



**Research Report of the Month**  
**MARCH 2005**

Stewart, J.A., Dennison, D.A., Kohl, III, H.W., Doyle, J.A. (2004).

**Exercise level and energy expenditure in the TAKE 10! in-class physical activity program**

Journal of School Health, 74, 397-400.

**Foreword** Where I live it has been a long, grey, and icy winter with not much relief in prospect for weeks ahead. So perhaps you will forgive me if my selection of this month's Research Report involves a bit of mischief designed to fend off cabin fever. The study here is straightforward and the report is entirely transparent. There are no mysterious tools of analysis and certainly no arcane theory for framing the investigation. With this one, what you see is what you get. The study is competently executed and clearly reported. The content, however, is unlikely to offer much by way of assistance with the daily demands of your professional practice or much for profound reflection on our subject matter.

Why, then, should I lay this one out for your inspection? It is hard to define an exact answer, but I think you will have one when you finish reading and thinking about the portents of Unlock's little research report for the Ides of March.

The opening sentence of the report establishes the premise for everything that follows. "Obesity among US children has reached epidemic proportions" (p. 397). And certainly that assertion is being trumpeted at every physical education conference, in every one of our professional and scientific journals, and in the testimony of every appeal for retaining our slice of the school curriculum. The study simply evaluates one kind of school-based response to the demand for providing and promoting physical activity. As the particular program examined in this study involves neither physical education nor sport, it, at least, ought to pique your curiosity.

**The Program** With children of elementary school age, even if physical education programs had no other objectives to pursue and devoted all of the available time to physical activity, the restriction of weight gain produced by the typical one or two 30-minute classes each week would be relatively trivial (even when taken cumulatively for the entire school year). In the course of casting about for approaches that offer the promise of more significant impact, the idea of school-wide efforts involving both other classes and the influence of nutrition (the cafeteria and vending machines) have been a natural outcome.

Accordingly, there have been attempts to utilize before and after school activity programs, recess-based exercise promotion, and even structured activity breaks during the school day (see Scruggs, Beveridge, & Watson in *Pediatric Exercise Science* (2003), 15, 156-169). Amidst this flurry of interest in finding chinks in the school day that might be filled with children's perspiration, it was inevitable that somebody would return to an idea that had its heyday in the 19th century -- exercise in the academic classroom.

The International Life Sciences Center for Health Promotion (ILSI-CHP), a non-profit organization headquartered in Atlanta, developed the TAKE 10! program as a school-based strategy for promoting "meaningful" physical activity in school-age children, K-5. As curriculum

material, TAKE 10! consists of a packet containing instructional guides (activity cards), a template for lesson planning, an evaluation process (worksheets), a variety of record keeping and motivational materials, and a videotape intended to prepare the teacher for leading the program.

As a program for children the basic TAKE 10! format is exercise in 10-minute modules accompanied (simultaneously) by grade-specific cognitive activities that are integrated into the objectives of the typical school core curriculum for language arts, mathematics, science, social studies, health, and character development. If you recognize this as an instance of required multitasking, you have grasped how TAKE 10! works.

There are 30 activity cards for each grade level, divided among the six academic core areas. Each card includes both prescribed exercises and the academic tasks to be executed concurrently. All of the physical activities are selected to require nothing other than a minimum of space (as between rows of desks); without activity clothing, equipment, mats, or organizational features that go beyond standing in one place and responding to teacher directions.

The exercises include vertical jumping, skipping (with an invisible jump rope), marching and running in place at various tempos, many forms of arm swinging, squats, thrusts, jumping jacks, body circles, hand clapping, deep breathing, and a variety of stretching activities. The intended format for implementation is 10 minutes of activity followed by a brief cool-down period of stretching and, when appropriate, worksheets for evaluation of cognitive learning.

Teachers are urged to insert one or several of the modules each day, using their judgment as to when the moment is propitious. As a headline in *The Journal of the American Dietetic Association* puts it, "Classroom-Based Program Fights Obesity by Getting Kids Out of Their Seats."

Some of the cognitive activities seem very creative and likely to engage children's imaginations, but many deal with routine content that emphasizes rote and repetition. Most of the physical exercises are done in unison although a few of the cards at upper grade levels involve assignments of individual exercise. A good sampling of TAKE 10! materials can be viewed (and downloaded) on the ILSI CHP website at <http://www.take10.net/>. Production values are high, and there is clear evidence of field-testing and careful development. Cost for a complete material packet for a single grade level within K-5 is \$79 US plus shipping and handling.

**The Study** The primary purpose of the study was to measure exercise intensity level and estimate energy expenditure achieved by elementary school students participating in TAKE 10!. Three classrooms, one each at the first- third- and fifth-grade levels, were selected on the basis of convenience for the investigators. The classrooms contained a total of 71 pupils and were located in a school where TAKE 10! already was in use. Measures of Individual student energy expenditure were collected for five consecutive days. Over that period each of the classroom teachers inserted eight or nine TAKE 10! exercise modules into their class days (one or two each day). That resulted in a total exercise time in each classroom of about 90 minutes for the five-day week.

Teachers had previously attended a two-hour training session that included information on curriculum integration, the linkages between health and academic learning, use of the TAKE 10! materials, and pedagogy that would be appropriate for use when conducting sessions. Pupils wore either an electronic pedometer or an accelerometer. The latter were rotated among the children each day. Step counts and accelerometer data for each student in each module were recorded by the teacher. The particular activity selected for each session also was recorded, as was the total duration of the module (9.5 to 11 minutes).

In the report as well as in the TAKE 10! materials themselves there is obvious care to characterize the program as an "...addition to any physical education or recess periods provided for students."

The authors of this report argue, however, that TAKE 10! gains importance from the fact that current emphasis on improvement of standardized test scores has "...caused many schools to decrease physical education and recess programs for elementary school children, thus diminishing opportunities for physical activity" (p. 397).

**Results** Both step counts and accelerometer readings increased from first to fifth grades. For example, when all TAKE 10! activities were totaled for the week, step count averages at the first-, third-, and fifth-grade levels were 743, 946, and 1022 respectively. Nevertheless, after adjusting for estimated mean body weights, the general levels of exercise intensity were closely similar across the grades (all were within the familiar range of moderate to vigorous energy expenditure). Expressed as Kilocalories expended by each child in each TAKE 10! session, that worked out to averages of 25, 31, and 37 Kcals at the three successive grade levels. Thus, depending on the grade level and number of sessions each day, children could burn between 125 and 370 Kcals each week.

No effort was made to evaluate the impact of the cognitive tasks, and no feedback from students is presented in the report. The investigators reported that the three teachers indicated the program was easy to implement, required a minimum of preparation time, and was enjoyed by the children.

**Conclusions of the Investigators** Here it seems best to allow the researchers to speak for themselves. Based on their findings they concluded that:

TAKE 10! provided participants with physical activity of moderate to vigorous intensity during the 10-minute activity sessions. The brief bouts of physical activity performed in the classroom, when accumulated over multiple sessions might play an important part in energy expenditure and may help contribute to maintaining energy balance.

TAKE 10! offers an effective means of increasing student physical activity through academically linked activities. The program fits within the public school system without requiring additional staff or extensive training, and program content appeals to multiple learning styles." (p. 400)

**Discussion** Let me be clear that the following does not represent the discussion provided by the researchers in their report. The following consists of my own comments and some questions intended to invite readers into contemplation of both the study and the nature of TAKE 10!

First, we can dispose of the several conclusions asserted by the research team. That TAKE 10! would provide physical activity was a given from the outset. That was what children were required to do – and they did it. That the activities selected and led by the teachers were, on average, of a moderate to vigorous nature was confirmed by the measurement findings. That the energy expenditures from the individual activity bouts might be summed over multiple sessions to provide a figure with more practical meaning than the relatively small number of Kcals burned in each session also was a given from the outset. Conclusions about staff and training are no more than gratuitous because that is how the program was designed. Finally, the report provides no evidence whatever to support either the conclusion about program content and learning styles or the assertion that it was "effective" to provide physical activity through academic activities.

As you can see, I was not overwhelmed by what I learned from the study. Most of the results seemed predictable. It is true that confirmation of actual intensity levels under real-world conditions would constitute a valuable first step in assessing the program's impact on children. I just find it difficult to understand why that was the first (and, apparently, the sole) priority for

formal program evaluation. An e-mail inquiry to ILSI-CHP revealed that this report remains the only published account of research concerning TAKE 10!

What are of far greater interest to me are the assumptions that may have been made by those who created TAKE 10! as well as the many questions that can be raised concerning its operation and consequences. Here is a sample from my own speculations about the program. If you reflect on how they might be answered I have no doubt that you can raise others that may be even more important.

1. What do you think motivated the designers of TAKE 10! to attach all those concurrent academic tasks if it is clear that the exercises could stand alone as a classroom program and still produce exactly the same physical activity results?
2. What do you think will be the consequence of associating children's physical activity experiences in TAKE 10! with activities that are arbitrary, without intrinsic meaning, and not, if taken by themselves, normally regarded by children as fun or challenging?
3. Why do you think the authors of the study made a point of underscoring the fact that physical education programs are being reduced or eliminated in school districts across the country?
4. What is your best guess as to how sustainable the energy expenditure levels observed in this study are going to be as the TAKE 10! program continues through the weeks of a school year?
5. Can you imagine a scenario in your own town in which the members of the school board argue for the termination of the elementary physical education specialist by pointing out that every classroom teacher is now equipped with a TAKE 10! packet for her or his grade level? Could you imagine that happening in any town within 100 miles of where you live?
6. What is your opinion of a frequent classroom activity in which children are asked to multitask on two difficult activities?
7. As adults, will the participating children recall their elementary school experiences with TAKE 10! as an important influence in leading them to adopt a vigorously active life style?
8. Do you believe that classroom callisthenic exercise breaks help students to "blow off steam" and thus improve their capacity for subsequent cognitive learning? (I have never encountered any definitive evidence to prove or disprove that hypothesis, so your belief may be as good as any other.)
9. The average of 90 minutes per week expended on TAKE 10! exercise breaks would be the time equivalent to two typical physical education classes at the elementary level. If you were faced with an either/or choice of the two uses of school time, which would you choose for your own children?
10. What additional questions do you think ought to be asked about TAKE 10! and about this study?

Your comments on this annotation will be welcome at [lflocke@hotmail.com](mailto:lflocke@hotmail.com)

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