MC=MVPA:
New Insight for Activity Intensity Relativity

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Background

What does physical activity look like?

How do we assess MVPA?

Discrete skills vs continuous skills; is energy expenditure equal?

Moderate Activity >3.0 METs, Vigorous Activity >6.0 METs

Sitting still: 0.0 - 1.0, Walking/Light jog 3.0 - 4.5, Running 6.0+
Purpose:

- To explore the energy expenditure associated with performance of ballistic object projection motor skills equivalent to moderate to vigorous physical activity?

- To assess if physical activity accelerometry adequately assesses physical activity intensity level of ballistic object projection skill performance?
Methods

- 40 adults 18-30 years
- 20 men (age m=23.9) and 20 women (age m=24.0)
- 3 nine-minute sessions of throwing, striking and kicking
- 3 different trial intervals (i.e., 6, 12 and 30 second trial intervals)
- Blocks of five trials of each skill in serial order
- Maximum effort
Methods

- COSMED k4b2 portable gas analyzer
- Average METs during minutes 4-8 of each nine-minute session
- Video recorded for qualitative movement analysis
- Accelerometers; hip, wrist and ankle
- RPE
- Maximum kicking and throwing speeds (mph) were collected using a radar gun
MC=MVPA: Advanced Theory of Exercise Relativity

<table>
<thead>
<tr>
<th></th>
<th>6 Seconds</th>
<th>12 Seconds</th>
<th>30 Seconds</th>
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<tbody>
<tr>
<td><strong>Females</strong></td>
<td>7.28</td>
<td>5.13</td>
<td>3.14</td>
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<tr>
<td><strong>Males</strong></td>
<td>9.14</td>
<td>6.24</td>
<td>3.76</td>
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<td><strong>Total</strong></td>
<td>8.12</td>
<td>5.63</td>
<td>3.41</td>
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**Moderate Activity >3.0 METs, Vigorous Activity >6.0 METs**

- Sitting still: 0.0-1.0, Walking/Light jog 3.0-4.5, Running 6.0+

Main effect for interval condition (df = 2, 33, F=177.17, p<.001, η²=0.915), Main effect for sex (df = 2, 32, F = 2.15.77, p< .001 eta =0.931)
Results

- Descriptive statistics were calculated for average METs in each interval condition and a 3 (interval condition) X 2 (sex) ANOVA was conducted to examine differences in metabolic cost (METs) across groups and sex.

- A main effect for interval condition (df = 2, 33, F=177.17, p<.001, $\eta^2=0.915$) with decreased interval times between performance trials yielding progressively and significantly higher metabolic expenditure across conditions

- $30 \text{ sec} = 3.41(\pm 0.44) \text{ METs}$, $12 \text{ sec} = 5.62 (\pm 1.05)$, $6 \text{ sec} = 8.11 (\pm 1.45)$

- There also was a main effect for sex (df = 2, 32, F = 2.15.77, p< .001 eta =0.931) with post hoc t-tests indicating men demonstrated higher METs at each performance trial interval

- The average metabolic expenditure for men and women respectively were $9.13 (\pm 1.33)$ and $7.28 (\pm 1.41) \text{ METs}$ during the six second intervals, $6.18 (\pm 1.30)$ and $5.13 (\pm 1.03) \text{ METs}$ during 12 second intervals and $3.74 (\pm 0.77)$ and $3.14 (\pm 0.43)$ during 30 second intervals.
Future = Children
Thank you

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