Meeting 2

Subcommittee 2 Brain Health

Chair: Kirk Erickson

Members: Chuck Hillman, Rich Macko, David Marquez, Ken Powell

Question 1

- **1. What is the relationship between physical activity and cognition and does such a relationship exist across the lifespan and include individuals with normal to impaired cognitive function (i.e., dementia)?**

Analytical Framework

Subcommittee: Brain Health

Systematic Review Question

What is the relationship between physical activity and emergent properties of brain function?

Cognition: Is there a relationship between physical activity and cognition and does such a relationship exist across the lifespan and include individuals with normal to impaired cognitive function (i.e., dementia)?

Target Population

People of all ages

Comparison

People who participate in varying levels of physical activity

Intervention/Exposure

All types and intensities of physical activity, including free-living activities, play, and physical fitness

Endpoint Health Outcomes

- Academic achievement
- ADHD
- Alzheimer's disease
- Cognitive decline
- Cognition
- Cognitive function
- Cognitive processing / cognitive processes
- Cognitive impairment
- Cognitive motor / motor cognition
- Dementia
- Impaired cognitive function
- Impaired memory
- Independence / Instrumental ADL / Basic ADL
- Intelligence
- Memory
- Mild cognitive impairment

Key Definitions

- Cognition: The set of mental processes that contribute to perception, memory, intellect, and action. Cognitive function can be assessed using a variety of techniques including paper-pencil based tests, neuropsychological testing, and computerized testing methods. Cognitive functions are largely divided into different domains that capture both the type of process as well as the brain areas and circuits that support those functions. Working memory, visual attention, and long-term memory are all examples of different cognitive domains that are thought to be dependent on overlapping but yet largely separate neural systems.

Common Inclusion/ Exclusion Criteria

- **Language**
  - **Exclude: Studies that do not have full text in English**
- **Publication Status**
  - **Include: Studies published in peer-reviewed journals, PAGAC-approved reports**
  - **Exclude: Grey literature**
- **Study Subjects**
  - **Exclude: Studies of animals only**

Inclusion/Exclusion Criteria

- **Date of Publication**
  - Original Research: Include 1980 - Present
  - Existing Sources: Include 2000 - Present
- **Study Subjects**
  - Include: People of all ages
  - Exclude: Studies of hospitalized patients and athletes only
- **Study Design**
  - Include: Randomized controlled trials, Non-randomized controlled trials, Prospective cohort studies, Retrospective cohort studies, Case-control studies, Cross-sectional studies, Before-and-after studies, Systematic reviews, Meta-analyses, PAGAC-Approved reports
  - Exclude: Narrative reviews, Commentaries, Editorials
- **Exposure/Intervention**
  - Include: All types and intensities of physical activity, Physical fitness
  - Exclude: Missing physical activity, Therapeutic exercise
- **Outcome**
  - Include: Academic achievement, ADHD, Alzheimer's disease, Cognitive decline, Cognition, Cognitive function, Cognitive processing / cognitive processes, Cognitive impairment, Cognitive motor / motor cognition, Dementia, Impaired cognitive function, Impaired memory, Independence / Instrumental ADL / Basic ADL, Intelligence, Memory, Mild cognitive impairment

Draft Search Terms

- **Physical Activity Terms**
  - Functional Fitness, Aerobic activities, Aerobic activity, Cardiovascular activities, Cardiovascular activity, Endurance activities, Endurance activity, Cardiorespiratory fitness, Cardiovascular fitness , Physical fitness, Physical fitness, Exercise, Exercise, Physical activity, Physical conditioning, Resistance training, strength training, Sedentary, Sedentary lifestyle, Physical education, Physical education and Training, (Recess AND (Child OR Youth))

- **Outcome Terms**
  - Alzheimer Disease, Mild cognitive impairment, Executive function, Academic achievement, Academic performance, Alzheimer*, Attention deficit, Attention Deficit Disorder with Hyperactivity, Dementia, Executive control, Executive function, Executive functions, Information processing, Inhibitory control, Neurocognitive, Neurocognition, Problem solving, Scholastic performance, Attentional control, Memory, Mental flexibility, Perceptual processing, Learning, Mental recall, Encoding, Attention, Inhibition

Prioritized Questions

1. What is the relationship between physical activity and **cognition** and does such a relationship exist across the lifespan and include individuals with normal to impaired cognitive function (i.e., dementia)?

2. What is the relationship between physical activity and perceptions of **well-being** and **quality-of-life** in healthy and impaired populations?

3. What is the relationship between physical activity and **affect** and does such a relationship exist across a continuum of mood and affective disorders (i.e., depression)?

4. What is the relationship between physical activity and **anxiety** and does such a relationship exist across the continuum of anxiety disorders?

5. What is the relationship between physical activity and **sleep** and circadian rhythms that include normal to impaired sleep behaviors?

6. What is the relationship between physical activity and **biomarkers of brain health**?

Areas for PAGAC Input or Discussion

- Removing third question from the list
- Inclusion of fitness
- Organization of 1st question