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Predictive Utility and Cut Point of the Physical Activity Questionnaire - Children for Differentiating Youth Meeting Moderate to Vigorous Physical Activity Recommendations Using Accelerometry

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Abstract

Objective: Moderate-to-vigorous physical activity (MVPA) is associated with a host of health benefits. As researchers continue to develop an understanding of what keeps young people from meeting physical activity recommendations, there is a need to develop efficient and cost-effective measures that can accurately distinguish youth who meet guidelines from those who do not. Therefore, the current study aims to evaluate the utility of the Physical Activity Questionnaire for Children (PAQ-C) in predicting accelerometer-derived estimates of MVPA.

Method: The final sample included 184 youth between the ages of 8 – 12, who completed self-report measures and wore an accelerometer for two weeks. Binary logistic regression was performed to evaluate the relationship between PAQ-C composite score and MVPA recommendation status. Receiver operating characteristics analysis was performed to identify an optimal cut value for the PAQ-C.

Results: Age and gender demonstrated small, but significant associations with meeting MVPA recommendation status. Specifically, females and older participants were less likely to meet MVPA recommendations. PAQ-C was also identified as a significant predictor of youth meeting MVPA recommendation status. The area under the curve was found to be .76. A cut value of 3.34 was found to optimize both specificity (.70) and sensitivity (.76). Participants at or above this value can be classified as having met MVPA recommendations.

Conclusions: The PAQ-C was found to be a useful measure for predicting youth meeting MVPA recommendations. Researchers can use these findings to determine if participants are meeting MVPA recommendations of 60 or more minutes of MVPA per day by evaluating if participants meet or exceed the identified PAQ-C cut point. Future studies should continue to establish the

predicative utility of the PAQ-C for youth experiencing chronic health conditions, such as obesity.

Introduction

Engagement in physical activity is associated with several positive outcomes for youth, including decreased risk for cardiovascular and metabolic disease development (Poitras et al., 2016), via biological pathways such as improved bone density, decreased inflammation, and improved hormonal regulation (Warburton et al., 2006). Specifically, researchers suggest that physical activity intensity is key to maximizing these health benefits. As noted by Carson et al. (2013), moderate-to-vigorous physical activity (MVPA) has demonstrated stronger associations with these health benefits compared to light physical activity. MVPA is defined by high levels of energy and oxygen use and includes activities such as jumping rope, swimming, or jumping on a trampoline (Butte et al., 2018).

Because of these benefits, national guidelines for MVPA have been issued, with organizations such as the Department of Health and Human Services suggesting that youth between the ages of 6 and 17 should engage in at least 60 minutes of MVPA per day (Piercy et al., 2018). Unfortunately, it has been noted that approximately 80% of children do not meet these recommendations (Guthold et al., 2020). Given the evident benefit of engagement in MVPA, researchers should aim to assess potential factors that could be modified to increase engagement in MVPA or that may explain the youths' difficulties in meeting recommendations.

A potential bottleneck in pursuing this line of research are the inherent challenges associated with physical activity measures. Gold-standard strategies, such as the double labeled water method, provide the most objective estimates of child energy expenditure (Corder et al., 2008). However, this strategy is limited by its cost and mobility, making it undesirable for community-wide research. Two other popular measures used to assess child physical activity are accelerometers and self-report questionnaires. Accelerometers are small devices, most often

worn on the wrist or hip, which aggregate child movement by measuring acceleration and direction in three-dimensional space (Corder et al., 2008). These devices are ideal in many ways and remove barriers, such as participant recall and potential social-desirability bias. Despite the benefits of accelerometry, there are still drawbacks that limit their use in community research settings. Modern research-grade accelerometers can be costly (Corder et al., 2008). Further, research requiring the mailing of accelerometers — such as research with rural participants — potentially lends itself to non-optimal data collection (e.g., nonadherence), given that the research team is not available in person to provide assistance with device location and placement. Further, mailing of devices can add additional overhead costs or increase the likelihood of the device being lost in transit. Given their lack of accessibility and the time required to successfully process accelerometer data, healthcare providers are limited in their ability to use these devices to screen youth and provide useful recommendations.

Self-report measures have the benefit of being cheap, easily accessible, and often require minimally complex scoring procedures. Several self-report measures for child physical activity exist, but one of the most popular is the Physical Activity Questionnaire for Older Children (PAQ-C). Developed by Kowalski and colleagues (2004), the PAQ-C is designed for children between the ages of 8 and 14, and asks about frequency and intensity of physical activity in the past seven days. Early studies demonstrated that the PAQ-C had acceptable internal consistency (a = .80), and test-retest reliability for both males (r = 0.75), and females (r = .82; Kowalski et al., 2004). Further, as noted by Kowalski et al. (2004), this measure is cheap, easy to use and score, and is specifically designed for use in large-scale data collection.

Thus, several researchers have begun to examine the relationship between PAQ-C composite scores and their ability to differentiate children who meet MVPA recommendations

from those who do not. For example, recent study results from de Castro et al. (2024) demonstrated that PAQ-C scores were significantly associated with meeting MVPA guidelines (measured using accelerometry) among a sample of children in Brazil who had been diagnosed with HIV. Further, it was noted that a PAQ-C cut point of 2.151 was significantly better than chance at differentiating children who met physical activity recommendations versus those who did not. Similar results using comparable methods have been noted in earlier studies with samples from Spain (Benítez-Porres et al., 2016), Canada (Voss et al., 2017), Morrocco (Baddou et al., 2023), and Italy (Lupo et al., 2022). However, the ability of the PAQ-C to differentiate between children who meet MVPA recommendations and those who do not has received limited attention in the United States.

Thus, the current study aims to explore the relationship between the PAQ-C and whether children located in the United States meet MVPA recommendations issued by the Department of Health and Human Services (i.e., at least 60 minutes per day). We will classify meeting MVPA recommendations using accelerometry, which is a more objective measurement of physical activity. We hypothesize that the PAQ-C will be significantly associated with whether or not participants met MVPA recommendations, such that higher scores will predict increased probability of meeting recommendations. Further, in exploring this relationship, a cut point will be proposed. This cut point will be beneficial to researchers who want to identify research participants who either meet or do not meet MVPA recommendations using a cheap and easily deployable measure. In doing so, they will be able to explore contextual and interpersonal factors associated with their MVPA guideline status.

Method

Data for the current study came from a larger project assessing the relationship between child dog ownership and physical health outcomes. Thus, this retrospective study and associated analyses were not formally pre-registered. However, data, analytical code, and other materials from this study can be shared upon reasonable request and as allowable by Texas Tech University's Institutional Review Board (IRB) standards.

Procedure

Participants from the general population in the Southwestern United States were recruited via community events, email lists, and flyers. Inclusion criteria for participants required youth to be between the ages of 8–12. Further, given the larger study's aim of examining the relationship between dog ownership and health outcomes, interested participants with a dog must have owned the pet for at least six months. The final convenience sample consisted of 226 participants.

Youth and their caregivers signed assent and consent forms and had the option to complete in-person study questionnaires under the supervision of a research assistant, either in a designated lab space or at the participant's home. Selected questionnaires provided information regarding demographics, mental health, family dynamics, and physical health. Following the completion of questionnaires, participants were provided with an accelerometer (ActiGraph wG3Tx-BT; ActiGraph LLC., Pensacola, USA) to wear for two weeks to monitor sleep and physical activity. Study research assistants provided instruction in appropriate wear and care of the accelerometer and answered any participant questions. Participants also took home a sleep diary to complete each day during the study. At the end of the two weeks, participants completed a self-report physical activity measure and returned the accelerometer and sleep diary. It should be noted that participants were asked to report on the previous seven days' physical activity. So,

if the form was given to participants on a Tuesday, participants would start their seven-day recall beginning on Monday. Since participants differed in their time of day when forms were picked up, this strategy was used to produce more equivalent estimates of full-day physical activity. Participants were compensated $20 for completing the initial questionnaires, and another $20 after successfully returning the accelerometer.

Participants

Participants were 226 youths between the ages of 8–12, residing in the Southwestern United States. Further, a plurality of participants identified as White (n = 89, 47.8%), and male (n = 94, 50.5.1% male) and had a mean age of 9.58 (SD = 1.33). A more detailed breakdown of participant demographic information can be found in Table 1.

Measures

Demographic Questionnaire

Both the participants and their parents completed this form to provide information regarding age, gender, ethnicity, and socioeconomic status. Participants noted their age in years and also reported their gender identification and self-reported ethnicity, with options to free-write their gender identity and ethnicity if they preferred. Finally, to measure socioeconomic status, participants were asked to rate themselves in comparison to their classmates on a scale from 1 – 10, with 1 being the classmates who have the least money and 10 being the classmates who have the most money. Both age and socioeconomic status were treated as continuous variables, while gender and ethnicity were treated as categorical.

Physical Activity Questionnaire for Older Children (PAQ-C)

The PAQ-C (Kowalski et al., 1997) is a 10-item self-report measure of general child physical activity and represents the index test in the current study. The first item asks children to

rate their participation in various activities and sports (e.g., walking, swimming, basketball) from 1 (*None)* to 5 (*7 times or more)*. Questions 2 through 8 ask about activity during free time (e.g., recess, after school), with 1 representing less intense activity (e.g., *Sat down*), and 5 representing more intense activity (e.g., *Ran and played hard most of the time*). Question 9 asks about activity that occurs during each day of the week on a scale from 1 (*None)* to 5 *(Very Often)*. Finally, question 10 allows participants to write down qualitative information regarding anything that kept them from doing their normal physical activity, such as illness. Then, the scores for items 1–9 are averaged to form a composite score that ranged from 1 to 5. Of the final sample, two participants had some missing data on their PAQ-C, which means that a final composite score could not be calculated. Thus, these participants were dropped from further analysis.

Accelerometer

Accelerometry was used as the reference standard for the current study given its widespread use and relative objectivity compared to other assessments of physical activity (e.g., self-report). Each participant was provided with an accelerometer to wear for two weeks. However, only the seven days used by the PAQ-C recall period were used to derive physical activity estimates. Devices were initialized to record activity using 60 second epochs, which is common in child accelerometer research (Cain et al., 2013). The primary author then validated the wear time for each file within ActiLife software using an algorithm described in detail by Troiano et al. (2008). The minimum wear time per day was defined as 200 minutes.

To be included in the sample, participants needed to have at least five valid wear days in order to increase the chance that both weekday and at least one weekend day were being captured, providing less biased estimates of physical activity (Cain et al., 2013). MVPA was classified as any count value of 9,805 or greater within each epoch (Chandler et al., 2016). The

number of these counts were then summed to provide total minutes of MVPA over the course of seven days. Then, this total score was divided by the number of valid wear days to provide an estimate of average minutes of MVPA per day. Based on the prespecified recommendations from Department of Health and Human Services (Piercy et al., 2018), participants with a resulting value greater than or equal to 60 were coded as having met MVPA recommendations. Participants whose value was below 60 were coded as not having met MVPA recommendations. After removing participants who had fewer than five valid wear days, the final sample decreased from 226 participants to 186 participants.

Data Analysis Plan

Analyses were conducted in SAS software version 9.4 (SAS Institute, Cary, NC). Nonparametric Spearman correlation statistics (i.e., ρ) were calculated to evaluate the relationship between MVPA guideline status, PAQ-C score, and potential covariates including age, gender, and socioeconomic status. Relationship between ethnicity and meeting MVPA guidelines was evaluated using the χ^2 statistic. Only gender and age were associated with MVPA recommendation status and were included in subsequent models. Part of the early validation work for the PAQ-C examined differences in composite scores between various demographic variables (e.g., gender; Kowalski et al., 1997). To extend this work, analysis of variance (ANOVA) tests were performed to determine whether PAQ-C scores differed across age, socioeconomic status, ethnicity, and day of the week the measure was completed. Further, to test the relationship between varying levels of MVPA and PAQ-C score, an ANOVA was performed to test for differences within three groups, defined as: (1) participants who accrued less than one standard deviation of total MVPA minutes (<160.22, $n = 29$) across the study period, (2) those who accrued more than one standard deviation of total MVPA minutes (>579.19, $n = 23$) across

the study period, and (3) those between or equal to these values (n = 132). An independent-samples t-test was used to evaluate PAQ-C score differences across gender. Binary logistic regression was implemented to test the hypothesis that increases in PAQ-C composite scores are associated with increased odds of meeting physical activity recommendations, controlling for age and gender. For all analyses, participants who did not meet MVPA recommendations, and males, were coded as the reference groups (0), while participants who met MVPA recommendations, and females, were coded as the comparison groups (1).

Unlike the contemporary adult International Physical Activity Questionnaire, there is no conclusive PAQ-C cut point score to denote children who are likely to meet physical activity recommendations. Thus, the area under the curve (AUC) was used to quantify the current model's classification ability, with larger AUC values representing better predictive ability of the model (Agresti, 2013). The estimate of AUC was determined to be acceptable (e.g., model provides reasonable predictive ability) if greater than .7, and if its confidence interval did not cross .5 (Youngstrom, 2014). In addition, sensitivity, specificity, positive and negative predictive values, and accuracy were all estimated to evaluate model performance. Further, a cut point score that maximized the tradeoff between sensitivity and specificity using Youden's J, calculated as (sensitivity + specificity) – 1 (Mitchell et al., 2021), was estimated.

Outliers were examined using Pearson's standardized residuals. Any residual above two was considered a possible outlier based on recommendations from Agresti (2013). Sensitivity analyses were performed to test the influence of potential outliers by estimating separate models with and without outliers included in the data set. Model fit was assessed statically using the Hosmer-Lemeshow test. Broadly speaking, this test partitions participants into groups, often 10, of roughly equal size based on a continuous predictor variable. The logic of the χ^2 statistic is then

used to evaluate if the predicted probability of each group significantly differs from the observed probability (Agresti, 2013). Finally, the Akaike Information Criterion (AIC) was evaluated for both the intercept only and with-covariates models to test if the addition of covariates improved relative model fit compared to just guessing the base rate of those who met MVPA recommendations. Results were deemed statistically significant at $p < .05$.

Results

Preliminary Analyses

Of the 186 participants with greater than five days of physical activity, only two did not complete the PAQ-C, resulting in a final sample size of 184. As expected from prior literature, a minority of participants met MVPA recommendations ($n = 64$, 35%). Participants who met MVPA recommendations had an average PAQ-C score of 2.76 ($SD = .78$), while those who did not meet MVPA recommendations had an average PAQ-C score of 2.36 ($SD = .75$). Correlation estimates can be found in Table 2. Results indicated that both age ($\rho = -.25$, $p < .01$), and gender ($\rho = -.20$, $p < .01$) demonstrated weak but statistically negative associations with MVPA recommendation statuses and that socioeconomic status was not associated with MVPA recommendation status ($\rho = .00$, $p = 1.00$). These correlations indicate that females and older participants were less likely to meet MVPA recommendations. PAQ-C scores demonstrated a significant, weak, and positive association with MVPA recommendations status ($\rho = .26$, $p < .01$). The χ^2 test suggested that there were no differences between participants based on ethnicity in terms of meeting MVPA guidelines ($\chi^2[7] = 6.9$, $p = .44$).

Further, the PAQ-C score was statistically equivalent across all identified demographic variables as demonstrated by nonsignificant ANOVA estimates for age ($F[4, 179] = 1.99$, $p = .10$), socioeconomic status ($F[9, 168] = .61$, $p = .79$), and ethnicity ($F[4, 178] = 1.59$, $p = .18$).

PAQ-C score did not differ on which day of the week that participants completed the measure (F[6, 176] = .71, p = .64) or for varying levels of MVPA (F[2, 181] = 2.05, p = .13). Further, males (M = 2.54, SD = .85), and females (M = 2.46, SD = .72) also did not differ regarding their PAQ-C composite scores (t[182] = .66, p = .51). Taken together, the PAQ-C score performed statistically similar across identified demographic variables and participants with varying amounts of total time spent in MVPA.

Logistic Regression

Binary logistic regression results are summarized in Table 3. The PAQ-C asks participants "Were you sick last week, or did anything prevent you from doing your normal physical activities," and allows for the selection of either "yes" or "no." To evaluate the influence of this question, sensitivity analyses were performed by removing all participants who answered "yes" (n = 43). Notably, all inferences remained statically significant and did not change regarding their general magnitude. Qualitatively speaking, participants did not exclusively select "yes" because they were sick or engaged in *less* physical activity than usual. For example, one participant who selected "yes" indicated that they were "helping dad move," potentially explaining why this item did not have an impact on the model. Thus, all participants were included in the final model estimates reported below. Overall, results indicated that the PAQ-C composite score was a significant predictor of MVPA recommendation status (p < .001), with an adjusted odds ratio of 2.14 (95% Wald Confidence Interval [CI] [1.36, 3.38]), controlling for age and gender. Thus, for every one-unit increase in PAQ-C score, there are 2.14 times the odds of meeting MVPA recommendations. Gender was also a significant predictor of MVPA recommendation status (p < .001), with an odds ratio of 2.71 (95% Wald CI [1.36, 5.38]), meaning males had 2.71 times the odds of meeting MVPA recommendations, compared to

females (controlling for PAQ-C score and age). Finally, age was also found to be a significant predictor of MVPA status (p = .004), with an odds ratio of .57 (95% Wald CI [.43, .76]), controlling for PAQ-C score and gender. This would suggest that for every one-year increase in age, there is a 43% decrease in the odds of meeting MVPA recommendations. To summarize findings regarding covariates, females and older participants were less likely to meet MVPA recommendations.

Out of the 184 residuals, 6 were found to exceed this cut point, with values of 2.15, 2.19, 2.29, 2.7, 2.88, and 3.93. To determine the impact of these outliers on the above estimates, they were removed, and analyses were performed again. Model estimates were not significantly different, so as to not overfit the model, these outliers were retained to better reflect potential normative variations in responses. Further, AIC values were only marginally different between the full model (AIC = 210.96) and the model with outliers removed (AIC = 206.46). Given these similarities and the lack of theoretical rationale for removing the values (e.g., no evidence of participant or researcher error), analyses including the identified outliers are reported above.

Regarding the final model, fit indices indicate the model with covariates (AIC = 210.96) performed better than the intercept-only model (AIC = 239.76). Finally, the results of the Hosmer-Lemeshow test also suggest adequate model fit ($\mathcal{X}^2[8] = 4.84$, p = .77).

Diagnostic Accuracy and Cut Point

The Receiver Operating Characteristic (ROC) curve can be seen in Figure 1. Both the PAQ-C score and associated covariates (i.e., gender and age) regression coefficients were used to estimate the predicted probabilities necessary to calculate the AUC, which was .76 (95% Wald CI = [.69, .83]). Thus, 76% of participants who met MVPA recommendations according to their accelerometer data had a higher PAQ-C score compared to those who did not. Table 4 includes

the cross tabulation of whether participants met MVPA recommendations measured via accelerometry by how well they were predicted by the final model. The identified sensitivity (i.e., true positive rate) was estimated to be .77 and the specificity (i.e., true negative rate) was estimated to be .70. Further, both the positive predictive value and the negative predictive value were calculated using the prevalence rate of those who met MVPA recommendations in the current sample (.35). The positive predictive value was estimated to be approximately 0.88 while the negative predictive value was estimated to be about .99. Finally, our accuracy was also estimated to be about .70, which suggests there is a 70% chance that the final model correctly classified a participant as meeting MVPA recommendations. Youden's *J* was used to identify an optimal cut point value. The cut point that maximized the ratio between sensitivity and specificity was estimated to be 3.34, which can be used to classify whether participants met MVPA recommendations. Specifically, participants at or above this can be classified as having met MVPA recommendations.

Discussion

The current study aimed to evaluate the relationship between the PAQ-C and whether children met MVPA recommendations in the context of relevant covariates in a nonclinical sample of children between the ages of 8 and 12 in the Southwestern United States. Further, a PAQ-C cut point score was proposed to reliably differentiate between youth who meet MVPA recommendations. Results indicated that both age and gender were significant predictors of meeting MVPA recommendations, with both females and older children being less likely to meet MVPA recommendations, compared to males and younger children.

Similarly, PAQ-C scores significantly predicted meeting MVPA recommendations. ROC analysis was used to produce a cut point score of 3.34.Youth who score 3.34 or greater on the

PAQ-C can be classified as having met MVPA recommendations issued by the Department of Health and Human Services of 60 or more minutes of MVPA per day (measured via accelerometry). Youth at or above this cut point would be classified as having met these recommendations with 70% accuracy. These results are similar to those reported in nonclinical samples who explicitly used the PAQ-C (Lupo et al., 2022). Therefore, PAQ-C can be used in the context of community-based research within this region of the United States to identify youth meeting MVPA recommendations. Due to its cost, ability to be disseminated, and its ease of use and scoring features, it presents a potential alternative when other measures, such as accelerometry, are not viable.

This study expands on previous literature by including potential covariates that have traditionally been associated with differences in physical activity engagement. Specifically, preliminary correlation analysis indicated that both age and gender had relatively small but significant associations with meeting MVPA recommendations. Though these covariates have been explored in previous studies evaluating the relationship between the PAQ-C and accelerometer derived MVPA (Baddou et al., 2023; Benítez-Porres et al., 2016; de Castro et al., 2024; Lupo et al., 2022), they have not frequently been included in ROC analyses and subsequent proposed cut point values, making the generalization of these cut point points to their intended population questionable.

Relatedly, the current study's reported ROC analysis demonstrated that the PAQ-C is a useful measure in differentiating youth who met MVPA recommendations. The AUC was well within the acceptable range (Youngstrom, 2014) and the confidence interval did not cross .5, suggesting the current prediction is better than chance alone. Additionally, the reported true

positive (sensitivity = .77) and true negative (specificity = .70) rates are higher than previous nonclinical studies, likely due to capturing additional sources of variance, as noted above.

However, it should be noted that several limitations exist. First, the age range of the current sample is relatively narrow. Therefore, even though the PAQ-C was developed to be used for children between the ages of 8 to 14, whether the proposed cut point value generalizes to the upper bound of the intended population (i.e., youth aged 12–14) remains an empirical question. Though the PAQ-C remains a widely used measure, a true factor structure remains elusive. For example, Makai and colleagues' (2023) findings supported a one-factor structure in their sample of 620 children from Hungary. Others, such as Thomas and Upton (2014) found that a two-factor structure was better supported in their sample of 336 children living in the United Kingdom. It is possible that individual items within the PAQ-C function differently as a result of cultural differences (Moore et al., 2007). Though there are no statistically significant differences for composite PAQ-C scores across demographic variables in the current study, future research should aim to explore the underlying factor structure and potential differential item functioning within the same sample context. Relatedly, while the current study considered several covariates, other factors, such as geographic variables, were not explicitly modeled. In addition, the proportion of participants who met MVPA recommendations in the current study, about 35%, is significantly greater than the proportion of participants who meet MVPA recommendations according to the global population, about 20% (Guthold et al., 2020). As a result, the overall estimates of diagnostic accuracy may be slightly inflated relative to what global estimates would be because calculations such as positive and negative predictive value rely on the base rate of the identified event (e.g., met MVPA recommendations). Finally, it should be noted that while accelerometers are typically considered an “objective” measure of physical activity (Reilly et al.,

2008), features of its use remain subjective in nature. For example, the selection of cut points with which to distinguish levels of physical activity can vary. In fact, as noted by Cain et al. (2013), there were 11 different cut point recommendations available from 2009–2010 for classifying child physical activity using accelerometry. Further, the literature is still inconclusive regarding definitions of valid wear days and times (Cain et al., 2013). Though this study seeks to improve these shortcomings by specifically listing the definitions for valid wear time and days and referencing physical activity cut point values (Cain et al., 2013; Chandler et al., 2016), it is possible the use of different definitions may impact results.

Overall, the current study builds on existing research (Baddou et al., 2023; Benítez-Porres et al., 2016; de Castro et al., 2024; Lupo et al., 2022; Voss et al., 2017) by examining the predictive validity between child-reported assessments of physical activity using the PAQ-C and whether children met MVPA guidelines measured using accelerometry. Further, the current study identified a cut point value of 3.34 as being sufficient for differentiating youth who successfully met MVPA recommendations. These findings may be of clinical interest for psychologists or other health care workers for screening purposes. For example, screeners for adjacent health behaviors, such as sleep, are becoming more common place in primary care settings and have resulted in increased follow-up for additional testing for pediatric sleep problems (Williamson et al., 2025). Given the negative correlation between participation in MVPA and cardiometabolic disease, health care workers can use the PAQ-C as a potential screening aid for identifying youth not meeting MVPA recommendations, subsequently enhancing preventive care.

In addition, researchers interested in correlates of youth MVPA engagement can use this free measure to examine group differences in their samples. In line with work already done by others (de Castro et al., 2024; Voss et al., 2017), future efforts should continue to examine the

relationship between the PAQ-C and accelerometer data in youth living with chronic health conditions. For example, as noted by the American Academy of Pediatrics (Hampl et al., 2023), increasing the frequency of physical activity is a critical component of a pediatric obesity treatment planning. If meeting MVPA recommendations is identified as a key end point for treatment, the PAQ-C might prove to be a useful benchmark of treatment progress, providing that its utility is first established within this population.

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