Changes in Objectively-Measured Physical Activity and Sedentary Behavior among School-Age Children during COVID-19

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Background

• Regular physical activity is important for energy-balance in children.

• COVID-19 affected how people live, work, study, travel, and play.

• Previous evidence on physical activity during COVID-19:
  • Cross-sectional studies
  • Self-report measures
  • Outside of US


Study Aims

To identify change trajectories of device-measured physical activity and sedentary time from pre-COVID-19 to during COVID-19 in school-aged children in the US.

To examine the socio-ecological factors associated with changes in movement behaviors.
Methods

• Part of STREETS 5-year natural experiment

• Cohort of school-age children (age 8-11)

• Measured at 2 time points:
  • **Time 1:** Sept 2019 – Feb 2020
  • **Time 2:** Oct 2020 – March 2021
Movement behaviors from GT3X accelerometers using Evenson cutpoints for children:

- Mean daily minutes of moderate-to-vigorous physical activity (MVPA)
- Mean daily hours sedentary behavior

Socio-ecological predictors:

- Individual, family, social and organizational, and neighborhood
Socio-Ecological Factors

**Individual**
- Age
- Gender
- Race/ethnicity

**Family**
- Parental education attainment (binary: HS or less vs. above HS)
- Number of children in household
- Independent mobility (binary: allowed to walk or play without adult vs. not allowed)

**Social and Organizational**
- School attendance during COVID (binary: in-person vs. virtual)
- Informal social control (5 item scale)
- Social cohesion (5 item scale)
- Perceptions of crime and traffic (2 items, dichotomized: low vs. high)

**Neighborhood built environment**
- Sidewalk availability (dichotomized: low vs. high)
- Crosswalk availability (dichotomized: low vs. high)
Methods

• Descriptive statistics
• Latent class linear mixed models
  • Used to identify change trajectories of MVPA and sedentary time in separate models
• Logistic regression models
  • Used to examine association between socio-ecological factors and membership in trajectory groups for each movement behavior

Sample Characteristics

168 Number of participants with valid physical activity at both timepoints

- 56% female
- 44% male

9 Average age at baseline in years

44% White, Non-Hispanic
39% Hispanic or Latinx
10% Asian or Other
7% Black or African American

29% with parents who have high school education or less

54% virtual school attendance during COVID
Physical Activity Trajectories

Latent Class
1: 'Decrease MVPA', n=138
2: 'Maintain High MVPA', n=30
Odds of being in the ‘Maintain High MVPA’ group

- Age
- Female (male referent)
- Black/African-American (white referent)
- Hispanic (white referent)
- Asian or other (white other)
- Above high school (HS or less referent)
- Number of children in household
- Walk to recreational or open spaces without adult
- Play on streets, playgrounds or parks without adult
- In person school (virtual reference)
- Informal social control
- Neighborhood social cohesion
- Safe road crossings (low referent)
- Sidewalks in neighborhood (low referent)
- Crime safety (low referent)
- Traffic safety (low referent)
Sedentary Behavior Trajectories

Latent Class
1: ‘Moderate Increase Sedentary’, n=132
2: ‘Steep Increase Sedentary’, n=10
3: ‘Decrease Sedentary’, n=26
Odds of being in the ‘Decrease Sedentary’ group
Discussion

- Significant declines in physical activity and increases in sedentary behavior
- Girls were less likely to maintain physical activity
- Hispanic children more likely to decrease sedentary behavior
- Importance of social cohesion
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