



## Review Essay

# A review of neighborhood effects and early child development: How, where, and for whom, do neighborhoods matter?



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## ABSTRACT

This paper describes a scoping review of 42 studies of neighborhood effects on developmental health for children ages 0–6, published between 2009 and 2014. It focuses on three themes: (1) theoretical mechanisms that drive early childhood development, i.e. *how* neighborhoods matter for early childhood development; (2) dependence of such mechanisms on place-based characteristics i.e. *where* neighborhood effects occur; (3) dependence of such mechanisms on child characteristics, i.e. *for whom* is development most affected. Given that ecological systems theories postulate diverse mechanisms via which neighborhood characteristics affect early child development, we specifically examine evidence on mediation and/or moderation effects. We conclude by discussing future challenges, and proposing recommendations for analyses that utilize ecological longitudinal population-based databases.

## 1. Introduction

The 1990s saw the emergence of a series of empirical papers demonstrating that the neighborhoods in which children live, play, and go to school, particularly those rife with poverty, matter to their health and wellbeing. Important theoretical contributions such as W.J. Wilson's *The Truly Disadvantaged* (Wilson, 1987) and Bronfenbrenner's social ecological model of human development (Bronfenbrenner, 1979) foreshadowed this research. These scholars postulated a concept that was relatively new at the time — that the neighborhood context, in conjunction with other factors, such as child characteristics, parenting, and family resources, matters to the wellbeing of developing children.

Now well into the third decade of this research, there is strong evidence to suggest that the social, economic, cultural, and built characteristics of children's neighborhoods lay down important, sometimes life-long foundations for their development. Research in this field has simultaneously benefitted from methodological and technological advances in the last few years. The development of infrastructures for population-based longitudinal data capture and linkage, geospatial mapping, and statistical software to test complex multilevel and longitudinal mediation and moderation models make it possible to

systematically test sophisticated hypotheses about the contextual influences on human development (Brownell et al., 2016; Nickel et al., 2014; Jutte et al., 2011; Roos et al., 2010; Mountain et al., 2016).

Despite these significant developments, previous reviews (cf. Sampson et al. (2002), van Vuuren et al. (2014)) have criticized the existing research for having limited capacity to inform effective policies and interventions. Sampson et al. (2002) argued that confusion over the direction of causation due to selection bias (the ability for people to self-select into neighborhoods) is one of the more important methodological limitations for interpreting statistical associations between neighborhood factors and health. Broader criticisms of the literature harken back to Jencks and Mayer (1990) argument that neighborhood research is a “black-box” (Galster, 2012, van Ham and Manley, 2012), showing that neighborhoods are important, but revealing little about the processes that produce inequalities (Jackson et al., 2009). From an empirical standpoint, this gap may be understood as a dearth of evidence about underlying processes, mechanisms, or pathways through which neighborhoods may affect children's developmental health (Sharkey and Faber, 2014).

To advance a research agenda that will fill existing gaps in the literature and avoid the pitfalls of past neighborhood effects studies, we pause to review this burgeoning literature. We focus on what is known

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(i.e. where we are) and especially on what we need to know to advance this research further (i.e. where do we go from here). This paper begins with an overview of the theoretical frameworks underpinning the literature on neighbourhoods and their effects on developmental health. Next, using scoping review methodology (Arksey and O'Malley, 2005), we synthesize recent empirical evidence of this relationship along three dimensions: 'how' (the structural and mediating pathways), 'where', and 'for whom' (the neighborhood- and child-level moderating factors respectively). Given the empirical and technological progress in this field over the last few decades, we argue that it is not only possible but also imperative for future research to examine these questions using mediation and moderation analyses. In our discussion, we describe how a Canadian intersectoral coalition of researchers and governments aims to meet this challenge with a national databank that monitors early child development and neighborhood characteristics (Guhn et al., 2016). We close by drawing from the evidence summarized in this paper to make recommendations for future research in the neighborhood effects on child development at this important juncture in the field.

### 1.1. Defining developmental health in early childhood

The early years of a child's life – the time between birth and age 5 – represent sensitive periods for development (Knudsen, 2004). The developing brain is influenced from the time the fetus is *in utero* and it continues to change through neuro-synaptic pruning over the first months and years of a child's life (Aylward, 1997; Levitt, 2003; Monk et al., 2001). Neuropsychological research suggests that rapid growth of children's brains during this time makes them particularly susceptible to environmental stimuli both positive and detrimental to development (Fox et al., 1994; Ursache and Noble, 2016; Noble et al., 2015). Through a process called *biological embedding*, social and environmental experiences in a child's early years are theorized to shape physiological changes that have lifelong protective or detrimental effects on children's learning, behavior, health and wellbeing (Boyce and Ellis, 2005; Hertzman and Boyce, 2010; Vimpani, 2000; Mitchell et al., 2014). Recent advances in neuroscience, allowing for direct measurement of the brain, confirm the strong association between poverty and brain growth in the first three years, resulting in differences in gray matter volume between children in families of varying socioeconomic status (Hanson et al., 2013).

The concept that children's developmental health is both an outcome of their early experiences and a predictor of future life success has profound implications for its measurement. While definitions of developmental health in early childhood have historically focused on academic and cognitive qualities such as literacy and numeracy (Kagan, 1999, 1992), contemporary conceptions extend this definition to include physical changes (including health-related factors) as well as social and emotional factors that are related to early life (Heim et al., 2004; Bartley et al., 1994; Stern et al., 2000; Wadsworth and Kuh, 1997; Scott-Little et al., 2006; Shonkoff and Phillips, 2000). This broadened conception is accompanied by a growing interest in measuring developmental health in association with communities where children live. Love et al. (1994), for example, proposed a methodology for assessing children's development in a way that is sensitive to the influence of local, cultural, and social issues. Where concepts of developmental health have increasingly focused on understanding the complex interactions between properties of individuals and systems, however, new challenges have emerged with regards to measuring and modeling these concepts, which we discuss later in this paper.

### 1.2. Situating the neighborhood effects literature in the bio-ecological model

The claim that a child's place of residence makes a difference to

their developmental health is made in at least three bodies of theory. First, Urie Bronfenbrenner's bio-ecological, or *person-process-context-time* framework for human development (Bronfenbrenner and Morris, 2007; Bronfenbrenner, 1979, Bronfenbrenner, 1999), suggests that developmental change must be understood as the product of the sustained *interaction* between a child, meaning their characteristics, and the features of their immediate and distal environments over time. The person characteristics refer to the developmental, biological, and psychological aspects of the developing child. Processes that lead to developmental change may include parent-child or child-child activities, group or solitary play, reading, learning new skills, studying, athletic activities and performing complex tasks. The environments that constitute the bio-ecological systems framework refer to a series of nested contexts ranging from intimate to distal, or what Bronfenbrenner refers to as "micro" to "macro". The intimate contexts refer to the child's family, childcare facility, and neighborhood of residence – those within which the processes leading to developmental change play out constantly through direct and reciprocal interactions between a child and objects or other people. The more distal contexts include interactions that occur between systems or environments – some which the child interacts with directly (e.g., the family and the school) and others that indirectly influences their developmental health (e.g., local or national policies). For example, policies about childcare provision may influence childcare availability and quality, which in turn determines the social and environmental stimuli that children encounter. In our view, the bio-ecological approach offers a useful framework to conceptualize a wide array of contexts that may influence children's developmental health. Given its breadth, however, it is difficult to operationalize and test it as a whole. Instead, as Bronfenbrenner (1999) has suggested, the research literature is rich with "latent paradigms" or frameworks that implicitly offer empirical support for the model.

A second theoretical body of literature casts a sociological lens on the relationship between children's early development and the effects of poverty in their residential environments. Research of this kind may be traced to work from the US in the 1980s that began in response to concerns about a growing underclass of people living in ghettos. Poor neighborhoods were perceived as disadvantages to their residents, isolating them from opportunities (Wilson, 1987). This perspective suggests that neighborhoods may indicate place-based inequalities in the distribution of social and environmental risks and opportunities for developmental health. In a recent review of the neighborhood effects on health literature, Galster (2012) mapped out the social, environmental, geographic, and institutional mechanisms that are theorized to link neighborhoods to individual health. In neighborhoods where residents work towards common goals (Sampson et al., 1999, 2002), or in areas where people share similar behavioral and attitudinal norms (Brooks-Gunn et al., 1993; Kohen et al., 1998), residents may be more likely to share resources, and to monitor and support their local children (Froiland et al., 2014; Leventhal and Brooks-Gunn, 2000; Sampson et al., 1999). Contact among residents may mean that children are more likely to share behaviors or attitudes towards problem behavior (Froiland et al., 2014; Leventhal and Brooks-Gunn, 2000). Parents' perceptions of their neighborhoods may also be influenced by their social environment, which may in turn affect the parenting strategies that they use within their homes (Roosa et al., 2003). There may be damaging developmental consequences as a result of exposure to environmental hazards, such as lead in soil and paint; asthma-inducing air pollutants may be more prevalent among disadvantaged areas (Earls and Buka, 2000; Litt et al., 2002; Ash and Fetter, 2004). Some neighborhoods may be located within political jurisdictions that have fewer resources for childhood or family services, or have operational challenges which lead to services that are inferior in quality (Galster, 2012). Finally, vital societal resources (e.g., schools, healthcare, social services, etc.) in neighborhoods may employ people who do not necessarily live in the neighborhood but who may be role-models for

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