



Parents accurately perceive problematic eating behaviors but overestimate physical activity levels in preschool children

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Abstract

Purpose The aim of this study is to examine the associations between parents' perceptions of their child's physical activity and eating behaviors to actual physical activity, body mass index percentage (BMI%), and body fat percentage (BF%). A secondary aim is to examine additional parental determinants to child's physical activity.

Methods Participants were preschool children ($N = 114$, 59 females, $M_{\text{age}} = 4.06$) from three University-sponsored centers and parents ($N = 114$, 107 mothers). Parents self-reported physical activity, perceptions of child's physical activity, and completed "The Child Eating Behavior Questionnaire". Children physical activity was collected with accelerometers.

Results Whereas 97% of the 68 parents with children meeting physical activity guidelines accurately identified their child as active, 93% of the 14 parents with children not meeting physical activity guidelines inaccurately identified their child as active ($\chi^2(1, N = 82) = 0.58, p = 0.446$). Regarding eating behaviors, child BMI% was moderately correlated with parent's perceptions of their child's Emotional Overeating ($r(74) = 0.416, p < 0.001$) and Food Responsiveness ($r(74) = 0.543, p < 0.001$). Parent's engagement in vigorous physical activity demonstrated a positive relationship to child's physical activity ($r(78) = 0.297, p = 0.008$).

Conclusion Parents of inactive children have inaccurate perceptions of their child's physical activity. The association between children's BMI% and eating behaviors indicates parents can accurately perceive problematic eating behaviors. Parents, who accurately perceive their child's behaviors, may be in a better position to identify deficiency and seek early intervention. Additionally, parent's physical activity may have implications to children's physical activity.

Level of evidence Level V: Descriptive cross-sectional study.

Keywords Parental perceptions · Preschool children · Physical activity · Eating behaviors

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Introduction

Rates of obesity and overweight for preschool populations across the United States is a concern and continues to rise. According to the 2015–2016 National Health and Nutrition Examination Survey (NHANES), the obesity rate for children ages 2–5 increased from 8.4% in the 2011–2012 NHANES to 13.9% [1]. Being overweight or obese is a serious health concern for children between 2 and 5 years and has been associated with numerous negative health risks including cardiovascular, metabolic, and psychological issues [2, 3]. Research has continually supported the imperative role of both physical activity and eating behaviors on obesity and overweight [4].

Unfortunately, many preschool children have low physical activity levels and display poor eating behaviors. The 2018 Physical Activity Guidelines for Americans recommend that

children 3–5 years old should be active throughout the day but did not include specific recommendations [5]. However, the National Academies of Science (formerly known as the Institute of Medicine), the Australian Department of Health and Ageing, and The Chief Medical Officers from the United Kingdom recommend that children ages 2–5 years should accumulate 3 h of moderate to vigorous physical activity (MVPA) per day [6, 7]. In the United States, only 50% of children are meeting the guideline of accumulating 3 h of MVPA per day [8], thus demonstrating that young children are not sufficiently active throughout the day. These findings are derived from objective measurements of physical activity, a method that is often used to measure physical activity indirectly. One such example are accelerometers, a small device worn on a person's hip, wrist, or ankle, used to measure frequency, intensity, and duration of physical activity over specified time intervals. Accelerometers are often recommended as they are the most reliable objective measurement of physical activity [9]. Problematic eating behaviors are also a concern in preschool children [10]. Food responsiveness (i.e. eating in response to food stimuli regardless of state of hunger), enjoyment of food, and emotional overeating are related to a higher body mass index (BMI) in preschool children [10, 11], while emotional overeating is also associated with higher BMIs in older children [12].

Interventions that target obesity in preschool populations have the potential to be more effective by establishing healthy habits from an early age [13]. Incorporating parents is one of the most critical components of effective preschool interventions [14]. Parents are generally the most influential individuals in their child's daily life, have the most contact hours with their child, and are their main role models [15, 16]. Parents' have the most control over their child's physical activity behaviors [16] and eating behaviors [17].

In understanding the role parents play in influencing physical activity and eating behaviors, it is essential to take into account parents' perceptions and determinants [18, 19]. Limited research has examined parental perceptions of physical activity in preschool children [20]. Hesketh et al. asked parents ($N=478$) of children aged 4 years "Would you describe your child as physically active?" with responses on a five-point Likert scale and compared responses to the child's actual physical activity measured with Acti-hearts [20]. While, 60% of parents accurately reported their child's behaviors, 90% of parents of inactive children inaccurately perceived their child as active [20]. In older populations (children and adolescents aged 8–18 years) findings are similar; parents generally overestimate their children's physical activity levels, while parents of inactive children are even more likely to have inaccurate perceptions [21–23]. Also, parents do not express concern about their child's low physical activity levels [24–27] and misperceive other health behaviors such as child's weight status and diet [27].

Understanding parental determinants on physical activity is also warranted as current research has shown conflicting findings in preschool populations due to heterogeneity across studies [15, 16]. A comprehensive meta-analysis conducted by Yao and Rhodes found that parental support and modeling was modestly related to their child's physical activity [16]. Schmutz et al. in a large-scale cross-sectional study ($n=394$) on correlates of preschool physical activity measured by accelerometry did not find any association between parental physical activity or physical activity participation and children's physical activity [28], while other research has found parental support of physical activity is associated with their children's physical activity levels and involvement [29].

For eating behaviors, research has shown parents' perceptions of their child's or preschool child's diet are inaccurate, as they tend to overestimate the amount and quality [27, 30–32]. However, when examining the validated Child Eating Behavior Questionnaire (CEBQ) [33], parents of preschoolers generally identify specific eating behaviors in their child that have been found to be associated with higher BMIs and weight status [10, 12]. Subscales of the CEBQ (Food Responsiveness, Enjoyment of Food, and Emotional Overeating) are associated with faster eating rates and greater total energy intake [34] and are significantly correlated with BMI scores [11]. There is a possibility that parents can identify problematic eating behaviors but may not understand the impact of these eating behaviors.

Most of the literature that addresses parents' perceptions of their child's health behaviors has focused on how parents perceive their child's weight status [35, 36], not physical activity nor eating behaviors. When parents underestimate their child's weight status it negatively influences the parent's decision to seek early intervention [35]. This unfavorable pattern can occur in parents' perceptions of physical activity and eating behaviors, thus not seeking early intervention or support to support positive health behaviors in their child.

We must rely on parents to report on their child's health behaviors when using survey research [37], justifying the need to examine parents' perceptions and determinants. The primary aim of the current study is to examine the relationships and agreement between parents' perceptions of their child's physical activity and eating behaviors to their child's objectively assessed physical activity behaviors and BMI percentage (BMI%) and body fat percentage (BF%). Based on previous research [10, 12], we expect that parents will correctly perceive problematic eating behaviors associated with higher BMI% and BF% but will not accurately report their child's physical activity levels [20]. A secondary aim of this study is to examine parental determinants on their preschool child's physical activity. We expect parent's physical

activity to be positively associated with their child's physical activity [16, 29].

Materials and methods

Procedures

This study is a secondary analysis of data collected for the Self-Regulation and Obesity Risk Study that was approved by the University of Michigan's Institutional Review Board (HUM00108917). A cross-sectional design was used to examine the relationship between self-regulation and physical activity on obesity risk. Data were collected at three early learning centers located in the Midwestern United States from April 2016 to April 2017. All families at the three University-sponsored centers were invited to participate in the study. Parental consent forms were distributed, and the inclusion criteria were typically developing children between the ages of 3.5–5 years. Parental consent and the child's verbal assent were also obtained. Research assistants collected data at each early learning center across three days: (a) Day 1 children's anthropometrics, perceived motor competence, and self-regulation was measured and the parent questionnaire that included the Child Eating Behavior Questionnaire was sent home; (b) Day 2 children's fundamental motor skills were tested using the Test of Gross Motor Development- 2; and (c) Day 3 marked the start of the 7-day physical activity assessments. Absent children were assessed on subsequent days.

Measures

Demographics

Parents self-reported demographic information about themselves and their child, which included relationship to the child, race/ethnicity of the child, their age and child's age, highest level of education, and partner's highest level of education. Race/ethnicity of the child was categorized as White or Other due to a high frequency of mixed race/ethnicity responses.

Anthropometrics

Socks and shoes were removed, and height was measured to the nearest eighth of an inch using the Charder height measure (Model HM200P, Taichung, Taiwan). Weight was measured to the nearest 0.01 lbs using the Seca weight measure (Model 22089, Hamburg, Germany). BMI% was calculated using the Centers for Disease Control and Prevention Children's BMI Tool for Schools [38]. BF% was measured to the

0.1% using a bioelectric impedance analysis scale (Tanita, Tokyo, Japan).

Physical activity

Parent

Parent's completed a survey consisting of questions about their own physical activity behaviors and perceptions of their child's physical activity behaviors. Five questions asked about their own weekly physical activity behavior including frequency of both moderate (e.g. walking continuously, gentle swimming, social tennis, golf, etc.) and vigorous (e.g., jogging, cycling, aerobics, competitive tennis, gardening, heavy yard work, etc.) physical activity. One question about modeling asked the parent how often their child "sees one or both of his/her parents/guardians being active". One question inquired about their child's physical activity behavior (i.e., "My preschool child is active"), and one asked about concern of their child's physical activity levels (i.e., "I am concerned about my preschool child not getting enough physical activity"). The two questions about their child's physical activity were measured with a 5-point Likert Scale (e.g., "strongly disagree" to "strongly agree") and we dichotomized them into two variables (i.e., disagree and agree) with the neutral statement being categorized as disagree. We interpreted a neutral answer to indicate parental uncertainty or indifference to their child's physical activity levels, which suggested more disagreement versus agreement with the statements.

Child

Physical activity was measured for 7 days using the tri-axial accelerometers (Actigraph GT3X+; Actigraph, Pensacola, FL, USA). Accelerometers were worn on the participant's non-dominant ankle and were worn for a total of 7 days (i.e., 5 weekdays, 2 weekend days). The devices were set to record data at 30 Hz and files were integrated into 5 s epochs. Following standard practice to control for non-compliance and accelerometer malfunctions, participants needed a minimum of 4 valid days of wear time, which is defined as > 10 h of wear time per day to be included in analyses [39]. Crouter et al. cut points developed for accelerometer placement on the ankle in children were used: sedentary ≤ 127 , moderate ≥ 309 , and vigorous ≥ 515 counts per 5 s [40]. Data was analyzed in Actilife software (Version 6.13.3). Time spent in moderate and vigorous physical activity were combined to describe a child's daily MVPA. Physical activity will be reported as average MVPA minutes per day, unless otherwise specified. A dichotomous, threshold variable was also developed to identify which children met the preschool physical activity guidelines of 3 h of daily MVPA.

Child's eating behaviors

The Child Eating Behavior Questionnaire (CEBQ) was used to assess eating behaviors. Parents completed the 35-item 5-point, Likert scale from “never” to “always.” The CEBQ is a valid and reliable eating behaviors tool ($\alpha \geq 0.70$) that was developed to identify eating behaviors and patterns in children completed by the caregiver [41]. The questionnaire is divided into seven different types of eating behaviors: Enjoyment of Food (e.g., My child loves food.), Emotional Overeating (e.g., My child eats more when worried.), Food Responsiveness (e.g., My child is always asking for food.), Desire to Drink (e.g., My child is always asking for a drink.), Fussiness (e.g., My child refuses new foods at first.), Satiety Responsiveness (e.g., My child eats slowly.), and Emotional Undereating (e.g., My child eats less when upset.).

Statistical analysis

Data were analyzed using IBM SPSS Statistics (Version 25). Frequencies and descriptives of variables were first explored to confirm assumptions were met (e.g., linearity). Pearson's correlation coefficients were calculated to examine relationships between BMI%, BF%, MVPA, and the CEBQ; values of 0.80 or above are considered very strong, values between 0.60 and 0.79 strong, values between 0.40–0.59 moderate, 0.20–0.39 weak, and 0.00–0.19 very weak [42]. Chi square tests for independence were used to examine the extent of agreement between parent's perceptions of their child's physical activity and their child's measured physical activity. To conduct this analysis of agreement, parent's perceptions of their child's physical activity was dichotomized to “agree” and “disagree” and children's MVPA was dichotomized to “met” and “not met”. Follow-up sensitivity analyses were conducted to examine the effect on Chi square test results if neutral answers were categorized as agree instead of disagree.

Results

Parental surveys were returned for 114 of the children (59 females, $M_{\text{age}} = 4.06 \pm 0.74$) with 42.61% of the sample being White, 54.78% as Other, and 2.61% not reported. Mothers were the primary respondent ($n = 107$). The remaining respondents were fathers ($n = 4$), grandparents ($n = 2$), and 1 guardian. The majority of parents (76.52%) and their partners (66.96%) had completed University or tertiary level education (76.52%). Respondents were mostly between 40 and 49 years of age (65.22%) and 12.17% of respondents reported not having a partner. Of the 114, 82 children completed all of the measures (i.e., demographics,

anthropometrics, physical activity, and eating behaviors) for this study; see Table 1 for descriptive statistics of BMI%, BF%, and physical activity levels.

Relationship between physical activity, BMI percentage, and body fat percentage

There was a downward trend observed in MVPA when comparing across age (see Fig. 1). Three-year-olds on average were engaging in MVPA for 231.86 min per day ($SD = 42.34$), while five-year-olds were getting on average 25 min less per day ($M = 207.17$, $SD = 34.49$). BMI% was normally distributed ($M_{\text{female}} = 57.95\% \pm 28.63\%$; $M_{\text{male}} = 53.85\% \pm 23.83\%$) and 14% of the sample was considered overweight while 6.1% was considered obese using the percentile range guidelines developed by an expert committee in 2007 (Barlow, 2007). BF% was not normally distributed ($M_{\text{female}} = 12.73\% \pm 5.44\%$; $M_{\text{male}} = 12.32\% \pm 6.60\%$) with right skewness of 2.50 ($SE = 0.23$) and excess kurtosis of 14.44 centered around the mean ($SE = 0.45$), so data was log-transformed to produce a normal distribution before conducting a Pearson's partial correlation test. Age was controlled since BMI and BF % can be dependent on age. In our sample, there were no significant associations between MVPA and BMI% ($r(76) = 0.021$, $p = 0.857$), or between MVPA and the log of BF% ($r(76) = -0.148$, $p = 0.195$).

Parent perceptions of child's physical activity and actual physical activity

While most children in this sample met the preschool physical activity guidelines of 3 h of MVPA a day ($M = 3.66 \pm 0.63$ h/day), 17% of children did not reach that threshold. Of the children who did not reach the MVPA guideline threshold, parent's perceptions were not in agreement as only one parent perceived their child as being inactive ($X^2(1, N = 82) = 0.58$, $p = 0.446$). None expressed concern, demonstrating a similar dissociation of agreement between parent perception and their child's actual physical activity ($X^2(1, N = 82) = 2.89$, $p = 0.089$). In a Chi square analysis, a lack of statistical significance indicates an absence of agreement between the dichotomized variables of parental perceptions and child's actual MVPA. When neutral answers were categorized as agree instead of disagree for a sensitivity analysis, it changed two responses for the question about their child's physical activity behavior and seven responses for the question about concern of their child's physical activity levels. While dichotomizing the neutral answers in the opposite direction did produce slightly different statistics, the primary findings remained the same because all of the neutral responses came from parents of children who met the MVPA guideline threshold (see Table 2).

Table 1 Descriptive statistics of BMI%, BF%, and physical activity (PA) levels

Measure	Mean	SD	Min–max
Body mass index% overall	55.97	26.39	4.1–99.6
Female	57.95	28.63	4.1–99.6
Male	53.85	23.83	4.7–99.3
Body fat% overall	12.53	5.99	3.0–50.9
Female	12.73	5.44	3.0–27.8
Male	12.32	6.60	3.0–50.9
Moderate PA average overall (min/day)	79.24	11.71	51.1–106.4
Sex			
Female	77.86	12.25	53.1–98.1
Male	80.62	11.12	51.1–106.4
Age			
3 years	82.65	13.80	51.1–104.6
4 years	80.13	8.85	62.0–106.4
5 years	75.35	13.51	53.1–101.1
Vigorous PA average overall (min/day)	140.09	25.87	77.6–106.4
Sex			
Female	135.37	25.55	90.4–194.7
Male	144.8	25.63	77.6–191.1
Age			
3 years	149.2	29.74	77.6–194.7
4 years	140.68	24.60	90.4–191.1
5 years	131.81	23.26	99.6–184.0
Moderate to vigorous PA average overall (min/day)	219.34	35.34	128.7–297.4
Sex			
Female	213.24	35.25	155.7–289.7
Male	225.44	34.79	128.7–297.4
Age			
3 years	231.86	42.34	128.7–289.7
4 years	220.80	30.69	160.0–297.4
5 years	207.17	34.49	155.7–275.3

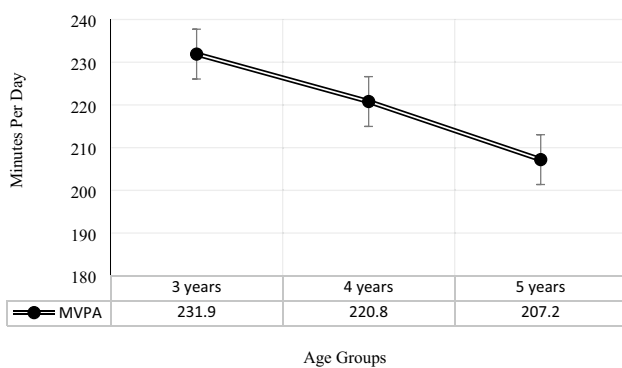


Fig. 1 Average moderate to vigorous physical activity (MVPA) minutes per day across age groups. *Note* Error bars represent standard errors

Table 2 Crosstabulation of parent perceptions and child meeting the physical activity guidelines of accumulating 3 h of moderate to vigorous physical activity (MVPA) each day

	MVPA not met	MVPA met
Neutral responses categorized as <i>disagree</i>		
Parent perception: child inactive	1	2
Parent perception: child active	13	66
Parent concern: yes	0	12
Parent concern: no	14	56
Neutral responses categorized as <i>agree</i>		
Parent perception: child inactive	1	0
Parent perception: child active	13	68
Parent concern: yes	0	5
Parent concern: no	14	63

Table 3 Correlations of child's BMI%, BF%, and parent perceptions of child's eating behaviors

Measure	BMI%		Body fat%	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Parent perceptions				
Enjoyment of food	0.299	0.009	0.200	0.083
Emotional overeating	0.416	< 0.001	0.261	0.023
Food responsiveness	0.543	< 0.001	0.193	0.094
Desire to drink	0.275	0.016	0.130	0.264
Fussiness	-0.099	0.393	-0.039	0.740
Satiety responsiveness	-0.134	0.249	-0.165	0.155
Emotional undereating	-0.066	0.569	-0.150	0.195

Parent's perception of child's eating behaviors to BMI percentage and body fat percentage

Correlations of all variables are presented in Table 3. Children's BMI% had a weak but significant association with their parent's perception of Desire to Drink ($r(74)=0.275$, $p=0.016$) and Food Enjoyment ($r(74)=0.299$, $p=0.009$). There was a moderate association between children's BMI% and their parent's report of how frequently they engage in emotional overeating ($r(74)=0.416$, $p<0.001$), and their food responsiveness ($r(74)=0.543$, $p<0.001$). The log of children's BF% only demonstrated a weak relationship with emotional overeating ($r(74)=0.261$, $p=0.023$).

Parental determinants on child's physical activity level

Parent's report of their own moderate physical activity in the last week was not correlated with their child's participation in MVPA, ($r(77)=0.158$, $p=0.169$). However, parent's report of frequency and time spent in vigorous physical activity demonstrated a small association with their child's MVPA participation (frequency: $r(78)=0.297$, $p<0.008$; time: $r(78)=0.249$, $p=0.030$). Lastly, parent's modeling of physical activity did not significantly correlate with child's MVPA ($N=82$, $r=0.046$, $p=0.680$).

Discussion

Previous research has found that physical activity and eating behaviors in preschool children are associated with obesity [4], supporting the need for effective, evidence-based interventions to support preschool children. The majority of preschoolers (83%) in this sample were meeting the physical activity guidelines of 3 h of MVPA each day. However, even in this relatively active sample, there is a prominent downward trend in minutes of physical activity per day in the 5-year-olds as compared to the 3-year-olds. This trend

mimics the downward trends nationwide in physical activity levels of children [43].

Although this was a relatively active sample, to have 17% of children not engaging in at least 3 h of MVPA a day is discouraging, especially at University-sponsored preschool centers where preschoolers are children of professors, staff, and students at a large prominent university. Even more disconcerting, parents of children who did not meet MVPA guidelines inaccurately perceived their child as being active and none expressed concern about their child's activity. The finding of inaccurate perceptions and lack of concern of physical activity aligns with and strengthens the conclusions of previous research in preschool children [20] and older children [21, 23, 25–27].

In this study, parents' perceptions on their child's eating behaviors (i.e., emotional overeating, enjoyment of food, food responsiveness, and desire to drink) were related to their child's BMI% and BF%. This relationship provides some evidence that these eating behaviors may be problematic and a potential risk factor for higher BMIs. In other research, enjoyment of food and food responsiveness was found to be associated with higher BMIs and weight status in preschool populations [10], and desire to drink and emotional overeating in older populations (i.e., 7–12-year-olds) [12]. Even though the current study did not examine parent's perceptions about quality of eating behaviors, previous research has found that parents perceptions of their child's or preschool child's diet are inaccurate [27, 30–32]. These findings demonstrate when behaviors are explicitly defined in a questionnaire, like in the CEBQ, parents can accurately perceive their child's eating behaviors [10, 12, 39]. When using surveys to ask parents about their perception of their child's physical activity and eating behaviors the surveys need to explicitly define specific behaviors that parents can easily and accurately identify. Parents also must be educated to identify both positive and problematic health behaviors. Due to the critical role parents play in shaping and establishing habits in their young children's lives [17], parents must understand how to recognize their children's problematic physical activity and eating behaviors. Without recognition, early intervention to adopt more positive lifestyle behaviors will likely not happen.

This study was conducted with children age 3–5 years who were relatively active, and variance was minimal in BMI% and BF%. These factors may explain why we did not find a relationship between physical activity, BMI% and BF%. Additionally, this study was a cross-sectional study, whereas a recent longitudinal study found a negative relationship between physical activity and BMI and BF% in children from birth to 5 years [44]. In the current study, parents who were more vigorously physically active had children who were more active. Evidence about the association between parents and children's physical activity has been

mixed [28, 29], so this study further adds to the research that there is likely a positive association between parent's and children's physical activity. Parent's role modeling did not have a significant association with children's MVPA, which aligns with previous research [16]. This study only had one question that addressed parental modeling so additional questions may be warranted in future work.

Future studies should measure parent's physical activity objectively to make sound conclusions about the relationship between parents' and children's physical activity behaviors. In a meta-analysis of 112 studies to examine parental determinants on children's physical activity, parental support and modeling were found to have a moderate to weak association with children's physical activity [16]. Of these 112 studies, only 27 studies measured physical activity objectively using accelerometers, pedometers, or a heart rate monitor and only four studies assessed physical activity objectively in both the parent and child. All four of these studies found a positive association between parent and child physical activity [45–48]. These findings demonstrate the need for objective measurements of physical activity in both the parent and child.

This study was not without limitations. While the study's original sample size was 115, complete physical activity data was only collected for 82 children. Since all children included in this study were affiliated with the University, we expected parents to report a high level of education. Parent income and occupation were not collected. Variables representing family socioeconomic status may influence parents' perceptions and therefore limits the generalizability of these results. We used the CEBQ, which ask parents to respond to validated questions on their child's eating behaviors, but we did not objectively measure the children's eating behaviors. Future research should assess parents' perceptions of the quality of their child's diet, in addition to using objective measures to examine children's actual eating behaviors. Future research should also strengthen the psychometrics (e.g., sensitivity, reliability) of parent-report physical activity questionnaires, so they can more accurately reflect the child's true physical activity levels. Most importantly, this study contributes to the growing evidence suggesting the need for earlier parent education on how to identify problematic lifestyle behaviors and how to implement evidence-based interventions for the promotion of physical activity, a quality diet, and positive eating behaviors.

Conclusions for practice

Future studies should continue to examine parent's perceptions of their preschool child's physical activity and eating behaviors. If parents cannot accurately identify their preschool child's problematic physical activity and eating

behaviors, then they may not seek support early on. Findings from this study support the idea that parents overestimate their child's physical activity but can accurately identify specific eating behaviors using the CEBQ. As researchers, we need to develop surveys that are directed at specific behaviors that can be easily identified and utilized by parents. It is also essential that parents have the knowledge and health literacy of problematic behaviors associated with obesity, so they know when to intervene.

What is already known on this subject?

Parent's perceptions and determinants of physical activity and eating behaviors are essential to consider for early intervention. The Child Eating Behavior Questionnaire is a valid and reliable measure to examine eating behaviors.

What this study adds?

Few studies have examined parents' perceptions of their child's physical activity and eating behaviors nor measured physical activity objectively. Parents need to have the knowledge and health literacy of problematic behaviors.

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Data availability Additional research analyses and questions are still underway and data sharing or data repository approval is not approved. Researchers are free to contact the Child, Movement, Activity, and Developmental Health Laboratory for additional questions or inquiries.

Compliance with ethical standards

Conflict of interest The authors have no known conflicts of interest.

Ethics approval The International Review Board (IRB) at the University of Michigan approved this study (HUM00108917), Momentum Center Grant Principal Investigator Leah E. Robinson.

Informed consent All parents in this study read and signed an informed consent to participate in this study. All children provided verbal assent.

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