

The College at Brockport: State University of New York Digital Commons @Brockport

Kinesiology, Sport Studies and Physical Education
Faculty Publications

Kinesiology, Sport Studies and Physical Education

2001

Middle School Students' Conceptions of Fitness: The Long Road to a Healthy Lifestyle

Judith A. Placek

University of Massachusetts - Amherst

Linda L. Griffin

University of Massachusetts - Amherst

Patt Dodds

University of Massachusetts - Amherst

Cheryl Raymond

University of Massachusetts - Amherst

Felix Tremino

University of Massachusetts - Amherst

See next page for additional authors

Follow this and additional works at: https://digitalcommons.brockport.edu/pes_facpub

 Part of the [Kinesiology Commons](https://digitalcommons.brockport.edu/pes_facpub)

Repository Citation

Placek, Judith A.; Griffin, Linda L.; Dodds, Patt; Raymond, Cheryl; Tremino, Felix; and James, Alisa, "Middle School Students' Conceptions of Fitness: The Long Road to a Healthy Lifestyle" (2001). *Kinesiology, Sport Studies and Physical Education Faculty Publications*. 29.

https://digitalcommons.brockport.edu/pes_facpub/29

Citation/Publisher Attribution:

Placek, J.H., Griffin, L.L., Dodds, P., Raymond, C., Tremino, F., & James, A. (2001). Middle School Students' Conceptions of Fitness: The Long Road to a Healthy Lifestyle. *Journal of Teaching in Physical Education*, 20(4), 314-323.

This Article is brought to you for free and open access by the Kinesiology, Sport Studies and Physical Education at Digital Commons @Brockport. It has been accepted for inclusion in Kinesiology, Sport Studies and Physical Education Faculty Publications by an authorized administrator of Digital Commons @Brockport. For more information, please contact kmyers@brockport.edu.

Authors

Judith A. Placek, Linda L. Griffin, Patt Dodds, Cheryl Raymond, Felix Tremino, and Alisa James

Chapter 3. Middle School Students' Conceptions of Fitness: The Long Road to a Healthy Lifestyle

**Judith H. Placek, Linda L. Griffin, Patt Dodds,
Cheryl Raymond, Felix Tremino, and Alisa James**
University of Massachusetts Amherst

Cognitive goals have been part of the physical education curriculum for many years and recently many of these goals have emphasized health related fitness. One of the content standards in the NASPE publication, *Moving Into the Future: National Standards for Physical Education* (1995), states that students should achieve and maintain a health-enhancing level of physical fitness. Part of that standard states that "middle school students [should] gradually acquire a greater understanding of the fitness components, how each is developed and maintained, and the importance of each in overall fitness" (p. 3). Other physical educators also suggest that health-related fitness should be included in physical education classes (Corbin, 1991; Pate & Hohn, 1994). Since fitness is not the sole focus of most physical education programs, and only 27% of students attend physical education daily (President's Council on Physical Fitness and Sports, 1998), actually improving fitness levels during physical education class is problematic. Thus, learning the concepts related to fitness seems particularly important as one aspect of encouraging students to embrace an active lifestyle.

While the extent of fitness instruction in physical education programs is not known, information about what and how to teach fitness concepts to children is readily available (e.g., Corbin & Lindsey, 1997; Hopple, 1995; *Physical Best Activity Guide Elementary Level*, 1999; Stokes, Moore, & Schultz, 1993; Virgilio, Berenson, Kowalski, & Feingold, 1993; Williams, Harageones, Johnson, & Smith, 1993). Conceptions of material to teach take multiple forms and range from very broad (e.g., understanding why a physically active lifestyle is important) to specific (e.g., knowing about different components of fitness or specific exercises to improve flexibility).

Research has shown that students of all ages can learn fitness concepts taught in physical education classes (Goldfine & Nahas, 1993; Harrell, McMurray, Gansky, Bangdiwala, & Bradley, 1999; Ignico & Corson, 1997). However, little research has been conducted to ascertain specific details of children's present conceptions of fitness. The majority of published studies show that students are not very knowledgeable about fitness and hold a number of alternative conceptions. Students scored best when asked broad questions about fitness and when answering recall questions (Desmond, Price, Lock, Smith, & Stewart, 1990; Ferguson, Yesalis, Pomrehn, & Kirkpatrick, 1989; Merkle & Treagust, 1993). For example, 6th through 8th graders in Ferguson et al.'s study were rated knowledgeable about exercise when they scored a 3.9 average (out of a maximum of 5 on a 1-to-5 Likert scale), but the

questions were nonspecific (e.g., “people should warm up before they exercise,” “competing in sports will always make you healthier”). Students scored lower in two other studies that used true/false questions, as 8th and 9th graders scored over 70% on only 10 of 20 questions (Merkle & Treagust, 1993) while inner city high school students scored above 70% on only 5 of 12 questions (Desmond et al., 1990).

In another study, all 4th and 5th graders enrolled in physical education at two schools were asked to identify a test that measured cardiorespiratory fitness (Hopple & Graham, 1995). Although both schools administered fitness tests twice a year, less than half of their students could identify the mile run as measuring cardiorespiratory fitness. When a subsample of students, selected because they had participated in the fitness testing, were asked open-ended questions, the majority showed no understanding of why they did the 1-mile run. Reasons ranged from the view that teachers used it to get you exercising to determining who was going to be in a track meet. Most of these researchers examined students’ knowledge as a small part of a larger study on such topics as student attitudes, perceptions of exercise, or fitness testing. No researchers specifically examined in detail students’ conceptions of fitness across several components.

The purpose of this study was to investigate middle school students’ conceptions of health-related fitness. More specifically, we wanted to understand whether middle school students thought it important to exercise, and if so, why; whether they could identify and define components of fitness; and whether they could describe activities that improved those components. We also were interested in their knowledge of principles of fitness such as frequency, intensity, time, and type.

Methods

A detailed methods section can be found at the end of chapter 2. In reference to this study, students were asked whether and why people should exercise, and to define fitness terms. They were asked to suggest activities for a friend who wanted to get in better shape. Students were also shown line drawings of people participating in various activities (e.g., bicycling, stretching, weight lifting) and asked what types of fitness were being improved. Throughout the interview the students were probed for clarification on their answers and asked to explain where they obtained their knowledge about fitness.

Detailed background data about students’ participation in fitness and their knowledge were not collected. Following the tradition of conceptual change research, we were interested in a snapshot description of students’ current conceptions of fitness. Although these students certainly had varied experiences in fitness, the data represent the variety of student conceptions similar to what teachers typically face in urban middle school physical education classes. It was beyond the scope of this study to gather detailed information about students’ recollections of past participation in fitness activities.

The interviews were transcribed verbatim. Next, we categorized the students’ answers and placed the answers to each question on a summary grid. Finally, both individual questions and cross-question analysis were conducted using constant comparison (Glaser & Strauss, 1967).

Results

The results will be reported in three sections. First, the overriding message from the students, fitness = looking good = being thin; their related conceptions about fat and fitness will also be discussed. Second, students' conceptions of types and principles of fitness will be reported. Third, students' views of fitness activities and how to become fit will be explained.

Fitness = Looking Good = Being Thin

The powerful message from these 6th graders was that fitness is equated with appearance. In the vast majority of cases that meant being thin, or in their own terminology, "being skinny." Both girls and boys mentioned time after time the notion that looking good and being thin meant that you were in good shape. Regardless of whether the students were talking about why you should exercise, how they judged their own fitness level, or how they would judge the effects of an exercise program, weight loss or weight control was a predominant theme for most of them ($n = 34$, or 87%).

For example, when asked to judge his own fitness level, Edward replied, "just a little . . . my Mom says I'm fat." Shannon evaluated her own fitness by saying she was an "anorexic type, very thin, I'm like the size of a monkey." Typical student responses when explaining why you should exercise were, "to lose weight and stuff" [Marilyn], "so you don't really get fat," [Tim], and "it keeps your weight in control...you can burn it off" [Kurt].

Students consistently evaluated the effects of an exercise program by assessing weight loss. For example, when asked to judge if a friend was in better shape after completing an exercise program, Shannon said, "she would be skinnier . . . she wouldn't be wearing baggy clothes...we just compliment her that she is really skinny." Mayra said that you should step on the scales and see if you lost weight, and Tim said he could tell if the fitness program worked by seeing whether his friend could wear a smaller clothing size.

In addition to equating fitness with being thin, 33% of the students ($n = 13$) noted that exercise helps you "get muscles." While boys might be expected to be more aware of the potential for gaining strength and muscles through exercise, both genders (7 boys, 6 girls) mentioned this possible effect. The students showed varying levels of sophistication in their understanding of gaining muscle. A number of students simply said that exercise would increase the size of muscles or build up your muscles; others connected weight training, muscle size, and strength. Carlton noted that after several months of weight training, a person would "look diesel...real big and a lot of muscles. That's how I can tell that he's in great shape." Harrell said that after an exercise program he could tell if a friend was in better shape because,

They start getting bigger and they be having more power. And they wouldn't be, like, skinny or how they used to be, they'd be changing. Like they'd get bigger muscles . . . and you could tell by the way they show their push-up, and their arms are getting a little thicker, getting stronger.

The students did not make a connection between health benefits and strength, but again equated fitness, in this case strength, with appearance (looking "diesel," having bigger muscles).

Students had a number of alternative conceptions related to the idea of fat and exercise. Most common was the well-known one that a specific exercise can reduce the fat in a specific area (spot reduction). Using sit-ups to reduce the amount of fat in the abdomen was the most common alternative conception about spot reducing, but other exercises also were cited for reducing fat. Referring to the effects of sit-ups, Diana said they “can tighten your stomach and it helps you lose the fat on your stomach.” Jessica understood that sit-ups work on your abdominal muscles but said that doing sit-ups would “get a thinner stomach or flatter stomach.” Other areas they believed could be reduced through specific exercises were the thighs and arms. While suggesting that running would be a good exercise for a friend who needed to get in shape, Shannon said, “she still has baby fat up here [pointed to thigh] so she needs to burn it off.”

Another common alternative conception was that sweating would burn off fat and help you lose weight. In a classic example of this conception, Harrell, talking about bicycling, said “You’re, like, losing more weight cause you sweat a lot. The sweat is, like, takin’ some of the weight off.” Maria said her mother told her to sweat a lot because “then you can lose some of the fat you have inside.” Jose, on jogging, noted that “the muscles, they get tighter and they, like, the fat value when you’re running, it, like, comes out as sweat, so it will leave the body.” While not providing the most coherent description, his idea typifies the conception these students have, that fat is sweated out and thus permanently gone.

In summary, the most dominant conception the students held about fitness was that fitness equals looking good, and looking good means being thin. Within that notion, exercise was viewed as a way of promoting looking good either through weight loss or building muscle. Students still held the alternative conceptions that spot reducing and fat loss through sweating are possible, in spite of an abundance of evidence to the contrary (DeVries, 1986; McArdle, Katch, & Katch, 1986).

Conceptions of Health Related Fitness

All students declared that exercise is good for you, and most believed everyone should participate. They had rather vague notions that the value of exercise is in keeping you healthy, although most could not verbalize any specific information about the health benefits of exercise. Typically they offered vague generalizations such as, “it helps your heart, it helps your insides go and it helps your mind...it works your mind I think,” [Shannon] and “it’ll make your body in great shape...a little workout will make you healthy and make your body feel good” [Carlton]. While a few students mentioned specific benefits such as lowering cholesterol or reducing heart disease, students overwhelmingly related fitness to weight issues and appearance.

Students had little knowledge of specific types of fitness and appropriate exercises for different types of fitness. When asked about types of fitness such as strength or flexibility, their overwhelming response was to name a part of the body such as an arm or leg. For example, when asked what type of fitness a bicyclist was trying to improve, James said, “your calves, legs, the back of your lower legs.” Even when asked more probing questions, students could not name or give definitions of types of fitness such as cardiovascular endurance, strength, or flexibility.

Cardiovascular Endurance. Students had never heard the term cardiovascular (CV) endurance. No one was able to define the term correctly; the overwhelming response when asked the meaning of the term was, "I don't know" ($n = 34$, or 87.2%). None of the remaining 5 students who attempted to define the term were entirely correct, even given wide latitude for a correct definition. Katie said CV endurance is something that happens "inside your body." Melissa thought it was the opposite of flexibility. The definition that came closest to a correct one was, "You're breathing when you are exercising, how well you can breathe and if you don't get out of breath while you are exercising" [Jessica]. She was one of 2 students who had some notion that breathing is related to providing oxygen to the body as it performs work over an extended period of time.

Responding to questions about the purpose of activities designed to improve CV endurance such as jogging, 27 students (69%) said jogging improves some part of the body such as the legs or arms. Even when pushed to answer beyond naming a part of the body, students were not able to augment their initial answer. They recalled that jogging or bicycling made their legs, arms, or back feel tired, and they focused on this muscle fatigue rather than on breathing and heart rate. While muscular endurance may also be improved through these activities, only 2 students mentioned heart rate and 3 others referred to breathing as something involved with jogging, but they could not explain how either heart rate or breathing are related to jogging and CV endurance. One student offered this enigmatic explanation: "You breathe better too, because breathing exercises, when you breathe in through your nose and out through your mouth, that too" [Keith].

The most common alternative conception was that jogging improves strength; 6 students made this connection. Riccardo offered this explanation: "It [jogging] helps your muscles get strong so you are not weak." Thus students had no knowledge of CV endurance or the connections among breathing, heart rate, and any type of activity designed to improve CV endurance.

Muscular Strength. Students had more familiarity with the term muscular strength. Although none were able to offer a definition that matches expert knowledge—the amount of force a muscle or muscle group can exert—28.2% of the students ($n = 11$) offered what we call functional definitions. That is, they stated what you could *do* if you were strong. For example, "You have the strength to pick up something that's really heavy" [Shannon], or "If I was powerful enough to move a refrigerator and you wasn't, and that's muscular strength" [James].

The remaining students either said they didn't know what muscular strength is ($n = 7$, or 18%) or gave incorrect responses. The incorrect responses just used the words being defined, sometimes in a different order. For example, "have a lot of strength" [Tim], or "get muscles and get strong" [Raul], a classic circular definition.

Students did understand that weight lifting improves muscular strength, as 61.5% ($n = 24$) identified weight lifting as a way to increase strength. While they usually named arms and legs as being strengthened through weight training, a number of students held the alternative conception that hands and feet could be strengthened through weight training. Pressure on the hands or feet and ensuing discomfort seemed to be confused with strength improvement. For example, Mayra pointed to the feet in the picture of the weight lifter she was shown as she noted that your hands and feet get tired when you lift weights.

However, students also cited CV activities such as biking and jogging as improving strength. When asked to explain their answers, students who cited these

CV activities said these activities made their muscles tired, thus confusing muscular strength and endurance. Calisthenics were also named as improving strength rather than muscular endurance. While not matching the classic definition of strength, this answer shows a certain amount of logic as students who are weak may need to exert maximum effort to complete one pull-up or push-up.

Muscular Endurance. In all, 82% of the students ($n = 32$) said they did not know the meaning of the term muscular endurance. From our interviews it was clear that some of these 6th graders did not even understand the meaning of the word *endurance*, which made it difficult to define either muscular or CV endurance. Not only were they unable to define the term, the few who attempted a definition were incorrect (e.g., “run faster, do more” [Kyle]; “trying to get muscles or being strong” [Jessica]).

As with muscular strength, students confused pressure placed on different parts of the body such as hands, feet, or back during exercises such as push-ups or sit-ups with the actual purpose of the exercise. When asked what type of fitness that sit-ups or crunches will improve, Mayra said, “your stomach and your head,” as she demonstrated pulling your head forward as you do in sit-ups.

While the majority of students ($n = 30$, or 76.9%) knew that in general sit-ups work on your abdominal area, they held a number of alternative conceptions about sit-ups. In addition to the spot reduction mentioned previously, 10 students (25.6%) believed that sit-ups or crunches help improve your back muscles. Kyle, responding to a probing question, said that your back “makes it so you can do sit-ups.” Angelica said that sit-ups improve CV endurance “cause when you do sit-ups you get real tired.”

In summary, students were not familiar with the term muscular endurance and often confused activities designed to improve muscular strength, CV endurance, and muscular endurance. They confused joint pressure or discomfort with the target muscles and were particularly misinformed about the purpose of sit-ups or crunches.

Flexibility. Students, while unable to correctly define the term flexibility, understood its basic concept and knew that stretching improves flexibility. When asked to define flexibility, 13 students (33.3%) suggested ways to increase flexibility rather than actually giving a definition. Shannon said, “to stretch and flex—has the right words, flex and ability, an ability that you do and it’s about flexing.” As with strength, many students ($n = 17$, or 43.6%) offered functional definitions of how you could demonstrate flexibility. For example, students said you could put your body in a knot, do the splits, put your foot over your head, or do a backbend. Only 7 students (18%) said they did not know what the word meant, thus showing that students were at least familiar with the term.

Students also had alternative conceptions about flexibility. Tasha noted, “you either have it or you don’t.” Kim said that stretching your muscles would “get them stronger.” Heather believed that improving your flexibility would help you run faster. A number of students believed that sit-ups improve back flexibility. Melissa noted that sit-ups and crunches improve flexibility because “you can bring yourself up without any problem.” Emmanuel said, “your spinal cord bends so you need a lot of flexibility to keep doing that.” Thus although students were familiar with the term flexibility, they could not define it, held a number of alternative conceptions, and had only vague notions about how to improve it.

In summary, the students displayed little knowledge of specific types of fitness, instead focusing on parts of the body that become fatigued while exercising.

While showing a surface familiarity with different exercises such as jogging, sit-ups, or stretching, many students did not understand the purpose of the exercise. They also demonstrated a number of alternative conceptions about all aspects of exercising, with sit-ups being the most commonly misunderstood activity.

Children's Conceptions of the Road to a Healthy Lifestyle

While students displayed little knowledge of fitness specifics, they were not shy about offering their opinions as to how a person might become more fit or how to "get in shape." This section will report on how students think you develop fitness. What were these 6th graders' conceptions of how to get in shape? What activities should you do? How often? For how long? How hard?

FITT Principles. In addition to information about specific activities and types of fitness, we determined the students' knowledge about the principles of fitness by asking them to design a fitness program for a friend who wanted to get into better shape. After listing the activities they would have a friend participate in, students were asked about the frequency, intensity, and time (duration) needed to improve their friend's fitness level. Although we did not expect 6th grade students to design a sophisticated exercise program, this question allowed us to focus on their understanding of the FITT principle, a less complicated concept.

Frequency. Students' answers showed a wide range in regard to how often you should exercise per week—from 1 to 7 times. The majority, however, were fairly accurate in their suggestions for frequency of *aerobic* activities, as 87.2% ($n = 34$) suggested a minimum of 3 days a week of aerobic activity such as running or walking. Students had far less knowledge about how often it is appropriate to lift weights, as they did not know that lifting weights should be done 2 or 3 times a week with periods of rest in between to allow recovery. For example, Christina said you should lift weights 4 or 5 times a week for 20 minutes each time, and Kyle noted that you should lift every morning for 30 minutes.

Intensity. Students had no concept of intensity for gains in either CV endurance or muscular strength or endurance. No student mentioned checking heart rate as a way of monitoring stress during running or jogging. In addition, no mention was made of specific weights, number of repetitions, or number of sets in regard to weight training.

Time. Students were asked how long you should exercise when participating in the aerobic activities they named. While answers ranged from 5 minutes to an hour, most students ($n = 27$, or 69.2%) showed an understanding that CV exercise should continue for at least 20 minutes. Of these 27 students, however, 13 said you should exercise for more than 60 minutes, a rather lengthy time for most untrained people.

Students also had alternative conceptions about the overall length of time you must exercise to become fit. While the level of desired fitness certainly varies by individual (e.g., initial level of fitness, motivation) and the goal set (health-related fitness vs. sport-related competitive athletics), students' answers ranged from less than 1 month to over a year, the majority ($n = 26$, or 66.7%) falling within a time frame of 1 to 3 months.

Type. The most common activity suggested by students as a component of an exercise program was running or jogging. While this might indicate that students knew CV endurance is important, the lack of specific knowledge about CV

endurance makes it doubtful that they actually knew running or jogging promotes CV endurance. Only about a third of the students named activities that develop muscular strength (e.g., weight lifting) and muscular endurance (e.g., calisthenics). Only 3 students included the fourth type of health-related fitness, flexibility, in the exercise program they suggested for their friend.

Sport and Exercise. When asked what activities could be used to get in shape, 71.8% ($n = 28$) freely intermixed sports such as basketball and baseball with fitness activities such as weight lifting and running. Edward said, "Sports is getting exercise but is having fun." The majority of sports cited were characteristic for this age group, mainly team sports such as basketball, soccer, baseball, volleyball, and football.

The most common fitness activities cited were running or jogging ($n = 26$, or 66.7%), walking ($n = 13$, or 33.3%), calisthenics such as push-ups and sit-ups ($n = 13$, or 33.3%), and weight lifting ($n = 11$, or 28.2%). Fewer students named biking, jumping rope, and aerobics. Only one mentioned the idea of using fitness activities to get in shape to play sports, as students apparently believed that both sport and fitness activities can be used to get into shape. Thus, rather than an adult view of fitness in which participants do aerobics, weight lifting, or cardio-boxing to improve fitness or get in shape for sports, these 6th graders view a combination of exercise and sports as a way to get in shape.

Diet. Even though students were not asked about diet and nutrition, 22 students (56.4%) mentioned these without prompting. While many linked diet with weight loss, students seemed aware that you should eat a healthy diet including vegetables and fruits, and should limit junk food, fat, and salt. Students either mentioned diet as a component of losing weight or getting in shape or they talked about their own diets in general. For example, Eric said he was in good shape because, "I exercise every day and eat all the right foods."

Summary

The conceptions of health related fitness held by these 6th-grade urban students showed a lack of knowledge, or at best an incomplete understanding. The strongest message they conveyed was that fitness = looking good = being thin. While there were a few general areas of accurate knowledge (e.g., exercise is good for everyone, aerobic exercise is important), these students lacked any specific knowledge about types of fitness, the purpose of specific exercises, or FITT principles. Thus, if these students are representative, physical educators apparently have a long road ahead in educating students about a healthy lifestyle.

Discussion

The results confirm the research conducted both in physical education and other subject areas. Our students are not blank slates; they come to physical education with many conceptions about fitness. As shown in previous studies (Hopple & Graham, 1995; Merkle & Treagust, 1993; Minter & Wolk, 1987), students' conceptions of fitness were for the most part incomplete and often inaccurate. For example, the students' overriding message—fitness = looking good = being thin—while reflecting the media's portrayal of fitness, is not accurate. Although obesity

is a major problem in the United States, studies have shown that overweight individuals are not necessarily unfit (Presidents' Council on Physical Fitness and Sports, 2000b). In fact, "studies consistently showed that active or fit men and women were protected against the health risks of overweight or obesity" (p. 4).

Students' knowledge structures were far removed from expert conceptions of health-related fitness, as they had few nodes (particular concepts or theories), little linking among nodes, and no sense of hierarchy among the knowledge structures (Anderson, 1976, 1982). For example, while the students had a vague understanding that exercise is important for maintaining and improving health, they could not define fitness terms or match activities to components of fitness. However, it should be noted that the multiethnic nature of the students, including some whose first language was not English (even though all were mainstreamed and no longer in bilingual education), may have influenced the depth of the responses.

These 6th graders did not possess accurate declarative knowledge about fitness, considered by some researchers a prerequisite for developing procedural knowledge (Anderson, 1982; Chi, Feltovich, & Glaser, 1981; French & Thomas, 1987; McPherson, 1993b). Procedural knowledge (how to) is a vital component of domain-specific knowledge (Alexander & Judy, 1988), but what is procedural knowledge in fitness? While certainly different from response selection and execution in a sport context, the ability to design and carry out a fitness program could be considered procedural knowledge. Assuming students are not limited in their ability to execute a program they have designed (in contrast to the problem of executing sport skills), the problem-solving that is needed to evaluate their own level of fitness and choose appropriate activities to improve fitness was not evident in this study. Given the lack of declarative knowledge about fitness, it was not surprising that students lacked procedural or "how to" knowledge.

How much can we expect 6th graders to know about fitness? While actually designing a complete fitness program is too advanced for this age level, an understanding of the components of health-related fitness, understanding heart rate, and which activities contribute to cardiorespiratory fitness are well within NASPE standards (NASPE, 1995). Also, objectives in physical education textbooks designed specifically for middle school students (Spindt, Weinberg, Hennessy, Holyoak, & Monti, 1993) include understanding the components of fitness and evaluating the fitness value of a variety of activities.

The data from this study indicate that students intermixed both fitness activities and sport-based activities when discussing fitness. This does not match a typical adult fitness program, but it raises the question, what is an appropriate fitness program for 11- and 12-year-olds? The answer is complicated by the fact that 11- and 12-year-olds are categorized as *children* by AAHPERD (NASPE, 1998) and as *adolescents* by physicians and scientists (Sallis & Patrick, 1994), and fitness standards are different for these two categories. NASPE states that children (ages 5–12) should accumulate at least 30 to 60 minutes of physical activity on all or most days of the week, and more than 60 minutes is encouraged.

As children have a relatively short attention span and normally participate in activity in bursts of energy followed by rest, an adult model of training may be inappropriate for them (NASPE, 1998). But 11- and 12-year-olds, on the other hand, are considered adolescents (Sallis & Patrick, 1994) and thus are more comparable to adults and, "should engage in three or more sessions per week of activities that last 20 minutes or more at a time and that require moderate to vigorous

levels of exertion” (p. 308). Although the 6th graders in this study certainly had a surface familiarity with an adult model of fitness, their own choice of fitness activities, shown by the mixture of sports and fitness, might be a combination of the two.

Given the recent emphasis on fitness by AAHPERD, the extensive material on fitness available to teachers, and the national publicity promoting healthy lifestyles in the broader culture, why are these students’ conceptions so incomplete and inaccurate? While the results of this study do not provide an answer, several hypotheses are offered. First, perhaps curriculum and instruction in physical education classes do not focus on fitness, or it is inadequate. Perhaps schools do not have enough equipment (e.g., weight machines, stationary bicycles) to provide good fitness experiences for all students. More important, perhaps the teachers themselves don’t have sufficient pedagogical content knowledge or subject matter knowledge to provide good fitness instruction. In addition, the way physical education is marginalized in the schools and our traditional focus on sport performance may make it difficult for teachers to design curricula that would get students and parents to take physical education seriously (O’Sullivan, 1989) and value the learning of conceptual material.

Second, even if quality instruction were provided, students may not be motivated to learn and apply the material. Students have stated in no uncertain terms their dislike of many fitness activities, particularly running (Hopple & Graham, 1995; Luke & Sinclair, 1991; McKenzie, Alcaraz, & Sallis, 1994). Research on urban high school students in physical education reveals a disengaged, alienated, and sometimes hostile clientele (Cothran & Ennis, 1999; Ennis, Cothran, Davidson, et al., 1997), particularly when faced with a fitness curriculum (Cothran & Ennis, in press).

The findings of this study are important because the domain-specific alternative conceptions that students take with them from school are often maintained throughout life and may be difficult to change (Chi, Chiu, & deLeeuw, 1991; Wandersee, Mintzes, & Novak, 1994). If as physical educators we hope to encourage students to exercise and be active for life, not only must we teach them accurate conceptions but we must also find ways to motivate students to use these conceptions to design appropriate exercise programs they will stick with after leaving school (Presidents’ Council on Physical Fitness and Sports, 2000a). In this case, knowledge is necessary but not sufficient to ensure students’ participation in an active lifestyle. Designing fitness curricula that will not only teach students new concepts and change alternative conceptions but will also engage students in meaningful ways may be one of a physical education teacher’s biggest challenges.

Note: This research was supported by a grant from the Commonwealth of Massachusetts, Governor’s Committee on Physical Fitness and Sports. Appreciation is extended to the following graduate students for their contributions to this project: Karen Pagnano, Michael Carney, Tony Lachowitz, and Tara Pack.

Copyright of Journal of Teaching in Physical Education is the property of Human Kinetics Publishers, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.