The Role of Self-Efficacy in Explaining Gender Differences in Physical Activity Among Adolescents: A Multilevel Analysis

John C. Spence, Chris M. Blanchard, Marianne Clark, Ronald C. Plotnikoff, Kate E. Storey, and Linda McCargar

Background: The purposes of this study were to determine if a) gender moderated the relationship between self-efficacy and physical activity (PA) among youth in Alberta, Canada, and, alternatively b) if self-efficacy mediated the relationship between gender and PA. Methods: A novel web-based tool was used to survey a regionally diverse sample of 4779 students (boys = 2222, girls = 2557) from 117 schools in grades 7 to 10 (mean age = 13.64 yrs.). Among other variables, students were asked about their PA and self-efficacy for participating in PA. Results: Based upon a series of multilevel analyses, self-efficacy was found to be a significantly stronger correlate of PA for girls. But, boys had significantly higher self-efficacy compared with girls, which resulted in significantly more PA. Conclusions: Findings suggest self-efficacy is an important correlate of PA among adolescent girls but that boys are more physically active because they have more self-efficacy for PA.

Keywords: children; exercise; determinants; social cognitive models

Low levels of physical activity (PA) during childhood and adolescence are associated with obesity and poor health outcomes later in life. Despite this evidence, a considerable proportion of children and youth exhibit low levels of activity. For example, PA levels among Canadian children have declined over the past decade and fewer than half of youth aged 5 to 17 are sufficiently active to attain optimal growth and development. To better inform prevention and intervention efforts, a detailed understanding of the variables related to PA is needed. PA is a complex behavior influenced by intrapersonal, social, and environmental factors. Among youth, participation decreases with age and girls are less active than boys at all ages. A national survey of Canadian youth found that teenage boys (27%) are twice as likely as teenage girls (14%) to meet international guidelines for optimal health. Additionally, boys take 1,200 more steps per day than girls on average. Trost and colleagues found that boys exhibited significantly greater participation in moderate-to-vigorous (MVPA) and vigorous PA (VPA) than girls at all ages, with the exception of MVPA in grades 1 to 3. Similarly, Strauss, Rodsilsky, Burack, and Colin reported that girls demonstrated significantly less total PA than boys after 13 years of age, with preteen girls spending approximately 35% more time in low- and high-level activity than teenage girls. In fact, girls may reduce their energy expenditure due to physical activity by as much as 50% in the years leading up to puberty. Body weight is also associated with PA; specifically, overweight children and adolescents are less likely to participate in PA than their normal weight peers.

In addition to age, gender, and body weight status, variables encompassed by social cognitive models of behavior (eg, social cognitive theory), such as the home and school environments, perceived barriers, and self-efficacy, are consistently associated with the PA of adolescents. Furthermore, most social cognitive models acknowledge that sociostructural or demographic variables may moderate the relationship between constructs, such as self-efficacy and perceived behavioral control, and behavior (eg, PA). For instance, De Bourdeaudhuij and Sallis demonstrated that psychosocial variables, including self-efficacy, vary in importance according to sex and age groups. In fact, self-efficacy appears to be particularly salient for adolescent girls.

Dishman and colleagues recently reported that the positive effect of a PA intervention targeting adolescent girls was partially mediated by increased efficacy beliefs about PA participation. Similarly, Allison and colleagues showed a significant and positive correlation between girls’ self-efficacy to participate in PA and self-reported PA levels. Given that self-efficacy is defined as a person’s belief in their ability to perform a behavior with desired results, these findings make intuitive sense. According to Bandura, self-efficacy not only influences whether a person will engage in a particular behavior but also
whether he or she will persist in their efforts in the face of barriers. Thus self-efficacy may be an important mediator for girls’ enjoyment and engagement in PA and warrants further investigation. In particular, it is less clear whether self-efficacy explains the well documented gender differences in PA among adolescents.

To test for mediating effects, Baron and Kenny\textsuperscript{31} suggest that a series of multiple regressions are conducted where the extent to which a variable (eg, self-efficacy) accounts for the relationship between a predictor variable (eg, gender) and a criterion variable (eg, PA) is determined. When testing a mediating model with cross-sectional data, as was done in this study, it is important to use theory to determine the temporal precedence of the variables.\textsuperscript{32} Thus we used social cognitive theory\textsuperscript{22,30} to guide our analysis. The purposes of this study were to determine if gender moderates the association between self-efficacy and PA among youth and self-efficacy mediates the association between gender and PA. We hypothesized the relationship between self-efficacy and PA would be stronger for girls than boys and that self-efficacy would mediate the relationship between gender and PA with boys being more efficacious toward PA. The study draws upon the strengths of web-based technology to gather data from a large sample of youth.

### Methods

#### Participants

The Web-Survey of Physical Activity and Nutrition (Web-SPAN) was a web-based survey of grade 7 through 10 students that assessed nutrition, physical activity, smoking and related meal behaviors. All 59 public and separate school boards in the province of Alberta, Canada were selected for participation, which included schools in both rural and urban areas, public schools, catholic schools, and separate schools. Forty-eight school boards agreed to participate (81%), and an average of 7 schools within each school board were randomly chosen and contacted after obtaining school board approval. To ensure that the small proportion of private schools (approximately 10%) were represented in our sample, those schools were stratified by 5 regions across Alberta including the 2 major metropolitan centers in the province (south, central, north, Calgary, Edmonton), and then selected at random within those regions. Teachers within participating schools were selected by school administrators to facilitate the web-survey.

In total, 363 schools were contacted of which 193 (53%) agreed to participate, 160 (44%) declined participation, and 10 (3%) were ineligible. Upon completion of the study, final participation was 136 (37%) schools within 4475 schools. Originally, 4981 students selected for participation, which included schools in both rural and urban areas, public schools, catholic schools, and private schools. Forty-eight school boards agreed to participate (81%), and an average of 7 schools within each school board were randomly chosen and contacted after obtaining school board approval. To ensure that the extent to which a variable (eg, self-efficacy) accounts for the relationship between a predictor variable (eg, gender) and a criterion variable (eg, PA) is determined. When testing a mediating model with cross-sectional data, as was done in this study, it is important to use theory to determine the temporal precedence of the variables.\textsuperscript{32} Thus we used social cognitive theory\textsuperscript{22,30} to guide our analysis. The purposes of this study were to determine if gender moderates the association between self-efficacy and PA among youth and self-efficacy mediates the association between gender and PA. We hypothesized the relationship between self-efficacy and PA would be stronger for girls than boys and that self-efficacy would mediate the relationship between gender and PA with boys being more efficacious toward PA. The study draws upon the strengths of web-based technology to gather data from a large sample of youth.

### Measures

#### Demographics. After logging on to the survey, students were asked to report their age in years, grade level, and gender.

#### Height and Weight. Students provided self-reported height (either inches or centimeters) and weight (either pounds or kilograms). Body mass index (BMI) was calculated (weight [kilograms]/height [meters\(^2\)]), and students were categorized as normal weight, overweight or obese using the International Obesity Task Force (IOTF) cutoffs.\textsuperscript{33} Among a sub sample of 459 students in our study, Web-SPAN showed good agreement for self-reported height (\(r = .88\)) and weight (\(r = .94\)) when compared with measured height and weight. The main discrepancy being a slight underreporting of weight on Web-SPAN, \(t (409) = -12.18, P < .001, d = -0.23\). Test-retest reliability for self-reported height and weight on the web-based survey completed approximately 8 days apart showed overall agreements of \(r = .90\) for height and \(r = .98\) for weight.

#### Physical Activity. The Physical Activity Questionnaire for Older Children (PAQ-C)\textsuperscript{34} was used to assess PA levels over the previous 7-day period. The PAQ-C was specifically designed for Canadian school-aged youth, and includes as components on PA during the school day as well as after school and weekend activity. The questionnaire consists of 9 items which are used to calculate an activity score. Responses are converted to a 5-point scale where a higher score represents greater levels of PA (scores range from 1.00 to 5.00). The PAQ-C has been shown to be a reliable self-report measure of PA when test-retest reliability was examined over a period of 1 week among 84 boys (\(r = .75\)) and girls (\(r = .82\)) ages 9 to 14 years.\textsuperscript{35} According to Kowalski and colleagues,\textsuperscript{36} the PAQ-C was a valid measure among 9 to 14 year olds (N = 97) when compared with other PA assessment methods including an activity rating (\(r = .57\)), the Godin Leisure Time Exercise Questionnaire (\(r = .41\)), a 7-day physical activity recall interview (\(r = .46\)), a Caltrac motion sensor (\(r = .39\)), and the Canadian Home Fitness Test (step test) (\(r = .28\)). Among a sub sample of 459 students in our study, no significant difference was observed between scores on the web-based PAQ-C when compared with scores on a guided self-administered paper-based PAQ-C, \(t (411) = -0.73, P = .46, d = -0.03\). Similar to Crocker and colleagues, good test-retest reliability was found for the web-based PAQ-C completed approximately 8 days apart (\(r = .79\)).

#### Body Mass Index (BMI). Body mass index (BMI) was calculated (weight [kilograms]/height [meters\(^2\)]) and students were categorized as normal weight, overweight or obese using the International Obesity Task Force (IOTF) cutoffs.\textsuperscript{33} Among a sub sample of 459 students in our study, Web-SPAN showed good agreement for self-reported height (\(r = .88\)) and weight (\(r = .94\)) when compared with measured height and weight. The main discrepancy being a slight underreporting of weight on Web-SPAN, \(t (409) = -12.18, P < .001, d = -0.23\). Test-retest reliability for self-reported height and weight on the web-based survey completed approximately 8 days apart showed overall agreements of \(r = .90\) for height and \(r = .98\) for weight.
Self-efficacy. Based upon the work of Pate and colleagues, the Web-SPAN survey included questions to assess self-efficacy for being physically active in a variety of situations. After reading the question, “How confident are you that you can do the following things on your own time outside of school?”, the participants then responded to the following 4 items: “Be physically active no matter how tired I may be,” “Be physically active even if I have a lot of homework,” “Ask my parent or other adult to take me to a physical activity or sport,” “Be physically active most days of the week.” Each item was scored on a 5-point Likert scale, anchored at 1 (not at all confident) and 5 (extremely confident). The items were then aggregated to form a composite measure of self-efficacy (internal consistency α = .83). Finally, principal components analyses with varimax rotation were conducted on the 4 items by gender, both of which extracted a single factor with loadings ≥ .76. The variance in the items accounted for by the factor was > 66% in both models.

Procedures

Parents and students received information letters, and parental consent was obtained using active consent. Furthermore, all students provided assent after signing on to the web-based survey. The anonymous 24 page survey took approximately 45 minutes to complete and was conducted during class time within the school day. Data collection occurred over 2 school terms between January and November 2005. All study procedures were approved by a university research ethics board and permission to conduct the research was received from each participating school board and school.

Analytical Strategy

Because our sample consisted of students (Level 1) who were nested within schools (Level 2), our analysis considered the potential problem of lack of independence among cases. In fact, the assumption of mean independence (ie, that the average PA levels are constant/ fixed across the schools) was violated. Unfortunately, violation of this assumption leads to standard error estimates (based on conventional statistical tests such as linear regression) that are too small and result in spuriously significant results. Consequently, we chose to conduct a multilevel analysis using hierarchical linear modeling (HLM). The advantage of this technique is that it allows regression intercepts to vary randomly across schools (ie, it allows for between-school variation in PA).

Before conducting the main analyses, however, the frequency of students nested within each school was examined to evaluate the statistical power of the analyses. Once completed, basic descriptives were calculated for the demographic and self-efficacy variables. Next, an intercept only model was conducted to calculate the intraclass (ICC) correlation for PA and self-efficacy to determine the need to account for the between-school variation in subsequent analyses. Then, to determine whether gender moderated the self-efficacy / PA relationship (ie, address purpose a), PA was regressed onto gender, age, BMI, self-efficacy, and a gender x self-efficacy interaction at Level 1 (see Table 2 for regression equation). Here, the intercept (ie, PA) was treated as random (ie, varied across schools), whereas the slopes were constrained to be fixed (ie, constant across schools based on preliminary analyses that showed the variance component for each of the predictors was nonsignificant). To address purpose b (ie, whether self-efficacy mediated the gender / PA relationship), the mediation procedure suggested by Krull and MacKinnon for level 1 mediational analysis was used, which required 3 separate analyses. The first analysis regressed PA onto gender controlling for age and BMI. The second analysis regressed PA onto gender and self-efficacy controlling for age and BMI. The third analysis regressed self-efficacy onto gender controlling for age and BMI. To establish mediation, the gender coefficient from regression #2 was multiplied by the self-efficacy coefficient from regression #3, which was statistically examined via the Sobel test. The intercept was treated as random and the slopes were constrained to be fixed for all 3 regressions (see Table 3 for detailed regression equations).

Results

The original sample contained 4887 students nested within 136 schools. However, 19 schools were removed because they had less than 8 students per school, which resulted in 4779 students nested within 117 schools. Fortunately, using the OpDes power program for HLM models with an effect size of .10, 117 schools, and 8 students per school resulted in a power of .80. Therefore, the analyses proceeded with this sample.

Descriptive statistics for the sample are presented in Table 1. According to the IOTF cut-offs, approximately 19% of students were overweight (13.5%) or obese (5.6%). A greater proportion of males students appeared to be overweight (16.9%) in comparison with female students (10.2%). Male students were more physically active (mean = 2.99, SD = 0.71) than females (mean = 2.79, SD = 0.63), F (1, 4300) = 96.44, P < .0001, and reported higher levels of self-efficacy for PA (mean = 2.99) than female students (mean = 2.79, SD = 0.89), F (1, 4425) = 64.28, P < .0001.

The intercept only models for PA and self-efficacy showed that both variance components were significant (P < .05). Specifically, the ICC for PA was .08 (ie, 8% of the variance in PA was at the school level, whereas 92% of the variance was at the individual level) and for self-efficacy was .02 confirming the need to account for between-school variation in our main analyses. In terms of the moderating analysis, the model accounted for 33.5% of the individual level variance in PA. Furthermore, the gender x self-efficacy interaction significantly predicted PA (β = .04) such that the self-efficacy/PA relationship was significantly stronger for the female, compared with male, students (see Table 2). With respect to the mediation analyses (Table 3), it was shown that self-efficacy partially mediated on the gender / PA association (β = - .07, P < .0001) such that
boys had significantly higher self-efficacy compared with girls, which resulted in significantly more PA.

**Discussion**

The objectives of this study were to determine if gender is associated with PA among youth and if this relationship is mediated by self-efficacy. Both self-efficacy and gender were found to be associated with PA with gender moderating the association between self-efficacy and PA. Specifically, the magnitude of the association was stronger for girls suggesting that self-efficacy may be more important for the PA of girls than boys. However, the results of our mediation analysis suggest that boys had significantly higher self-efficacy which resulted in them being more physically active than girls. Though a number of studies have documented gender differences in PA among adolescents, ours is among the first to demonstrate that these differences may be partially explained by self-efficacy.

Since our findings suggest that self-efficacy partially explains gender differences in PA then we should acknowledge that other factors, apart from self-efficacy, may more completely explain this relationship. But, within the context of our findings it is important to consider why self-efficacy explains even some of the association between gender and PA. According to Bandura, sources of information influence perceptions of self-efficacy: mastery experiences, vicarious experiences, verbal persuasion, and physiological states or emotion arousal. Mastery experiences are considered the strongest source of self-efficacy information. Though our study does not address the reasons why adolescent girls report lower levels of self-efficacy for PA, other research suggests that the quality of girls’ PA experiences are greatly influenced by the level of support they receive from peers and influential adults in PA settings. Girls’ accounts

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**Table 1** Descriptive Statistics for Physical Activity (PAQ-C), Self-efficacy, and Bodyweight

<table>
<thead>
<tr>
<th></th>
<th>Boys (n = 2222)</th>
<th>Girls (n = 2557)</th>
<th>Total (N = 4779)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years (SD)</td>
<td>13.64 (1.22)</td>
<td>13.63 (1.19)</td>
<td>13.63 (1.20)</td>
</tr>
<tr>
<td>Overweight (%)</td>
<td>16.9</td>
<td>10.2</td>
<td>13.5</td>
</tr>
<tr>
<td>Obese (%)</td>
<td>7.0</td>
<td>4.2</td>
<td>5.6</td>
</tr>
<tr>
<td>PAQ-C (SD)</td>
<td>2.99 (0.71)</td>
<td>2.79 (0.63)</td>
<td>2.88 (0.67)</td>
</tr>
<tr>
<td>Self-efficacy (SD)</td>
<td>3.52 (0.96)</td>
<td>3.29 (0.89)</td>
<td>3.40 (0.93)</td>
</tr>
</tbody>
</table>

**Table 2** Results From Analyses Examining the Moderating Effect of Gender on the Self-Efficacy/Physical Activity Relationship

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Parameter</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>γ₀₀</td>
<td>2.96</td>
<td>.03</td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>Slopes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>γ₁₀</td>
<td>−.07</td>
<td>.01</td>
<td>−.13</td>
<td>.000</td>
</tr>
<tr>
<td>Gender (0 = male)</td>
<td>γ₂₀</td>
<td>−.11</td>
<td>.02</td>
<td>−.08</td>
<td>.000</td>
</tr>
<tr>
<td>BMI</td>
<td>γ₃₀</td>
<td>−.01</td>
<td>.002</td>
<td>−.07</td>
<td>.018</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>γ₄₀</td>
<td>.35</td>
<td>.02</td>
<td>.49</td>
<td>.000</td>
</tr>
<tr>
<td>Gender × self-efficacy</td>
<td>γ₅₀</td>
<td>.04</td>
<td>.02</td>
<td>.04</td>
<td>.046</td>
</tr>
</tbody>
</table>

**Level 1:** PAQ-C = \( \beta₀ + \beta₁ [age] + \beta₂ [gender] + \beta₃ [BMI] + \beta₄ [SEFF] + \beta₅ [gender * SEFF] + rᵢ \)

**Level 2:**

\( \beta₀ = γ₀₀ + u₀ \)

\( \beta₁ = γ₁₀ \)

\( \beta₂ = γ₂₀ \)

\( \beta₃ = γ₃₀ \)

\( \beta₄ = γ₄₀ \)

\( \beta₅ = γ₅₀ \)

Abbreviations: B, unstandardized beta; SE, standard error; β, standardized beta; BMI, body mass index; PAQ-C, Physical Activity Questionnaire for Older Children; SEFF, self-efficacy.
of negative PA experiences include feelings of embarrassment, fear of letting down teammates, and teachers’ and coach’s negative attitudes toward girls’ skill levels.43,45,46 Furthermore, adolescent girls who participate in jumping and pivoting sports are 4 to 6 times more likely to experience knee injuries than males participating in the same type of sports.47 This gender difference in risk of injury is not apparent until after the onset of puberty and appears to be related to neuromuscular imbalances that then change the way girls land from a jump.47 On a related note, Thompson and colleagues48 have shown that gender differences in PA are eliminated once biological age, as opposed to chronological age, is taken into account. Basically, girls mature approximately 2 years before boys49 and this may be a critical factor in their PA participation. Thus, adolescent girls may feel less efficacious for PA because they have fewer opportunities for mastery experiences, have less support for PA, and experience more injuries in PA as a result of physiological factors. Recognizing that other factors may play a role in how gender is associated with PA, an implication of our findings is how self-efficacy for PA can be enhanced among young girls. Dzewaltowski and colleagues50 suggest that to promote self-efficacy, environments should be structured to encourage: connection, autonomy, skill building, and healthy norms (CASH). Specifically, girls should be engaged in environments where the group norm is healthy behavior and where they have a sense of belonging and control while allowing them to develop their skills. Thus, coed physical education programs that focus on competition are less likely to allow adolescent girls the opportunities to develop efficacy for physical activities. For instance, a qualitative study51 reported that girls said they would be more likely to engage in a new activity if their relationship with the physical education teacher was positive and not solely focused on skill acquisition and performance. Furthermore, girls express that feeling skilled at sport and adequate encouragement by peers and influential adults can help them overcome hesitation to participate and contribute to their sustained involvement in PA.44,45 This is reflected by the finding that adolescent girls are more likely to participate in structured physical activities, such as sports and PA classes, if they report higher levels of self-efficacy for PA and higher enjoyment of physical education classes.52 Similar to the LEAP intervention,27 future studies should attempt to enhance self-efficacy of girls for PA by influencing the components of CASH50 and include qualitative assessments of girls’ experiences and perspectives on how the program may have influenced self-efficacy.

Table 3  Results From Analyses Examining the Mediating Effect of Self-Efficacy on the Gender/Physical Activity Relationship

<table>
<thead>
<tr>
<th>Parameter</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>R²</th>
</tr>
</thead>
</table>
| Regression #1 gender → PAQ-C | γ₁₀ | −.22 | .03 | −.16* | .05  
| Regression #2 gender → PAQ-C | γ₁₀ | −.11 | .02 | −.08* | .04  
| SEFF → PAQ-C | γ₁₀ | .37 | .01 | .51* | .33  
| Regression #3 gender → SEFF | γ₁₀ | −.26 | .04 | −.14* | .04  
| Mediation effect | γ₁₀(#2) × γ₁₀(#3) | −.10 | −.07* |  

Final HLM models

Regression #1

Level 1: PAQ-C = β₀ + β₁j [sex] + β₂j [Body mass index] + β₃j [age] + rᵢ

Level 2:

β₀ = γ₀₀ + u₀
β₁ = γ₀₁
β₂ = γ₀₂
β₃ = γ₀₃

Regression #2


Level 2:

β₀ = γ₀₀ + u₀
β₁ = γ₀₁
β₂ = γ₀₂
β₃ = γ₀₃
β₄ = γ₀₄

Regression #3

Level 1: SEFF = β₀ + β₁j [sex] + β₂j [Body mass index] + β₃j [age] + rᵢ

Level 2:

β₀ = γ₀₀ + u₀
β₁ = γ₀₁
β₂ = γ₀₂
β₃ = γ₀₃

*P < .001.

Abbreviations: B, unstandardized beta; SE, standard error; β, standardized beta; PAQ-C, Physical Activity Questionnaire for Older Children; SEFF, self-efficacy.
The levels of PA observed in our study are similar, though slightly lower, than those reported by other studies using the PAQ-C with Canadian youth. For instance, the mean PAQ-C score for our total sample was 2.88 in comparison with 3.24 reported by Crocker and colleagues. When considered by gender, our mean PAQ-C scores of 2.99 (males) and 2.79 (females) are lower than those reported by both Crocker and colleagues (males = 3.44; females = 2.96) and Thompson and colleagues (males = 3.11; females = 2.71). However, these differences are likely explained by the fact that our sample is older on average than those included in the 2 studies. In addition, the rates of overweight (13.5%) and obesity (5.6%) observed in our study are very similar to those from a large population based study, using self-reported height and weight, where approximately 19% of Canadian children were overweight or obese.

Limitations of this study include the cross-sectional design, use of self-report measures, and the sampling protocol. The cross-sectional design prevents the assessment of temporal causality. So, consistent with the idea of triadic reciprocity, whereas self-efficacy influences children’s PA, it is also likely that children who are more active perceive they have more control and feel more efficacious about their ability to be physically active. The use of self-reports of behavior is a common critique of studies such as ours. We tried to address this issue by using previously validated measures of PA and self-efficacy. Furthermore, our tests of validity and reliability found very little difference between actual measures of height and weight and self-reports on Web-SPAN. Finally, though the schools involved in our study were selected through a stratified sampling process, the children in those schools came from intact classes that were not necessarily selected at random. Our statistical analysis (ie, HLM) allowed us to account for any nesting effects that may have existed at the level of the school, however it would not have addressed nesting effects at the level of the class. The fact that our sample demonstrated similar levels of PA and overweight to other Canadian studies, gives us some confidence in its representativeness.

The strengths of this study included the large sample, the use of validated questionnaires to assess PA and self-efficacy, and the statistical analysis that controlled for potential nesting effects. Though some may consider our use of a web-based platform for data collection as a limitation, we believe it was another strength of this study. It allowed for mass data-collection without imposing too much of a burden on the students and reduced data entry time and errors. In fact, many teachers incorporated these sessions into their regular computer or health classes. Our tests of validity and reliability found no difference between paper and pencil and web-based reports of PA and various correlates (eg, self-efficacy). Similarly, Pealer and colleagues found no significant differences in demographics, response rates, item completion, and item completion errors between undergraduate students who completed a health risk behavior survey either online or through a traditional paper questionnaire. Furthermore, the web participants were more prone to reveal potentially embarrassing or sensitive information than participants in the mail survey group. Additional studies have found that the response bias associated with web questionnaires was no greater than that associated with paper questionnaires and suggest that web-based tools provide benefits such as widespread accessibility and economic efficiency.

In sum, our findings suggest that self-efficacy is an important correlate of PA among adolescent girls, but that boys are more physically active because they have more self-efficacy for PA. Thus, programs promoting PA should consider how to foster mastery experiences in supportive environments for adolescent girls.

Acknowledgments

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