This study aims to address the following questions:

1. Can Parkopolis increase STEM language compared to another STEM focused museum exhibit?
   
   Hypothesis: Compared to the control condition caregivers and children playing Parkopolis will use significantly more STEM language.

2. Can Parkopolis increase caregiver’s and children’s engagement, interactions, 6 C’s (communication, collaboration, content, critical thinking, creativity, and confidence), and decrease cell phone usage, compared to a control condition?

Hypothesis: Compared to the control condition caregivers and children playing Parkopolis will show higher levels of engagement, interaction, 6 C’s, and decreased cell phone usage.

Research Questions & Hypotheses

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Method

Participants:
- Patron at the Please Touch Museum in West Philadelphia
- 111 families
- Most children at the museum range from ages 2-7

Procedure:
- Observational data collected on 67 Parkopolis groups and 44 control groups
- 5 minute observation cycles (maximum of 3 cycles per group)

Measures

- A Likert scale from 1 (never) to 5 (very often) that captured STEM language including:
  - Numeracy language (whole numbers and fractions), spatial language, reasoning language, measurement language, completing patterns, making predictions, making observations, planning, and questions

- Categorical ratings of the following:
  - Engagement (low, medium, high)
  - Amount of interaction (low, moderate, high)
  - Physical Activity (sedentary, moderate, vigorous)
  - Technology use (yes or no)
  - Valence of Interactions (Negative, Neutral, Positive)
  - 6 C’s (communication, collaboration, content, critical thinking, creativity, confidence)

Results

- Caregivers demonstrated increased:
  - Numeracy Language, F(108)=27.21, p<.001
  - Fraction Language, F(108)=6.42, p=.013
  - Pattern Language, F(108)=14.87, p<.001
  - Planning Language, F(108)=16.97, p<.001
  - Questions, F(108)=27.21, p<.004
  - Physical Activity, F(108)=10.74, p=.001
  - Children demonstrated increased:
    - Numeracy Language, F(108)=44.85, p<.001
    - Fraction Language, F(108)=11.7, p=.011
    - Reasoning Language, F(108)=6.34, p=.013
    - Pattern Language, F(108)=22.83, p<.001
    - Physical Activity, F(108)=4.76, p=.042
  - As a group caregivers and children demonstrated increased:
    - Content, F(108)=13.92, p<.001
    - Critical Thinking, F(108)=3.45, p=.050
    - Creativity, F(108)=3.79, p=.054
    - Interaction, F(108)=2.60, p=.101

Discussion

- Results demonstrate that Parkopolis can elicit STEM language, and increase caregiver-child interaction.

- This study highlights the promise of Parkopolis to foster STEM learning in a fun and engaging way during the 80% of time children spend outside of school.

- Our next goal is to build Parkopolis outdoors at a park in a low-income community to test its efficacy in that setting.