Developmental Trajectories of Overweight during Childhood: A Focus on Parental Nativity

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Abstract

In this paper we identify the age-related trajectories of overweight and at risk for overweight from early childhood into the beginning stages of adolescence using the ECLS-K, and test the association between these trajectories and family characteristics among the young children of immigrants and the children of natives. The growing levels of obesity among many children from immigrant families are often attributed to acculturation, a process which involves exposure to US culture and food environments. We draw upon assimilation theory to develop research expectations regarding the relationship between parental nativity and/or age at arrival and children's weight status and weight trajectories. We hypothesize that 1) in some cases weight status trajectories among children of immigrant parents will feature both lower levels and later onset of overweight than among the children of natives; 2) overweight trajectories among children with immigrant parents will vary by parental duration in the US.

Introduction

In the past 25 years, the prevalence of overweight and at-risk for overweight children quadrupled, increasing from roughly four to sixteen percent (National Center for Health Statistics 2004). A number of studies have examined the health consequences of childhood obesity, finding that obese children are more likely to become obese adults (Whitacker, Wright, Pepe, Seidel and Dietz 1997). For example, a recent study found that children with a body mass index (BMI) between the 50th and 84th percentile were roughly 5 times more likely to be overweight or obese young adults compared with children below the 50th percentile (Field, Cook and Gillman 2005). In addition, children who experience early onset weight gain are more likely to be heavier later in adulthood than children with later onset (Wisemandle et al 2000). Another found that at least a quarter of obese adults were overweight as

children and that if overweight begins before 8 years of age, obesity in adulthood is more likely to be severe (Freedman, Khan, Dietz, Srinivasan, and Berenson 2005).

In this paper we identify the age-related trajectories of overweight and at risk for overweight from early childhood into the beginning stages of adolescence, and test the association between these trajectories and family characteristics among the young children of immigrants and the children of natives. The health outcomes of the children of immigrant are of great policy significance because they represent the fastest growing segment of U.S. society under age 18 (Henandez & Charney 1998), currently making up about one-fifth of all U.S. children (Hernandez 1999). This population may be particularly vulnerable to poor health because more than half of the children of immigrants in the U.S. are living in families with low incomes (below 200 percent of the federal poverty thresholds) (Capps, Fix, Reardon-Anderson 2003). In addition, a large portion of immigrants are Hispanic, and Hispanic children have been disproportionately affected by the obesity epidemic. Among children ages 6-11 in 2003/2004, 22.5% of Mexican-Americans versus 17.7% of non-Hispanic whites were classified as overweight (Ogden, Carrol, Curtin, McDowell, Tabak, & Flegal, 2006), and 42.9% of Mexican-American children compared with roughly a third (36.9 %) of non-Hispanic white children were at risk for overweight.

Much of the available research examining the variation in child weight trajectories has been limited by a lack of nationally representative data and a lack of focus on parental nativity. A recent study of rural non-Hispanic white children aged 9 to 13 found that 15% remain chronically overweight through middle childhood into adolescence (Mustillo et al 2009). Another study using a select sample of children ages 2 to 20, Li et al (2008) found that 11% of children experience early and sustained overweight. Prior research has examined generational patterns of overweight among the children of immigrants (e.g. Balistreri and Van Hook 2009; Van Hook and Balistreri 2007) through the use of growth curve models. Growth curve models have been shown to be ideal for modeling the trajectories children

follow over time, including levels and trajectories of body mass index (BMI) (Heo et al 2003), but are less

helpful for identifying growth patterns (Nagin 1999).   Learning about the levels as well as the patterns

of change in children's BMI will be helpful in identifying group differences that can be traced to possible

family characteristics.

Background

In this paper, we draw upon assimilation theory to develop research expectations regarding the

relationship between parental nativity and/or age at arrival and children's weight status and weight

trajectories. Assimilation is a social process that results in the decline of ethnic distinctiveness along

economic, spatial, and sociocultural dimensions (Alba & Nee 2003). Sociocultural assimilation is

sometimes referred to as "acculturation" (Gordon 1964). The growing levels of obesity among many

children from immigrant families are often attributed to acculturation, a process which involves

exposure to US culture and food environments. A common finding in the extant literature on immigrant

health is that health outcomes of immigrants are better than natives when they first arrive in the US, but

are likely to deteriorate with time in the US (Bates et al. 2008; Hummer et al. 1999; Landale et al., 1999;

Rumbaut & Weeks 1989). Although selective migration may account in part for immigrants' initial

healthy outcomes (Palloni and Arias 2004), the dominant hypothesis is that exposure to American

environment (e.g. fast food industry and advertising, availability of cheap, pre-packaged food, reliance

on cars) leads to the "Americanization" of health behaviors involving diet, exercise, and smoking, which

in turn leads to overweight and obesity (Blumenthal 2002; Carter 2002; Fried & Nestle 2002). In support

of this idea, some research shows that the likelihood of being overweight increases with the time in the

United States among adults (Antecol & Bedard, 2006), and is higher among native-born than foreign-

born adolescents (Popkin & Udry 1998), patterns that can be explained for the most part by variations in

diet and physical activity (Gordon-Larsen et al., 2003; Singh et al 2008).

We therefore hypothesize that weight status trajectories among children of immigrant parents would feature both lower levels and later onset of overweight than among the children of natives. Because duration in the U.S. is expected to be associated with changes in lifestyle choices, we further hypothesize that overweight trajectories among children whose parents arrived as children (known as the 1.5 generation) would be more similar to those among children of natives than the children of immigrants who arrived as adolescents or young adults (known as the 1.0 generation).

Immigrant parents who spent most of their life in their home countries (the 1.0 generation) may be unfamiliar with US foods and grocery stores, unaware of the health risks of American junk food, and uniformed about opportunities for their children to participate in sports or other school related activities (Van Hook, Baker and Altman 2009). They may be coming from environments characterized by food scarcity and under nutrition (Van Hook and Balistreri 2007; Popkin and Doak 1998) and may not consider over indulgence in food among their children a problem. In environments in which food sources are less secure (such as in some less-developed countries), overweight may be a marker of status, or at least is not perceived as unhealthy. Parents with the means may therefore use their resources to indulge their children (Doak et al. 2005; Melgar-Quinonez and Kaiser 2004). Immigrants may bring such inclinations with them to the United States. We hypothesize that 1.0 generation parents may be less effective at protecting their children from behavior-related health risks such as overweight than native-born parents or parents who came to the US as children, such that children of the 1.0 generation will have higher levels of overweight than the children of the 1.5 generation or children of natives.

Data and Analysis

We use the Early Childhood Longitudinal Study- Kindergarten Cohort (ECLS-K), a nationally representative sample of US kindergartners, to identify overweight trajectories and explore the

relationships among weight patterns, race/ethnicity, and parental nativity status. The ECLS-K data are ideal for these analyses because they include measures of weight and height (necessary to establish BMI) which are assessed up to 7 times (twice in Kindergarten and first grade, once in third, fifth and eighth). In addition, these data are measured by the interviewer, and are not based on parent's reports, which may be biased. Further, the ECLS-K data are particularly well suited for studying the children of immigrants because Asian and Pacific Islander children were oversampled, and the sample was freshened to include children who may have attended kindergarten outside of the U.S. (NCES 2001). The ECLS staff interviewed parents who spoke languages other than English by translating the parent questionnaire into Spanish, Chinese, Lakota, and Hmong.

We proceed in two stages. First, we fit latent growth mixture models (GMM) of the repeated measures of binary overweight indicators over age to identify distinct trajectories in overweight. The GMM allows for heterogeneity in growth trajectories for a population (Muthen 2001). These models are similar to cluster analysis in that they identify groupings of individuals in the data, except that they incorporate entire trajectories in weight status rather than weight status at a single point in time. These models are estimated by maximum likelihood using the expectation-maximization algorithm, excluding participants who had missing values on all BMI measurements. Logistic regression analysis was used for the binary outcomes. The number of latent classes was determined by model fit indices of Bayesian Information Criteria (Rafferty 1995). In general, the model with the smallest BIC indicates the preferred model.

In the second stage, we produce descriptive statistics of children in each weight trajectory category by race/ethnicity, gender, parental nativity and/or generational status. We estimate the likelihood of being classified in each of the weight trajectories using multinomial logistic regression in order to assess the independent effects of parental generational status while controlling for other individual and household factors. We estimate these models for both boys and girls pooled together

(with gender included as a control variable) and then separately by gender. Given that generational

differences are difficult to assess independent of national origin (because incorporation patterns are

likely to vary by group), we also explore the effects of parental generation by race/ethnicity by including

interaction terms between generational status and race/ethnicity. We estimate predicted probabilities

of being in each trajectory category by race/ethnicity and parental generational status.

Measures

Generational Status.

        The children of immigrants are defined here as children having at least one foreign born parent.

For those respondents with two foreign-born parents, we use country of origin characteristics based on

the mother's record. We further distinguish between newly-arrived and settled immigrant parents

because we expect country-of-origin characteristics to operate more strongly for children of parents

who grew up in their countries of origin than parents who arrived in the U.S. as children themselves.

Newly-arrived could be defined as having moved to the U.S. within the last 5-10 years (as is done in

some research on wages). Because assimilation is theorized to occur in steps across generations as the

children and grandchildren of immigrants are socialized in the new country (e.g., Alba & Nee 2003), a

more meaningful definition of "newly-arrived" in some applications is having been socialized as a child

primarily in the country of origin. Thus immigration scholars commonly make distinctions between the

1.0 generation (foreign born who arrived after some cut-off age such as 6, 12, or 15) and the 1.5

generation (foreign born who arrived at younger ages) (Rumbaut, 1994; Portes & Rumbaut, 1997; Portes

& Zhou, 1993). We use the latter definition (with the "1.0" generation defined as "newly-arrived") as

those children arriving in the U.S. ages 15 or older, and the "1.5" generation as those parents who

arrived between the ages 0 to 14.

Of the full longitudinal ECLS-K sample (N=21,409, including freshened sample) there are

N=20,746 respondents with at least one valid parental data collection point across all 4 waves—among

these 80.3% (N=16,662) contain information on parents country of birth, and nearly the same

percentage (79.2%; N=16,437) contain information on parents country of birth *and* age at entry to the

United States. Among the sample with complete immigrant parent information (N=16,437), there are

2,626 children of the "1.0" generation, 1,043 children of the "1.5" generation, and 12,768 children of

natives.

BMI.

Prior research on child obesity has established body mass index (weight/height^2) as a suitable

adiposity index for children (Poskitt 2000). BMI is also a preferred measure because height and weight

are easy to obtain with a reasonable degree of accuracy across different settings. In the ECLS-K,

children's height and weight were assessed by ECLS-K staff at each wave of data collection and recorded

using a Shorr Board and a digital scale. Algorithms provided by the Centers for Disease Control and

Prevention based on 2000 growth charts are used to classify any outliers in weight or height. We use

the CDC guidelines to classify children with a BMI $\geq$95th percentile for their gender-specific BMI-for-age

as overweight, and those with BMI $\geq$ 85th to $\leq$94th percentile as 'at risk for overweight'. We create a

dichotomous variable that combines children who are overweight and at risk for overweight for use in

the GMMs.

Control Variables.

A number of socioeconomic and health characteristics that may be associated with children's BMI

will be used as control variables in the multinomial logit models. These include gender, parental

education, household income, the number of children in the household, physical disability status, and

prematurity status (i.e., whether the child was born before 38 weeks of gestation). We also will control

for family structure because single parent families have been found to favor pre-manufactured food and

fast food consumption (Crockett & Sims, 1995), and whether the child had two immigrant parents.

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