Examining the benefit of a novel simultaneous cognitive-physical training video game


**Introduction**

- Cognitive and physical training have shown positive effects on cognitive control abilities.
- We hypothesized that simultaneous cognitive and physical training would enhance any cognitive benefits.
- To test this, we developed a “Brain-Body Trainer” video game (“BBT”) that combines these training approaches using video game mechanics, a Kinect for motion capture, and a heart rate monitor.

**Methods**

- Healthy young adults were recruited for the training study (n=6) and for an expectancy-matched group of controls (n=10).
- Each participant completed a cognitive and physiological battery before and after training.
- BBT participants (5 females, 1 male) trained for 24 one-hour-long sessions over eight weeks. Placebo participants (6 female, 4 male) trained for 15 hours over six weeks.
- BBT is divided into three modules (see images above), each running for four minute intervals.
- Cognitive task difficulty adapted on a trial-by-trial basis, while physical task difficulty adapted based on real-time heart rate measurements.

**Physical Outcomes**

- **Blood Pressure Change Pre-Post**
  - Systolic Blood Pressure
  - Diastolic Blood Pressure

**Cognitive Outcomes**

- **Percentage of participants that showed positive cognitive improvement**

**Conclusions**

- Significant improvements in blood pressure and a high intensity ballistic movement are indicative of physical training effects being present.
- Early evidence of transfer indicated improved working memory performance, unlike the placebo group.

**Future Directions**

- We will increase the number of participants and evaluate a broad range of other assessments including EEG, MRI, physiological markers, VO2 max, sleep metrics, and surveys of daily living.
- We will also begin enrollment of mechanistic control groups to assess the benefits of training either a “Brain” or “Body” version of BBT.