

Ecological Momentary Assessment of Motivational Drivers of Adolescent Physical Activity: A Self-Determination Theory Perspective

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Background

- Research on adolescent physical activity motives is largely divided into separate bodies of literature: one focusing on rational motives and another on automatic motives
- However, it is likely that these two processes are interconnected, with rational process potentially mitigating the vulnerabilities to poor physical activity caused by automatic processes (i.e., affect, fatigue, or energy levels)
- Adolescence is a key period of development when self-regulation of affect, cognition, and behavior is not yet fully formed
- As a result, adolescents may be particularly susceptible to the influence of automatic processes that negatively impact physical activity

Purpose

The current study seeks to explore variables central to self-determination theory as moderators of the relationship between automatic motives and physical activity in adolescents

Methods

Procedure:

- Adolescents were recruited from a small Midwest community
- Participants completed a baseline survey assessing social support, motivation, and competence for physical activity. Subsequently, participants wore an Actigraph accelerometer (on non-dominant wrist) 24 hours per day and answered Ecological momentary assessment (EMA) surveys four times per day for 20 days on a smartphone

Participants:

- 100 adolescents aged 13-18 ($M = 14.45$, $SD = 1.37$)
- 60% female and 80% Caucasian, with 78% of participants reporting their family income as \$51,000 or above

Materials:

Moderate to Vigorous Physical Activity and Sedentary Behavior

ActiGraph wActi Sleep-BT accelerometer (ActiGraph LLC, Pensacola, FL). Raw data were processed using the Actilife software v.6.10.2, and scored using the Troiano algorithm and Chandler algorithm

Positive and Negative Incidental Affect

Assessed via Positive and Negative Affect Schedule for Children (Ebesutani et al., 2012), with five items measured positive emotion (i.e., joyful, cheerful, happy, lively, proud) and five measured negative emotion (i.e., miserable, mad, afraid, scared, sad). Adolescents indicated how much they currently feel each emotion on a 5-point Likert scale from 1 ("not at all") to 5 ("extremely")

Energy and Fatigue

The Profile of Mood States (POMS) was used to assess energy and fatigue (McNair et al., 1971). The three highest loading items for the "Vigor-Activity" (i.e., energetic, full of pep, and vigorous) and the "Fatigue-Inertia" (i.e., fatigued, exhausted, and worn out) were used to measure energy and fatigue, respectively. Participants were asked how much they currently felt each physical feeling state since the last prompt on a scale of 1 ("not at all") to 5 ("extremely")

Motivation

The Treatment Self-Regulation Questionnaire (Levesque et al., 2007) was used to assess autonomous, controlled, and (a)motivation for engaging in physical activity. Responses to the 15 items were indicated on a 7-point Likert scale from 1 ("not at all true") to 7 ("very true")

Perceived Competence

The Perceived Competence Scale (Williams et al., 1998) was used to assess competence as a motive for physical activity. The 4 items were scored on a 1-7 scale with anchors at 1, 4, and 7. An example item is, "I am able to meet the challenge of exercising regularly"



Results

Figure 1

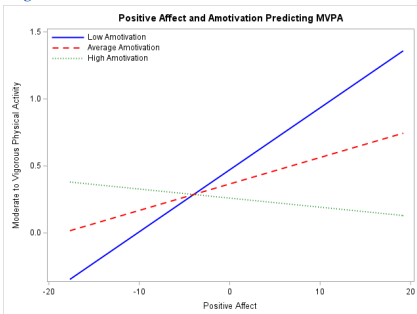


Figure 2

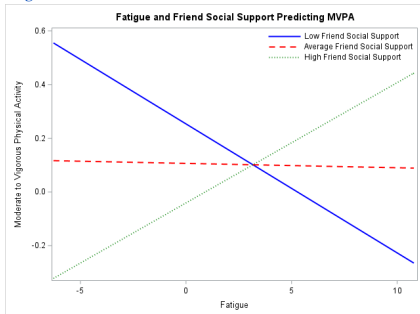


Figure 3

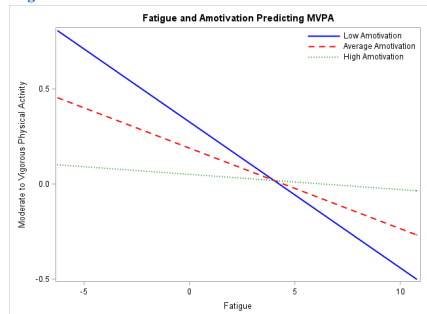


Figure 4

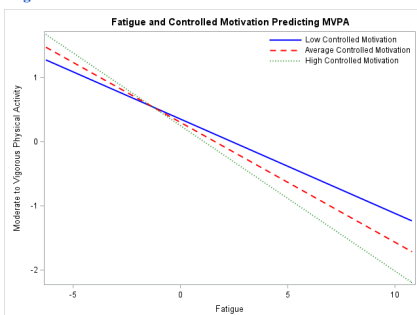


Figure 5

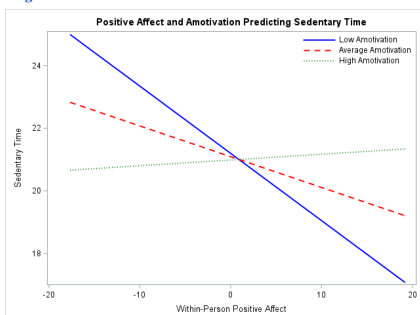
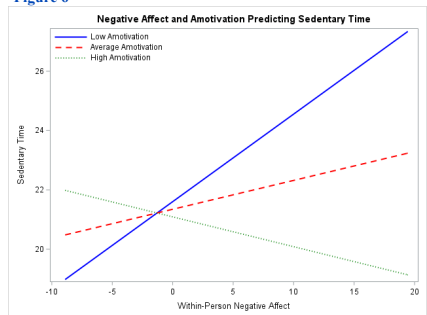


Figure 6



Multilevel Models

- A series of multi-level models were estimated using SAS PROC MIXED and evaluated using full information maximum likelihood estimation
- Null Model: 7% of the variance in physical activity engagement was between-person and 93% of the variance was within-person. 8% of the variance in sedentary behavior was between-person and 92% of the variance can be accounted for by within-person moment-to-moment changes
- There was a significant interaction between within-person positive affect and amotivation as a predictor of MVPA ($b = -0.02$, $p < .05$) with 95% CI [-0.04, -0.01] and sedentary time ($b = 0.10$, $p < .01$) with 95% CI [0.04, 0.16]
- There was also a significant interaction between within-person negative affect and amotivation as a predictor of sedentary time ($b = -0.08$, $p < .05$) with 95% CI [-0.14, -0.01]
- Within-person fatigue interacted with friend social support ($b = 0.05$, $p < .01$) with 95% CI [0.02, 0.08], amotivation ($b = 0.03$, $p < .05$) with 95% CI [0.003, 0.06], and controlled motivation ($b = -0.03$, $p < .01$) with 95% CI [-0.05, 0.01] in relation to MVPA

Conclusions

- Overall, findings from this study reveal that rational and automatic motives are intertwined, highlighting the need to explore them together as targets for physical activity and sedentary time intervention efforts
- This novel perspective opens a new avenue for understanding how these motives interact, suggesting that future research should also consider past experiences, affective responses, and affect processing as key factors