# Testing Products to Increase Children's Physical Activity in the Classroom: Identifying What Works and What Doesn't

**Identifiers:NCT03394846  Unique Protocol ID: Pro00069012**

**5/26/2022**

## Study setting and participants

Study protocols were approved by the [redacted] IRB prior to enrollment of the first participant. Data were collected from five elementary schools in two separate school districts. Both school districts served a major metropolitan area in one southeastern state in the United States. Table 1 presents the participating schools' characteristics. These schools were identified to participate because they served a large number of minoritized children from families that are low income. These students often experience disproportionately fewer opportunities to participate in PA [18]. At regularly scheduled faculty meetings, teachers in the participating schools were provided with information about the study and invited to participate. Teachers who agreed to participate were provided with and signed an informed consent form. A total of 57 (60%) of teachers consented. For students in the consented teachers' classes, a passive consent procedure was employed due to the noninvasive and low-risk nature of the study. Letters with information about the study were sent home to the parents of children in the participating classes. If a parent did not wish for their child to participate, the letter informed them to sign and return the form to their child's classroom teacher. A total of 123 (5.2%) parents opted out of their child wearing the activity monitor. Prior to data collection, all children provided verbal assent.

## Study design/procedure

The COVID-19 pandemic impacted this study and caused changes to the design. Prior to the COVID-19 pandemic, this pre-post study was designed to assess teachers' intact classrooms for a total of five weeks, at two separate timepoints in the spring (i.e., January and February) and fall (September and October) of 2020. The intention was to provide all teachers with three MI products to test in their classroom for one week each. The teachers would also be observed for

one week (i.e., baseline) when they were asked to go about their regularly schedule classroom activities like any other typical week. The decision was made not to include a comparison group of teachers based on feedback from school administrators indicating they desired all participating teachers to receive a MI product and would not participate if that was not the case. One baseline week was allocated for the spring and fall. Following the baseline week, teachers were to receive one MI product to use (i.e., intervention). Teachers were to try one MI product in the spring and two products in the fall. The order of product testing was counterbalanced at the school level to minimize contamination and potential timing effects. However, due to disruptions of the COVID-19 pandemic, the study was not able to be executed as designed, and the provision of the MI products and measures were not completed in the fall of 2020. Thus, we collected one baseline week and one intervention week in spring of 2020, prior to the onset of the COVID-19 pandemic related school closures. This meant that each school only received one MI product for testing (see Table 1 for the product that each school tested).

The intention of this study was to maximize ecological validity [19]. Therefore, to simulate off-the-shelf conditions, no orientation or training related to MI product implementation was provided by the study team. Associated product orientation materials were provided to the teachers to review at their discretion one week prior to the intervention week. Teachers were allowed to determine the times and duration of product use and there were no restrictions or guidance from the research team. Teachers were informed that they were free to use any feature of the product to implement in their classroom as often or infrequently as they preferred. All teachers were informed of the study's purpose and that the study staff were not affiliated with the MI products. The three MI products were selected for this study because in a previous product

testing study conducted by our research team [20], teachers rated these products the highest and indicated that these products maximized facilitators of use while minimizing barriers to use.

**Sample Size Considerations**

A power analysis using G*Power (v.3.1.7) was performed to determine the sample size. With a power of 0.8 and an alpha of 0.05 and a sample of 60 teachers, the study had the ability to detect an effect size of 0.32 which translates to an 8.3 minute increase in MI use per day. This was deemed sufficient given past MI work showing similar increases in MI use per day [14, 21] and that 0.32 is commonly considered a small effect [22].

**Movement Integration Products**

*ABC for Fitness* is a free guidebook designed to provide teachers with ideas to intersperse physical activity bursts throughout the school day. Each activity burst has three components: A. Warm-up, B. Core Activity (e.g., exercise, stretching), and C. Cool Down lasting a maximum of five minutes. This resource contains academic content which teachers are encouraged to integrate into their lesson plans.

*Take 10* is a classroom-based guidebook that provides teachers with grade-specific academic lessons that are integrated with PA. Each lesson offers an opportunity for the students to be physically active while learning academic content in one of five subject areas: language arts, math, science, social studies, or general health. Each activity is designed to last for a maximum of ten minutes. Take 10 employs a tiered pricing scheme based on grade level and ranges in cost from $85-$112.

*GoNoodle* is a free, online resource that contains a series of videos integrating grade-specific academic content with a variety of physical activities (e.g., dance, exercise, yoga) set to music

and activity breaks. These activities are non-teacher led and incorporate elements of social and emotional wellness to support child development. Video length tends to run between 5-10 minutes. For a cost (i.e., $99 per year), GoNoodle Plus offers extended curricula videos, more learning games, and includes printable activities. Teachers were provided with the GoNoodle Plus version during product testing.

**Outcomes**

*Teacher-reported MI strategy and MI Product use.*

For each day that teachers participated in the study, they were asked to complete a daily log at the end of the school day indicating total uses of MI strategies (e.g., use of any MI product, provided or otherwise), uses of the specific MI product that they were provided, and the amount of time they used these products/strategies. In addition to use of the MI product, teachers were asked to provide information about their daily classroom schedule and out of classroom activities (e.g., physical education, recess, Art/Music, lunch). The log was collected from the teacher daily at the end of the school day by a trained research assistant.

*Sedentary behaviors and Physical Activity.*

Each teacher was observed on five school days during baseline and intervention weeks. In classrooms with 20 students or fewer (n=34) all students received an accelerometer. In classrooms with more than 20 students (n=23, mean number of students=24, SD=1.4) the first 20 students to arrive to school received an accelerometer each observation day. Random selection of students in classes with more than 20 students was not deemed necessary for because, this study focused on classroom level estimates of SB and PA, and classrooms with more than 20 students had a mean of 24 (SD=1.4) students. Thus, the vast majority of students were measured on any

given day. At the end of the school day, accelerometers were collected by trained research staff. Accelerometers (ActiGraph GT3X+ Shalimar, FL) were affixed to students' non-dominant wrist. Students' engagement in SB, light PA (LPA), and moderate-to-vigorous PA (MVPA) were calculated using previously developed cutpoint thresholds for elementary age children's sedentary behavior, LPA and MVPA [23]. Accelerometer epochs were set to five seconds to account for the intermittent and transitory nature of youth PA [24]. A valid day of accelerometer wear was defined as total time in attendance of at least 70% of the school day (260 mins) [25]. Age, sex, and race of all students were collected using school records.

**Statistical analyses**

Analyses were conducted on children that had at least one accelerometer wear day [26-28]. Descriptive means, standard deviations, and percentages (for dichotomous variables) were calculated for demographic characteristics, SB and PA, and teacher MI uses. Mixed effects general linear models were used to evaluate the impact of providing teachers access to MI products on their MI strategy use. Days measured were nested within teachers, and teachers were nested within schools. The dependent variables were number of overall MI strategy uses/day, the amount of time implementing MI per day, and the number MI product uses/day for the specific product provided. The independent variable was a dichotomous baseline or intervention week variable. To evaluate the impact of providing teacher access with MI products on students' SB and PA, mixed effects general linear models were estimated with days measured nested within children, children, nested within teachers, and teachers nested within schools. Separate models were estimated with SB, LPA, and MVPA as the dependent variables and the dichotomous baseline or intervention week variable as the independent variable. PA models controlled for

children's age (years), race, sex, and time in attendance at school. Additionally, all analytic models controlled for school day level factors (i.e., physical education vs. non-physical education day, recess vs. non-recess day).