



## Self-Reported Peer Victimization and Objectively Measured Physical Activity Behavior in Boys: A Quasi-Experimental Study

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### ABSTRACT

**Rittenhouse MA, Barkley JB, Author EF.** Self-Reported Peer Victimization and Objectively Measured Physical Activity Behavior in Boys: A Quasi-Experimental Study. **JEPonline** 2013;16(3):84-93. Previous studies that identified a negative association between peer victimization and physical activity (PA) behavior in youth relied on survey instruments to assess PA. This study assessed self-reported peer-victimization and its relationship to objectively-measured PA in boys in a controlled environment. Twenty-four overweight/obese (n=12) and non-overweight boys (n=12) completed a validated peer victimization questionnaire that assessed overt victimization (OVS) and relational victimization (RS). The boys were then taken to a gymnasium individually where they had free access to physical and sedentary activities for 30 min. The overweight/obese children ( $11.5 \pm 3.9$  OVS,  $11.8 \pm 4.7$  RS) reported greater ( $P \leq 0.04$ ) peer victimization than non-overweight children ( $7.6 \pm 2.6$  OVS,  $8.2 \pm 3.1$  RS). Overweight/obese children ( $5.1$  METs,  $7.7 \pm 6.6$  min) had lower average PA intensity and allocated more time ( $P \leq 0.01$  for all) to sedentary activity than non-overweight children ( $7.0$  METs,  $1.2 \pm 3.7$  min) during the 30-min activity session. The OVS and RS peer victimization subscales were significantly and positively ( $r \geq 0.41$ ,  $P \leq 0.05$ ) correlated to time allocated to sedentary behaviors. The results support a potentially harmful link between peer victimization and decreased, objectively-measured PA behavior in boys.

**Key Words:** Obesity, Ostracism, Exercise, Children

## INTRODUCTION

Previous research has indicated that peer interaction may influence physical activity (PA) behavior in youth (4,6,7,9,11,12,15-22). Initial studies have provided evidence that positive interaction with one's peers is associated with greater PA in youth (4,7,16-18,21). Conversely, negative interaction with one's peers is likely to discourage PA in youth (6,9,11,12,15,19,20,22). This is problematic as overweight/obese youth, who often participate in inadequate amounts of PA, are more likely to experience negative social interaction (i.e., peer victimization) than their non-overweight peers (13,14).

Peer victimization can manifest in multiple forms: (a) being ostracized or excluded from a social group; (b) having peers threaten relationships with others; and (c) experiencing overt victimization, which includes threats of or actual physical violence (3,10,25). Previous non-experimental studies have indicated a negative association between peer victimization and self-reported PA behavior in youth (6,9,11,12,15,19,20,22). However, none of these previous non-experimental studies have utilized objective measures of PA nor have they examined behavior in a controlled environment. Furthermore, these studies have only examined peer victimization either in a general sense or self-reported overt victimization.

Interesting, Barkley and colleagues (1) examined the effect of simulated ostracism on PA behavior in children. They reported that a bout of simulated ostracism (i.e., exclusion for the peer group) caused a reduction in PA behavior in youth (1). However, ostracism represents only a single form of peer victimization, and its effect on PA behavior may differ from that of other types of peer victimization (e.g., overt victimization). While it is not possible to assess overt victimization experimentally, it is likely that overweight/obese and non-overweight youth represent naturally high- and low-overt victimization groups that could then be compared to one another in a controlled environment. A quasi-experimental design could then be used to compare this potential, naturally-occurring discrepancy in overt peer victimization and its association with PA in overweight/obese and non-overweight/obese youth. However, because previous studies assessing the association between overt peer victimization and physical activity behavior in youth have relied on subjective measures of physical activity in free-living environments, it is unclear whether or not this negative relationship will be present in a controlled, laboratory environment while assessing physical activity utilizing objective measures.

Therefore, the purpose of the present study was to utilize a quasi-experimental design to compare various subscales of self-reported peer victimization, including assessments of overt victimization and objectively measured PA behavior between an overweight/obese group and a non-overweight/obese group of boys in a controlled environment. The association between peer victimization and physical and sedentary activity was also assessed. We hypothesized that overweight/obese boys would report greater peer victimization and participate in less physical and greater sedentary activity than non-overweight/obese boys. Additionally, we hypothesized that overt peer victimization scores would be positively associated with sedentary activity and negatively associated with PA.

## METHODS

### Subjects

Participants were boys (n=24), age 8-12 yrs who were classified as either non-overweight/obese (<85th BMI percentile) (n=12, all Caucasian) or overweight/obese (≥85th BMI percentile) (n=12; n=11, Caucasian and n=1, African American). The children were recruited from the local community through flyers and through a database of subjects who had previously contacted the Applied Physiology

Laboratory to participate in previous, unrelated research projects. Children were excluded from participating in the study if they had any conditions that limited their ability to participate in, or any contraindications to, PA, including: (a) BMI for age less than the 5th percentile; (b) cardiovascular disease; and (c) neuromotor or cognitive disorders interfering with participation in PA.

## Procedures

Eligibility of interested children was determined via phone screen with a parent or legal guardian. If children were eligible they were required to report to the Applied Physiology Laboratory at Kent State University on one occasion. During that visit, the child's parent or legal guardian signed a consent form and the child signed an assent form. Each child was then measured for height (using a stadiometer) and weight (using a calibrated balance beam scale). After anthropometric measures were completed, the children completed validated questionnaires that were designed to measure peer victimization (3,10). The children were then taken into a 4,360 square foot gymnasium that was located in the same building as the Applied Physiology Laboratory. While in the gymnasium, a trained exercise physiologist demonstrated the proper use of the PA equipment of which then each child was encouraged to sample the following equipment: (a) one foot (0.305 m) tall modified hurdles; (b) ski jump; (c) jump rope; (d) Nerf™ footballs; (e) flying discs (Hasbro, Pawtucket, Rhode Island); (f) standing long jump; (g) kicking a soccer ball around a series of seven cones; (h) shooting a basketball at a standard 10 ft (3.05 m) hoop; and (i) navigating an obstacle course made up of gymnastic/soft-play equipment (UCS inc. Lincolnton, NC). Once the children sampled all physical activities, they verbally acknowledged that they understood how to use each of the following sedentary activities: (a) drawing; (b) crossword puzzles; (c) word finds; (d) magazines; and (e) the matching game Perfection™ (Milton Bradley Company, East Longmeadow Massachusetts). These sedentary options were located at a table with two chairs in the same gymnasium as the PA options.

After sampling the physical and sedentary activities, the children participated in a 30-min free-choice activity session. During this activity session, the children had the option to use any of the physical activities, run or walk around the gymnasium space as well as use any of the sedentary options and sit and rest on the chairs at the table with the sedentary activities in any pattern and amount they wished. If the children wished to use the sedentary activities, they were informed they must sit in the provided chairs. Behavior was monitored by a member of the research team who was present in the gymnasium discreetly observing the subjects. Other than the research team member observing the children there were no other individuals in the gymnasium during the 30-min activity session.

The amount and intensity of the PA that each child performed was measured via accelerometry (ActiGraph GT1M, Pensacola FL). The amount of time that each children allocated to participating sedentary activities was recorded utilizing a stop watch (Traceable® Stopwatch, Fisher Scientific, Waltham, Massachusetts). At the conclusion of the free-choice activity session, the children were compensated with a \$10.00 gift certificate to a store of their choosing. All procedures were approved by the Institutional Review Board at Kent State University.

## Measurements

**Peer Victimization Questionnaire:** The validated Children Self-Experience Questionnaire-Self Report (3,10) consisted of the two subscales assessing peer victimization. Each subscale consisted of five items measuring the frequency of particular experiences (1 = Never, 2 = Almost never, 3 = Sometimes, 4 = Almost all the time, and 5 = All the time). The Overt Victimization subscale (OVS) assessed the frequency with which other children have harmed or threatened to harm their physical well-being. The Relational subscale (RS) was used to assess how often the children attempted to harm a peer relationships. Each subscale was summed individually for a composite score ranging from 5 to 25.

**Accelerometer:** The ActiGraph GT1M Monitor (ActiGraph, Pensacola, Florida) was worn at the children's hip, snug against the body for the entirety of the free-choice activity gymnasium session. Epoch length was set at 60 sec and the average per-minute counts were summed over the 30-min activity session to provide the measure of total PA. Accelerometer data were also converted to metabolic equivalents (METs, 1 MET = 3.5 mL·kg<sup>-1</sup>·min<sup>-1</sup> of oxygen consumption) based on each child's age (24). The ActiGraph has been shown to be a valid and reliable tool for quantifying physical activity in children and adolescents (8).

**Sedentary Time Observation:** During each 30-min activity session, the amount of time the children allocated to the sedentary activities was monitored with a stop watch (Traceable® Stopwatch, Fisher Scientific, Waltham, Massachusetts) by a member of the research team discretely observing the session. Sedentary time was defined as the time from the moment the child sat in the chair at the table with the sedentary activities to the time the child stood up to return to the physical activities. If a child participated in multiple bouts of sedentary activity during the 30-min activity session, the bouts were summed.

## Statistical Analyses

Independent-samples *t* tests were performed to examine differences in the subjects' characteristics (age, height, weight, and BMI percentile), the two subscales of the peer victimization questionnaire (OVS, RS), accelerometer counts, and time allocated to sedentary activities between non-overweight and overweight/obese boys. Correlation analyses were then performed between the OVS and RS subscales from the peer victimization questionnaire and total accelerometer counts and sedentary time performed in the 30-min activity session.

## RESULTS

### Descriptive Data

The subjects' physical characteristics are shown in Table 1. Height, weight, and BMI for age percentile ( $t(22) \geq 2.2$ ,  $P \leq 0.04$  for all) were greater in overweight/obese boys than non-overweight boys.

**Table 1. Subject Characteristics**

	Non-Overweight (n = 12)	Overweight/Obese (n = 12)
Age (yrs)	10.0 ± 1.4	10.8 ± 1.6
Height (cm)*	138.6 ± 9.9	147.6 ± 9.6
Weight (kg)*	33.2 ± 6.2	56.8 ± 17.1
BMI for age percentile*	54.6 ± 16.6	93.4 ± 6.0

Data are mean ± SD; \*Significant difference between groups ( $P \leq 0.04$ ).

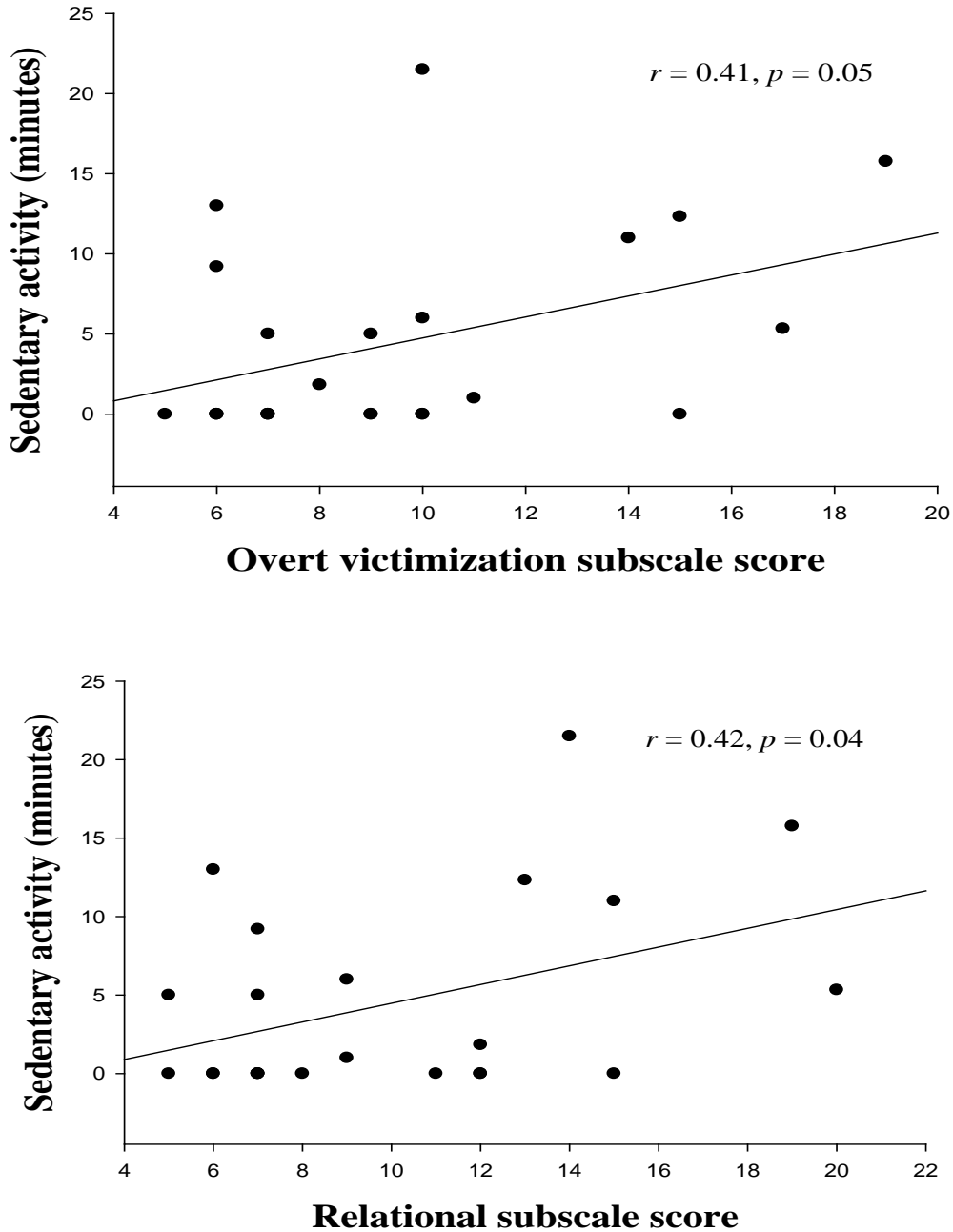
### Peer Victimization

The overweight/obese boys ( $M = 11.5$ ,  $SD = 3.9$  OVS and  $M = 11.8$   $SD = 4.7$  RS), relative to non-overweight boys ( $M = 7.6$ ,  $SD = 2.6$  OVS and  $M = 8.2$   $SD = 3.1$  RS), reported significantly greater



### Sedentary Activity Time

The overweight/obese boys ( $M = 7.7$ ,  $SD = 6.6$  minutes) allocated significantly more ( $t(22) = 3.0$ ,  $P = 0.007$ ) time to sedentary activity than non-overweight boys ( $M = 1.2$ ,  $SD = 3.7$  min) during the free-choice activity session (Figure 2).



**Figure 2. The Relationship between the OVS and RS Subscale Scores and Sedentary time.** The upper panel illustrates a significant, positive correlation between sedentary activity time and the OVS subscale. The lower panel illustrates a significant positive correlation between sedentary activity and the RS subscale.

### Relationship between Self-Reported Peer Victimization and Activity

Overt victimization ( $r(22) = 0.41$ ,  $P = 0.05$ ) and RS ( $r(22) = 0.42$ ,  $P = 0.04$ ) were positively and significantly correlated to the total sedentary time children accumulated during the free-choice activity session. The greater the score on the OVS and RS subscales, the greater the amount of time children allocated to sedentary activities. There was also a trend towards a negative relationship between the two scales ( $r(22) = -0.38$ ,  $P = 0.06$  OVS,  $r(22) = -0.36$ ,  $P = 0.07$  RS) and total accelerometer counts during the free-choice activity session. The greater the score on the OVS and RS subscales, the fewer accelerometer counts the children accumulated.

## DISCUSSION

This was the first study to use a quasi-experimental design to assess the differences in objectively measured physical and sedentary activity and its relationship to various subscales of self-reported peer victimization in a controlled environment in overweight/obese versus non-overweight boys. Presently, overweight-obese boys reported greater overt and relational peer victimization than their non-overweight peers. Those self-reported peer victimization scores were negatively associated with PA behavior and positively associated with sedentary behavior. The greater reported victimization and its negative association with PA may partially explain why overweight-obese boys were less physically active than non-overweight boys in the present study.

The results from the present investigation support those from previous, non-experimental studies that also examined the relationship between various forms of peer victimization and PA behavior in youth. Faith et al. (6) reported that overweight/obese children were more frequently the targets of weight-related criticism from their peers than non-overweight children. This greater weight-related criticism was associated with a reduced self-reported sport enjoyment and leisure-time PA in overweight/obese children. Storch et al. (22) also demonstrated a significant negative association between self-reported PA behavior and peer victimization in children. The peer victimization questionnaire from that study was very similar to the one used in the present study. Interestingly, the association between peer victimization and PA behavior noted by Storch ( $r = -0.32$ ,  $P < 0.001$ ) was very similar to what was noted the present study ( $r = -0.38$  OVS and  $r = -0.36$  RS). However, our present study expands upon these previous results by separately examining overt and relational subscales of peer victimization and their relationship to objectively measured PA in a laboratory environment.

The present results also support the findings of a single experimental study assessing the effect of a specific type of simulated peer victimization (i.e., ostracism) on PA behavior (1). In this previous study, which was conducted by our research group, children played a computerized ball-tossing game in two, separate laboratory sessions. During these separate sessions the children experienced an episode of inclusion (i.e., a control condition) in one session and then an episode of exclusion (i.e., an ostracism condition) in the other. The children completed free-choice activity access sessions immediately after playing the ball-tossing game. These activity sessions were very similar to the activity sessions in the present study. The children accumulated 22% fewer accelerometer counts and allocated 41% more minutes to sedentary activity in the ostracized condition relative to the inclusion condition. While this approach provided causal evidence of the negative effects of ostracism on physical activity in children, ostracism is only one form of peer victimization. Other forms, such as overt victimization (i.e., threats or acts physical violence) cannot be tested experimentally. Therefore, while the present quasi-experimental research design did not allow for causal inference, it did provide the first assessment of the association between overt victimization and objectively measured PA.



Because the association between peer victimization and PA can be observed in a controlled environment it may provide an excellent setting for assessing the efficacy of interventions that seek to increase PA behavior in children by targeting social interaction. Experimental and non-experimental studies have indicated that positive interaction with a friend encourages PA behavior in both the overweight/obese and the non-overweight youth (2,17,18). Therefore, attempts to increase positive social interaction and decrease negative social interaction in overweight/obese youth may increase PA behavior. Changes in self-reported peer victimization and objectively measured PA behavior pre- and post-intervention would likely provide a valid assessment of the interventions efficacy. The mounting evidence supporting the association between peer victimization and depressed PA behavior in youth is worrisome. Overweight/obese youth in this study and previous studies have reported greater incidence of peer victimization (e.g., overt victimization, ostracism, etc.) and less PA than their non-overweight counterparts. Not surprisingly, then, the overweight/obese youth have fewer reciprocal friends and, therefore, they spend more time alone (6,17,23). When socially isolated, the overweight/obese youth turn to highly-motivating sedentary activities (e.g., watching television and playing computer games) as their primary source of leisure-time activity. These sedentary activities can be done when alone and in an environment that does not expose the overweight/obese youth to further ridicule. This may partially explain why overweight/obese youth find sedentary activity more reinforcing (i.e., motivating) than non-overweight children (5). However, if peer victimization occurs as the consequence of children being overweight/obese, and that peer victimization encourages sedentary behavior, it may further perpetuate obesity. This means that the relationship between overweight/obesity and peer victimization in youth may be cyclical.

While this study used a novel approach to examine an important question, it is limited in that it did not examine girls. Therefore, these results can only be generalized to boys. Previous research has indicated that girls may be more prone to certain types of peer victimization than boys (6). However, it is not clear if sex has a significant role in mediating the association between peer victimization and PA behavior in youth. Future investigations examining both boys and girls are warranted.

## CONCLUSIONS

This was the first study to use a quasi-experimental design to derive at objective measures of PA and a controlled environment to compare self-reported peer victimization and PA behavior in children who are overweight/obese and non-overweight. Presently overweight/obese boys were less physically active and reported greater peer victimization than non-overweight boys. The peer victimization scores were negatively associated with PA behavior. These findings add to the growing evidence that implicates peer victimization as an anathema to PA behavior in youth.

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