

Research Report of the Month
MARCH 2004

Prochaska, J.J., Sallis, J.F., Slymen, D.J., & McKenzie, T.L. (2003).

A longitudinal study of childrens' enjoyment of physical education.

Pediatric Exercise Science, 15, 170-178.

Introduction

Research reports can be deceptive; what you see (at first glance) is not always what you get. Sometimes the real payoff is a lot less than promised, and sometimes you receive a lot more than you expected. This month's selection is a perfect example of the latter. A quick glance at the abstract for this study would be likely to evoke the same response from all sorts of physical educators – a polite yawn. Experienced practitioners who know what kids are like in the gym (particularly in the upper elementary grades) would wonder why a team of researchers had to do a study to find out what is perfectly obvious to anyone who has taught PE. And anyone who has read a sample of the recent research on pupils' enjoyment of PE (or attitudes toward PE) would wonder why yet another research team would bother to do a study designed to find out what we already know. Yawn!

Ah, but they would have been watching the right hand – the one making the big obvious gesture. What, however, was going on with the left hand – the one writing out all those little details? Savvy research consumers know exactly where the devil resides, and they always pay attention to the details.

Physical educators who have learned (usually the hard way) to be wary of the illusions created by "skimming the abstract," would push on to read the whole report (not difficult to do in this case because the report is brief and completely transparent). Those readers would come away with an entirely different impression of this study, and a very different sense of what they have learned. You are invited to watch both my hands while I conduct a brief tour of this deceptive little investigation.

The Study

The PE enjoyment of 414 elementary school students was examined in a three-year study. The reported enjoyment of those participants decreased significantly from the fourth to the sixth grade. In addition, enjoyment was lower among girls as well as among students (both boys and girls) who did not participate in organized sports outside of PE classes.

That was the study and those were the main results – all reported in five lines of the abstract. Beyond that, however, the nine subsequent pages of detail in the report do offer two important additions: (1) an unexpectedly different frame for the results, one that allows you to understand them in a different way, and (2), a number of specific points of information about how the study was conducted that might alter how you understand research (and, perhaps, researchers). To explain how the authors accomplished that feat of legerdemain, I need to take you back to the starting place.

Design and Method

This was a longitudinal study in which a single group of students was asked to report their enjoyment on six successive occasions – in the fall and spring of the fourth, fifth, and sixth grades. All of the other studies of PE enjoyment (insofar as I am aware) were cross-sectional studies in which separate samples of students' feelings were taken from different students at different grade levels. Both designs, longitudinal and cross sectional, allow the investigator to ask questions about how enjoyment changes over time – as students get older – but they achieve the answer by different means. Longitudinal

designs track a single group of students by using repeated measures over time. Thus, data collection in the present study took three years. In cross sectional study designs, however, enjoyment is measured by testing the responses of different groups of students at adjacent ages. In theory, at least, all of the data in such investigations can be collected on a single day.

Research specialists do not regard one design as superior to the other. They simply provide different ways of examining the same thing. Each has advantages and limitations. Data from both designs allow successive points to be entered on a graph. When connected, the resulting line displays how the average level of children's enjoyment changes across time. Cross sectional studies, however, require an inference about what probably is taking place – that students now reporting an enjoyment level of X in the fifth-grade would, when they were back in the fourth-grade, have reported a level of enjoyment like the Y reported by today's fourth grade students. Such inferences are not always exactly correct, but they are seldom far from the mark.

Longitudinal studies do not require that particular kind of inference – we can watch the same students progressively change (or not change) as they grow older. Therein lies the catch, however, because it is difficult (and in many cases impossible) to keep track of students over time and longitudinal samples suffer progressive erosion (inelegantly called “subject mortality”) and participants who are lost or drop out may be different from those who are retained – introducing the need to guard against a potentially corrupting source of bias.

One design may not be inherently superior to the other, but when results from both types of study point in exactly the same direction -- the level of confirmation has changed in an important way. Standing, as it were, at two different vantage points you are seeing the same view. If the news is good it is safe to start planning a celebration, and if the news is bad you now have good cause to worry. If the studies also have been replicated (and the agreement of results across designs persists) you can take the findings to the bank.

Results from cross sectional studies of students' enjoyment of PE already have been duplicated at different grade levels (even if the studies themselves have not been exactly replicated). Now, in the report considered here, the first longitudinal study of enjoyment in PE offers data from a different kind of observation. The results are the same, and the news is distinctly not good.

On the surface, at least, what researchers have found is simple and straightforward. Throughout their school careers the majority of children report that they enjoy attending PE classes, but there is a growing minority among them who enjoy it less and less as they grow older. That minority includes progressively more girls than boys, and more children who are inactive outside PE classes – irrespective of gender. Are those important findings? Does it really matter that some kids are not having fun in gym?

That is a critical question, but as many of you will know (or have suspected), we are not ready to answer it. First, no study can be any better than the quality of its measurement, and that rule applies just as much to the one at hand as to any other. Did the investigators really have tools that could dependably and truly measure how much those kids enjoyed their PE classes? Second, just whose enjoyment was studied by Prochaska et al., and what population of elementary students was that sample of 414 participants supposed to represent? The latter concern is easy to address.

Context and The Participants

Data were collected as part of the Sports, Play, and Active Recreation for Kids (SPARK) project, and they were collected prospectively (as the study progressed over three years), so that students were not asked to recall past experiences. All of the classes took place in the control schools for which no SPARK interventions were provided.

The participating children, initially all in the fourth-grade, were attending three public elementary schools in a middle class suburb of San Diego, California. In the SPARK study, credentialed classroom teachers who were not required to have any college level preparation in the subject area of physical education taught 97% of the PE classes. The average length of class was a little over 15 minutes and there was about one class each week (totaling about 10% of the 150 minutes of instruction per week recommended by our professional organization). Slightly more than half the time was devoted to game play, and 46% of overall lesson time involved students in moderate to vigorous physical activity. The

sample was 51% male with a mean age of 9.5 years at the first measure of enjoyment. Ethnic distribution was Caucasian (77%), Asian/Pacific Islander (16%), Latino (5%), and African American (2%).

We all know (or believe) that California is different from the rest of the nation, but what matters here is how much it differs from the schools (or school) with which you are concerned. As you try to think about that question, remember that the sample size is relatively large, and that all of the data were collected by trained research staff (not by local teachers) under carefully controlled conditions. Over the three years of the study, children changed grades and classes, moved to different schools, and received PE instruction from 43 different teachers. The 414 pupils in the final sample are all those who could be tracked from start to finish (with statistical adjustments being made for missing data). Would they, and their experiences in PE classes, be substantially different from the students and PE classes you know? Only you can make that judgment.

The Measures

As to the quality of the data collected, that depended on the validity and reliability of the instrument used. PE enjoyment was assessed with the question: "How do you feel about PE classes?" Response options were six "sad to happy" faces ranging from frowning (coded 1) to smiling (coded 6). The participant simply marked the face that best reflected their feeling, thus providing an indication of both direction and intensity.

Reliability of the enjoyment instrument was assessed by a straightforward test/retest of 65 fourth- and fifth-grade students, with a three-week interval between the two tests. The resulting intraclass correlation of .73 indicated that the test was appropriate for use with young students. Many of the kids I taught at that level would have been lucky to remember their own names over a three week period, so I am prepared to assume that the single item measure of enjoyment was at least consistent in how it tapped into something in the kids' heads – but what? That question, of course, involves the measure's validity – the degree to which it consistently tells the truth about enjoyment.

The authors cite three kinds of evidence to support the truthfulness of their enjoyment measure. First, they cite the history of a similar single item instrument used in a more extensive national study of children in grades 4 through 12. How much children enjoy PE had proven to be one of the most powerful predictors of the extent of their participation in physical activity. There was a significant and positive association between students' reports of liking the physical activities in PE classes and their actual engagement in those activities – both in and out of class. The logical inference, then, is that the simple instrument truly measures something (quite possibly enjoyment) that makes kids want to be active.

A second kind of evidence supporting the "sad/happy face" instrument was the fact that students' scores on it tended to closely resemble their choices between positive and negative word descriptors of their PE classes. Students who picked the positive word from pairs such as "nice/awful," and "fun/boring," were more likely to enjoy PE classes (and, of course, the reverse for students who did not enjoy PE). In other words, student scores from the two kinds of tests were significantly and positively correlated. In part, at least, that must have been because they were reflecting the same dimension of experience – again, very possibly enjoyment.

The third and final strand of evidence reflected the authors' careful and creative approach to establishing the validity of their enjoyment instrument. They hypothesized that students who enjoy PE classes probably try harder on fitness tests, and that extra effort would exert its influence most obviously in tests that involve a large component of motivation – such as the mile-run test of cardiovascular endurance. Under carefully controlled conditions, trained field assessors gave the mile-run test to all participants in the study. When performance times were matched with enjoyment scores – it was revealed that students who enjoyed PE classes tended to run significantly faster.

No great surprise there, but again some additional reassurance that the enjoyment test was measuring what the researchers claimed it measured – the extent to which students thought they enjoyed or did not enjoy being in PE classes. With multiple arguments thus made for the validity and reliability of the data, and a clear pattern revealed when the data were subject to statistical analysis, the authors were positioned to give their interpretation of the findings. Does it really matter that a growing number of students are not enjoying PE classes by the time they reach the fifth and sixth grade, and that more of

those students are girls – and physically inactive students in general?

Discussion

The authors found their results both important and very disturbing. Other studies have shown that the size of that alienated minority grows as students move toward adolescence and secondary school PE classes. Those students may never become a majority (particularly when PE becomes a voluntary elective in high school). Nevertheless, the possibility of a connection between the growing national epidemic of aversion to physical activity, and the six to eight years that some elementary and middle school students spend not enjoying the experience of required PE classes, must give us pause. At the least, such a hypothesis was given new weight by the ominous trend suggested in this report.

To use my own metaphor, this longitudinal study may allow us to glimpse the small seeds of a problem that, when left unattended, can grow and spread until it becomes a threat with serious implications for society. The investigators in this study clearly think that sequence of events is a strong possibility.

In the discussion of their findings they point to other studies that have revealed specific reasons for some students, and girls in particular, to become increasingly disenchanted with their PE classes. Not least of those reasons are the girls' perception that teachers sometimes give preferential treatment to boys, and the fact that PE curricula so frequently impose activities that do not match the girls' preferences. Perhaps some PE classes actually serve to teach some students a negative lesson – that they do not want to be physically active.

My wife, with a decade of teaching experience in a middle school, cautioned that the upper elementary grades are the beginning of a period when students generally become less positive toward school. She was intimating that the same sort of study might well find similar results if other school subjects were examined. My response is that while that might be true, it does not change the fact that we almost certainly have a problem with disaffection in PE, and that is what we are responsible for – not mathematics, art, music, or language arts.

In the end, I think this report demonstrates how even a modest study, if it is done from a different vantage point and is executed with care and attention to detail, can reframe our understanding of an already demonstrated problem. For myself, I now have concluded that the small but growing number of disaffected students who begin to appear in upper elementary school PE classes is a symptom of a serious educational dysfunction. I think there is evidence at hand to urge that if we do not invent ways to make PE instruction enjoyable for all students, we will have contributed to a much larger and far more serious problem – a problem of health and quality of life that will have devastating consequences for them and for ourselves.

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