Effects of High Tempo, Asynchronous Music on Participation and Morale in Physical Education

by

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Abstract

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Physical inactivity is a significant problem in our nation, and physical education is a possible avenue to address this issue. This research sought to explore the use of music as a tool in physical education to increase participation and morale and potentially promote physical activity outside the school day. The effects of music were studied on middle school students in regular physical education classes.

The study took place across three units of instruction: fitness games, floor hockey, and basketball. There were three groups, including the control (no music) and two treatment groups (high tempo instrumental and popular music with lyrics). Participation and morale were measured through the use of pedometers, daily surveys, and unit surveys.

After running an ANOVA, the results of the pedometer steps and survey responses showed no significant differences across the groups in any unit in the study. Also, when standardizing each student's individual scores and measuring them against themselves across the treatments, no significant differences were found.

This study did not find that music was the answer to increasing participation or morale in physical education. Although a majority of participants stated they would prefer music during the next unit of instruction, the data showed that music had no affect on participation or morale in physical education.

Chapter One

Introduction

Obesity is a growing epidemic in the United States not only affecting adults but both children and adolescents. The obesity rates for adolescents and children, ages 2-19, increased from 5.1% in the early 1970's to 16.9% in 2010 (Fryar, Carroll, & Ogden, 2012). Data suggests that obese children and adolescents have a high risk of becoming obese adults (U.S. Department of Health and Human Services [USDHHS], 1996).

Obesity in adults causes a variety of health concerns as well as an economic burden for our nation. Obesity in adulthood is related to the development of heart disease, diabetes, and some cancers (USDHHS, 1996). These diseases increase healthcare issues for our nation. Through 2006, almost $40 billion of increased medical spending and $7 billion in prescription drug costs were due to obesity-related illnesses (Finkelstein, Trogdon, Cohen, & Dietz, 2009).

Obesity is largely attributed to poor nutrition and a lack of physical activity (USDDHHS, 1996). Low levels of physical activity increase the risk of cardiovascular disease, cancer, diabetes, osteoarthritis, osteoporosis, and affect overall quality of life (USDHHS, 1996). The 2008 Physical Activity Guidelines for Americans recommend that adults should do at least 150 minutes a week of moderate-intensity physical activity, while children and adolescents should do 60 minutes or more of physical activity daily to decrease risk of illnesses (USDHHS, 2008).

In the state of Wisconsin, it is reported that only 44.6% of adults achieved the recommended amount of physical activity and 22.0% reported no physical activity in the

past month (Centers for Disease Control and Prevention [CDC], 2012). The CDC (2012) reported that only 23.8% of adolescents, in Wisconsin, achieved the required amount of physical activity, while 12.9% did not participate in 60 minutes of physical activity in any day of the past week. Wisconsin's response includes various projects and programs to increase physical activity and promote healthier eating including the Wisconsin Nutrition and Physical Activity State Plan, grants to local coalitions, and participation in surveys such as the one used to provide the above statistics (CDC, 2012). These interventions may reach small populations, however according to the Surgeon General's Report on Physical Activity and Health, 95% of school districts require physical education which make it the most widely available resource for promoting physical activity among young people (USDHHS, 1996).

In looking to increase physical activity, one might look at the state of physical education in schools. The following literature review addresses how using music as an intervention to engage students in physical education may promote more physical activity.

Chapter Two

Literature Review

Research shows that physical education has a prominent role in promoting physical activity among our nation's youth. One strategy used to engage students in physical education is music. Music has powerful effects on the brain and learning. In addition, the effects of music on exercise has been studied extensively, finding many positive benefits. Can music then be connected to physical education and help address the epidemic of physical inactivity? This review of literature summarizes the role of

physical education promoting physical activity, effects of music on the brain and learning, effects of music on exercise, motivational music in exercise settings, and music in physical education.

Physical Education's Role in Promoting Physical Activity

In the United States, more than 55 million children attended public or private schools in the fall of 2012 (USDHHS, 2012). These sheer numbers make schools the ideal setting for promoting and providing physical activity to students through physical education, recess, and extracurricular programs. Within schools, physical education has been a curricular subject in the United States for over 100 years with a variety of different goals related to the promotion of physical activity (Sallis et al., 2012). A common goal among physical education programs is to provide students with the opportunity to gain the knowledge and skills needed to establish and maintain a physically active lifestyle through childhood and adolescence and into adulthood (USDHHS, 2012).

Sallis and McKenzie (1991) have been at the forefront in researching ways to increase the quality of physical education and published an article titled "Physical Education's Role in Public Health." The goal of their article was to challenge physical educators to prepare children for a lifetime of physical activity as well as engage them in physical activity during class to maximize public health benefits. Over the past 20 years, many steps have been taken forward and backward in regards to this goal to improve public health through physical education (Sallis et al., 2012). In review of the goals previously set, Sallis et al. (2012) noted that progress included "support from various national agencies to use physical education as an avenue to promote physical activity, the

development of evidence-based physical education programs, research that shows positive correlations between physical education and academic achievement, and the increase of federal and state support for physical education" (p. 126). However, reduced requirements for physical education time, the struggle to define and measure quality physical education, the lack of evaluation of evidence-based programs, and that physical education has not fully adopted the public health goals, were all seen as set backs over the past 20 years (Sallis et al., 2012).

Sallis et al. (2012) identified a new strategy designed to improve the quality of physical education through a program, "health-optimizing physical education" or HOPE. The goals of HOPE were to engage all students, regardless of ability, in physical activity; keep students active for at least 50% of class time; and contribute positively to students' participation in physical activity outside of class. Many health-enhancing benefits were identified through HOPE. The benefits included the prevention of disease, promotion of lifetime wellness, obesity reduction, promotion of lifelong physical fitness, and education of the total child (Le Masurier & Corbin, 2006).

To promote physical activity in physical education, Wallhead (2007) recognized two important goals. The first goal was that teachers need to use their lesson time effectively to maximize participation in class activities. The second goal was to make physical activity experiences motivating so students choose to be active outside of lesson time. The White House Task Force on Childhood Obesity (2010) supported these two goals listed above and added that teachers must be trained in methods to engage students in physical education.

One untapped resource for promoting physical activity in physical education classes is the use of music. The second part of this review examines the effects of music on the brain and learning, the effects of music on exercise, and music in physical education. The implications this research has for the domain of physical education are profound. If music can be used to motivate students in physical education, students may choose to increase their physical activity by participating in it outside of school.

Effects of Music on the Brain and Learning

Music can have mind-altering effects on people, engaging both our dominant and non-dominant hemispheres of the brain (Jensen, 2000). Physiologically, music's potential effects included the ability to increase muscular energy, increase molecular energy, influence heartbeat, alter metabolism, reduce pain and stress, speed healing and recovery, relieve fatigue, aid in the release of emotions, and stimulate creativity, sensitivity, and thinking (Jensen, 2000). Music also benefited learning by reducing stress, fostering creativity through brain-wave activation, stimulating the imagination and motor skills. Music also was shown to reduce discipline problems and has been used as a vehicle for information transmission (Jensen, 2000).

Another important aspect about music's effect on the brain was its ability to release endorphins (Sprenger, 2007). Sprenger (2007) noted that when endorphins are released, with no pain present, the body experienced pleasurable feelings. Increasing pleasurable responses was perceived as important when trying to engage students in class activities. Sprenger (2007) also noted that music had a powerful influence on brain waves and that teachers should use this information to their advantage when prepping

students for learning. If students need to slow down and relax, teachers should play music that has fewer beats per minute. Likewise, to arouse students, teachers could use music that has higher beats per minute. Sprenger (2007) also described how music has been used as classroom management; for example, when the music stops, the students stop and know that it is time to be quiet.

Effects of Music on Exercise

When looking at music in exercise settings, the effects were consistent and measurable across many studies according to a review by Karageorghis, Terry, Lane, Bishop, & Priest (2011). Karageorghis and Terry (2011) identified four key benefits to using music in exercise: synchronization, dissociation, arousal control, and skill learning.

Synchronization in exercise refers to the ability to coordinate work rate to a musical tempo (Karageorghis & Terry, 2011). This was found to be particularly useful in activities that require repetitive movements such as running, cycling, and various aerobic activities. Asynchronous music is background music to which movements are not consciously synchronized (Karageorghis et al., 2011). In a study on the effects of music on mood during bench stepping exercise, middle-aged women reported significantly less fatigue (dissociation) with both synchronous and asynchronous music than non-music conditions (Hayakawa et al., 2000). Hayakawa et al. (2000) also found that when bench stepping exercise was accompanied by synchronous aerobic dance music, the women experienced significantly more vigor and less confusion than with asynchronous music.

Dissociation refers to music's ability to divert the mind from sensations of fatigue, which lowers the perceptions of effort (Karageorghis & Priest, 2008). Karageorghis and

Terry (2011) explained how the amount of information your mind processed at any given moment was limited; therefore, focusing on music altered the perception of effort. This alteration promoted a positive mood state, vigor and happiness became heightened, while negative aspects such as tension, depression, and anger were reduced during exercise (Karageorghis & Priest, 2008).

An example of dissociation was found in a study of college students' usage of personal music players (PMP) during exercise (Barney, Gust, & Liguori, 2012). The most common reasons given for listening to a PMP during exercise were to work out harder, make the exercise seem easier, and to work out longer. A significant amount of participants also stated they worked out more frequently while using a PMP. Barney et al. (2012) concluded that music appears to serve as a motivating factor, making exercise more pleasant and seem easier.

Arousal control was found to be another powerful effect of music on exercise, used either as a stimulant or sedative (Karageorghis & Terry, 2011). Arousal is defined as a person's physiological state, ranging from deep sleep to a state of panic. Music had the power to control arousal due to the physiological reactions to the rhythmic components of upbeat music, such as the increase in respiration, heart rate, and perspiration. Another effect music had on arousal is the exerciser's emotional response to the lyrics (Karageorghis & Terry, 2011). In a study investigating the effects of motivational music in exercise settings, a significant amount of participants (aged 12-79) referred to feeling more motivated in response to the music (Priest, Karageorghis, &

Sharp, 2004). The participants described the music as "inspiring," "incentivizing," or "encouraging" (p.80).

Music also has a positive impact on skill learning (Karageorghis & Priest, 2008). Karageorghis and Terry (2011) listed three explanations to account for the effects music has on skill learning. First, music guided the body in adopting effective movement patterns. Second, the lyrics in the music reinforced the sporting technique at hand. Third, music made the learning environment more fun, which increased the intrinsic motivation to master the skills. Spilthoorn (1986) studied the effects of music on motor learning in gymnastics in women, aged 18-20. The group that received music in combination with the gymnastic lessons performed higher in stylistic gymnastic movements than the non-music group. However, Karageorghis & Terry (2011) noted that music was possibly a distraction if used during the learning of a skill with high technical demands or during detailed instructions (Karageorghis & Terry, 2011).

Various studies found other positive effects of music on exercise. Specifically, music in exercise had been shown to reduce feelings of fatigue (Hayakawa, Miki, Takada, & Tanaka, 2000), to motivate exercisers to work out harder and more frequently (Barney et al., 2012), to inspire or energize (Priest et al., 2004), and to increase skill performance (Spilthoorn, 1986).

Motivational Music in Exercise Settings

When selecting music to be used in exercise settings, many factors need to be considered. Music should be congruent with the socio-cultural background and age group of listeners, functional for the activity, selected with desired effects in mind,

selected in consultation with participants using some form of objective rating method, characterized by prominent rhythmic qualities, within tempo of 125-140 beats per minute, imbedded with motivating associations, accompanied by lyrics with affirmations of movement, and used in ways safety is not compromised (Karageorghis et al., 2011).

The Brunel Music Rating Inventory-2 was designed to assist in the selection of music for exercise settings (Karageorghis, Priest, Terry, Chatzisarantis, & Lane, 2006). The characteristics of motivational music that the instrument evaluated were: rhythm, style (i.e. rock, jazz), melody (tune), tempo (speed), sound of instruments used, and beat (Karageorghis et al., 2006).

In a qualitative investigation into the characteristics and effects of music on exercise, musical components such as the artist, bass, segmentation, and variety were noted as motivational characteristics in addition to the items included on the inventory listed previously (Priest & Karageorghis, 2008). However, Priest and Karageorghis (2008) noted many other factors affecting the motivational qualities of music such as social factors, time of day, attitude to exercise, personality, background, music preference and familiarity. In looking to select music for the context of physical education classes, one should recognize the interaction between musical, personal, and contextual factors. The main prerequisites to selecting a piece of music for physical education was rhythm and the selection of music which had the greatest chance of appealing to the greatest number of pupils (Priest & Karageorghis, 2008).

Music in Physical Education

Although there is limited research in the area of music's effects on physical education, a recent study described the effects of asynchronous music on satisfaction and motivation in physical education (Digelidis, Chatipetrou, Pollatou, & Papaioannou, in press). The participants were senior high students and were assigned to one of three groups: no music, student-selected music, or teacher-selected music. The lesson consisted of a warm-up, 20 minute fitness circuit, and a cool-down. Following the lesson, students completed questionnaires. The participants receiving either music treatment reported significantly higher lesson satisfaction and intrinsic motivation than the non-music participants, supporting the notion that music has potentially positive effects on physical education.

Priest and Karageorghis (2008) suggested that professionals interested in the health benefits of exercise should regard music prescription as an area of pivotal importance, stating that music is a largely untapped resource within physical education contexts. Blakemore (2004) suggested that music was generally used for warm-up activities, but should be used as background music for motivational purposes and to enhance the learning of new skills. Harms and Ryan (2012) suggested that using music in physical education was a low-cost way to enhance the physical education environment for both students and the teacher.

Synthesis

Physical educators cannot ignore the research that suggested exercise is influenced positively by music (Karageorghis & Priest, 2012). A study is needed to

evaluate the effects of music on participation and morale in physical education classes. Research suggested that music should be high tempo and asynchronous to increase motivation and assist in skill-learning (Karageorghis et al., 2011). Karageorghis et al. (2011) also stated that the positive impact of music on performance and psychological states have important implications for exercise adherence. For physical educators trying to promote physical activity within their classes and across a lifetime, this may be an important piece to solving the larger problem physical inactivity in the United States.

This study looked at the effects of asynchronous music on middle school physical education classes. I hypothesized that students who experience either musical treatment will have higher participation rates and morale than the control group with no music.

Chapter Three

Methods

This section describes the current study on the effects of high tempo, asynchronous music on participation and morale in physical education. There were multiple research questions to be answered in this study. To what extent does music affect participation and morale in physical education? Does high tempo instrumental music or popular music with lyrics have a greater effect on either fitness games, floor hockey, or basketball units? The rest of this section explains the study design, context, participants, procedures, instruments, and analysis.

Study Design

The study involved three 7th grade physical education classes. It was a quasi-experimental design that used the intact physical education classes. The independent

variable was music, with treatments of no music (control), high tempo instrumental music (135 beats per minute), and popular music with lyrics (128 beats per minute). The dependent variables were student participation (pedometers) and morale (survey).

Context

The research took place in a small rural town in southern Wisconsin in the fall of 2013. The town had about 4,000 residents, which were predominantly white and middle class. There were two schools in the district, an elementary (K-6) and the middle/high school (7-12). This study took place at the middle/high school. The teacher had taught middle school physical education for five years at this school district.

Participants

A total of 55 seventh grade students participated in the study. Participants were 12-13 years of age (31 females and 24 males). All participants were enrolled in physical education class during 2nd, 3rd, or 4th period. Table 3.1 represents the distribution by class period and gender.

Table 3.1. *Distribution of Participants by Class Period and Gender*

Class Period	Females	Males	Total
2	11	8	19
3	9	9	18
4	11	7	18
Total	31	24	55

Procedure

Units were scripted in advance to ensure consistency across treatment groups, and expectations were the same for all classes. Data was collected during three different units of instruction (fitness games, floor hockey, and basketball). Participants experienced each of the three different treatments of music: high tempo instrumental music (HTI), popular music with lyrics (PML), as well as no music to serve as the control group (CG). The music CD's were ordered from Power Music, a company that sells music for exercise purposes with established beats per minute. The music was played at the beginning of the lesson, at the same volume level, and only paused during instructional periods.

For the first unit, fitness games, period two served as the control group receiving no music during physical education class, period three received high tempo instrumental music, and period four received popular music with lyrics as their treatment. For the second unit, floor hockey, period two received the treatment of popular music with lyrics, period three received no music, and period four received high tempo instrumental music. For the third unit, basketball, period two received high tempo instrumental music, third period received popular music with lyrics, and fourth period received no music. Table 3.2 shows the treatment assignments for each class period across three units.

Table 3.2. *Treatment Group Assignment for Each Class Period across Three Units*

Class Period	Unit 1-Fitness Games	Unit 2-Floor Hockey	Unit 3-Basketball
2	CG	PML	HTI
3	HTI	CG	PML
4	PML	HTI	CG

Instruments

Data was collected through three different units of instruction. Physical education classes met Monday through Thursday, each unit was four lessons (appendix A). Students recorded their pedometer steps and responded to three questions addressing morale on a daily survey (appendix B). In addition, on the final day of each unit, students in each of the musical condition groups answered questions related to the motivational aspects of the music as well as open-ended survey questions related to their experiences with that particular musical treatment in addition to the daily morale questions (appendix C & D). On the final day of the third unit, each group responded to a question addressing which treatment they preferred (appendix E). All survey questions were adapted from the Brunel Music Rating Inventory-2 by Karageorghis et al. (2006).

To measure participation, students wore Accusplit Eagle 2720 pedometers. These pedometers counted the steps taken each lesson of each unit. Students had used the pedometers in regular physical education classes prior to the study and were well-versed in using and recording their steps honestly.

Analysis

The results of the pedometer logs and morale surveys were analyzed to determine if either type of music significantly affected participation or morale in any of the three units of instruction. Pedometer values and survey responses were compared using a one-way ANOVA to find if there were any significant differences among the treatment groups using Microsoft Excel and SPSS. Chapter four describes the results found.

Chapter Four

Results

Descriptive statistics were used to depict student engagement in each unit of instruction. Means represent the average across all four days of the unit for that particular class. Table 4.1 shows each treatment group and the corresponding mean values for unit one, fitness games. Daily surveys were combined and mean values for each question as well as the pedometer steps are represented. The control group (period 2) had the highest scores for each question as well as the highest amount of pedometer steps. However, a one-way ANOVA revealed no statistical differences between treatment conditions, $f(2,54)=.064$, $p=.938$.

Table 4.1. *Dependent Variable Means and Standard Deviations for Experimental Groups during Fitness Games.*

			Fitness Games			
Group	Period	n	Q1: Motivation	Q2: Enjoyment	Q3: Adherence	Pedometer Steps
CG	2	19	6.03 (1.29)	5.94 (1.64)	5.45 (1.94)	1796.83 (831.15)
HTI	3	18	5.88 (1.18)	5.66 (1.54)	5.25 (1.69)	1763.40 (656.85)
PML	4	18	5.73 (1.04)	5.91 (1.39)	5.37 (1.58)	1687.20 (617.03)

Table 4.2 depicts each treatment group and their mean values and standard deviations for the second unit, floor hockey. The popular music with lyrics group (period 2) had the highest scores for each of the three survey questions. However, the control group (period 3) had the highest average pedometer steps. Again, a one-way ANOVA revealed no statistical differences between the treatment conditions, $f(2,54)=.552$, $p=.579$.

Table 4.2. *Dependent Variable Means and Standard Deviations for Experimental Groups during Floor Hockey.*

			Floor Hockey			
Group	Period	n	Q1: Motivation	Q2: Enjoyment	Q3: Adherence	Pedometer Steps
CG	3	18	5.71 (1.38)	5.05 (1.86)	4.92 (2.10)	2090.85 (878.55)
HTI	4	18	5.75 (1.21)	5.44 (1.28)	4.64 (1.86)	1889.76 (775.41)
PML	2	19	6.26 (1.05)	5.98 (1.45)	5.25 (1.88)	2062.48 (1095.50)

Table 4.3 displays each treatment group and their mean values for unit three, basketball. The high tempo instrumental group (period 2) had the highest scores for each

of the three survey questions as well as the pedometer steps. No statistical differences were found using a one-way ANOVA, $f(2,54)=.344$, $p=.710$.

Table 4.3. *Dependent Variable Means and Standard Deviations for Experimental Groups during Basketball.*

			Basketball			
Group	Period	n	Q1: Motivation	Q2: Enjoyment	Q3: Adherence	Pedometer Steps
CG	4	18	5.34 (1.15)	4.81 (1.74)	4.38 (2.04)	2231.31 (769.66)
HTI	2	19	6.19 (1.12)	5.85 (1.65)	5.34 (2.16)	2242.88 (777.97)
PML	3	18	5.60 (1.46)	5.48 (1.52)	4.99 (2.04)	2050.03 (478.99)

After comparing each individual class and seeing a pattern of period 2 reporting high survey and pedometer scores, another analysis was done to compare each individual across the three treatments/units. To control for pre-existing group differences for all dependent variables, statistical comparisons involved centering each dependent measure around each individual's average score across all experimental conditions. This was done through standardizing pedometer values into z-scores for each student within each unit. A one-way three-level within subjects ANOVA was run to see if there were any significant differences among the treatments for each class when comparing pedometer steps as the dependent variable. There were no significant differences, $f(2, 54)=1.158$, $p=.318$.

Students were asked at the end of the study to state whether they would prefer no music, popular music with lyrics, or high tempo instrumental music for their next unit in

class. The response was 21.2%(11) preferred no music, 63.4%(33) for popular music with lyrics, 15.4%(8) for high tempo instrumental, and no response from three students. When comparing music to no music, 78.8% would prefer music during the next unit.

Chapter 5

Discussion

Music did not have an impact on student participation and morale in this study. There was not one treatment group that showed significant differences from the others in terms of their survey responses or pedometer steps. The lack of significant relationships between music and participation and morale have several implications for practice and future research which will be discussed in the paragraphs below; limitations of the current study, comparison to previous literature, and suggestions for future research.

The direct finding of this study is that music does not seem to influence engagement in middle school physical education for fitness games, basketball, or floor hockey. Pedometer measures and observational data indicated that students were actively participating in each of the units no matter what the music treatment was. Also, all treatment groups in each unit reported high scores for enjoyment, motivation, and exercise adherence. The students enjoyed the activities, felt they worked hard, and expressed interest in participating in similar activities outside of class regardless of the music treatment. In this case, middle school students are actively engaged in physical education classes regardless of music, and it is likely that engagement had more to do with other factors such as the activities presented, management of the class, etc.

There were several limitations of this study. First, irregularities in the school environment may have affected student behavior. For example, the floor hockey unit was taught during homecoming week when class schedules were altered, students were dressed in costumes, and there were many other distractions throughout the school day. Second, the morale scores may have been affected by many different variables such as interpersonal dynamics, team composition, and personal preferences. Third, measurement errors may have affected the pedometer values due to technological inconsistencies, misuse, or dishonesty. Finally, another limitation of this study is measurement sensitivity. Participation in class activities was a previously established expectation for each student in the class.

The results of this study do not support the literature to date. Sprenger (2007) noted that music has various positive effects on mood and that the tempo of the music can be used to arouse student's energy levels. In the musical treatment groups of this study, there was no significant effect on mood. In terms of motivation, the treatment groups experiencing music during activities did not produce significantly higher ratings. When Barney et al. (2012) found that music motivated exercisers to work out harder and more frequently.

Regarding music in physical education settings, Digelidis et al. (in press) found music to be associated with higher lesson satisfaction and increased intrinsic motivation when tested in a fitness circuit lesson with high school students. Similar results were not found in this study of middle school physical education lessons. This leads to my recommendations for further research.

Further research on this topic may be more successful by testing activities with highly repetitive movements. For example, if I were to recreate this study with middle school students, I would use an activity such as weight-training, step-aerobics, or running. The nature of the activities in this study were very interactive and social, and I believe that music might be more effective in other activities such as the ones mentioned above.

Possibly, this study should be done with high school students who may have a more concrete preference for what environment is most motivating for participation in physical activities. I also suggest that a qualitative study might be more helpful in understanding the motivational nature of the music and give more guidance for application of the findings.

In conclusion, this study did not find that music was the key to engagement in physical education. The effects of music on physical education should be studied in other settings to find what purpose it does have in physical education. Physical education teachers should continue to find ways to enhance engagement in physical education classes in hopes to encourage lifelong fitness and health.

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Appendix A

Unit Plans for Thesis

1. Fitness Games
2. Floor Hockey
3. Basketball

All class periods are 42 minutes. This will be the general breakdown for all classes:
0-5 min: students change clothes, report to gym, put on pedometer; teacher preps music, organize equipment, take attendance.
6-35 min: warm-up, instructions, activities, etc. *(30 minutes of warm-up and activity time)*
36-42 min: record pedometers, answer survey questions, change clothes.

Fitness Games
Day 1:
Fitness Circuit
Warm-Up: Line Tag (5min)
Partner Circuit Stations: plank, medicine ball sit-ups, jump roping, agility ladder, etc. Students worked at each station for 45 seconds, jogged laps for 60 seconds, then moved to the
next station. Students completed 10 stations. (25 min)

Day 2:
Small-Sided Soccer Games
Warm-Up: Dynamic Exercises (5 min)
Soccer Games: Students were divided into 4 teams and played 5 v 5 soccer games. (25 min)

Day 3:
Steal the Bacon: Students were divided into two teams for this capture the flag themed game. They played this the entire period (30 min)

Day 4:
Aerobic Kickball: Students were divided into two teams. Each team kicks until their team gets 5 outs. Students have to run two laps around the bases before they can score. (30 min)

Floor Hockey
Day 1:
6 Stations: (30min)
-Short Goal Corner Shooting (no goalie)

-Keep Away Passing
-Close, Medium, Far Shooting
-2 on 1, pass then try to score
-Zig Zag Puck Handling
-Around the World Shooting (no goalie)

Day 2:
Warm-up: Dribble Relays (5min)
Game: Wall Hockey, hit opponents back wall to score. (25 min)

Day 3:
Warm-up: Hill Dill Tag Game (5min)
Game: Rule for game play, then 5 on 5 full-court game, switch opponents halfway through(25 min)

Day 4:
Warm-up: Line Tag (5min)
Game: 4 Team, 4 Goal Hockey (offensive round, defensive round, combine teams, etc.) (25min)

Basketball
Day 1:
Warm-up: Dribble Relays with Fitness (5min)
Passing: Pass and Replace (chest, bounce, overhead) (7min)
Shooting: Lay-ups (8min)
Game: Lightning, shoot at other hoops when eliminated (10 min)

Day 2:
Warm-up: Dribble Knockout, dribble around outside when eliminated (5 min)
Passing: Shuffle and Pass, full court (7 min)
Shooting: Partner Shooting, rebound 5 and switch (8 min)
Game: 5 Passes against Defense (10 min)

Day 3:
Warm-up: Dribble Laps (change direction at whistle) (5min)
Passing: 3 on 1, 5 passes, then shoot (8min)
Shooting: (5min)
Game: Sideline Basketball, 5 passes then shoot (12min)

Day 4: Team Challenges (students divided by skill groups)
Warm-up: In teams, 50 chest passes, 50 bounce passes, make 10 lay-ups from left and right, make 15 shots outside the lane (10min)
Games: 2 Rounds of lightning, half-court game to 10 points, 21 (20min)

Appendix B
Daily Survey

Name:_____

Pedometer Steps:_____

Student Survey for PE Class

	Strongly Disagree		Disagree		Agree		Strongly Agree
I worked my hardest in PE class today.	1	2	3	4	5	6	7
I enjoyed the activities in PE class today.	1	2	3	4	5	6	7
I would like to participate in activities like this outside of PE class.	1	2	3	4	5	6	7

Appendix C
End of Unit Survey for PML Treatment Group
Name:_____

Pedometer Steps:_____

Survey for PE Class

	Strongly Disagree		Disagree		Agree		Strongly Agree
I worked my hardest in PE class today.	1	2	3	4	5	6	7
I enjoyed the activities in PE class today.	1	2	3	4	5	6	7
I would like to participate in activities like this outside of PE class.	1	2	3	4	5	6	7

Think about the music you heard during PE class this week while you respond to the following statements.

	Strongly Disagree		Disagree		Agree		Strongly Agree
1. The rhythm of this music motivated me during exercise.	1	2	3	4	5	6	7
2. The lyrics of this music motivated me during exercise.	1	2	3	4	5	6	7
3. The melody (tune) of this music motivated me during exercise.	1	2	3	4	5	6	7
4. The tempo (speed) of this music motivated me during exercise.	1	2	3	4	5	6	7
5. The instruments used (guitar, synthesizer, etc.) motivated me during exercise.	1	2	3	4	5	6	7

6. Did the music affect your effort or enjoyment in PE classes this week? (Circle one.)

Yes or No

7. If <u>yes</u>, how did the music affect you? If <u>no</u>, why didn't the music affect you?

Appendix D
End of Unit Survey for HTI Treatment Group
Name:_____

Pedometer Steps:_____

Survey for PE Class

	Strongly Disagree		Disagree		Agree		Strongly Agree
I worked my hardest in PE class today.	1	2	3	4	5	6	7
I enjoyed the activities in PE class today.	1	2	3	4	5	6	7
I would like to participate in activities like this outside of PE class.	1	2	3	4	5	6	7

Think about the music you heard during PE class this week while you respond to the following statements.

	Strongly Disagree		Disagree		Agree		Strongly Agree
1. The rhythm of this music motivated me during exercise.	1	2	3	4	5	6	7
2. The melody (tune) of this music motivated me during exercise.	1	2	3	4	5	6	7
3. The tempo (speed) of this music motivated me during exercise.	1	2	3	4	5	6	7
4. The instruments used (guitar, synthesizer, etc.) motivated me during exercise.	1	2	3	4	5	6	7

5. Did the music affect your effort or enjoyment in PE classes this week? (Circle one.)

Yes or No

6. If <u>yes</u>, how did the music affect you? If <u>no</u>, why didn't the music affect you?

Appendix E
Question for End of Third Unit

During the last three units, you were exposed to High Tempo Instrumental (Fitness Games), No Music (Floor Hockey), and Popular Music with Lyrics (Basketball). Which one would you prefer for the next unit and why?

I would prefer (circle one) **High Tempo Instrumental** **No Music** **Popular Music with Lyrics** because:

_____

_____.