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Health-Related Parenting among U.S. Families and Young Children's Physical Health

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Abstract

Parenting is a constellation of behaviors, yet investigations of the link between parenting and children's health typically focus on singular behaviors. Thus, patterns of health-related parenting among U.S. families, associations between patterns and children's physical health, and the prevalence of such patterns among different sociodemographic groups remain unknown. Applying latent class analysis to the Early Childhood Longitudinal Study-Birth Cohort (2001; $n=8,550$) revealed six parenting patterns. The pattern characterized by high levels of television watching was associated with the worst overall health; the pattern characterized by the highest consumption of food and amount of outdoor play was linked to the highest odds of obesity. Children of less educated mothers and Black mothers were more likely to experience both of these patterns than the patterns associated with the best child health, but these patterns did not differ for Hispanics (versus Whites). Income differences only appeared for patterns associated with children's general health.

Keywords

Health; parenting; socioeconomic status; early childhood

Children's physical health is determined by the interplay among a number of factors, including their social environment, physical environment, and genetics. Parents, however, have been referred to as the primary gatekeepers of children's health, particularly when children are young (Case & Paxson, 2002). This is because parents, more than anyone else in a child's life, control the factors most proximate to young children's health. For example, parents of infants—not medical providers—ultimately decide to adopt health-related behaviors such as breastfeeding and immunizations (Benin et al., 2006; Giugliani et al., 1994). Among preschool-aged children, parent behaviors like boundary setting or enrolling children in activities impact children's diets, routines, and levels of physical and sedentary

activity (Davison & Birch, 2001). As such, parent-health related behaviors—or more broadly, parenting—is considered a proximate determinant of children’s health that is just as important as other determinants such as insurance coverage and access to quality health care (Case & Paxson, 2002; Gable & Lutz, 2000; Houghugh 1998).

Nevertheless, our understanding of the role of parent behaviors in shaping young children’s health remains limited by investigations that typically conceptualize parenting based on singular behaviors, rather than as a constellation of behaviors. Certainly, such an approach helps to clarify the co-variance between a behavior and health outcome. Yet it does not reflect the reality of families’ lives in which parents perform numerous health-related parent behaviors each day (Hofferth & Sandberg, 2001). As such, conventional approaches to studying the link between parenting and child health overlook how different health-related behaviors co-occur in ways that may magnify or offset health risks and advantages. They also can convey simplistic assumptions about how behaviors vary across different sociodemographic groups. For example, the general finding that higher SES families are better at following through on individual healthy parent behaviors than lower SES families (e.g., Prickett & Augustine, 2016) suggests that higher SES families are better at following through on *all* healthy parent behaviors. Many higher SES families, however, likely engage in a combination of adverse and advantageous behaviors.

Given these conceptual and methodological limitations of prior research, our aim is to generate new insights into how families influence young children’s health by studying health-related parenting behavior as a holistic concept. We do so by pursuing three aims. The first is to describe the typical patterns of “health-related parenting.” Doing so will provide new knowledge of how parent behaviors that promote children’s physical health occur in tandem, how some risks co-occur, and how advantageous and adverse behaviors occur in some families simultaneously, as well as the prevalence of each distinct pattern of health-related parenting among U.S. families. Second, we will describe how different patterns in parenting correlate with young children’s physical health, focusing on general health and obesity (two key indicators of population health disparities in children), and provide fresh understanding in comparison to conventional modeling approaches. Finally, we will examine how different patterns in health-related parenting vary across sociodemographic groups (defined by family income, maternal education, and race/ethnic background) and estimate which groups of children are more likely to experience the parenting patterns associated with the greatest childhood health risks.

To pursue these aims, we use data from the largest and most contemporary nationally-representative survey of U.S. families with young children, the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), and an innovative analysis strategy that pairs latent class analysis (LCA) with regression techniques. We focus on parenting behaviors during preschool, which is a period when many behaviors linked to children’s health take on greater salience as compared to younger ages (for example, household routines have less relevance to infant children), and long-term health trajectories are set in motion (Williams & Golding, 2009). Thus, it is also a critical juncture for social policy and research linking family life to child health.

Health-Related Parenting and Child Health

Our first aim, to describe the most common patterns of health-related parenting among U.S. families with preschool-aged children, draws on a multi-disciplinary literature emphasizing the importance of parenting for children's physical health (Case & Paxson, 2002; Gable & Lutz, 2000; Hoghughi, 1998; Philips et al., 2014; Prickett & Augustine, 2016). We consider parenting to encompass activities, routines, or behaviors that include some action on the part of the child, but for which parents are the primary structuring or controlling agents (Gable & Lutz, 2000). We consider health-related parenting behaviors to be aspects of children's lives that parents structure or control to optimize children's healthy development or create boundaries that protect them against unhealthy physical development (Hoghughi, 1998).

Health-related parent behaviors that are primarily intended to optimize children's health include on time child well-visits, which are important for identifying health issues that may become more problematic if left undiagnosed, administering vaccinations that prevent many common child illnesses, and exchanging information about children's age-appropriate health related needs (Hagan, Shaw, & Duncan, 2008); promoting children's physical activity and healthy nutrition; and ensuring children have adequate sleep, which bolsters children's immunities and supports their growth (National Institute of Health, 2012). Parent behaviors that are primarily boundary setting activities include the amount of time children spend watching television children, household routines, and the frequency of children's consumption of fast food. A behavior that could be considered to span both domains is shared meals because it is a time when parents can control what children eat, on one hand, and model healthy eating on the other (Pearson, Biddle, & Gorely, 2009).

Importantly, these eight health-related parenting behaviors have also been repeatedly, although not unequivocally, associated with children's health during preschool (Anderson & Whitaker, 2010; Committee on Children with Disabilities, 1994; Dennison & Edmunds, 2008; Fiese & Schwatz, 2008; Kamp-Dush et al., 2013; Kimbro, Brooks-Gunn, & McLanahan, 2011; Ronsaville & Hakim, 2000; Wildenger et al., 2008). Although other parent behaviors can have consequences for children's health, such as parental smoking or exercise, we exclude such behaviors that do not include any action by the child. For similar reasons, we also do not include factors such as environmental exposures (e.g., to violence), which some have been considered as part of children's health lifestyles more broadly (Davison et al., 2013; Mollborn et al., 2014).

Building on the results of this first aim, the second aim is to examine how patterns of parenting are associated with children's health. The importance of studying the link between *patterns* of parenting and child health is highlighted by the family ecological model, a theoretical framework for studying child health that lays out the diverse set of family-related factors that influence parenting, including cognitions, habits, and resources (Davison et al., 2013). Thus, it conveys how parenting, as the result of varied influences, can include behaviors that positively and negatively affect children's health. At the same time, prior research underscores how some positive—or negative—aspects of health-related parenting behaviors may bundle together. For example, television watching has been associated with children's greater consumption of sugary and salty snacks and fast food (because intake of

snacks increases while watching television, as does preferences for snacks and fast food due to programming), and poor nutrition has been linked to inadequate sleep (Gable & Lutz, 2000; Goris et al., 2009; Mollborn et al., 2014). These results suggest that certain risks may co-occur in some children in ways that widen disparities in children's health outcomes. Alternately, children in families with frequent shared meals eat more vegetables and fruits at non-meal times because (as we mentioned above) shared meals allow parents to discuss and model healthy eating, pointing to one way that advantageous health behaviors may co-occur (Gable & Lutz, 2000; Pearson et al., 2009).

Such examples highlight the connections among only a handful of parenting behaviors, but serve to underscore how studying patterns of parenting can reveal which sets of behaviors are pernicious to child health and which are not, help us understand the role of parenting in shaping child health disparities, and inform the efforts of practitioners assessing the complete proximate risks to children's health and policy makers developing comprehensive parent-targeted programs to improve it. Finally, they have potential to inform a new way of studying how health-related parenting varies across different segments of the population.

Sociodemographic Patterns in Health-Related Parenting

The family ecological model not only emphasizes the multifaceted quality of parenting, but it locates parenting within a broader social context shaped in part by the sociodemographic characteristics of families (Davison et al., 2013). Thus, the third aim is to examine how different patterns of parenting vary by families' sociodemographic characteristics. Building on aim 2, this step also informs our understanding of how parenting connects to sociodemographic disparities in child health. In this spirit, we follow in the tradition of health disparities research by focusing on three family sociodemographic characteristics strongly linked to childhood health disparities—mothers' education, family income, and race/ethnic background—although we acknowledge that others, such as family structure and maternal employment, matter as well.

Each of these family-level sociodemographic factors have also been linked to variation in health-related parenting in families of young children. For example, researchers have found that Black and Hispanic children were less likely than White children to receive the recommended number of pediatric visits, had less structured home environments, watched more television, ate more fast food, ate less nutritious food, and were less likely to get the recommended number hours of sleep. A notable contrast to this overall pattern, however, is that minority children spend more time playing outdoors (Edelstein, 2002; Kimbro et al., 2011; Ronsaville & Hakim, 2000; Taveras et al., 2010). When comparing poor children to non-poor children, similar patterns have been found, but researchers have also noted that economically-advantaged children are more likely to be enrolled in organized activities than economically-disadvantaged children (Case & Paxson, 2002; Chin & Phillips, 2004; Lareau, 2002; Tandon et al., 2012). Research on maternal education differences in parenting beyond the post-natal period is more sparse, but one study of preschool children found that across seven health-related parenting behaviors, more educated mothers were consistently more likely to engage in advantageous ones (e.g., on-time well-visits) and less likely to engage in adverse ones (e.g., screen time) (Prickett & Augustine, 2016).

Although the connections between these three characteristics and parenting are complex and not necessarily identical, in general, they all reflect (albeit to varying degrees) differences in the economic and social resources, time, energy, stressors, and knowledge and cognitions around parenting practices that parents draw on (or are limited by) to structure the health-related aspects of children's lives that were described above (Davison et al., 2013; Lareau, 2002). For example, one pathway by which race shapes parenting is by constraining where families can live, in spite of their incomes (Alba, Logan, & Stults, 2000). Neighborhood quality, in turn, matters for parental perceptions of neighborhood safety and desire for children to play outside (Frech & Kimbro, 2011); proximity to fast food versus sources of healthier foods (Larson, Story, & Nelson, 2009); and exposure to stress, which can undermine parents' effort to monitor children and implement rules and routines (Gutman, McLoyd, & Tokoyawa, 2005). As an alternative example, maternal education matters for health-related parenting, again, outside its association with income, by shaping knowledge of healthy parenting practices and efficaciousness in following through on those practices (e.g., avoiding fast food, instituting shared family meals), even when resources like time (particularly in families where mothers work) are constrained (Prickett & Augustine, 2016).

These examples illustrate how advantages and disadvantages associated with families' sociodemographic characteristics shape differences in parenting behaviors, but they do not convey how patterns of parenting vary across different sociodemographic groups. Beyond the theoretical rationale of our approach, the value of taking a comprehensive approach to studying health-related parenting is again suggested by other studies. For example, Mollborn and colleagues (2014) studied patterns in children's health lifestyles (which included parenting but also factors like exposure to violence, gun safety, and helmet use) and found that White children were no more likely to experience "consistently positive" health lifestyles than Black or Hispanic children. This finding suggests that although minority children may be more likely than White children to experience many adverse health-related parenting behaviors—as suggested above—they are no less likely to be among the group of children that experience consistently positive parenting. In sum, aim 3 will provide a more complete picture of demographic differences in parenting and children's risk of experiencing poorer health.

Summary of Study

Prior research has largely focused on the link between singular health-related parenting behaviors and young children's physical health. Our study takes a broader view of health-related parenting that has the potential to reveal: 1) the different patterns in health-related parenting that exist among U.S. families; 2) how these different patterns connect to child health outcomes; and 3) which segments of the population are most likely to experience patterns associated with the lowest levels of child health. In doing so, we present a more realistic conceptualization of health-related parenting that cuts across the nuances which have made it difficult to draw conclusions on how parenting matters to young children's physical health.

Methods

Data

We use data from the ECLS-B, a nationally-representative sample of over 10,600 U.S. children born in 2001, designed to examine the contexts that influence children's development. Sponsored by the National Center for Education Statistics, data were collected when children were 9-months, 2-, 4-, and 5-years old (kindergarten) from in-home interviews conducted with the primary caregiver, who in most cases was the mother. During interviews, mothers responded to a variety of questions about their own behavior that supported their child's physical health.

Our analytical sample began with around 8,950 children who remained in the study at the third wave. We then excluded about 350 children who were not living with their mother and children whose mothers were 15 years or younger at their birth ($n=50$), a subsample that, due to sampling procedures, could not be generalized to the population of young mothers in the U.S. These restrictions left us with a final sample of 8,550 children. Longitudinal sample weights were used to adjust for differential attrition across waves and the initial study design in which certain subgroups, such as low-birth weight babies and Pacific Islanders, were oversampled. A description of the characteristics of the sample is provided in Table 1.

Measures

Health-related parenting—We included 11 measures that have been conceptualized as parenting behaviors aimed at optimizing children's health or creating barriers that protect against negative health development. They are based four categories: 1) preventative health, 2) nutrition, 3) physical activity, and 4) health routines, taken from the age 4 (Wave III) data collection. *Preventative health* was represented by a binary variable for whether the mother reported meeting the appropriate number of well-child visits since the previous interview (at least two). *Nutrition* was captured by four separate continuous scales indicating the weekly frequency of eating fruits and veggies, drinking soda, eating sweets (e.g., cakes, cookies, candy), and fast food (0 = *never*, 4 = *at least twice a day*). *Physical activity* was measured using three variables: whether the child participated in an organized sports or dance (0 = *no*, 1 = *yes*), the number of days during the past week the child played outside (range: 0–7 days), and the number of hours the child typically watched television in a day (continuous scale from 0 through 10 or more hours, censored to rescale the <1% of cases with improbable reports [e.g., child watched 18 hours per day while sleeping 10–12 hours per night]). Last, *health routines* included the number of times per week that dinner was eaten together as a family (0–7 days), whether the child consistently slept between 10 and 12 hours a night (0 = *no*, 1 = *yes*), and whether the mother had rules about food, bedtime, and television watching (a continuous scale ranging from 0 = *no rules in these domains* through 3 = *rules about each*).

Child health—Children with body mass indexes (BMIs) at or above the 95th percentile were classified as *obese* (Center for Disease Control and Prevention, 2015). All other children (including overweight) were sorted into the reference group. BMI was based on measures of children's heights and weights taken by trained data collectors during the

preschool in-home data collection using a stadiometer to measure height and a digital bathroom scale to measure weight. Each height and weight measurement was recorded twice and averaged together. BMI measures were then converted to percentiles using the Center for Disease Control Growth Charts (http://www.cdc.gov/growthcharts/cdc_charts.htm) appropriate for the child's gender and age in months. *Overall health* was based on the primary caregiver's (usually the mother) response to the question "would you say your child's health is poor ("1"), fair, average, good, or excellent ("5"). This measure tapped the child's health status more generally as well as experience of common health disorders like flus and colds, which were highly correlated with it. Although parent reported, the validity and reliability of parent-reported health has been examined and affirmed (e.g., Case, Lubotsky, & Paxson, 2002). Because this variable was right skewed (more mothers reported their children's health as excellent/good than poor/fair), we used a squared version, which helped correct for skewness and improve the model fit.

Family sociodemographic characteristics—*Maternal education* was identified as the highest level of educational attainment reported by mothers at the preschool interview and dummy coded as less than a high school diploma, high school diploma/GED, some college experience or an associate's degree, and a college degree or more. *Household income* was measured at the same time and captured by four dummy variables based on sample quartile ranges (\$20,000 or less; \$20,001 to \$40,000; \$40,001 to \$75,000; or more than \$75,000 a year). Finally, maternal *race and ethnicity* was self-reported by mothers at the 9-month interview and coded into four categories: non-Hispanic White, non-Hispanic Black, Hispanic, and some other race/ethnicity.

Covariates—We included several factors that may be correlated with parenting and family sociodemographic characteristics, or parenting and child health. *Maternal characteristics* included age at child's birth (continuous measure in years), nativity (foreign born or not), mother's self-reported health (excellent/good health or not), and employment (not working, employed part-time, or employed full-time). *Family and household characteristics* included family structure (married biological parents, cohabiting biological parents, step parent, mother only), whether English was spoken in the home, and the number of siblings in the home (continuous). *Child characteristics* included whether the child was female, born at clinically low birth weight, did not have health insurance at some point since the last interview, and a continuous measure of months by which the child's real age departed from the interview age (e.g., a child that is 50 months old would have a value of 2 [50–48]). *Geographic factors* were dummies for urbanicity of residence (rural, urban area, urban cluster), region (Northeast, South, Midwest, and West), and mothers' perceived safety of the neighborhood (1 = *very unsafe* through 4 = *very safe*). We also controlled for whether the child was in center-based, relative, and/or nonrelative home-based care using three mutually exclusive binary variables.

Analytical Plan

As a first step, we used LCA to identify subgroups or "classes" of health-related maternal parenting based on the 11 parenting measures. In this method, actual group membership is unobserved, or latent. Rather, group assignment is based on a conditional probability that

each individual's observed pattern of parenting aligns with one of the classes identified by the model (Collins & Lanza, 2010). Individuals are then assigned to the class in which their probability of membership is the highest. The advantage of this latent approach is that it identifies unique patterns of parenting where such patterns were previously unknown and yields knowledge of the proportion of the population (and subpopulations) whose overall parenting is reflected in each class. Also, compared to other ways of holistically measuring an unobserved construct (i.e., parenting), like factor analysis, it does not assume an underlying structure where advantageous parenting behaviors must correlate with other advantaged ones, and vice versa (Bollen, 1989).

In order to identify the correct number of classes (or the point at which no unique profiles are observed), we fit several solutions with the number of set classes ranging from 2 to 8, using Mplus (Muthen & Muthen, 2010). Drawing on seven different pieces of information criteria, such as the Bayesian information criterion (BIC), sample-size adjusted BIC, entropy, and Lo–Mendel-Rubin (LMR) test, among others (Hagenaars & McCutcheon, 2002), the tests consistently pointed to six classes as the best fit for the data. Compared to a four or five class solution, the six class solution was substantially better. It was also better than a seven class solution (although the differences were smaller) in which one class had a very small cell size (<100). To further verify the stability of the six classes, we estimated the LCA with and without key controls (e.g., maternal education, race/ethnicity, income, nativity). Our findings (e.g., number of classes, characteristics of each class) were robust across these strategies. We were also confident we had identified the correct number of classes and properly assigned families to them based on their probability of membership in which the vast majority of mothers (87.0%) had at least a 90% probabilities of belonging to their assigned class. Even among families assigned to the smallest three classes, over 80% had at least a 70% probability that they were correctly assigned, with this figure over 90% for the smallest class. Class probabilities produced in Mplus were imported into Stata (StataCorp, 2013) for the bivariate and multivariate analyses.

We then calculated z-scores to convey how families in each class varied from the sample mean on each behavior and chi-squared and t-tests to assess whether the class mean for each behavior was significantly different from the sample's mean. Doing so highlighted meaningful differences between classes and overall patterns of parenting. Based on our observations of these patterns, we provided names to characterize each class and use in subsequent analyses. For example, we designated Class 2 the Average group because there were few significant mean differences in parenting behaviors from that of the overall sample mean and the differences that did exist were generally smaller than those observed for other groups. We also examined the sociodemographic composition of each group and compared it to the overall sample distribution.

Moving to the multivariate analysis, we estimated the association between health-related parenting and overall health (using OLS regression) and children's odds of obesity (with logistic regression). As an initial step, we estimated the association between each parenting measure and child health (Model 1). This approach mirrored conventional analyses of parenting and child health. We then modeled these behaviors together to see how, net of other behaviors, associations between individual parenting behaviors and child health

changed (Model 2). Finally, we predicted child health using our LCA groups to see whether a different pattern, one which accounts for the potential for cumulative or offsetting effects, emerged. We used the class which typified the most advantage (i.e., parenting below average on adverse behaviors and above average on optimal ones), which we call the Advantaged class, as the reference group. This class also represented a majority of the sample. In all models, we adjusted for the full set of covariates.

Finally, we used multinomial regression to investigate whether some sociodemographic groups were at greater odds of belonging to certain parenting profiles compared to other groups (controlling for covariates), with measures of maternal education, income, and race/ethnicity entered into the model together to adjust for the correlations between them. Given that this approach required two reference groups (one for each demographic indicator and one for each class), interpretation can be unwieldy. Thus, we focused on differences between the Advantaged class and the classes we identified in the previous analysis as being associated with lower levels of children's physical health. To account for the small amounts of missing data (no more than 2.6% on any variable), we used the suite of *mi* commands in Stata to impute 100 complete datasets and estimated the multivariate models based on these imputed data (Royston, 2004).

Results

Latent Class Analysis

The LCA revealed six unique parenting profiles. In Table 2, we present the sample mean for each parenting measure alongside the z-score (amount of deviation from sample mean) by class. Based on our examination of the patterns, we labeled Class 1 as the 'Advantaged' class. Families in this group were below average on all four adverse parenting behaviors (frequency of sweets, soda, and fast food and hours per day watching television) and above average on five of seven optimal ones (organized sports, outdoor play, shared meals, veggies/fruit, and sleep). They were also above average by the widest margins for organized sports, sleep, and frequency of shared meals (three of seven advantageous behaviors) and below average by the widest margins for soda drinking, sweets, fast food, and television watching (all four adverse ones), with two exceptions to this pattern. For well-visits and rules, the Advantaged Class was no different from the sample's mean. This group represented the largest segment of the sample at 57.3%.

We considered Class 2 the 'Average' class because there were no significant differences in parenting between this class and the sample mean for four behaviors, and for the other seven behaviors that were significantly different, the difference was smaller than for most other classes. Moreover, there was no extreme level of one behavior, as was the case with the remaining four classes. This class represented 21.8% of the sample. Class 3, in contrast, was best characterized as the 'Multiple Risks' class. Mothers assigned to Class 3 were above average on all adverse parenting behaviors (e.g., fast food) and were below average on all optimal parenting behaviors (e.g., organized sports), with one exception: frequency of outdoor play, for which Class 3 was no different than the sample average. Moreover, the margins were the widest for four parenting behaviors and on the other five, they were the second largest. This class was also notably low on the rules scale and the only class below

the sample average on the measure of well-visits. This ‘Multiple Risks’ class represented 10.3% of the sample.

We characterized Class 4 by ‘Low Family Meals/Low Play’ because their frequency of shared family dinners was nearly two full days less per week than the sample average, and they were also lower than any other class on outdoor play. They were also lowest on frequency of consumption of fruits and veggies, suggesting how shared dinners may encourage healthy eating among children. This group was a modest portion of the sample at 5.0%. Class 5 was best characterized as the Television Watchers. There were almost no differences in parenting between this group and the sample average, but levels of television watching were almost three times higher than the sample average. They were a very small class, representing 1.7% of the sample. Finally, Class 6 was higher on their frequency of food consumption for all food categories, both “good” (fruits/veggies) and “bad” (soda, sweets, fast food), although they were only one of two classes (the other the Advantaged class) above average in frequency of outdoor play. Thus, we characterized this group as the High Food/High Play group, representing 4.0% of the sample.

Table 2 also provides initial support for the link between advantageous health-related parenting behaviors and children’s health. For example, the Advantaged class was more likely to report their children being in better health than the sample average, and were the only group with a lower proportion of children classified as obese. Similarly, the Average, Multiple Risks, and High Food/High Play classes were more likely to include obese children compared to the sample.

Bivariate Analyses

Next, we examined the percentage of each sociodemographic group that belonged to each class and compared that percentage to the group’s representation in the general sample (Table 3). Here we highlight patterns in which a subset of the group was particularly over or underrepresented relative to their size in the sample. For example, for the Advantaged class, children with mothers who were White (68.0%) and college-educated (35.4%), and had family incomes over \$75,000 (35.4%) were overrepresented relative to their size in the sample (57.5%, 26.4%, 27.1%), but membership in this class was more strongly driven by the mothers’ education and family income than race/ethnicity. For example, college-educated mothers and families in the highest income quartile were 31–34% more likely to be in the Advantaged group relative to their sample size, whereas children of White mothers were only overrepresented by 18%.

For the Average group, the most striking pattern was the underrepresentation of the most educated groups, particularly children with college-educated mothers (13.7%) or a family income above \$75,000 (16.2%). Children of White mothers were also underrepresented, although to a more modest extent. This same pattern held true for the Multiple Risks class, but children who were the least advantaged were also overrepresented to a larger extent (compared to the Average class, where distributions for the other education, income, and race/ethnic groups somewhat resembled their distribution in the sample). This class was comprised of 35.2% children with mothers without a high school diploma/GED (vs. 15.3% in the overall sample) and 36.8% of children with family incomes below \$20,000 (vs.

21.2%). Interestingly, only children of Hispanic mothers appeared overrepresented in the Multiple Risk Group (42.4% vs. 22.8%), whereas children of Black mothers were not (16.6% vs. 13.8%).

Turning to Class 4, the Low Family Meals/Low Play class, there were few noteworthy patterns by mothers' education or family income. The important pattern was by race/ethnicity in which children with Black mothers were overrepresented (24.2%) relative to their sample share (13.8%). For the Television Watching class (Class 5), families with a mother who had no high school diploma/GED or incomes between \$20,000–\$40,000 were overrepresented, but the most notable pattern was again by race/ethnicity. In contrast to Class 4, however, children with Hispanic mothers were substantially overrepresented (41.1% vs. 22.8%). The High Food/High Play group mirrored the pattern we observed for the Low Family Meals/Low Play group in which there were few notable differences by maternal education or income, but children with Black mothers were overrepresented (21.4% vs. 13.8%).

These results revealed how some groups were more likely to fall into certain parenting classes than others. Next, we conduct multivariate analyses to assess how children's health varied by class membership. The final step, in which we predict sociodemographic differences in membership in classes associated with lower levels of child health, weaves these steps together.

Health-Related Parenting and Child Health Outcomes

In Models 1a through 1k, which we refer to as Model 1, each of the 11 parenting behaviors were entered into the model separately. In Model 2, we entered all 11 parenting behaviors into the model together, adjusting for any possible correlation among them. In Model 3, we predicted child health using our latent parenting classes with the Advantaged class as the reference group, setting up a comparison between the class in which child health is likely to be the highest (i.e., best overall) and all others. As noted before, they were also the modal class. Model coefficients and indicators of significance for parenting measures are presented in Table 4. The full set of results with covariates are available upon request.

Model 1 predicting child overall health revealed significant associations among several parenting behaviors: frequency of shared family dinners, outdoor play, consumption of fruits and vegetables, and of fast food, household rules, television time, and enrollment in organized sport (seven of 11 measures). Only well-visits, frequency of consumption of soda and sweets, and sleep were not significantly associated with general health. In Model 2, with all 11 measures included together, the general pattern of results remained, but the size of the coefficients for four measures (shared family dinners, consumption of fruits/vegetables, outdoor play, organized sports) was slightly reduced and two became insignificant: rules and television watching. Only the fast food coefficient was mostly unchanged by the inclusion of the others in the model.

For Model 3, we found four of the five classes were associated with poorer general child health compared to the Advantaged class. The largest differences were with the Television Watching class, followed by the Low Family Dinners/Low Play class. For both groups, there

were more extreme levels of adverse parenting behaviors compared to the sample average. The Multiple Risk class also had significantly lower levels of general health, but not as low as the former two classes, in spite of their multitude of risks. The Model 3 results also departed from Model 2, in which television watching was not significantly associated with child health. This disparity suggests that only high levels of television watching may be deleterious to children's general health. Interestingly, children's general health was no different for the High Food/High Play class compared to the Advantaged class.

Predicting children's odds of obesity, we found a different pattern of results. In Model 1, only two parenting measures were significantly associated with children's odds of obesity: rules and frequency of fast food eating. In Model 2, both coefficients were reduced to marginal significance. In Model 3, we found that children in three classes—Average, Multiple Risks, and High Food/High Play—had significantly greater odds of being obese than children in the Advantaged class. This risk was greatest for the High Food/High Play class and about equal for the Average and Multiple Risk class. Surprisingly, children in the Low Family Meals/Low Play and Television Watching classes—the classes in which children had the lowest levels of general health—were not at greater risk of being obese than children in the Advantaged class.

Sociodemographic Differences in Health-Related Parenting

With these patterns in mind, the last step was to explore how family demographics were associated with membership in the classes most closely associated with poorer child overall health and greater odds of obesity. To do this, we used multinomial logistic regression and focused on comparing the risks of being in Classes 2–6 versus the Advantaged class (Table 5). Estimates of pairwise comparisons between other classes are available upon request.

Panel 1 shows results for maternal education, which revealed that as maternal education decreased, families were at greater risk of being in classes associated with lower general child health (2, 3, 4, and 5) and children's greater odds of obesity (2, 3, and 6), with one exception. Membership in the Television Watching class was only higher for families with mothers who did not have any college schooling. This pattern suggests that higher levels of maternal education are linked to a greater likelihood families will be in the Advantaged class versus other classes and a consistent health-related parenting advantage for children. Panel 2 presents patterns by family income. Interestingly, income did little to distinguish the relative risk of membership in classes 2–6 compared to risk of membership in the Advantaged class. Only families in the top income quartile were significantly less likely to be in the Average class than the Advantaged class ($RR = 0.720$, $p < .01$) and families in the top two income quartiles were significantly less likely to be in the Multiple Risks class ($RR = 0.497$, $p < .001$ top quartile; $RR = 0.701$, $p < .01$ second quartile). Income did little to differentiate membership in Classes 4–6.

Panel 3 presents patterns by maternal race/ethnicity. Both children with Black and Hispanic mothers were more likely to be in the Average Class than children with White mothers versus the Advantaged Class, with the relative risk higher for children of Black mothers ($RR = 1.640$, $p < .001$) than for children of Hispanic mothers ($RR = 1.290$, $p < .001$). The difference in the relative risk of membership in the Multiple Risks Class versus Advantaged

for children of Black ($RR = 1.881, p < .001$) and children of Hispanic ($RR = 1.547, p < .01$) mothers was even greater. This pattern was also observed for the Low Family Dinners/Low Play class, although children of Black mothers (vs. White) ($RR = 2.836, p < .001$) had much higher risks than those of Hispanic mothers ($RR = 1.649, p < .01$). There were no significant differences in the relative risk of membership in Classes 5 and 6 for children of Hispanic versus White mothers, yet children of Black mothers had significantly higher risks of membership in both groups, particularly the Television Watching class ($RR = 3.140, p < .001$).

Discussion

As some scholars have declared, “Parenting is probably the most important public health issue facing our society” (Hoghughi 1998). In response, they have produced a large literature identifying the health significance of different parenting behaviors for children (Case & Paxson, 2002; Davison & Birch, 2001). We aimed to push this literature forward by recognizing that parenting is comprised of myriad behaviors that work in concert to influence children’s health. This insight is obvious but yet to be applied in an empirical way, which is surprising given that scholars have used holistic ways of studying parenting in other domains of children’s lives like their academic progress (Augustine, 2014; Cheadle, 2008; Lareau, 2002). To do so, we used a latent class approach. Although there are other approaches to studying parenting holistically—for example, in the examples above, Augustine (2014) and Cheadle (2008) used factor analysis based on insights from Lareau’s (2002) qualitative findings—we used LCA, which allowed us to model health-related patterns in parenting when a priori knowledge of health-related patterns is limited, and offered other unique advantages that are valuable for both theory and for future research that we elaborate on below.

Among them, the approach allowed us to describe the prevalence of different patterns of parenting. For example, we found that 57% of U.S. parents practiced nearly the full range of parenting behaviors linked to children’s optimal health. By comparison, only about 10% of children experienced multiple parenting-related health risks. These estimates depart from others that define population risk by general indicators (e.g., family structure, poverty) (Moore, Vandivere, & Redd, 2006), which may convey a sense that more children are experiencing multiple parenting-related health risks than actually are, although we do not discount the importance of these indicators for pointing to other types of risk. Our results also suggest that for children experiencing multiple parenting risks, most of these risks (except for rules) do not reach extreme levels, with Z-scores ranging from .17 to .44. This insight has relevance to practitioners by suggesting they be sensitive to small deviations in optimal health-related parenting when they co-occur. Our LCA results also revealed that the Multiple Risk group had comparatively much lower levels of rules and routines (compared to other groups and behaviors), suggesting lack of household organization and routine might be a signal of other parenting risks.

The LCA also revealed three parenting classes characterized by extreme levels on one or two parenting behaviors. One was the Television Watchers, a small group (<2%), suggesting that lengthy amounts of screen time is not a common problem (at least compared to U.S.

children's average amounts). Our results also revealed that high levels of television watching were also not correlated with other adverse parenting behaviors, such as larger amounts of high caloric foods consumption or poor sleep, as indicated by other studies (e.g., Gable & Lutz, 2000; Mollborn et al., 2014). The High Food/High Play class captured the complexity of health-related parenting where some adverse and advantageous behaviors occur in children together, underscoring the need to examine the associations between health-related parenting and child health in families where both advantageous and adverse parenting behaviors co-occur. It also may reflect the lives of children where monitoring is low (Kimbrow et al., 2011). On the flip side, the Low Family Dinners/Low Play class pointed to how some health risks co-occurred, as they were not only lowest in their frequency of shared meals and outdoor play, but also ate vegetables and fruits less often. We speculate this class may represent families with greater time constraints where shared activities, like playing outside or eating dinner together, or time to prepare meals or shop for fresh foods are few. This finding highlights future investigations that can examine how and why time constraints on families' lives shape specific patterns of parenting.

The second contribution of our approach was an examination of how children's health varied by real world patterns of parenting, which produced different results from models using single parenting measures. In models predicting children's odds of obesity, we found that the few significant associations for the singular measures of parenting were reduced to null significance once we controlled for the correlation amongst them. Yet using our latent classes, we found some parenting patterns were associated with significantly higher odds of obesity. In particular, children in the Average and Multiple Risk groups had greater odds of obesity compared to children with the most Advantaged parenting. This pattern suggests that obesity may arise when children experience many risk factors, even if they are small relative to the sample average, while children that experience extreme levels of one sedentary behavior, as reflected in the Television Watching and Low Family Meals/Low Play groups, may not be at a higher risk of obesity when their families' parenting is average on all other behaviors. Alternately, children in the High Food/High Play group did have greater odds of being obese versus children in the Advantaged group. This result may suggest that consumption of large amounts of food has a stronger link to obesity and that frequent outdoor play (which is only one aspect of physical activity) is not enough to counteract its risks to children's weight. Taken together, these sets of findings also underscore why many studies have failed to find strong or significant effects using single measures of parenting (Te Velde et al., 2012) and how the correlations among many variables still may not capture the associations amongst *patterns* of parenting and child health.

In predicting mother's reports of her child's overall health, the size and significance of the association with the parenting behaviors remained about the same when modeled together. One variable that was no longer significant was, however, was television watching. Using the latent classes, we found that the Television Watching class had the lowest levels of overall health compared to the Advantaged class, suggesting that marginal increases in television watching are not associated with lower levels of child health, but high levels are. Our results also pointed to the general health risks associated with infrequent family meals, which may be partly driven by low levels of outdoor play and infrequent consumption of fruits and vegetables. More broadly, these patterns contrast the results for child obesity, in

which the Low Family Dinners/Low Play class did not have significantly higher odds of obesity, thereby highlighting the unique links between different parenting patterns and different measures of child health. They also reveal how correlations between many single parenting behaviors are low and thus cannot be assumed to co-occur in a monotonic way (e.g., linear increases in time in outdoor play do not occur with increases in other behaviors).

Our final analyses examined whether class membership associated with lower health and higher risks of obesity differed by family sociodemographic characteristics. We found that higher levels of maternal education were linked to families' increased membership in the class associated with the "best" child health outcomes (Advantaged class) in comparison to all other classes, yet when examining family income, membership in the Advantaged class was only greater among families in the highest income quartile, and only in comparison to their likelihood of membership in the Average or Multiple Risks classes. This pattern suggests that children in the highest income families were more likely to experience parenting associated with lower odds of obesity, yet children in lower-income families were no more likely than those in higher-income families to experience parenting associated with the lowest levels of general health. More broadly, the pattern suggests that maternal education is a more powerful sorting mechanism in producing childhood health disparities than family income. We also found risks by race/ethnic group, but more so for children of Black mothers, who were more likely than children of White mothers to be in disadvantaged parenting classes compared to the Advantaged class, especially the two classes associated with the lowest levels of overall health. Children of Hispanic mothers, on the other hand, were no less likely than those of White mothers to be in the Advantaged class than in the class associated with the lowest overall health or highest odds of obesity.

Our study also has limitations. First, LCA is sensitive to differences between samples and measures. If we used a different sample or measures of parenting, we could have found classes that look different than the ones we found. We used a large, nationally-representative sample and a widely used set of measures, but our analysis should be followed up using other data to ensure its reliability. Second, we only used two measures of child physical health. The outcomes we chose included the leading chronic disease in children (obesity) and a well validated and reliable measure that taps differences in child health across a swath of conditions. Still, parenting is likely to matter for other health conditions, which should be considered in future research. Parenting is also parent reported, which could skew our results if some groups of parents over report and others do not. Extant research reveals, however, that social desirability bias, while prevalent, equally affects different groups (Fisher et al., 2008). We also cannot conclude that our latent classes are causally linked to child health. Although we included a rich set of covariates, it is possible that unmeasured factors continue to confound the associations between parenting and families' sociodemographic characteristics. Parents may also act in certain ways in response to their children's health or perceive their children's health in response to their parenting. For example, it remains plausible that mothers perceived children in the Television Watching group, who were at no greater risk of obesity than the Advantaged group, as having poorer overall health. Next, we did not explore the link between parenting and child health at different ages. We took a cross-sectional approach because developmentally-appropriate parenting varies at different child ages and the association between the same parenting behavior and children's health

outcomes is likely to vary across ages, too. Thus, we focused on one age, preschool, when many parent behaviors become more developmentally-appropriate measures of parenting (e.g., shared meals, outdoor play) (Prickett & Augustine, 2016). For this same reason, future research should expand our analysis to examine associations at other ages. Finally, we cannot provide insights as to why certain parenting behaviors cohere among some segments of the population, but this question would also make for an important topic of future inquiry.

Taken together, these results provide some general lessons for researchers, practitioners, and policy makers. For research, they reveal how parenting plays out in diverse ways and how our understanding of the link between parenting and population-level disparities in child health can be enhanced by accounting for such diversity instead of focusing on solitary indicators of parenting behaviors. For practitioners, these results highlight potential points of intervention while offering specific insights on how to identify children at risk of experiencing poor health. For policy, given limited public resources, these results suggest that population-based public health campaigns (e.g., Let's Move!) may be less impactful as interventions than those that more narrowly target the smaller segments of families at risk of lower levels of health-related parenting.

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References

- Alba RD, Logan JR, Stults BJ. How segregated are middle-class African Americans? *Social Problems*. 2000; 47:543–558.
- Anderson SE, Whitaker RC. Household routines and obesity in US preschool-aged children. *Pediatrics*. 2010; 125:420–428. [PubMed: 20142280]
- Augustine JM. Maternal education and the unequal consequence of family structure for children's achievement. *Social Forces*. 2014; 93:687–718.
- Benin AL, Wisler-Scher DJ, Colson E, Shapiro ED, Holmboe ES. Qualitative analysis of mothers' decision-making about vaccines for infants: The importance of trust. *Pediatrics*. 2006; 117:1532–1541. [PubMed: 16651306]
- Bollen, KA. Structural equations with latent variables. New York: Wiley; 1989. Wiley Series in Probability and Mathematical Statistics.
- Case A, Paxson C. Parental behavior and child health. *Health Affairs*. 2002; 21:164–178. [PubMed: 11900156]
- Case A, Lubotsky D, Paxson C. Economic status and health in childhood: The origins of the gradient. *American Economic Review*. 2002; 92:1308–1334.
- Center for Disease Control and Prevention. Defining childhood obesity. 2015. Retrieved May 26, 2016. <http://www.cdc.gov/obesity/childhood/defining.html>
- Cheadle JE. Educational investment, family context, and children's math and reading growth from kindergarten. *Sociology of Education*. 2008; 81:1–31.
- Chin T, Phillips M. Social reproduction and childrearing practices: Social class, children's agency, and the summer activity gap. *Sociology of Education*. 2004; 77:185–210.
- Collins, L., Lanza, S. Latent class and latent transition analysis. New York: Wiley; 2010.
- Committee on Children with Disabilities. Screening infants and young children for developmental disabilities. *Pediatrics*. 1994; 93:863–865. [PubMed: 7513080]

- Davison KK, Birch LL. Childhood overweight: A contextual model and recommendations for future research. *Obesity reviews*. 2001; 2:159–171. [PubMed: 12120101]
- Davison KK, Jurkowski JM, Lawson HA. Reframing family-centered obesity prevention using the Family Ecological Model. *Public Health Nutrition*. 2013; 16:1861–1869. [PubMed: 23089267]
- Dennison BA, Edmunds LS. The role of television in childhood obesity. *Progress in Pediatric Cardiology*. 2008; 25:191–197.
- Edelstein BL. Disparities in oral health and access to care: Findings of national surveys. *Ambulatory Pediatrics*. 2002; 2:141–147. [PubMed: 11950385]
- Fiese, Schwatz. Reclaiming the family table: Mealtimes and child health and wellbeing. Society for Research in Child Development Social Policy Report. 2008; XXII(IV)
- Fisher J, Butte NF, Mendoza PM, Wilson TA, Hodges EA, Reidy KC, Deming D. Overestimation of infant and toddler energy intake by 24-h recall compared with weighed food records. *American Journal of Clinical Nutrition*. 2008; 88:407–415. [PubMed: 18689377]
- Frech A, Kimbro RT. Maternal mental health, neighborhood characteristics, and time investments in children. *Journal of Marriage and Family*. 2011; 73:605–620.
- Gable S, Lutz S. Household, parent, and child contributions to childhood obesity. *Family Relations*. 2000; 49:293–300.
- Giugliani ER, Caiaffa WT, Vogelhut J, Witter FR, Perman JA. Effect of breastfeeding support from different sources on mothers' decisions to breastfeed. *Journal of Human Lactation*. 1994; 10:157–161. [PubMed: 7619265]
- Goris JM, Petersen S, Stamatakis E, Veerman JLT. Television food advertising and the prevalence of childhood overweight and obesity: A multicountry comparison. *Public Health Nutrition*. 2009; 13:1003–1012. [PubMed: 20018123]
- Gutman LM, McLoyd VC, Tokoyawa T. Financial strain, neighborhood stress, parenting behaviors, and adolescent adjustment in urban African American families. *Journal of Research on Adolescence*. 2005; 15:425–449.
- Hagan, J., Shaw, J., Duncan, P. Recommendations for preventive pediatric health care. *American Academy of Pediatrics*; 2008.
- Hagenaars, JA., McCutcheon, AL., editors. *Applied latent class analysis*. Cambridge, UK: Cambridge University Press; 2002.
- Hofferth SL, Sandberg JF. How American children spend their time. *Journal of Marriage and Family*. 2001; 63:295–308.
- Hoghugh M. The importance of parenting in child health. *British Medical Journal*. 1998; 316:1545–1550. 1998. [PubMed: 9596585]
- Kamp-Dush CM, Schmeer K, Taylor MG. Chaos as a social determinant of child health: Reciprocal associations? *Social Science and Medicine*. 2013; 95:69–76. [PubMed: 23541250]
- Kimbro RT, Brooks-Gunn J, McLanahan S. Young children in urban areas: Links among neighborhood characteristics, weight status, outdoor play, and television watching. *Social Science & Medicine*. 2011; 72:668–676. [PubMed: 21324574]
- Lareau A. Invisible inequality: Social class and childrearing in black families and white families. *American Sociological Review*. 2002; 67:747–776.
- Larson NI, Story MT, Nelson MC. Neighborhood environments: Disparities in access to healthy foods in the US. *American Journal of Preventive Medicine*. 2009; 36:74–81. [PubMed: 18977112]
- Mollborn S, James-Hawkins L, Lawrence E, Fomby P. Health lifestyles in early childhood. *Journal of Health and Social behavior*. 2014; 55:386–402. [PubMed: 25413801]
- Moore KA, Vandivere S, Redd Z. A sociodemographic risk index. *Social Indicators Research*. 2006; 75:45–81.
- Muthén, L., Muthén, BO. *Mplus user's guide*. Los Angeles, CA: Muthén & Muthén; 2010.
- National Institute of Health. Why is sleep important?. 2012. Retrieved May 24, 2016. <http://www.nhlbi.nih.gov/health/health-topics/topics/sdd/why#>
- Pearson N, Biddle SJ, Gorely T. Family correlates of fruit and vegetable consumption in children and adolescents: a systematic review. *Public Health Nutrition*. 2009; 12:267–283. [PubMed: 18559129]

- Philips N, Sioen I, Michels N, Sleddens E, De Henauw S. The influence of parenting style on health related behavior of children: Findings from the ChiBS study. *International Journal of Behavioral Nutrition and Physical Activity*. 2014; 11:95–108. [PubMed: 25052905]
- Prickett KC, Augustine JM. Maternal education and investments in children's health. *Journal of Marriage and Family*. 2016; 78:7–25. [PubMed: 26778853]
- Ronsaville DS, Hakim RB. Well child care in the United States: Racial differences in compliance with guidelines. *American Journal of Public Health*. 2000; 90:1436. [PubMed: 10983203]
- Royston P. Multiple imputation of missing values. *Stata Journal*. 2004; 4:227–41.
- StataCorp. *Stata Statistical Software: Release 13*. College Station: TX: StataCorp LP; 2013.
- Tandon PS, Zhou C, Sallis JF, Cain KL, Frank LD, Saelens BE. Home environment relationships with children's physical activity, sedentary time, and screen time by socioeconomic status. *International Journal of Behavioral Nutrition and Physical Activity*. 2012; 9:88. [PubMed: 22835155]
- Taveras EM, Gillman MW, Kleinman K, Rich-Edwards JW, Rifas-Shiman SL. Racial/ethnic differences in early-life risk factors for childhood obesity. *Pediatrics*. 2010; 125:686–695. [PubMed: 20194284]
- Te Velde SJ, Van Nassau F, Uijtdewilligen L, Van Stralen MM, Cardon G, De Craemer M, Manios Y, Brug J, Chinapaw MJM. Energy balance-related behaviours associated with overweight and obesity in preschool children: A systematic review of prospective studies. *Obesity Reviews*. 2012; 13:56–74. [PubMed: 22309065]
- Wildenger LK, McIntyre LL, Fiese BH, Eckert TL. Children's daily routines during kindergarten transition. *Early Childhood Education Journal*. 2008; 36:69–74.
- Williams SM, Goulding A. Patterns of growth associated with the timing of adiposity rebound. *Obesity*. 2009; 17:335–341. [PubMed: 19057527]

Table 1**Sample Description**

	<i>n</i>	%/Mean (std. dev.)
Health variables		
Well-visit (0/1)	7,000	81.2
Frequency dinner together (0–7)	8,550	5.51 (1.87)
Frequency veggies/fruit (0–4)	8,500	2.86 (1.00)
Frequency soda drinking (0–4)	8,500	1.52 (1.39)
Frequency sweets (0–4)	8,500	2.17 (1.18)
Frequency fast food (0–4)	8,500	0.99 (0.85)
Rules scale (0–3)	8,550	2.55 (0.74)
TV watching (0–10)	8,550	2.20 (1.04)
Frequency play outside (0–7)	8,200	3.40 (0.48)
Organized sports/dance (0/1)	3,100	37.0
Sleep 10–12 hours (0/1)	7,300	86.9
Child health outcome variables		
Maternal-reported child health (1–5)	8,550	4.38 (0.78)
Child BMI obese	1,300	18.4
Maternal education		
No HS/GED	1,150	15.3
HS/GED	2,150	27.0
Some college/Associate's degree	2,650	31.3
College or higher	2,550	26.4
Annual family income quartiles		
<=\$20,000	1,800	21.2
\$20,001 – \$40,000	2,200	27.7
\$40,001 – \$75,000	2,100	24.0
>\$75,000	2,450	27.1
Maternal race/ethnicity		
Non-Hispanic White	4,100	57.5
Non-Hispanic Black	1,300	13.8
Hispanic	1,450	22.8
Other	1,650	5.9
Family structure		
Married, biological parents	5,650	65.3
Cohabiting biological parents	650	8.0
Biological mother, step-father	450	5.4
Single mother	1,750	21.4
Maternal age at child's birth	8,550	27.5
Foreign born	2,050	20.2
English not spoken in the home	1,750	18.7
Mother in good/excellent health	5,450	64.1

	<i>n</i>	%/Mean (std. dev.)
Maternal employment		
Not in paid employment	3,350	40.3
Employed part-time	1,650	20.0
Employed full-time	3,500	39.7
Number of siblings in the home	8,550	1.4
Child female	4,200	48.6
Child born at low birth weight	2,400	7.7
No or lapse in health insurance	1,000	12.4
Interview age deviation (months)	8,550	4.5
Child is in center care	6,050	68.4
Child is in non-relative care	950	11.3
Child is in relative care	1,750	20.8
Hours in non-parent care	8,550	22.56
Perceived neighborhood safety (1–4)	8,500	2.46
N	8,550	

Note: Means and percentages calculated using weights. Ns are rounded to the nearest 50 due to NCES's rounding rules. Means for urbanicity and region not shown.

Table 2

Health-Related Parenting Measures and Outcome Z-Scores by Latent Class

	All	Class 1 Advantaged	Class 2 Average	Class 3 Multiple risks	Class 4 Low family meals/Low play	Class 5 Television watchers	Class 6 High food/High play
Z-Score							
Child health outcomes							
Maternal-rated child health (1–5)	4.38	0.18 *	–0.08 *	–0.29 *	–0.09 *	–0.23 *	0.07
Child BMI obese	18.4	–0.01 *	0.17 *	0.22 *	0.01	0.10	0.27 *
Health related parenting							
Well-visit (0/1)	81.2	–0.02	–0.04	–0.18 *	0.02	–0.01	–0.29 *
Frequency dinner together (0–7)	5.51	0.24 *	–0.11 *	–0.44 *	–1.93 *	–0.11	–0.01
Frequency veggies/fruit (0–4)	2.86	0.10 *	–0.16 *	–0.21 *	–0.52 *	0.02	0.25 **
Frequency soda drinking (0–4)	1.52	–0.18 *	0.26 *	0.52 *	0.08	0.10	0.48 *
Frequency sweets (0–4)	2.17	–0.05 *	0.07	0.17 *	0.00	0.12	0.46 *
Frequency fast food (0–4)	0.99	–0.26 *	0.15 *	0.34 *	–0.16 *	0.09 *	2.67 *
Rules scale (0–3)	2.55	0.61	–0.77	–2.46 *	0.61	0.61	0.61
TV watching (0–10)	2.20	–0.23 *	0.26 *	0.39 *	0.03	3.76 *	–0.05
Frequency play outside (0–7)	3.40	0.08 *	0.00	–0.02	–0.51 *	0.27	0.18 *
Organized sports/dance (0/1)	37.0	0.17 *	–0.14 *	–0.37 *	–0.25 *	–0.13	0.04
Sleep 10–12 hours (0/1)	86.9	0.14 *	–0.15 *	–0.23 *	–0.15 *	0.03	0.01
N	8,550	4,850	1,950	850	400	150	350
% of sample	100.0	57.3	21.8	10.3	5.0	1.7	4.0

Note: Means and percentages calculated using weights. Ns are rounded to the nearest 50 due to NCES's rounding rules.

One-sample t-test: statistically different from 0 at

*
p<.05

Table 3

Distribution of Socioeconomic Groups by Latent Class

	All %	Class 1 Advantaged %	Class 2 Average %	Class 3 Multiple risks %	Class 4 Low family meals/Low play %	Class 5 Television watchers %	Class 6 High food/High play %
Maternal education							
No HS/GED	15.3	8.3	23.9	35.2	14.0	29.0	14.3
HS/GED	27.0	22.1	33.8	34.5	34.7	27.3	29.9
Some college/Associate's degree	31.3	34.2	28.6	21.7	31.5	27.9	30.8
College or higher	26.4	35.4	13.7	8.6	19.8	15.8	25.1
Annual family income quartiles							
<=\$20,000	21.2	15.3	27.3	36.8	25.2	18.5	29.1
\$20,001 – \$40,000	27.7	23.2	34.8	38.7	23.7	42.7	24.1
\$40,001 – \$75,000	24.0	26.1	21.7	16.9	28.3	17.6	22.6
>\$75,000	27.1	35.4	16.2	7.7	22.8	21.2	24.2
Maternal race/ethnicity							
Non-Hispanic White	57.5	68.0	45.6	34.8	46.0	39.7	53.6
Non-Hispanic Black	13.8	10.3	17.8	16.6	24.2	16.8	21.4
Hispanic	22.8	16.2	29.5	42.4	23.9	41.1	20.0
Other	5.9	5.5	7.1	6.3	5.9	2.4	5.0
N	8,550	4,850	1,950	850	400	150	350
% of sample	100.0	57.3	21.8	10.3	5.0	1.7	4.0

Note: Means and percentages calculated using weights. Ns are rounded to the nearest 50 due to NCES' s rounding rules.

Table 4

OLS and Logit Regressions Predicting Child Health and Obesity Status by Parenting ($n = 8,550$)

	Child health (2)		Obesity (2)		Obesity (2)	
	(1) Single Behaviors	Coef.	(3) Combined Behaviors	Coef.	(1) Single Behaviors	(3) Combined Behaviors
	Coef.		Coef.		OR	OR
Parenting behaviors						
Well-visit (0/1)	0.156		0.084		0.877	0.881
Frequency dinner together (0–7)	0.182 ^{***}		0.121 ^{***}		0.983	0.989
Frequency veggies/fruit (0–4)	0.579 ^{***}		0.483 ^{***}		0.972	0.982
Frequency soda drinking (0–4)	–0.007		0.033		1.033	1.024
Frequency sweets (0–4)	–0.032		–0.047		0.975	0.957
Frequency fast food (0–4)	–0.264 ^{**}		–0.250 ^{**}		1.076 [*]	1.066 ⁺
Rules scale (0–3)	0.306 ^{***}		0.125		0.906 [*]	0.926 ⁺
TV watching (0–10)	–0.083 [*]		–0.049		1.016	1.011
Frequency play outside (0–7)	0.507 ^{***}		0.427 ^{***}		1.012	1.017
Organized sports/dance (0/1)	0.422 ^{**}		0.320 [*]		1.006	1.015
Sleep 10–12 hours (0/1)	0.308		0.211		0.883	0.905
Latent classes (ref: Class 1: Advantaged)						
Class 2: Average				–0.493 ^{**}		1.274 ^{***}
Class 3: Multiple risks				–0.752 ^{***}		1.263 [*]
Class 4: Low family meals/Low play				–1.000 ^{***}		1.091
Class 5: Television watchers				–1.323 [*]		1.156
Class 6: High food/High play				–0.224		1.647 ^{***}

Note:

⁺ $p < 0.10$,^{*} $p < 0.05$,^{**} $p < 0.01$,

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 $p < 0.001$.

Model 1 represents separate models, each containing one health behavior only. Model 2 contains all parenting behaviors in a single model.

Controls for: Maternal education, household income, family structure, maternal race/ethnicity, maternal age at birth, maternal nativity, English spoken in the home, maternal self-rated health, maternal employment status, number of siblings in the home, child gender, child low birthweight, no or lapse in child's health insurance, age deviation from survey wave, child care settings and hours, perceived neighborhood safety, urbanicity, and region.

Table 5

Multinomial Regression Predicting Latent Class by Family Socioeconomic Status ($n = 8,550$)

	Class 1 Advantaged	Class 2 Average	Class 3 Multiple risks	Class 4 Low family meals/Low play	Class 5 Television watchers	Class 6 High food/High play
	OR	OR	OR	OR	OR	OR
Panel A: Maternal education (ref: College)						
Advantaged reference group						
No HS	–	3.517 ***	3.932 ***	2.433 ***	3.372 ***	1.662 *
HS/GED	–	2.534 ***	2.616 ***	2.309 ***	2.427 **	1.716 **
Some college	–	1.787 ***	1.465 **	1.454 *	1.349	1.146
Panel B: Household income (ref: <\$20,000)						
Advantaged reference group						
\$20,001 – \$40,000	–	0.944	0.853	0.867	1.565	0.692 *
\$40,001 – \$75,000	–	0.863	0.701 **	1.158	1.635	0.754
>\$75,000	–	0.720 **	0.497 ***	1.064	1.474	0.679
Panel C: Maternal Race/Ethnicity (ref: Non-Hispanic White)						
Advantaged reference group						
Non-Hispanic Black	–	1.640 ***	1.881 ***	2.836 ***	3.140 ***	1.803 ***
Hispanic	–	1.290 *	1.547 **	1.649 **	1.549	1.278
Other	–	1.601 ***	1.615 ***	1.179	0.794	1.092

Note:

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$

Controls for: Family structure, maternal age at birth, maternal nativity, English spoken in the home, maternal self-rated health, maternal employment status, number of siblings in the home, child gender, child low birthweight, no or lapse in child's health insurance, age deviation from survey wave, child care settings and hours, perceived neighborhood safety, urbanicity, and region.