and Observation Content. These findings are significant in that despite the primary investigator co-teaching the aerobics intervention, the physical education teacher was spending equal time engaging in activities and observing students in both conditions across the four phases. While this does not dismiss the effect the primary investigator may have had on the intervention, it does provide support that the teacher’s involvement with the students was similar across the phases in both conditions. There was, however, a
significant difference in the Other Content during the intervention phase, suggesting that the physical education teacher spent more time in Other behaviors in the control condition. This is likely due to the structure of the aerobics intervention. More specifically, the dance aerobics intervention consistently required the entire class period, whereas the standard physical education curriculum was often less structured, with more free time in the beginning and end of class where the teacher was able to engage in other behaviors.

Satisfaction

Class Satisfaction

Class satisfaction was repeatedly measured with the four main variables, thus multi-level modeling was also used to analyze differences in class satisfaction between groups across the four phases. The final model examining differences in class satisfaction was not significant, suggesting that class satisfaction trajectories did not differ significantly between groups across the four phases. One possible explanation for the lack of significant differences is the activities participants were engaging in as part of the standard curriculum. During the baseline phase, as well as the intervention phase for the control group, participants’ curriculum consisted of floor hockey. After the intervention, participants’ curriculum changed to either walking outside or playing basketball in preparation for their March Madness tournament. Unfortunately, walking and basketball were also among the activities that female adolescent have reported as enjoyable and preferential activities, thus making differences difficult to detect (Barr-Anderson et al., 2007; Klomsten et al., 2005; Rees et al., 2006). Therefore, the current study lends additional support to Barr-Anderson and colleagues’ (2007) findings that adolescent
females enjoy dance aerobics, walking, and basketball as part of their physical education class. Future researchers may want to examine class satisfaction of the intervention program against other physical education curriculums not previously identified as preferential activities such as flag football, dodge ball, and softball, to name a few.

_Treatment Satisfaction_

The brief questionnaire assessing satisfaction with the dance aerobics program was consistent with previous findings, with students participating in the aerobics program indicating that they enjoyed the dance aerobics intervention. Furthermore, participants enjoyed the dance aerobics so much that majority of participants reported that they would participate in dance aerobics even if it required staying after school. While participants indicated enjoyment in the activity, participants’ preference for music during class was also highly preferred. This finding is significant in that no known studies have assessed for the preference of music during the intervention. Music is an important component that may impact students’ preference for the activity, thus future studies should further explore the impact of music on student’s participation in physical activities.

_Study Limitations_

Several limitations were present in this study. First, power of the study was severely compromised by including only six participating classes in a single school. As previously reported, power in a cluster randomized trial is influenced by four factors: number of clusters, cluster size, intraclass correlation, and effect size. This study had six clusters (three intervention classes and three control classes), each with a relatively small cluster size (ranging from two to 27). Based off a power analysis curve, power for the current study was roughly 0.2, making it difficult to detect significant differences.
between the two groups across the four dependent variables. Future studies should not only increase the number of clusters, but also increase the number of students within each cluster. Similarly, by increasing the number of clusters and thus expanding the number of participants across a variety of schools and sites, variability between participants would also increase, simultaneously decreasing the intraclass correlation which in return increases power.

A second limitation is the administration of the dance aerobics intervention by the primary investigator rather than the physical education teacher. Original development of the intervention named the physical education teacher as the sole administrator of the aerobics intervention. More specifically, the primary investigator was to develop the class curriculum, and then provide the teacher with a brief education on the aerobics steps so that she would be able to appropriately teach the students the developed intervention. Upon collecting baseline data, it was noted that the physical education teacher’s participation in instructing the class was minimal at best. Therefore, to ensure that the participants received the intervention with adequate integrity, the primary investigator taught the dance aerobics intervention alongside the physical education teacher. While the primary investigator’s involvement may have an additional effect on student’s participation, it was the only way to ensure that the intervention was in fact administered appropriately. It should also be noted that while the primary investigator was not directly teaching the students in the control condition, she was present for every class from baseline through follow-up two to collect pedometer readings. Therefore, her presence and involvement in classes was consistent from the beginning to the end of the study throughout the six classes.
A third limitation is the inconsistent administration of the treatment integrity measure, (i.e., Dance Aerobics Checklist) during the intervention phase for all the intervention and control classes. As previously indicated, the Dance Aerobics Checklist was a brief checklist completed by the research assistant to determine which components of the intervention were administered to the intervention and control groups during the intervention phase. Ideally, the Dance Aerobics Checklist would have been completed for every class (both intervention and control) during the entire intervention phase; however, due to lack of research assistant support, administration of the Dance Aerobics Checklist only occurred twice a week for one intervention and one control class during the intervention phase, yielding a total of eight class observations. While completion of the checklist at every class would have provided support for complete administration of the intervention, it is important to note that the IOA for the administered checklists was 100%, indicating that for those intervention classes observed, every component of the intervention was observed, and none of the intervention components were observed in the control condition classes.

A fourth limitation is the lack of information about the control group’s satisfaction of the standard curriculum. Upon completing the dance aerobics intervention, participants in the intervention condition completed a brief survey assessing their preference for dance aerobics as part of the standard physical education curriculum, as well as an after school option. Due to an unfortunate oversight, students in the control condition were not administered a similar questionnaire assessing satisfaction of the standard curriculum. Therefore, satisfaction ratings between the dance aerobics intervention and standard curriculum could not be determined. Future studies should
incorporate additional class satisfaction questionnaires to better determine students’ preference of physical education curriculums.

A fifth limitation is the use of pedometers as a measure to obtain physical activity level in participants. While the use of pedometers is an advantage over self-report questionnaires in that it allows for objective measure of physical activity, there are also systematic errors and variability within pedometers that may not be reflective of actual physical activity. It has recently been reported that sensitivity of pedometers is second to that of accelerometers. Recent literature suggests that in addition to better sensitivity, accelerometers can also monitor intensity, duration, and frequency of physical activity, allowing for estimation of overall energy expenditure (Corder, Brage, & Ekelund, 2007). Of course the ability to measure behavior more accurately also comes with added costs: the standard accelerometer can run anywhere from $900 to $1200, whereas a pedometer costs on average $20. For the purpose of this study, pedometers were able to obtain the necessary data to evaluate activity level in participants; however, should the study be replicated and allotted financial assistance, accelerometers may be a more sensitive measure of physical activity. Additionally, future studies may also want to include an additional measure of physical activity level to determine students’ physical activity level outside of the classroom. By including this measure, researchers can better determine if the intervention has an impact on students’ overall physical activity level.

A final limitation is the measurement of self-efficacy and decisional balance. The questionnaires assessing both constructs may not have adequately allowed a change in scores due to the nature of the questionnaires. More specifically, the self-efficacy measure assessed organization of participating in activities rather than an individual’s
capability of participating in physical activity. According to Bandura (1998), a change in self-efficacy would be expected if students were able to engage in successful physical activity experiences and/or achieve a desired goal; however, the questionnaire used in the current study did not adequately provide a measure of these two components. Therefore, it is unlikely that a change in self-efficacy scores would have been detected given the measurement issues. Similarly, the decisional balance questionnaire was also problematic in that it was written in mixed tense, with some questions assessing future barriers/benefits and others assessing current barriers/benefits. This inconsistency likely caused a fundamental problem in assessing student’s current barriers and benefits at each time point, thus making difference over time difficult to determine. Future studies should closely assess the type of measurement used when assessing these constructs, especially in a repeated measures design, to maximize likelihood of detecting significant differences between groups over time.

Directions for Future Research

Given the continued increase in childhood obesity, the need for continued research on children’s physical activity level and nutrition education are important. While the current literature indicates several different effective interventions aimed at increasing children’s physical activity level and other psychosocial constructs, research in the field of childhood obesity is still in its infancy. One area in which this study built from prior research is implementing a physical activity intervention in a school-based setting. Future studies should continue to explore the impact of interventions in a school-based setting as it allows all children enrolled in the school access to the intervention, rather than those with the willingness or resources to participate outside of school. Results would also be
more generalizable in that the variety of participants would be greater within a school district rather than a select community sample.

Future studies should also aim to further explore the impact of preferential activities, such as dance aerobics, on children and adolescents physical activity. Current literature suggests that preferential activities may be the gateway to increasing physical activity in children. Therefore, it is important that the research on childhood obesity continue to explore these preferential activities based on the samples age, gender, and ethnicity.

While this study examined the impact of a two-week dance aerobics program, future researchers may want to expand the length of the intervention to longer than two-weeks. Current literature evaluating the effect of the length of the intervention suggests that interventions lasting less than four months and up to eight months are optimal in producing behavior change in participants (Kitzman et al., 2010). Furthermore, with lengthier intervention periods, changes in physical measures such as body weight and BMI can also be evaluated. While the current study aimed to introduce dance aerobics as a component of the physical education curriculum, future studies may have to implement the intervention as the entire physical education curriculum to meet the suggested length of intervention.

Future studies should also build upon McAuley and Courneya’s (1993) findings and educate participants on physiological symptoms related to cardiovascular exercise so that they are able to anticipate and work through these symptoms, rather than end their physical activity. This is particularly important when evaluating participants’ decisional balance scores as increased physiological symptoms are often cited as a con of
exercising. Therefore, by providing participants with the tools to overcome their fears associated with these physiological symptoms, participants will continue with their physical activity regimen. Furthermore, future studies may also want to evaluate decisional balance pro and con scores as one variable, subtracting the con total from the pro total. This value may better represent an individual’s overall decisional balance score rather than evaluating the two as separate variables.

Future studies exploring stages of change may also find it helpful to dichotomize the five stages into pre-change (precontemplation, contemplation, preparation) and post-change (active and maintenance), particularly if their study consists of a small sample. By dichotomizing the construct into two components, researchers may be better able to determine what constructs are most important in influencing a behavior change and what constructs are most important in maintaining a behavior.

Conclusion

Despite the limitations, the current study provided initial evidence that a dance aerobics intervention can be implemented within a school-based physical education curriculum in efforts to provide female adolescents with a preferential physical activity. While the physical activity, self-efficacy, and decisional balance pro models did not reveal significant findings, trends based off the regression equations suggest that the intervention can increase physical activity in adolescent females. Additionally, while the decisional balance con model indicated significant difference between the intervention and control conditions, it was not in the predicted direction. Therefore, further examination of these constructs with regards to physical activity should be explored in
future studies with more participants to increase participant diversity as well as statistical power.
APPENDIX A

INSTITUTIONAL REVIEW BOARD

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board
118 College Drive #5147
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Fax: 601.266.5509
www.usm.edu/irb

TO: Alexis Suozzi
3011 Navajo Circle
Hattiesburg, MS 39402

FROM: Lawrence A. Hosman, Ph.D.
HSPRC Chair

PROTOCOL NUMBER: 29110402
PROJECT TITLE: The Impact of a Dance Aerobics Program on Middle School Girls’ Physical Activity Level, Decisional Balance, and Self-Efficacy

Enclosed is The University of Southern Mississippi Human Subjects Protection Review Committee Notice of Committee Action taken on the above referenced project proposal. If I can be of further assistance, contact me at (601) 266-4279, FAX at (601) 266-4275, or you can e-mail me at Lawrence.Hosman@usm.edu. Good luck with your research.
HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 21, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the “Adverse Effect Report Form”.
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 29110402
PROJECT TITLE: The Impact of a Dance Aerobics Program on Middle School Girls' Physical Activity Level, Decisional Balance, and Self-Efficacy
PROPOSED PROJECT DATES: 11/01/09 to 11/01/10
PROJECT TYPE: Dissertation or Thesis
PRINCIPAL INVESTIGATORS: Alexis Suozzi
COLLEGE/DIVISION: College of Education & Psychology
DEPARTMENT: Psychology
FUNDING AGENCY: N/A
HSPRC COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 11/09/09 to 11/08/10

Lawrence A. Hosman, Ph.D.
HSPRC Chair

Date
APPENDIX B

PARENT CONSENT

Dear Parent,

You are being asked to allow your child to take part in a physical activity program for adolescent girls at your child’s school as part of a research study. To provide informed consent for your child to participate, please read the following information and ask any questions necessary to be sure you understand what she will be asked to do.

**Description of the Study**

The study is being conducted to determine the impact of a girls dance aerobics physical education class on adolescent females physical activity level, decision to exercise, and confidence in their ability to exercise. Every female student from your child’s school who is enrolled in physical education class, will be recruited for this study. Each physical education class will be randomly assigned to one of two groups. There is no guarantee as to which group your child will be assigned. A description of both groups is provided below.

- **If your child is assigned to Group 1**, she will complete questionnaire in class on physical activity level, decision to exercise, and confidence in her ability to exercise at the beginning of the study, after the intervention, and then 2 and 4 weeks after the intervention. Participants in Group 1 will receive the “intervention” component in their regular PE class, which will consist of a 2 week dance aerobics program led by both the primary investigator and the student’s physical education teacher. To monitor physical activity level, students will be asked to wear a pedometer during their physical education class. Pedometers will be provided by the primary investigator at the beginning of class each day.

- **If your child is assigned to Group 2**, she will be asked to complete the same questionnaires in class at the same four time periods as Group 1. The only difference between Group 1 and Group 2 is that while Group 1 receives the dance aerobics program, Group 2 will receive the standard physical education class. Students in Group 2 will also be asked to wear pedometers during physical education class to monitor physical activity level.

All participating students will receive a Program T-Shirt. Additionally, students can discontinue the study at any time. Information obtained from your child’s assessment is confidential and will be available only to the primary investigator and research assistants. After completion of the program, your child will be asked to complete a brief written survey to evaluate the program.

**Risks of Study**

The risks involved in this study are minimal. If your child experiences anxiety or discomfort related to answering questions, she can discontinue participation at any time. Risks from injury are slight because class physical activity is not extreme or excessive. Any injuries during the physical activity will be addressed by the school nurse. Risk for heart problems during physical activity is rare in this age group. Parents should include any preexisting medical conditions on the Participation Registration Form. The implementation of a dance aerobics program in a school setting is experimental; however, these types of assessments have been performed in other settings.
Benefits of Study
Students participating in the program will benefit from participation in physical activity. Results of the study may aid future schools with a physical activity component that increases female adolescents’ physical activity level. Additionally, results of the study will help researchers better understand the relationship between physical activity exercises and motivation to engage in exercise in female adolescents. All participating students will receive a participation t-shirt for participating in the current study.

Your participation is voluntary. If you decide not to participate in this study you will not suffer a penalty or loss of benefits to which you are otherwise entitled. If you decide to participate in this study, you may discontinue your participation at any time without penalty or loss of benefits; however, if you or your child fails to complete any of the questionnaires, your data will not be used in this study.

If you have any questions or need to report any problems or want additional information about being a study participant, please call Alexis Suozzi at (843) 422-1313 or Dr. Sara Jordan at (601) 266-4587, or by email at sara.jordan@usm.edu. This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of the Institutional Review Board, The University of Southern Mississippi, Box 5147, Hattiesburg, MS 39406, (601) 266-6820.

By signing below and completing the participation registration form, you are indicating that you have read this letter, had an opportunity to ask questions about this study, and are agreeing that you and your child are participating in this study. Thank you for your interest in this research study.

Sincerely,

Alexis Suozzi
Graduate Student
USM Department of Psychology

Sara Jordan, Ph.D.
USM Department of Psychology

____________________
Child’s Name (print)

____________________
Date

____________________
Parent Name (print)

____________________
Parent Signature
Dear Student,

You are invited to participate in a study to learn about what motivates middle school girls to participate in physical activities. You will be asked to complete several questionnaires during your PE class over the next 8 weeks, as well as wear a step-counter during your PE class. The questionnaires will be coded by a secret number so that your responses will be confidential. Your parents, teachers, and friends will not know your answers, and your participation will not impact your PE grade. There are no right or wrong answers to the questionnaires because this is not a test.

You can ask questions about this study at any time. If you decide at any time not to finish, you can ask us to stop.

Your signature ______________________  Date ________________
APPENDIX D
STUDY DESIGN

Weeks 1 & 2: Assigned pedometers to students. Established baseline physical activity data. Randomly assigned treatment (3 classes) and control conditions (3 classes). Students’ height and weight recorded. Physical Activity Questionnaire and child assent completed.

After week 2, every student completed Self-efficacy, Stage of Change, Decisional Balance, and Physical Activity Class Satisfaction Questionnaires. Students’ weight measured.

Weeks 3 & 4: Control Group
- Standard Physical Education Class
- Daily Record of Physical Activity
- Bi-weekly session Observation

Weeks 3 & 4: Treatment Group
- Dance Aerobics Physical Education Class
- Daily Record of Physical Activity
- Bi-weekly session Observation

End of Week 4, every student completed Self-efficacy, Stage of Change, Decisional Balance, and Physical Activity Satisfaction Questionnaires. Students’ weight measured.

Weeks 5-8: Every student received standard physical education class. Daily record of Physical Activity for every student.

After weeks 6 & 8, every student completed Self-Efficacy, Stage of Change, Decisional Balance, and Physical Activity Satisfaction Questionnaires. Students’ weight measured.
APPENDIX E

INTERVENTION DESCRIPTION

Girls Exercising Together

Aerobics Manual
Day 1

Warm up
Hold stretches for 20 seconds
• 3 laps around gym
• 10 jumping jacks
• Hamstring stretch
• Quad stretch
• Hip stretch
• Arm across chest
• Arm over head
• 3 deep breaths

Routine
Introduction to Dance Aerobics
• Any activity that uses large muscle groups, can be maintained continuously, and is rhythmic in nature.
• Low impact: at least one foot remaining in contact with the floor at all times while exercising.
• High impact: occurs when the body is moved through space and both feet lose contact with the floor (jumping and hopping).

Learning the basics
1-1
• High Knees (1 x slow 8 count; 2 x fast 8 count)
• High Knees with twist (2 x slow 8 count)
• Step kick front (2 x 8 count)
• Step kick back (2 x 8 count)

1-2
• Grapevine walking (2 x 8 count)
• Grapevine jogging (4 x 8 count)
• Grapevine heel (4 x 8 count)
• Grapevine hamstring (4 x 8 count)
• Grapevine squat (4 x 8 count)

1-3
• Shuffle 2 claps (4 x 8 count)
• Right step, Left step, Right step, Kick forward (4 x 8 slow; 8 x 8 fast)
• Left step, Right step, Left step, Kick back

1-4
• Grapevine L with Right step, Left step, Right step, Kick forward
• March 4 count
• Grapevine R with Left step, Right step, Left step, Kick backward
- March 4 count
- Repeat 1-4

**Cool Down**
Hold each stretch for 20 seconds
- March in place (2 x 8 count)
- Hamstring stretch
- Quad stretch
- Hip stretch
- Twist
- Arm across chest
- Arm over head
- 3 deep breaths
Day 2

Warm up

• 3 laps around gym
• 10 jumping jacks
• Hamstring stretch
• Quad stretch
• Hip stretch
• Arm across chest
• Arm over head
• 3 deep breaths

Routine

2-1

• High Knees (1 slow 8 count, 2 fast 8 count)
• High Knees with twist (2 slow 8 count)
• Step kick front (2 x 8 count)
• Step kick back (2 x 8 count)

2-2

• Grapevine walking (2 x 8 count)
• Grapevine jogging (4 x 8 count)
• Grapevine heel (4 x 8 count)
• Grapevine hamstring (4 x 8 count)
• Grapevine squat x 2 (4 x 8 count)
• 4 count grapevine with 4 count step kick (8 x)

2-3

• Grapevine L; Step Right, Step Left, Step right, Kick forward Left
• March 4 count
• Grapevine R; Step Left, Step Right, Step Left, Kick backward Right
• March 4 count
• Repeat 4 times

2-4 Beginning of Routine

• Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
• One minute break
• Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
**Cool Down:**
Hold each stretch for 20 seconds
- March in place (2 x 8 count)
- Hamstring stretch
- Quad stretch
- Hip stretch
- Twist
- Arm across chest
- Arm over head
- 3 deep breaths
Day 3

Warm up
Hold stretches for 20 seconds
• 3 laps around gym
• 10 jumping jacks
• Hamstring stretch
• Quad stretch
• Hip stretch
• Arm across chest
• Arm over head
• 3 deep breaths

Routine

3-1
• High Knees (1 slow 8 count, 2 fast 8 count)
• High Knees with twist (2 slow 8 count)
• Step kick front (2 x 8 count)
• Step kick back (2 x 8 count)

3-2
• Grapevine jogging (8 x 8 count)
• Grapevine heel (4 x 8 count)
• Grapevine hamstring (4 x 8 count)
• Grapevine squat x 2 (4 x 8 count)
• 4 count grapevine with 4 count step kick (8 x)

3-3 Beginning of Routine
• Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times

3-4
• Chasse step (4 x 8 slow; 2 x 8 fast)
  o Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  o Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
• Step-hop back step (4 x 8)
  o Step back on right foot and hop on right foot
  o Step back on left foot hop on left foot
• Chasse Step (2 x 8); Step-hop (2 x 8); Repeat 2 times

3-5
• Combine 3-3 and 3-4; Repeat 2-4 times
**Cool Down:**
Hold each stretch for 20 seconds
- March in place (2 x 8 count)
- Hamstring stretch
- Quad stretch
- Hip stretch
- Twist
- Arm across chest
- Arm over head
- 3 deep breaths
Day 4

**Warm up**
Hold stretches for 20 seconds
- 3 laps around gym
- 10 jumping jacks
- Hamstring stretch
- Quad stretch
- Hip stretch
- Arm across chest
- Arm over head
- 3 deep breaths

**Routine**

4-1
- High Knees (2 fast 8 count)
- High Knees with twist (2 slow 8 count)
- Step kick front (2 x 8 count)
- Step kick back (2 x 8 count)

4-2
- Grapevine jogging (8 x 8 count)
- Grapevine heel (4 x 8 count)
- Grapevine hamstring (4 x 8 count)
- Grapevine squat x 2 (4 x 8 count)
- 4 count grapevine with 4 count step kick (4 x)

4-3 Beginning of Routine
- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times

4-4
- Chasse step (2 x 8 slow; 2 x 8 fast)
  - Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  - Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
- Step-hop back step (2 x 8)
  - Step back on right foot and hop on right foot
  - Step back on left foot hop on left foot
- Chasse Step (2 x 8); Step-hop (2 x 8); Repeat 2 times

4-5
- Cha-Cha (1 x 8 count slow; 4 x 8 count fast)
o  Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
  •  Step-Hop back step (1 x 8 count)
  •  Cha-Cha (2 x 8); Step-hop (2 x 8)

4-6
  •  Combine 4-3, 4-4, and 4-5; Repeat 2-4 times

Cool Down:
Hold each stretch for 20 seconds
  •  March in place (2 x 8 count)
  •  Hamstring stretch
  •  Quad stretch
  •  Hip stretch
  •  Twist
  •  Arm across chest
  •  Arm over head
  •  3 deep breaths
Day 5 & 6

**Warm up**

Hold stretches for 20 seconds
- 3 laps around gym
- 10 jumping jacks
- Hamstring stretch
- Quad stretch
- Hip stretch
- Arm across chest
- Arm over head
- 3 deep breaths

**Routine**

5-1
- High Knees (2 fast 8 count)
- High Knees with twist (2 slow 8 count)
- Step kick front (2 x 8 count)
- Step kick back (2 x 8 count)

5-2
- Grapevine jogging (4 x 8 count)
- Grapevine heel (2 x 8 count)
- Grapevine hamstring (2 x 8 count)
- Grapevine squat x 2 (2 x 8 count)
- 4 count grapevine with 4 count step kick (2 x)

5-3 Routine
- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
- Chasse step (2 x 8 fast)
  - Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  - Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
- Step-hop back step (2 x 8)
  - Step back on right foot and hop on right foot
  - Step back on left foot hop on left foot
- Cha-Cha (2 x 8 count)
  - Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
- Step-Hop back step (2 x 8 count)
- Repeat 4 times
5-4 Add on
  • Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times

5-5
  • Repeat entire routine 4 times

**Cool Down:**
Hold each stretch for 20 seconds
  • March in place (2 x 8 count)
  • Hamstring stretch
  • Quad stretch
  • Hip stretch
  • Twist
  • Arm across chest
  • Arm over head
  • 3 deep breaths
Day 7

**Warm up**

Hold stretches for 20 seconds

- 3 laps around gym
- 10 jumping jacks
- Hamstring stretch
- Quad stretch
- Hip stretch
- Arm across chest
- Arm over head
- 3 deep breaths

**Routine**

7-1

- High Knees (2 fast 8 count)
- High Knees with twist (2 slow 8 count)
- Step kick front (2 x 8 count)
- Step kick back (2 x 8 count)

7-2

- Grapevine jogging (2 x 8 count)
- Grapevine heel (2 x 8 count)
- Grapevine hamstring (2 x 8 count)
- Grapevine squat x 2 (2 x 8 count)
- 4 count grapevine with 4 count step kick (2 x)

7-3 Routine

- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
- Chasse step (2 x 8 fast)
  - Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  - Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
- Step-hop back step (2 x 8)
  - Step back on right foot and hop on right foot
  - Step back on left foot hop on left foot
- Cha-Cha (2 x 8 count)
  - Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
- Step-Hop back step (2 x 8 count)
- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
• Repeat entire routine 4 times

7-4 Add on
• Chasse step (2 x 8 fast)
  o Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  o Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
• Cha-Cha (2 x 8 count)
  o Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
• Repeat together 2 times

7-5
• Repeat entire routine 4 times

Cool Down:
Hold each stretch for 20 seconds
• March in place (2 x 8 count)
• Hamstring stretch
• Quad stretch
• Hip stretch
• Twist
• Arm across chest
• Arm over head
• 3 deep breaths
Day 8

**Warm up**
Hold stretches for 20 seconds
- 3 laps around gym
- 10 jumping jacks
- Hamstring stretch
- Quad stretch
- Hip stretch
- Arm across chest
- Arm over head
- 3 deep breaths

**Routine**

8-1
- High Knees (2 fast 8 count)
- High Knees with twist (2 slow 8 count)
- Step kick front (2 x 8 count)
- Step kick back (2 x 8 count)

8-2
- Grapevine jogging (2 x 8 count)
- Grapevine heel (2 x 8 count)
- Grapevine hamstring (2 x 8 count)
- Grapevine squat x 2 (2 x 8 count)
- 4 count grapevine with 4 count step kick (2 x)

8-3 Routine
- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
- Chasse step (2 x 8 fast)
  - Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  - Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
- Step-hop back step (2 x 8)
  - Step back on right foot and hop on right foot
  - Step back on left foot hop on left foot
- Cha-Cha (2 x 8 count)
  - Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
- Step-Hop back step (2 x 8 count)
- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
• Chasse step (2 x 8 fast)
  o Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  o Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
• Cha-Cha (2 x 8 count)
  o Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
• Repeat entire routine 4 times

8-4
  • March 4 steps forward and four steps backward
  • Repeat 2 times

8-5
  • Combine 8-3 and 8-4
  • Repeat routine 4-8 times

**Cool Down:**
Hold each stretch for 20 seconds
  • March in place (2 x 8 count)
  • Hamstring stretch
  • Quad stretch
  • Hip stretch
  • Twist
  • Arm across chest
  • Arm over head
  • 3 deep breaths
Day 9

**Warm up**
Hold stretches for 20 seconds

- 3 laps around gym
- 10 jumping jacks
- Hamstring stretch
- Quad stretch
- Hip stretch
- Arm across chest
- Arm over head
- 3 deep breaths

**Routine**

9-1

- High Knees (2 fast 8 count)
- High Knees with twist (2 slow 8 count)
- Step kick front (2 x 8 count)
- Step kick back (2 x 8 count)

9-2

- Grapevine jogging (2 x 8 count)
- Grapevine heel (2 x 8 count)
- Grapevine hamstring (2 x 8 count)
- Grapevine squat x 2 (2 x 8 count)
- 4 count grapevine with 4 count step kick (2 x)

9-3 Routine

- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
- Chasse step (2 x 8 fast)
  - Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  - Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
- Step-hop back step (2 x 8)
  - Step back on right foot and hop on right foot
  - Step back on left foot hop on left foot
- Cha-Cha (2 x 8 count)
  - Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
- Step-Hop back step (2 x 8 count)
- Step right, step left, step right, and kick left forward; Step left, step right, step left, and kick backward. Quarter turn. Repeat 8 times
• Chasse step (2 x 8 fast)
  o Side step to right, left, right, and place left foot behind right foot; rock backward on left foot, lift right foot, and put down (1- and-2, 3, 4)
  o Side step to the left, right, left, and place right foot behind left foot; rock backward on right foot, lift left foot, and put down (5- and-6, 7, 8)
• Cha-Cha (2 x 8 count)
  o Forward, backward, cha, cha, in place; backward, forward, cha, cha in place.
• March 4 steps forward and four steps backward (2 x 8 count)
• Repeat routine 8 times

Cool Down:
Hold each stretch for 20 seconds
• March in place (2 x 8 count)
• Hamstring stretch
• Quad stretch
• Hip stretch
• Twist
• Arm across chest
• Arm over head
• 3 deep breaths
APPENDIX F

DEMOGRAPHIC FORM

Participation Registration Form

Child’s Name: ________________________________  Child’s Grade: ______
Child’s Date of Birth: ___________________  Child’s Age: ______
Child’s Race: Caucasian/White  African American/Black  Asian  Hispanic
Other: ________

Does your child participate in physical extra curricular activities (soccer, baseball)?
If yes, what activities and how often? (Continue on back if need more space)
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Does your child have any health conditions that may prevent them from engaging in physical activities? If yes, please explain and provide a physician contact name and number. (Continue on back if need more space)
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Information about YOU
Relationship to Child: ____________  Age: ____  Sex: Male  Female

Race: Caucasian/White  African American/Black  Asian  Hispanic
Other: ____________

Marital Status: Married  Separated  Divorced  Widowed
Never Married/Living Alone  Never Married/Living with Significant Other
Education: Highest Level of Education Completed:

<table>
<thead>
<tr>
<th>Yourself:</th>
<th>Your Spouse/Significant Other:</th>
</tr>
</thead>
<tbody>
<tr>
<td>_____ 6th Grade or less</td>
<td>_____ 6th Grade or less</td>
</tr>
<tr>
<td>_____ Junior High School (7th, 8th, 9th)</td>
<td>_____ Junior High School (7th, 8th, 9th)</td>
</tr>
<tr>
<td>_____ Some High School (10th, 11th)</td>
<td>_____ Some High School (10th, 11th)</td>
</tr>
<tr>
<td>_____ High School Graduate</td>
<td>_____ High School Graduate</td>
</tr>
<tr>
<td>_____ Some College (at least 1 year) or Specialized training</td>
<td>_____ Some College (at least 1 year) or Specialized training</td>
</tr>
<tr>
<td>_____ Junior College Graduate</td>
<td>_____ Junior College Graduate</td>
</tr>
<tr>
<td>_____ Bachelors/University Graduate</td>
<td>_____ Bachelors/University Graduate</td>
</tr>
<tr>
<td>_____ Graduate Professional Degree (masters, doctorate)</td>
<td>_____ Graduate Professional Degree (masters, doctorate)</td>
</tr>
</tbody>
</table>

Occupation: Please provide your job title or position. For example, if you are a teacher at Lee High School, please state “high school teacher.” If you are retired, please state your prior occupation. If you do not work outside the home, please state “unemployed.”

Your Occupation (please be specific):

________________________________________

Your Spouse/Significant Others Occupation:

________________________________________

Income: What is the total annual income of your household? (Combine the income of ALL the people living in your house) Please circle.

$0--$4,999  $5,000--$9,999  $10,000--$14,999  $15,000--$24,999
$25,000--$34,999 $35,000--$49,999 $50,000--$74,999 $75,000--$99,999
$100,000 and above
APPENDIX G

MODIFIED PHYSICAL ACTIVITY QUESTIONNAIRE

**Directions.** Please read each question and choose the answer that best represents you. Please only circle one answer per question.

1. During the past 7 days, on how many days were you physically active for a total of **at least 60 minutes per day**? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard for some of the time.)
   - ○ 0 days
   - ○ 1 day
   - ○ 2 days
   - ○ 3 days
   - ○ 4 days
   - ○ 5 days
   - ○ 6 days
   - ○ 7 days

2. On an average school day, how many hours do you watch TV?
   - ○ I do not watch TV on an average school day
   - ○ Less than 1 hour per day
   - ○ 1 hour per day
   - ○ 2 hours per day
   - ○ 3 hours per day
   - ○ 4 hours per day
   - ○ 5 or more hours per day

3. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as Nintendo, Game Boy, Play Station, Xbox, computer games, and the Internet.)
   - ○ I do not play video or computer games or use a computer for something that is not school work
   - ○ Less than 1 hour per day
   - ○ 1 hour per day
   - ○ 2 hours per day
   - ○ 3 hours per day
4. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
   - 0 days
   - 1 day
   - 2 days
   - 3 days
   - 4 days
   - 5 days

5. During the past 12 months, on how many sports teams did you play? (Include any teams run by your school or community groups.)
   - 0 teams
   - 1 team
   - 2 teams
   - 3 or more teams
**APPENDIX H**

**SELF-EFFICACY QUESTIONNAIRE**

**Directions.** Please indicate how confident you are that you can participate in vigorous physical activity on a scale from 1, not at all confident to 5, very confident.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1. At least three days per week.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. If there is a lack of time due to school-work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. If there is a lack of time due to part-time work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. If there is a lack of time due to family responsibilities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. If there is a lack of time due to other interests.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. If you lack energy (too tired).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. If you lack athletic ability.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. If there is a lack of programs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. If there is a lack of facilities.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. If you lack a partner.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. If there is a lack of support from family.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. If there is a lack of support from friends.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. If participation costs money.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. If you lack self-discipline or willpower.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. If you are self-conscious (feeling uncomfortable).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. If you have a long-term illness, disability, or injury.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>17. If you have a fear of injury.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>18. If you feel stressed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>19. If you do not feel in the mood.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>20. If you feel discomfort (for example, soreness).</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>21. If you do not have fun.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
**APPENDIX I**

**DECISIONAL BALANCE QUESTIONNAIRE**

**Directions.** Please rate how important each statement is in your decision whether or not to exercise. In each case, think about how you feel right now, not how you have felt in the past or how you would like to feel.

<table>
<thead>
<tr>
<th>Not at all important</th>
<th>Moderately Important</th>
<th>Extremely Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

1. I would have more energy for my family and friends if I exercised regularly.  
2. Regular exercise would help me relieve tension.  
3. I think I would be too tired to do my daily work after exercising.  
4. I would feel more confident if I exercised regularly.  
5. I would sleep more soundly if I exercised regularly.  
6. I would feel good about myself if I kept my commitment to exercise regularly.  
7. I would find it difficult to find an exercise activity that I enjoy that is not affected by bad weather.  
8. I would like my body better if I exercised regularly.  
9. It would be easier for me to perform routine physical tasks if I exercised regularly.  
10. I would feel less stressed if I exercised regularly.  
11. I feel uncomfortable when I exercise because I get out of breath and my heart beats very fast.  
12. I would feel more comfortable with my body if I exercised regularly.  
13. Regular exercise would take too much of my time.  
14. Regular exercise would help me have a more positive outlook on life.  
15. I would have less time for my family and friends if I exercised regularly.  
16. At the end of the day, I am too exhausted to exercise.
APPENDIX J

STAGES OF CHANGE QUESTIONNAIRE

Physical Activity Stages

- **Physical activity** is any activity that increases your heart rate and makes you get out of breath some of the time.
- **Physical activity** can be done in sports, playing with friends, or walking to school.
- Some examples of **physical activity** are running, brisk walking, rollerblading, biking, skateboarding, dancing, swimming, soccer, basketball, football, & surfing.

<table>
<thead>
<tr>
<th>Physical Activity Stages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In a typical week, how many days do you do physical activity for <strong>60 minutes</strong> or more?</td>
</tr>
<tr>
<td><strong>Mark the answer that is true for you.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zero</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

(If you answered between "0" and "4" to question 1, go to question 3.)

<table>
<thead>
<tr>
<th>Five</th>
<th>Six or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>6+</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

(If you answered "5" or "6 or more" to question 1, go to question 2.)

<table>
<thead>
<tr>
<th>3. Do you think you will start doing <strong>60 minutes</strong> of physical activity <strong>5 or more days</strong> a week in the next 6 months?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No, and I do <strong>not</strong> intend to in the <strong>next six months</strong>.</td>
</tr>
<tr>
<td>2. Yes, I intend to in the <strong>next six months</strong>.</td>
</tr>
<tr>
<td>3. Yes, I intend to in the <strong>next 30 days</strong>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. How many months have you been doing <strong>60 minutes</strong> of physical activity on <strong>5 or more days</strong> per week?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Less than 6 months</strong></td>
</tr>
<tr>
<td>2. <strong>6 months or more</strong></td>
</tr>
</tbody>
</table>

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APPENDIX K

PHYSICAL ACTIVITY CLASS SATISFACTION QUESTIONNAIRE

Physical Activity Class Satisfaction Questionnaire

**Directions.** Think back to your physical activity class over the past **two weeks**. Please indicate on a scale of 1 (*not satisfied at all*) to 8 (*very satisfied*) how satisfied you are with each of the following physical activity class statements.

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My overall enjoyment in the class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>2. How much fun I had in the class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>3. The pleasant experiences I had in class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>4. The extent to which I had a good time in class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>5. The improvement of my health due to this class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>6. The physical workout I receive in the class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>7. The development of greater fitness as a result of this class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>8. The class’ contribution to my overall health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9. The progress I have made toward a healthier body during the class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>10. The quality of the overall instruction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>11. The clarity of the instructor’s lessons.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>12. The instructor’s enthusiasm during the class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>13. The empathy the instructor showed for the students in the class.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>14. The instructor’s ability to effectively communicate content matter.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>
APPENDIX L

DANCE AEROBICS RATING FORM

**Directions.** Please answer the following questions on a scale from 1 (not true at all) to 5 (very true).

<table>
<thead>
<tr>
<th>Question</th>
<th>Scale 1</th>
<th>Scale 2</th>
<th>Scale 3</th>
<th>Scale 4</th>
<th>Scale 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I enjoyed participating in the dance aerobics class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I would rather participate in dance aerobics for PE than hockey/walking/basketball.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I enjoyed having music while participating in the dance aerobics class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. If dance aerobics was the standard PE class, I would participate in PE more than I do now.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. If available, I would participate in a dance aerobics class after school.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. If available, I would participate in a dance aerobics class after school to increase my physical activity level.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Participating in the dance aerobics class made me want to be more physically active.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

 Were you on the 7th or 8th grade girls’ basketball team?  YES  NO

 Are you trying out for track and/or softball?  YES  NO

 Did you play any other sports this school year? If yes, what?
REFERENCES


Hollingshead, A. B. (1975). Four factor index of social status. Unpublished manuscript. Yale University, New Haven, CT.


behaviors among adolescents. *Paper presented at the 19th Annual Meeting of the Society of Behavioral Medicine, New Orleans, LA.*


