

Child Obesity and the Interaction of Family and Neighborhood Socioeconomic Context

INTRODUCTION

In response to dramatic increases in child obesity, a growing body of literature considers the consequences of this epidemic for children, families, and communities (Balistreri and Hook 2011; Miller 2011; Merten 2010; Wang *et al.* 2011; Roberto *et al.* 2015). These efforts highlight the impact of obesity, especially experienced early in life, on both the trajectories of individuals and the future health and vitality of society. Although the root cause of weight gain trends in children remains elusive, a wealth of data indicate that obesogenic environments lead to changes in consumption practices and lifestyle behaviors (Swinburn *et al.* 2011) that drive the prevalence and severity of obesity in children. While this literature increases our understanding of the demographic and socioeconomic variation in child obesity, we know little about how multiple demographic factors may combine to produce steep socioeconomic gradients in obesity and still less about the role neighborhood socioeconomic status (SES) plays in these disparities. A clear connection between the empirical evaluation of how neighborhoods matter differently by child characteristics and a theoretical premise for why the residential context is experienced differently by specific segments of the population is needed (Sharkey and Faber 2014; Van Hulst *et al.* 2013) to advance the literature on neighborhoods and child obesity.

In the present analysis, we investigate whether children with different family SES, but living in the same neighborhood contexts, have similar or different odds in obesity. We systematically explore the extent to which distinctive residential environments give rise to social patterning that produces variation in obesity prevalence. We examine the complexities of associations between child obesity, area deprivation, and neighborhood-level social characteristics through a more nuanced lens by leveraging unique data and using latent profile modeling techniques to characterize neighborhoods into areas of distinctive physical and social contexts. We then use a series of multilevel cross-level interaction models to examine how the residential socioeconomic context impacts children differently by household SES.

HYPOTHESES

We motivate our hypotheses by focusing on the incongruence of children's sociodemographic characteristics within distinctive neighborhood contexts. We begin by hypothesizing that, in general, the more disadvantaged the community the higher the odds of obesity for children in those communities. This is derived from prior research (Grow *et al.* 2010; Kimbro and Denney 2013). Thus,

H1. The odds of obesity for children will be higher in more socioeconomically disadvantaged communities than in less disadvantaged communities.

Next, we consider whether the influence of a disadvantaged neighborhood *differs* across children in more and less advantaged families. We develop two additional

hypotheses that focus on the relative impact of neighborhood context on child obesity by family SES.

It may be that neighborhood disadvantages accumulate along with family disadvantages (Birch, Jerrett, & Eyles 2000; Ferraro & Kelley-Moore 2003). In this scenario, and in line with the cumulative disadvantage perspective, children's low family SES may fail to buffer against the additional deleterious effects of living in a disadvantaged community. In contrast, higher-SES children may be less influenced by neighborhood conditions and thus maintain relatively healthy weights by leveraging their family advantages to avoid obesogenic neighborhood factors. As a consequence, the gap in obesity between low- and high-SES children *grows* as neighborhood disadvantage increases.

Alternatively, pursuant to the Blaxter hypothesis, increasing neighborhood disadvantage might influence high-SES children more than low-SES children (Blaxter 1990). If more socioeconomically advantaged children live in areas characterized by features of socioeconomic and other disadvantages, those children may be exposed to a more obesogenic environment (Lovasi 2009; Townshend and Lake 2009) and adhere more closely to local weight-related behaviors and expectations. Meanwhile, children from low-SES families are more accustomed to the health norms and customs of lower-SES neighborhoods. In this way, the impact of the neighborhood environment might be enhanced for higher-SES children, and socioeconomic advantages typically leveraged toward better health may not be realized to the same extent when living in a more advantaged place. This heterogeneity between family SES and neighborhood conditions will in turn impact the odds of obesity differently and ultimately *shrink* the gap in obesity between lower-SES and higher-SES children the more disadvantaged the neighborhood. Thus, we test the following two competing hypotheses:

H2a. Increasing neighborhood disadvantage will impact the odds of obesity more for low-SES children than for high-SES children, resulting in a larger gap in obesity the more disadvantaged the neighborhood.

H2b. Increasing neighborhood disadvantage will impact the odds of obesity more for high-SES children than for low-SES children, resulting in a smaller gap in obesity the more disadvantaged the neighborhood.

METHODS

Our focal data set is a compilation of electronic medical and administrative records from the largest single system network of pediatric clinics and hospital admissions in the country in Houston, TX. Medical records include inpatient and emergency room pediatric encounters at a large pediatric hospital as well as outpatient visits to one of 50 pediatric clinics throughout the Houston metropolitan area for all patients who were 2 – 12 years old in 2011 and 2013. The pediatric records were geocoded to the Census tract level and then linked to neighborhood-level social, economic, walkability, and crime data to provide a comprehensive portrait of the different kinds of neighborhoods in Houston, TX. =

PRELIMINARY RESULTS

Aligned with previous studies, and consistent with H1, we show that the likelihood of obesity is higher for children in more socioeconomically disadvantaged areas. We add to this literature by examining additional hypotheses and finding that the impact of neighborhood disadvantage is different for children of different socioeconomic standing, such that higher-SES children's odds of obesity in disadvantaged communities are more impacted by the community in which they live relative to other lower-SES children living in those same neighborhoods. In part, our use of Latent Profile Analysis provided analytical strength in the characterization of the city of Houston into different kinds of environments that children may reside. As a result, our findings indicate that when the differential experiences of children in the same neighborhood are accounted for within distinct residential environments, the gap in obesity between children by social status begins to converge.

Our preliminary results provide evidence that affluent children's odds of obesity are more impacted by living in an impoverished area. Although it is beyond the scope of our analysis to examine precisely why, it may be that economically advantaged children living in communities characterized by disadvantage, such as higher rates of crime and diminished walkability, are more vulnerable to neighborhood context. In this way, and in line with work from Blaxter (1990), the impact of the neighborhood environment matters less for lower-SES children perhaps due to already high rates of exposure to the deleterious effects of social disadvantage. The direction and magnitude of these two adaptations push in opposite directions, thereby generating more pronounced differences in the odds of obesity by sociodemographic attributes. In other words, neighborhood disadvantage associates with greater weight among children overall, and it does so differentially by child and family characteristics.

