

Children's levels of energy expenditure, perceived exertion, and fun during skill practice

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Abstract

Background/Purpose: The US Department of Health and Human Services recommends that children participate daily in 60 minutes of moderate to vigorous physical activity (MVPA). A threshold of >4.0 METs (metabolic equivalent of task) is considered MVPA in children. Physical education classes are ideal settings for the promotion of MVPA through the practice of continuous (walking, running) and discrete (kicking, throwing, striking) skills. Recent research in adults has determined the energy expenditure of discrete skill practice to be high while participants' rate of perceived exertion (RPE) was low. The replication of this phenomenon in children would provide evidence for the inclusion of discrete skill practice in curricula aiming to promote MVPA. Thus, this study examined energy expenditure (METs), rate of perceived exertion (RPE), and level of fun during object projection skill performance (kicking, throwing, and striking) at three different practice intervals in children.

Method: Children ($N = 42$, $M_{\text{age}} = 8.1 \pm 0.8$ years) participated in three nine-minute experimental sessions where participants performed rounds of 5 kicks, 5 throws, and 5 strikes in blocked fashion, at three practice intervals (i.e., 30, 12, and 6 seconds). Each participant completed the three sessions in a randomized order. Participants were instructed to perform all trials with maximum effort and to report their RPE (1 "Not tired at all" – 10 "So tired, I can't go anymore") and level of fun (1 "Not fun at all" – 10 "The most fun I've ever had") using 10-point scales. The average energy expenditure (METs) during minutes 4-8 of each nine-minute session were calculated using a COSMED K4b2 gas analyzer.

Analysis/Results: Three one-way repeated measures ANOVAs for METs, RPE, and fun were conducted to examine differences across groups and sex. Data indicated a main effect for interval condition ($F = 94.36$, $p < .001$, $\eta^2 = 0.605$) with decreased interval times between performance trials yielding significantly higher METs across conditions (4.5 ± 0.8 , 6.3 ± 1.3 , 8.3 ± 1.6 at 30-, 12-, 6-sec interval respectively). There also was a main effect for sex ($F =$

52.28, $p < .001$, $\eta^2 = 0.305$), with boys demonstrating higher METs at each performance trial interval. RPE and fun analyses determined a main effect for each interval (RPE; $F = 91.16$, $p < .001$, fun; $F = 96.61$, $p < .001$) with no difference in gender at each interval. The average RPE responses were low (3.3 ± 1.8 , 4.1 ± 2.2 , and 4.9 ± 2.7 at 30-, 12- and 6-sec interval respectively) while average fun levels remained high (8.0 ± 1.4 , 8.3 ± 1.4 , and 8.7 ± 1.4 at 30-, 12-, 6-sec interval respectively).

Conclusions: Results indicate that skill practice in all three interval conditions resulted in MVPA. Boys and girls reported equivalent low levels of RPE and high levels of fun. These data demonstrate that the practice of discrete skills yield high levels of energy expenditure (METs), low levels of perceived exertion, and high levels of fun. This study provides positive evidence for the inclusion of discrete skills in physical activity interventions and physical education curricula attempting to promote MVPA.