Social and Physical Contextual Influences on Children’s Physical Activity: An Ecological Momentary Assessment Study

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Environmental Factors and Children’s Physical Activity

- Availability of home equipment
- Access to recreational facilities
- Presence of sidewalks and controlled intersections
- Access to destinations
- Availability of parks and green space
- Social support

Ferreira et al., 2007, review
Davison & Lawson, 2006, review
Conceptual Gaps in Research Literature

• Studies measure the presence and availability of social resources and built environment facilities.

• How children actually behave in settings thought to promote PA.

• Whether children’s experiences of physical activity differ across settings.
Behavior Setting Theory

- Characteristics of the immediate situation can shape mood and behavior (Barker, 1968).
- Greater motivation and exercise intensity when with *others vs. alone* (Salvy, 2008).
- Higher intensity activity when *outdoors vs. inside homes* (Baranowski, 1993).
- Past research does not consider full range of settings.
Ecological Momentary Assessment (EMA)

• Real-time responses in naturalistic settings

• Can simultaneously measure:
  1) Where ..... 
  2) With whom..... 
  3) How children feel...... 

• Without recall bias
Research Goal

To examine differences in children’s physical activity levels and experiences (NA, PA, enjoyment) across social and physical contexts.
Participants

- 120 children
- Ages 9-14 years
- Residents of San Bernardino County, CA.
- 52% male.
- 32% Hispanic, 24% Caucasian, 13% Asian, 10% African-American.
- 36% At risk for overweight or overweight
- 25% Annual household income < $45,000.
EMA Equipment/Protocol

- Mobile phone (HTC Shadow, T-Mobile)
- Monitoring occurred across 4 days (Fri-Mon).
- No prompts during school hours on Friday or Monday.
- 3-7 randomly-spaced prompts each day (20 total).
- Reminder prompt after 5 min for missed entry.
- Each item appeared in a randomly programmed 60% of surveys (but main activity item every time).
### EMA Items

<table>
<thead>
<tr>
<th>Variable</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Activity</strong></td>
<td>“What were you DOING just before the beep went off?”</td>
</tr>
<tr>
<td></td>
<td>- Reading/Computer/Homework</td>
</tr>
<tr>
<td></td>
<td>- Watching TV/Movies</td>
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<tr>
<td></td>
<td>- Playing video games</td>
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<tr>
<td></td>
<td>- Active Play/Sports/Exercising</td>
</tr>
<tr>
<td></td>
<td>- Eating/Drinking</td>
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<tr>
<td></td>
<td>- Talking/On the phone</td>
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<tr>
<td></td>
<td>- Chores</td>
</tr>
<tr>
<td></td>
<td>- Riding in a car</td>
</tr>
<tr>
<td></td>
<td>- Something else</td>
</tr>
<tr>
<td><strong>Physical Context</strong></td>
<td>“WHERE were you just before the beep went off?”</td>
</tr>
<tr>
<td></td>
<td>- Home</td>
</tr>
<tr>
<td></td>
<td>- School</td>
</tr>
<tr>
<td></td>
<td>- Car/Van/Truck</td>
</tr>
<tr>
<td></td>
<td>- Outdoors</td>
</tr>
<tr>
<td></td>
<td>- Restaurant</td>
</tr>
<tr>
<td></td>
<td>- Store/Mall</td>
</tr>
<tr>
<td></td>
<td>- Someone else’s house</td>
</tr>
<tr>
<td></td>
<td>- Gym/Rec center</td>
</tr>
<tr>
<td></td>
<td>- Someplace else</td>
</tr>
<tr>
<td><strong>Social Context</strong></td>
<td>“Were you (ALONE, WITH YOUR MOM OR DAD, SISTER(S) OR BROTHER(S), OTHER FAMILY MEMBERS, FRIEND(S), CLASSMATES, PEOPLE YOU DON’T KNOW) just before the beep went off?”</td>
</tr>
<tr>
<td><strong>Mood</strong></td>
<td>“How (HAPPY, JOYFUL, STRESSED, MAD OR ANGRY, NERVOUS OR ANXIOUS, SAD) were you feeling just before the beep wet off?”</td>
</tr>
<tr>
<td><strong>Enjoyment</strong></td>
<td>“How much FUN is this activity”</td>
</tr>
</tbody>
</table>
Accelerometer

- Actigraph GT1M.
- Time-stamped and linked with EMA data.
- Outcome variables (± 30-min. of EMA prompt)
  (1) Steps
  (2) MVPA min.
- MVPA ≥ 4 METs (1910 activity counts/min.)
Results

• Children responded to 73.5% or $M = 14.7$ (SD = 4.1) EMA prompts.

• Accelerometer data lost for $n = 9$.

• Physical activity (i.e., active play, sports, or exercise) was reported as the main activity in 17% (291 of 1,749) of EMA responses.

• $n = 97$ had at least one report of physical activity.
Physical Activity Level by Physical Context
(± 30-min. of EMA prompt)

Steps

MVPA min.

Outdoors  | Yard  | Other | Other house | Home  | Outdoors  | Yard  | Other | Other house | Home  

n = 108
Adjusted for day of the week, time of day, sex, age, race/ethnicity, income, weight status.
Physical Activity Level by Social Context
(± 30-min. of EMA prompt)

n = 108
Adjusted for day of the week, time of day, sex, age, race/ethnicity, income, weight status.
Physical Activity Experience by Physical Context

**Positive Affect**

- Outdoors: 2.0
- Yard: 2.5
- Other: 1.5
- Home: 1.0
- Other house: 0.5

**Enjoyment**

- Outdoors: 2.5
- Yard: 2.0
- Other: 1.5
- Home: 2.0
- Other house: 1.0

n = 53 and n = 55

Adjusted for day of the week, time of day, sex, age, race/ethnicity, income, weight status.
Physical Activity Experience by Social Context

n = 63

Adjusted for day of the week, time of day, sex, age, race/ethnicity, income, weight status.
Limitations

- Not all PA captured (due to interval-contingent sampling).
- Missing data.
- Short monitoring period (4 days).
- Leisure-time only.
Conclusions

• PA levels higher when outdoors and with others.

• Pos. affect/enjoyment higher and neg. affect lower when active outdoors and with others.

• Results may inform context-specific interventions.

• Novel research methodology.
Acknowledgments

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Thank You