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KU THE UNIVERSITY OF KANSAS
School of Social Welfare

Assets, Economic Opportunity, and Toxic Stress

A Framework for Understanding Child and Educational Outcomes

Trina R. Shanks
University of Michigan

Christine Robinson
Stillwaters Consultation

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Child health, educational attainment, and family socioeconomic status are inextricably linked. We introduce a model that ties together research drawn from the fields of economics, education, psychology, sociology, medicine, epidemiology, neuroscience, public health and biostatistics. Organized around an integrated conceptual paradigm of environmental, economic, familial and psychosocial pathways, we demonstrate various ways SES alters the performance of biological systems, thereby affecting family interaction, stress, school success, and child outcomes.

Key words: *child outcomes, educational outcomes, assets, stress*

Introduction

A large body of evidence indicates that socioeconomic status (SES) is a strong predictor of school achievement, college graduation and child outcomes in general. Better developmental and health outcomes are strongly associated with family assets; families with greater wealth, more income, more years of education, steady professions, as well as living in neighborhoods rich with services and supportive networks. Child health, educational attainment, and family socioeconomic status are inextricably linked. We introduce a model that ties together research drawn from the fields of economics, education, psychology, sociology, medicine, epidemiology, neuroscience, public health and biostatistics. Organized around an integrated conceptual paradigm of environmental, economic, familial and psychosocial pathways, we demonstrate various ways SES alters the performance of biological systems, thereby affecting family interaction, stress, school success, and child outcomes.

In the United States, where there are high levels of child poverty and a limited safety net, the benefits of economic security can be monumental while the consequences of economic distress can be devastating. *There are multiple pathways by which SES may affect developmental outcomes, including access to and quality of education and social supports, health care and health-related behaviors, individual psychosocial processes, and physical and social environments.* The initial physical and social environmental determinants, the resulting mediating role of the psychosocial processes and the balance between resources and demands in each stage of development, are shaped by socioeconomic forces. For example, poverty, environmental degradation, and vulnerability are interrelated. Poverty impacts health and education because it defines how many resources poor people have for basic needs thereby defining the amount of environmental risks they will be exposed to in their immediate environment (Olden, 1998). Educational attainment among adults is linked inextricably with children's health as well, beginning early in life; babies of more-educated mothers are less likely to die before their first

birthdays and children of more educated parents experience better health. (Low et al., 2005; Ross & Mirowsky, 1999)

Families and communities play the central role (and bear most of the costs) in providing the supportive relationships and positive experiences that young children need for healthy development. Economic resources provide stability and can reduce many of the factors that might lead to stressful circumstances, thus making life easier for children. Although the primary focus of this paper is educational outcomes, we highlight developmental outcomes more generally because social-emotional, cognitive functioning and health status are highly interrelated. Their basic foundation is formed early, even prenatally. The architecture of the brain is intricate; higher level abilities are built upon the layers of neural circuits developed initially. MRI's, biopsychology and cognitive neuroscience demonstrate that adverse circumstances interrupt healthy brain and physical development. Although the early childhood years (birth to 5) are very important, it is still possible for adaptive interventions to take place later in life. Remedial interventions, however, often require greater effort to overcome initial delays, and typically at greater expense. Yet, nurturing environments for all children (those that are safe, stable, stimulating and responsive) strengthen developmental trajectories across all phases of child and adolescent development.

In general, there is a strong, two-directional association between socioeconomic status and child outcomes across all developmental periods in childhood and adolescence. Figure 1 focuses on three central components of SES, outlining the impact on family life and configuration, neighborhood, stress, and ultimately child educational and socio-emotional outcomes. The association of SES and developmental outcomes begins at birth and extends throughout life, but the strength and nature of the relationship can vary at different stages of life. The effects of SES in childhood and through adulthood appear to be cumulative, underscoring the value of examining trajectories of SES along with trajectories of risk.

Child development is a dynamic process that unfolds from birth to early adulthood. Interacting factors including household assets and social supports provided by neighborhood and community of residence along with responsible caregiving are perhaps the most salient indicators of optimal child development. Among these factors, household assets are one of the most significantly aligned with improved child outcomes and educational attainment. Families with assets have the means to support and protect their children more readily. By definition, families with few, no, or negative assets are frequently placed in a precarious position as they strive to navigate a path toward enhancing their child's social, emotional, cognitive, and physical development.

One of the most important indicators of an individual's health is one's street address or neighborhood. Where you live affects your health, your options, and your opportunities. Numerous researchers are investigating individual health outcomes through an ecological lens. It is clear that place matters. The use of geographic information system (GIS) software allows analysis of the relationships between the availability of fast food, neighborhood racial and income composition, nutrient intake, and body mass index (BMI). Additionally, links between the built environment, walking, pedestrian accidents;

outdoor alcohol advertisement and youth attitudes about drinking; recreation facilities and physical activity; park acreage, green access, and ethnicity; distribution of transportation dollars, transit access and alternatives to driving, air quality, and asthma; pollution "hot spots," industrial facility siting and permitting, and health impact assessment (HIA) points to numerous disparities among low-income populations and communities of color (Bullard, Johnson, & Torres, 2011).

Socioeconomic status and race/ethnicity interact in their associations with educational outcomes. This interaction is documented in the rich data on disparities and can be augmented by further study of racial differences in SES trajectories, material hardship, experiences of discrimination, and the impact of these differences on family configuration, marriage rates, family stability, housing, asset accumulation, parental education, neighborhood of residence, and indicators of health outcomes.

Household level variables mediated by social support are a critical element in the mix. *Loving and nurturing relationships in a household environment provide the context for a child to learn, grow, and thrive.* These are typically initiated at birth and the most sustained interactions that a child has early in life. Multiple transactional theories outline how a parent (or caregiver) and child interact with one another over time. In general, if the parent or child has a difficulty that compromises positive interactions, dysfunctional patterns can emerge. Depression and mental health issues are an underlying concern in more than 25% of US households, affecting millions of children/families. Furthermore, households with few socio-economic resources are frequently situated in disadvantaged neighborhoods with overcrowded and/or questionable educational and child welfare systems, environmental and other toxins and inadequate social safety nets, where negative effects are exacerbated.

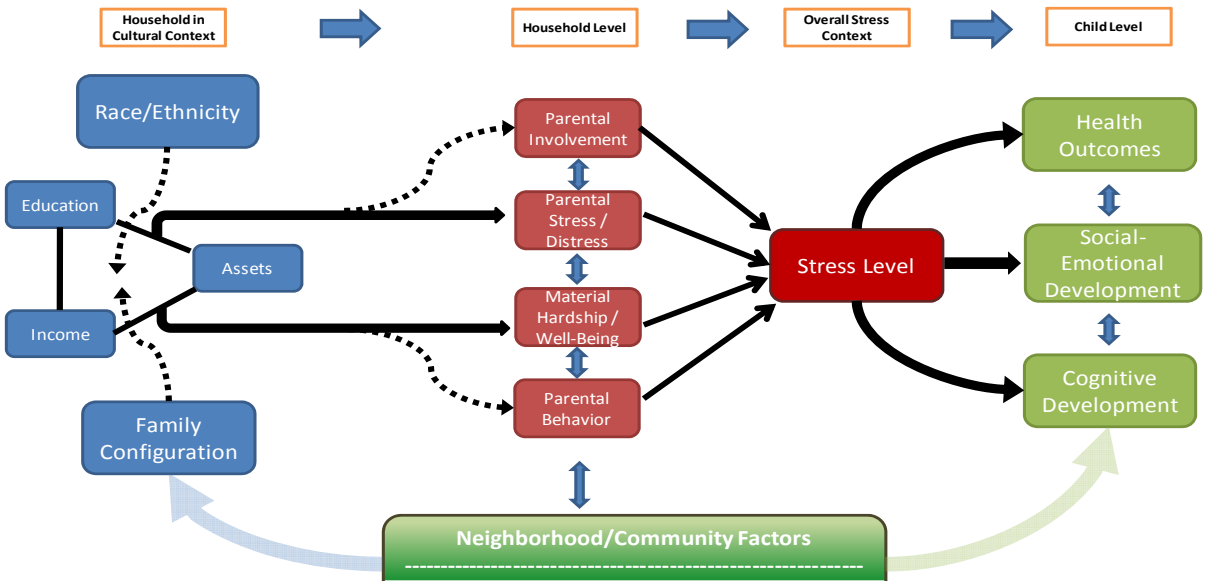
Social support is a mediating factor in the lives of families. This is a variable with a wide range of outcomes regardless of SES. It is of critical importance as the research points to the centrality and significance of support in the life of every child with positive outcomes. These children have at least one persistent source of support (e.g. a strong family support, mentor, teacher, coach, minister, neighbor) someone who took an active interest in their development, provided guidance and nurturance, and helped to mediate stressful situations. Moreover, the level of social support is also a mitigating factor for adults in their own personal development and in their parenting roles. Parents who are supported are able to be stronger in their own lives and in the lives of their children.

Stress

A central concept in our thesis is the role of stress in the life of the child and family. The positive, tolerable, and toxic stress framework has been extensively developed by Jack Shonkoff and his colleagues at the Center for the Developing Child at Harvard University. There are several key implications that come from this work. Recent scientific advances in the biological and neurological sciences emphasize evolving evidence that illustrates the physiological disruptions caused by excessive adversity early in life—and their long-term manifestations as impairments of learning,

behavior, and both physical and mental health (Shonkoff, Boyce & McEwen, 2009). Stress is any perceived adverse situation that upsets a child, parent, or household ranging from a homework assignment to a death in the family. Stress is a condition of the mind and a factor of expression that differs among individuals and reflects not only major life events but also the realities and pressures of daily life that elevate physiological systems. This burden reflects not only the impact of life experiences but also genetic variations; individual life-style habits such as diet, exercise, sleep and substance abuse; and epigenetic modifications in development and throughout life that set life-long patterns of behavior and physiological reactivity through both biological embedding and cumulative change.[i] A more exhaustive overview of stress and its relevance to educational and developmental outcomes will be presented later.

Figure 1: General Overarching Framework



Model overview

Our purpose in this document is to provide general models that are relevant to all families, incorporating the best empirical literature about the relationships between a household's socio-economic situation, household interactions, and child educational outcomes. The intention is to illustrate how these frequently cited factors are exacerbated and aligned by stress or difficult circumstances that cause long-term difficulties for children in high-risk circumstances. All relationships take place within a larger cultural context, so at times demographic factors such as race, ethnicity, and family structure become more salient with an exponential effect on developmental outcomes. In addition, the quality of public systems and services are frequently related to

geographic setting and may have a stronger or weaker influence on the particular risks and opportunities experienced by a child. Furthermore, there is resounding evidence that environmental toxins are over represented in communities of color. Finally, we modify the model to illustrate the dynamic nature of these relationships, highlighting how the developmental trajectory of a child who lives with toxic stress might differ from a comparable child with social supports in a situation of low or tolerable stress.

The models have four main components. Each will be introduced here and then described in more detail in subsequent sections. The first set of relationships is the household's socio-economic status (SES) and the way that status plays out in a particular cultural context. The second component is household level interactions mediated by social support, which are influenced by household SES, but also take on their own dynamic based on particular characteristics of the parent/caregiver, family configuration, and the focal child. The third component is what is sometimes called the wider ecological system—characteristics of the residential neighborhood, community resources, and systemic influences from schools, to child welfare, public health, and other key public systems/institutions, and policy.

All three of these components contribute to a set of risk and protective factors that result in an overall environmental stress context, the fourth component. When stress is positive or tolerable, all the components work together in predictable ways to influence child developmental outcomes over time. When multiple risk factors exist with few protective relationships, the stressors faced by a child and household can reach toxic levels. High levels of stress are often exacerbated by a range of social and environmental factors in low socioeconomic neighborhoods. When stress is persistently high and sustained at toxic levels, and exacerbated by environmental toxins, a child's neural circuitry and physical health are impacted which can lead to problems in socio-emotional and cognitive development. Again, the basic model is depicted in Figure 1.

Detailed Description of Model Components

Household SES in cultural context

At the far left of the figure in the blue are the core areas of household socio-economic status (SES). We note income, which is total household income from all sources. We also note education, which summarizes the highest educational attainment of the child's parents or primary caregiver. And finally we note assets, which are typically measured as net worth—the total value of everything the household owns minus any debt or liabilities the household owes. However, some studies focus on specific assets, such as home ownership, business ownership or financial wealth (liquid assets that could be easily converted to cash if needed). Research noting the direct relationship between each of these aspects of household SES and relevant household and developmental outcomes are summarized later, but given the importance of economic security in household interactions and as a potential source of stress, this section will attempt to describe how these various aspects interact.

Dynamic nature of income, education and assets

Although income, education, and assets can easily be measured separately, in these models they are seen as a dynamic triangle, expanding or declining across a lifetime and generations. Examining SES across the life cycle, there are typically stages of scarcity and abundance. For example, most young adults (or couples) start out with very little. However, if they complete a postsecondary degree and increase their educational attainment, they then have a greater likelihood of earning a higher income over their lifetime. Similarly, if someone earns a higher income and/or works for an organization that offers some sort of a matched retirement plan, they will have more resources to invest in building assets or further education. And if someone has high net worth and low debt, they have a nest egg that can be used to pay for further education and training or to fall back on in a time of unemployment or reduced income. The following studies provide empirical evidence for these assertions:

- "In 2009, young adults aged 25-34 with a bachelor's degree earned more than twice as much as young adults without a high school diploma or its equivalent, 50% more than young adult high school completers, and 25% more than young adults with an associate's degree (Aud, Hussar, Kena, Bianco, Frohlich, Kemp, Tahan, et al., 2011).

- More years of schooling increases the probability of holding financial assets; "asset levels rise significantly with income, age, and education (Shapiro and Wolff, 2001)."

- "Income has a strong, positive association with positive holdings of financial assets (Shapiro and Wolff, 2001)."

- Individuals from a higher-income background are consistently found to have more years of schooling relative to low-income individuals; rates of high school and college matriculation diverge on these grounds as well (Bowen, Kurzweil, Tobin, & Pichler, 2006).

- A family's likelihood of owning assets is significantly influenced by the asset ownership of the parents' parents–by teachings of the value of financial investments. Thus, asset accumulation and financial literacy is influenced by the condition of past generations (Chiteji & Stafford, 1999).

Moreover, there are a number of dependent and interacting variables here. If the parents have inherited a home, this may be an asset that the family lives in or one that could be sold to provide funds for a range of supports that enhance educational and developmental outcomes such as tutoring, lessons, access to quality health care, or private school or college tuition. The dynamic interaction among a range of assets--education, home ownership, business ownership, and retirement savings—provides a supportive environment for a child born into asset-rich circumstances.

Race and ethnicity

Given the strong influence of household SES on both family dynamics and child outcomes, it is crucial to note that economic security is not similarly distributed across racial and ethnic groups. In the U.S. context, a person's race and ethnicity often influence educational opportunity, employment opportunity, general health, life expectancy, where one lives, where one worships, and how one is treated by law enforcement and other important institutional systems. It is not possible to neatly summarize the role of race in the United States so this report will simply highlight recent empirical data showing the correlation between race/ethnicity and household SES

- Whites are significantly more likely to graduate high school or go on to attain higher education than are blacks and Hispanics. Whites are twice as likely to have attained a Bachelor's degree relative to blacks and three times as likely relative to Hispanics (Ryu, 2009).

- Among the major race and ethnicity groups, median weekly earnings for black men working at full-time jobs were $673 per week, 79.2% of the median for white men ($850). The difference was less among women, as black women's median earnings ($592) were 84.0% of those for white women ($705). Overall, median earnings of Hispanics who worked full time ($565) were lower than those of blacks ($623), whites ($770), and Asians ($872) (BLS, Department of Labor, 2011a).

- White women earned 81% as much as their male counterparts in 2010, while Asian women earned 83% as much as their male counterparts. By comparison, Hispanic women had earnings that were 91% of those of their male counterparts, while black women earned 94% as much as black men (BLS, Department of Labor, 2011b).

- Median income for black and Hispanic households was $32,068 and $37,759 respectively in 2010, compared with $54,620 for non-Hispanic white and $64,308 for Asian households (U.S. Census Bureau, 2011).

- In 2009, 20% of all U.S. children lived in poverty – 12% of non-Hispanic white children, 13% of Asian and Pacific Islander children, 31% of Hispanic children, 35% of American Indian children, and 36% of black children (Annie E. Casey, 2011).

- The most recent poverty statistics indicate that the number of children in poverty increased between 2009 and 2010, rising to 22% of all children less than age 18—and to 39.1% of black and 35% of Hispanic children (U.S. Census, 2011).

- While 24% of non-Hispanic white children grew up in a single-parent household in 2009, the rate is 40% for Hispanic children, 53% for Native American children, and over two thirds, 67%, for black children (Annie E. Casey, 2011).

- Blacks and Hispanics are significantly more likely to live in poorer neighborhoods with fewer resources relative to whites; even affluent blacks and Hispanics tend to live in poorer neighborhoods than the average for whites (Logan, 2011).

- Exposure to environmental toxins is highest in low-income minority communities (Bullard, Johnson, & Torres, 2011; Landrigan et al., 1998).

There are substantial racial and ethnic disparities in wealth. In 2007, the average white household had 15 times as much total wealth as the average African-American or Latino household. If home equity is excluded from the calculations, the ratios for financial wealth are in the neighborhood of 100:1 (Domhoff, 2011). Moreover, these racial wealth gaps have been increasing. A recent study by the Pew Research Center finds that whites now have 20 times the amount of wealth blacks have, and 18 times that of Hispanics. Minority assets have eroded the most since the economic downturn of 2008, with Hispanics being hit hardest by the housing market meltdown (Kochlar, Fry & Taylor, 2011). There are many explanations offered for this reality including that non-Hispanic white households hold more varied investment portfolios that earn higher returns or that non-white households have a smaller likelihood of receiving an inheritance (Shanks, 2011; Shapiro & Wolff, 2001). There are many good books that provide a detailed historical perspective on how discrimination and biased policy choices impact racial wealth gaps, highlight the intergenerational aspects of this issue, and also provide longitudinal data on the racial wealth gap among various racial and ethnic groups in the United States (Lui et al., 2006; Nembhard & Chiteji, 2006; Oliver & Shapiro 1995).

It is possible to make the case that many of the disparities attributed to race are actually class differences defined primarily by wealth. Using Panel Study of Income Dynamics (PSID) data to measure the adult outcomes of children, Dalton Conley (1999) analyzes differences in net worth, high school graduation, college graduation, rates of repeating a grade, labor force participation, wages, welfare receipt, and pre-marital childbearing (for daughters). He finds that racial differences are either no longer significant or dramatically less so once parental wealth is added to the equation. He argues that to understand the life chances of children, it is necessary to take into account accumulated wealth, which would include property, assets, and net worth. Shapiro (2004) makes a similar case using qualitative interviews to demonstrate how parents use either personal wealth or money inherited from their parents' wealth to create transformative opportunities for children, particularly via enrollment in better schools. He argues that families and communities use economic resources to create advantages that benefit themselves, often leaving a more disadvantaged public infrastructure for everyone else by default.

Racial and ethnic minorities not only have fewer economic resources themselves, but due to residential segregation patterns they are also more likely to live and interact in communities that are also income and asset poor. A recent Pew study found that black children are more likely to live in high-poverty neighborhoods throughout childhood and that living in such neighborhoods increases the chances of downward mobility by 52% (Sharkey, 2009). Fewer assets in a community mean less entrepreneurial development, fewer businesses providing employment opportunities, and lower incomes. As Conley (1999) notes, "(b)ecause of a dearth of businesses serving ghetto areas, black residents pay higher prices for consumer goods" (p.139).

Levels of income and education, both strongly related to health, vary across racial or ethnic groups. Disparities in both access to and quality of medical care play an important role in racial and ethnic disparities in health (Escarce, 2007). Although medical care is important, an accumulating body of evidence suggests that racial or ethnic differences in living and working conditions that affect health may be even more important in determining who will be healthy or become sick (Braveman et al., 2008). Less frequently measured modifiable social factors—including income, education, wealth and neighborhood socioeconomic conditions, both current and earlier in life—are likely to be more important in explaining health differences by race or ethnicity (Braveman et al., 2005). Researchers at the U.S. Center for Disease Control and Prevention (CDC) estimated that 38% of the excess mortality among black adults compared with white adults in the United States was related to differences in income (Otten, 1990). Increasing, evidence also suggests that chronic stress related to overt or subtle experiences of racial or ethnic bias may significantly contribute to disparities in health among racial or ethnic groups, over and above differences in living and working conditions and differences in medical care (Williams & Mohammed, 2009). In addition, findings from studies in the United States and other countries have found that perceived racial/ethnic bias makes a contribution to racial or ethnic disparities in health after income and education are considered (Harris, 2006; Williams, 2003).

Family configuration

Similar to race and ethnicity, family configuration is also closely linked to SES and can have a strong influence on family dynamics and developmental outcomes. How many adults live together in a household, their relation to one another, and the total number of children are all relevant factors in how young people are provided for and nurtured. As a practical matter, limited resources must stretch further when there are more people to support. In addition, children who reside with both their biological parents fare much better on a range of outcomes. One reason suggested for this is that mothers who enter co-residential relationships with biological fathers reported lower levels of parenting stress than mothers who remain single (Cooper, McLanahan, Meadows, & Brooks-Gunn, 2009). Findings from the Fragile Families study notes that in the wake of a non-marital birth, marriage is correlated with an increase in fathers' earnings and mothers' income and health; separation reduces both outcomes. Family structure is found to be extremely important for father involvement, while for mothers, family structure and stability are important influences on parenting.

Again, it will not be possible for this report to neatly summarize the dynamic nature of family formation in the United States, how family composition is influenced by economic resources, or all the issues being faced (i.e. working moms, stay-at-home moms, teen moms, marriage, separation, divorce, child support, foster care and adoption, grandparents raising grandchildren). It is important to note that all of these circumstances have implications for family economic security and child outcomes. However, we will summarize recent general empirical data showing some of the relationships between family configuration and household SES:

- In 2007, children living in households headed by single mothers were more than five times as likely as children living in households headed by married parents to be living in poverty—42.9% compared with 8.5% (U.S. Census Bureau, 2008).

- "Safe, reliable child care is essential to working parents, but its high cost is especially challenging for low-income families. When low-income working families pay for child care, they purchase less expensive care than higher-income families, but pay a much larger share of their income for it" (McLoyd, 2011).

- Having more children in the household can mean greater material hardship and poorer asset accumulation: "siblings strain material and nonmaterial resources during childhood and decrease adult home ownership, stock ownership, and total assets" (Keister, 2004).

- Single mothers and fathers are economically disadvantaged in terms of wealth accumulation compared to adults without children; single mothers fared worst in household wealth accumulation (Yamokoski & Keister, 2006).

- Single black and Hispanic women have a median wealth of $100 and $120 respectively; the median for single white women is $41,500—which is a quarter of the median wealth for married or cohabiting white households (Chang, 2010).

- Low levels of personal wealth are associated with relatively later entry into marriage (Schneider, 2011).

Household level interactions

In the center of the figure in red are the core areas of household interaction. We note parental involvement, which has been defined in many ways but is an essential measure of how caregivers relate to their children to personally support their growth and development. We note parental stress, which can come from a range of roles and responsibilities, but if not properly managed can lead to distress. We note material hardship/well-being, which is the key area where household SES directly influences family life. We note parental behavior, which includes a range of health and parenting measures and captures many areas where risk factors could emerge. These areas are all interrelated.

As with SES, these household interactions can have direct effects as well as work together to provide an overall positive and reinforcing—or a more difficult and detrimental—environment.

Family strengths/parental involvement/social supports

As stated above, family strengths and parental involvement are heavily influenced by socioeconomic status, education, and assets. These elements are determining factors across the range of dynamics that define family strengths.

There are numerous definitions of parental involvement. In general, the following areas are accepted:

Meeting the child's personal needs. Prepare meals, provide clothing, home, a clean and healthy environment; meet material needs

Engage in meaningful social communication. Eat meals with parents; talk with parents; parent facilitates activities

Cultural communication. Discussion of books, films, or TV; discussions on politics or social issues

Educational involvement. Help with homework; volunteering or other involvement at school; conferences; communication; etc.

General investment in child's growth and development. Has/buys cognitively stimulating materials; plans and supports active engagement with the child in activities outside of the home (church, sports, community service, etc.); engaged in planning and decision-making; provides and is attuned to the quality of out-of-home care

Moreover, social, emotional, and cognitive development are strongly influenced by *parental behavior*. The stability of family life and the capacity to be an involved parent as outlined above are strongly determined by the general warmth and supportiveness of the home environment, parental mental health,[1] physical health, substance use/abuse, violence in the home, and/or illegal activity.

[1] Depression affects millions of U.S. adults over their lifetime, many of whom are parents with children. In a given year an estimated 7.5 million adults with depression have a child under the age of 18 living with them. It *is estimated that at least 15 million children live in households with parents who have major or severe depression (20%)*. The burden of depression and the barriers to quality of care for depressed adults are increasingly well understood, but the ways in which depression affects parenting and children's health and psychological functioning are often ignored. Many factors are associated with depression, including co-occurring medical and psychiatric disorders (such as substance abuse), economic and social disadvantages, and conflicted or unsupportive relationships. These factors typically amplify stress and erode effective coping. For many depressed adults (30–50%), depression becomes a chronic or recurrent disorder in a vicious cycle of stress and poor coping that exacts sustained individual, family, and societal costs. Effective screening tools and treatments for adult depression are available and offer substantial promise for reducing the negative consequences of the disorder. However, not everyone benefits from even the treatments associated with the strongest evidence base, and

Family dynamics are further complicated by the level of *parental stress*, which is often determined by employment status, household economic security, parents' ability to consistently meet normal obligations, parental marital status and the quality of the marriage or partnership, and the parent's joy and sense of competence in the role of parent.

Upon reflection, it is apparent that *material hardship/well-being* has a direct impact on parents' ability to provide consistent ongoing material support: housing, food, utilities, clothing, and supplies needed. Furthermore, material hardship too often results in dislocation, disruption, and mobility, which lead to adverse educational and developmental outcomes. Material hardship can be defined as: family paid at least ½ of its income for housing; or more than 2 people per bedroom, lack of health insurance, food insecurity, no telephone in the household, receipt of public assistance or difficulty paying bills.

Neighborhood/community/systemic factors

At the bottom of the figure in shades of green, we attempt to summarize non-familial environmental factors. In the United States neighborhoods have great spatial differentiation, with some geographic areas having high concentrations of poverty or affluence as well as a range of public and private resources that contribute to a young person's actual and perceived opportunity structure (Casciano & Massey, 2008; Galster & Killen, 1995; Massey, 1996). In general, lower-income communities of color tend to be exposed to more formidable ongoing stressors, e.g., job insecurity, unpaid bills, inadequate child care, underperforming schools, dangerous or toxic living conditions, crowded homes, and noisy streets. They are also less likely to have access to the money, status, knowledge, social connections, and other economic resources they need to gain control over the many challenges that threaten to upset their lives. Environmental racism creates unhealthy environments in which a disproportionately large share of poor people and people of color live (Bullard, Johnson, & Torres, 2011). Moreover, the systems in many disenfranchised communities are under-resourced, slow to respond, and frequently do not meet the needs of residents. There have been entire volumes published on neighborhood poverty and its potential effect on developmental outcomes (e.g. Brooks-Gunn & Duncan, 1997) as well as recent research that focuses on environmental toxins and disparities. This paper, however, will focus on whether community and systemic factors are likely to provide a set of supports and resources that mitigate the stress experienced by a child or, in contrast, contribute additional risk factors.

The extra-familial environment is important for all households, but it may be a source of support of last resort for households facing multiple disadvantages. Social support refers to the various types of support (i.e., assistance/help) that people receive from others and is generally classified into two (sometimes three) major categories: emotional support and instrumental (and sometimes

individual, provider, and system-level barriers decrease access to these treatments. These institutional and sociocultural barriers both cause and sustain existing disparities in care for depressed adults. (National Research Council and Institute of Medicine (2009).

informational) support. Emotional support refers to the things that people do to make us feel loved and cared for and bolster our sense of self-worth (e.g., talking over a problem, providing encouragement/positive feedback); such support frequently takes the form of non-tangible types of assistance. By contrast, instrumental support refers to the various types of tangible help that others may provide (e.g., help with childcare/housekeeping, provision of transportation or money). Informational support represents a third type of social support (one that is sometimes included within the instrumental support category) and refers to the help that others may offer through the provision of information.

Social support has been found to vary positively with socio-economic status in studies in the US, England, and Sweden (Brim et al., 2004; Matthews et al., 1999; Marmot et al., 1997; Ostergren, 1991). These patterns are seen for both emotional and instrumental support and for both men and women (though the differences appear to be somewhat greater for men; Marmot et al., 1997).

Research also suggests that social stressors that tend to be more prevalent in lower SES environments (e.g., residential crowding, fear of crime, financial strain, lack of transportation, lack of access) are associated with lower perceived support (Lepore et al., 1991), and that these social stressors contribute to reductions in reported levels of social support because they tend to foster a distrust of others (Krause, 1994).

Lower parental education rates widen the gulf between research on child development and daily applications. In many poor neighborhoods there is no computer in the home, rural poverty makes technology access extraordinarily challenging. In summary, social capital is often in short supply in the very communities where it is most needed.

The strongest associations between social support (particularly emotional support) and developmental outcomes are seen in relation to psychological well-being. A large literature documents lower risk for depression and for psychological distress more generally for those who enjoy greater social support (for review see George et al., 1989 and more recently Stansfeld et al., 1997).

Social and environmental factors

Highly correlated with socioeconomic status is the range of social and environmental factors which have a significant impact on social, emotional, cognitive, and physical child development. There is a strong relationship between living in a chaotic environment and socioeconomic status as posited in the work of Gary Evans (Evans, 2004; Evans, Eckenrode, & Marcynyszyn, 2010). Some of the most relevant factors are residential segregation, concentration of poverty, crowding, noise, establishment of routines and rituals, residential relocation and mobility, school relocation, and maternal partner changes.

The contributions to a child's social environment made by school is thought to be less positive for low SES children relative to those for more affluent children; low SES children are more likely to attend schools that lack resources or rigor (Kishiyama et al., 2009). The negative environmental features faced by low SES children are not limited to school characteristics; environmental toxins also are likely to be much more prevalent. Additionally, low SES children are exposed to a relatively greater degree of violence, with U.S. homicide rates being highest in the most impoverished areas (Bowen and Bowen, 1999; Hannon, 2005; Jones et al., 2002). In general, children growing up in these environments encounter fewer positive role models than children that do not. These factors place low SES children at a higher risk for psychosocial difficulties (McLoyd & Wilson, 1991; McLoyd, 1998; U.S Department of Housing and Urban Development, 2000).

Direct effects on child outcomes

Each of the components of SES detailed in the model so far have been empirically demonstrated to have a direct effect on child outcomes. These findings are summarized below, organized by domain.

SES/Wealth

Wealth is a significant determinant of socio-economic status insofar as a lack of wealth can prohibit individuals from climbing the SES ladder. Households with few or no assets are less likely to have the financial resources (and often the social capital and knowledge to navigate these resource systems) necessary to provide their children high quality early education, college tuition, or inheritances relative to households with accumulated assets (Shanks, 2011; Shapiro, 2004). The effects of wealth on educational attainment are distinct from the effects of income and other socioeconomic background characteristics; Conley (2001) finds, for example, that a doubling of assets is associated with an 8.3% increase in the probability of college attendance after high school graduation and a 5.6% increase in the likelihood that a college-enrolled individual graduates.

SES/Income (socio-emotional outcomes)

By whatever index used, poverty is a highly prevalent risk factor for children in the United States. Furthermore, the poverty rate is rising. However, the federal poverty line does not fully capture the proportion of families who do not have sufficient resources to meet their basic needs for housing, child care, food, transportation, health care, miscellaneous expenses, and taxes. The Economic Policy Institute estimated that the number of families that do not have sufficient budgets to meet their basic needs independent of outside subsidies is more than 2.5 times that of the number of families with incomes at or below the federal poverty line (Boushey et al., 2001). Families who live in poverty or near poverty continually need to make trade-offs between necessities. For example, 65% of families with household incomes between 100% and 200% of the federal poverty line experienced at least one serious hardship during the prior year, including food insecurity, lack of health insurance, or lack of adequate child care (Boushey et al., 2001).

Poverty is a risk factor for several disorders and is associated with other developmental challenges. Children in poverty have a greater risk of displaying behavior and emotional problems, such as disobedience, impulsiveness, and difficulty getting along with peers; these children are likewise less likely to display positive behavior, such as compliance (Dearing, Taylor & McCartney, 2004; Taylor, Dearing & McCartney, 2004). Poor social-emotional outcomes among low SES children beget even more negative outcomes. Family poverty, for example, is associated with a higher risk for teen childbearing, thereby magnifying SES-induced stressors (Bolder et al., 1995; Conger, Conger & Matthews, 1999; McLeod & Shanahan, 1993; Wadsworth & Compas, 2002; Weinger, 1998). Evidence has been uncovered that suggests that poverty can have differential socio-emotional effects based on its persistence. Moore and colleagues (2002) note that, while long-term poverty is associated with children's inner feelings of anxiety, unhappiness, and dependence, current poverty is associated with behavioral problems such as disobedience and aggression.

SES/Income (health outcomes)

Food insecurity – more prevalent among low SES households – can negatively affect children, hitting infants hardest (Klerman, 1991). Outcomes include poor motor skills, "age-normed growth stunting" (low height-for-age), and "wasting" (low weight-for-age) (Brooks-Gunn, et al., 1999; Korenman & Miller, 1997). Poverty is also associated with negative health outcomes on the other extreme of the spectrum; childhood obesity is of great concern as access to healthy fresh fruits and vegetables and full service grocery stores are limited in poor communities. (Phillips et al., 2006; Wells et al., 2010). Furthermore, poverty has been found to be associated with a wide range of problems in physical health, including low birth weight, asthma, lead poisoning, and accidents. Poor children are also more likely to experience developmental delays (Brooks-Gunn, & Duncan, 1997).

Individuals growing up in low SES households do not necessarily escape negative health outcomes after childhood. Adolescents in poverty are more likely to suffer from chronic diseases and be physically impaired (Alaimo et al., 2001). Likely influenced by social and cognitive development issues as children, low SES adolescents also have a greater tendency to become involved in risky behavior like early sexual activity or smoking (Afxentiou & Hawley, 1997; Evans, 2003; Lowry et al., 1996).

SES/Income (cognitive outcomes)

The relationship between poverty and poor academic outcomes is well established; low SES children consistently underachieve educationally relative to their more affluent peers (Brooks-Gunn & Duncan, 1997). Dropout rates, too, are higher among low SES youth (Haveman & Wolfe, 1995; Moore et al., 2002). While environmental factors such as school quality play a major role, evidence is accumulating that suggests that stress factors significantly impede cognitive development as well (Evans, 2009). Additionally, research suggests that poverty's effects on cognitive outcomes may

depend heavily on variables such as duration and age of onset of low SES (Guo, 1998; Haveman & Wolfe, 1995).

SES/Income (adult economic outcomes)

The effects of experiencing low SES as a child carry on well into adulthood and can contribute to a cyclical regeneration of poverty. Individuals that experienced poverty as children are relatively more likely to be poor as adults and will, on average, earn lower wages than those who grew up in more resource-rich circumstances (Corcoran & Chaudry, 1997; Hauser, 1997; Peters & Mullis, 1997; Vartanian, 1999). While upward mobility among the poor is not unheard of, Corcoran and Matsudaira (2005) find that African-Americans that grew up poor are almost five times as likely to remain poor at ages 25-27 as whites that grew up poor. In a 2008 report, Holzer et al. estimate that the aggregate cost of childhood poverty to the US is $500 billion, roughly equivalent to 4% of GDP (Holzer et al., 2008).

Overall stress context

Given that stress and its ramifications is a key mediator in our models and a relatively new concept that is not as well known, this section will attempt to flesh out the importance of a child's overall stress context, which is the fourth and final component of our models (noted in red in the middle of the figure). As stated previously this concept has been extensively developed by Jack Shonkoff and his colleagues at the Center for the Developing Child at Harvard University (Shonkoff et al., 2004a, 2004b, 2007a, 2007b).[2]

Stress is any perceived adverse situation that upsets a child or parent such that their interactional system becomes stressed by the situation. For children, this could be an immunization, going to school for the first time, preparing for a test, a fall on a bike, the death of a pet, or moving to a new home. The stressful indicator is less important than learning how to cope with adversity, which is a vital component of healthy child development. It is important to note that the overall stress context as experienced by the child is what is being emphasized here (which may be indicated by the number and intensity of adverse events), not simply a negative emotional or mental state.

Hormones associated with the chronic stress burden protect the body in the short run and promote adaptation, but, in the long run, the burden of chronic stress causes changes in the brain and body that lead to disease and have a deleterious effect on educational and developmental outcomes. Brain circuits are plastic and remodeled by stress so as to change the balance between anxiety, mood control, memory, and decision making. Such changes may have adaptive value in danger but their persistence and lack of reversibility can be maladaptive.

[2] http://developingchild.harvard.edu/

Social ordering in human society is associated with gradients of developmental outcomes along a scale of decreasing income and education (lower SES is correlated with negative child outcomes). Although the causes of the gradients of child outcomes are very complex, they are likely to reflect, with increasing frequency going down the SES ladder, the cumulative burden of coping with limited resources, toxic environments, and negative life events, as well as differences in life style, and resulting chronic activation of physiological systems involved in adaptation. *SES gradients can be seen in pre-disease indicators, such as cortisol patterns.* This may reflect the wear and tear on the body of exposure to stressors and lifestyle factors associated with lower SES. Research indicates that summary scores of these indicators appear to be strong predicators of toxic stress and related negative developmental outcomes (Shonkoff et al., 2007a).

All individuals face some stress; this is normal and helps a child mature and build resiliency to deal with life challenges (McEwen, 2008). When we are threatened, our bodies prepare us to respond by increasing our heart rate, blood pressure, and stress hormones, such as cortisol. The definition of overall stress includes the physical, emotional, intellectual, and material deprivations experienced directly by children as a result of household poverty (e.g. inadequate nutrition, lack of heat, lack of cognitive stimulation) and neighborhood poverty (e.g. environmental hazards, brownfields, violence, inadequate schools, and/or social services). These direct stressors experienced by children of any age can have lasting physiological consequences.

When a child's stress response systems are activated within an environment of supportive relationships with adults, these physiological effects are buffered and brought back down to baseline. Tolerable stress represents those factors that are difficult, but manageable in the context of a nurturing parental/familial relationship. This type of stress includes events such as a death in the family, a car accident, or severe illness of a family member. Toxic stress, however, is distinct—caused by extreme, prolonged adversity in the absence of a supportive network of adults to help the child adapt. *The stressful experience itself is not the problem, but how the child's body responds.* When it occurs, toxic stress can actually damage the architecture of the developing brain, leading to disrupted circuits and a weakened foundation for future cognitive, social, emotional, and physical development.

Three different types of stress are further outlined below:

Positive stress refers to moderate, short-lived stress responses, such as brief increases in heart rate or mild changes in the body's stress hormone levels. This kind of stress is a normal part of life, and learning to adjust to it is an essential feature of healthy development. Adverse events that provoke positive stress responses tend to be those that a child can learn to control and manage well with the support of caring adults, and which occur against the backdrop of generally safe, warm, and positive relationships. The challenge of meeting new people, dealing with frustration, entering a new child care setting, going to the doctor, and overcoming a fear of animals all can be positive stressors if a child has the support needed to develop a sense of mastery. This is an important part of the normal developmental process.

Tolerable stress refers to stress responses that could affect brain architecture but generally occur for briefer periods that allow time for the brain to recover and thereby reverse potentially harmful effects. In addition to their relative brevity, one of the critical ingredients that make stressful events tolerable rather than toxic is the presence of supportive adults who create safe environments that help children learn to cope with and recover from major adverse experiences, such as the death or serious illness of a loved one, a frightening accident, or parental separation or divorce. In some circumstances, tolerable stress can even have positive effects. Nevertheless, it also can become toxic stress in the absence of supportive relationships.

Toxic stress refers to strong, frequent, or prolonged activation of the body's stress management system. Stressful events that are chronic, uncontrollable, and/or experienced without the child having access to support from caring adults tend to provoke these types of toxic stress responses. Studies indicate that such stress responses – particularly when they are sustained over time – can have an adverse impact on brain architecture (Lupien et al., 1998; McEwen & Sapolsky, 1995). In the extreme, such as in cases of severe, chronic abuse, toxic stress may result in the development of a smaller brain. Less extreme exposure to toxic stress can change the stress system so that it responds at lower thresholds to events that might not be stressful to others, thereby increasing the risk of stress-related physical and mental illness. Examples include prolonged poverty, homelessness, being raised by a parent with a mental illness, or food insecurity.

The lasting, neurobiological effects on young children (who, along with infants, have particularly malleable neural circuits) that experience toxic stress are a far greater likelihood of anti-social behavior, lower achievement in school and at work, and poor physical and mental health – all of which society addresses at great cost (Loman & Gunnar, in press; Sapolsky, Romero & Munck, 2000; Zhang et al., 2004). Persistent poverty is but one risk factor for toxic stress and its long-term consequences. However, poverty is often the indicator for several aligned stressors including inadequate housing, food insecurity, neighborhood violence, and parental unemployment. Depression in mothers has been demonstrated to exacerbate some of these stressors (Dawson & Ashman, 2000*). The greatest harm comes from the cumulative burden of multiple risk factors, including neglect, abuse, parental substance abuse or mental illness, and exposure to violence* (National Center for Children in Poverty, 1999). *With each additional risk factor, the odds of long-term damage to brain architecture increases* (Shonkoff et al., 2004a, 2004b, 2007a).

In nearly all cases, environmental deprivation exerts a powerful influence on the course of brain development. It must be underscored, however, that the specific effects of deprivation and the severity of those effects will vary with the degree, timing, and duration of the deprivation. Individual responses to the deprivation will also vary, and this variation will likely have to do with an individual's genetic makeup and experiential history. There is a visible difference between the effect of an enriched environment and an environment of deprivation on the human brain

In some cases, the cumulative burden of multiple risk factors early in life may limit the effectiveness

of later interventions, thereby making it impossible to completely reverse the neurobiological and health consequences of growing up poor and exposed to toxic environments (Kuh & Ben-Shlomo, 2004). Children from lower socioeconomic backgrounds show heightened activation of stress-responsive systems (Lupien et al., 2000), and emerging evidence suggests that differences in parenting related to income and education—as mediated through parent-child interaction, exposure to new vocabulary, and stability of responsiveness—can alter the maturation of selected brain areas, such as the prefrontal cortex (Farah et al., 2006).

Common pathways and indirect effects

Some have tried to create theoretical models to show how various SES and household factors interact with one another. The *Family Stress Model* highlights that economic hardship (low incomes, high debts/assets ratios, negative financial events) results in "economic pressure" on the family such as unmet material needs (e.g. food and clothing), inability to pay bills or "make ends meet," and the necessity of cutting back on critical expenses like health insurance or medical care. High economic pressure increases parental risk for emotional distress and behavioral problems through areas such as increased marital conflict and reduced marital warmth; parenting involvement and nurturing suffers as a result. Moreover, poor quality parental involvement translates to poorer cognitive and socio-emotional development of children, reflected in lower quality social interactions and worsened academic performance (Conger & Conger, 2002; Conger & Donnellan, 2007).

The *Family Investment Model* highlights that parents of higher SES have greater access to financial, social, and human capital relative to lower SES parents. Thus, higher SES parents can make significantly greater investments in the development of their children which may translate to more learning materials available at home, direct parental support (the quality of which may be enhanced by tutoring or training), a higher standard of living (all needs met), and the ability to live in a safe environment that encourages healthy child development. The existence (or lack) of these investments significantly influences child social and cognitive development in ways that facilitate their well-being from childhood into the adult years (Conger & Donnellan, 2007).

More recently, *Interactionist Models* combine aspects of stress and investment in various ways. In these, parental SES influences both the tendency and the ability to invest in children. There are often reciprocal relationships between SES and parental behavior. Being stressed about money and financial concerns can lead to reactions that might otherwise be less harsh under better circumstances.

Effects of family poverty and material hardship. Gershoff, Aber, & Raver (2003) describe three pathways by which poverty affects child brain development. The **first** is the parent investment pathway, where the relationship between poverty and children's cognitive development is mediated by the quality of the home environment, which is represented by the amount of cognitively stimulating material in the home (such as books and CDs) and how often parents take their children to stimulating places

(such as museums and libraries).

The *second* is the parent behavior and stress pathway, where the parents are considered to be under high levels of stress because of their economic difficulties and because of the occurrence of stressful life events for which they have insufficient resources to cope effectively. This parental stress can lead to increased levels of parental depression and interparental conflict, which in turn leads to problems in parenting, including withdrawal from the children, hostility, more frequent use of corporal punishment, and, at extreme levels, maltreatment. Each of these factors has been found to relate to higher levels of internalizing and externalizing problems among children.

The *third* pathway involves the neighborhood and community in which poor families are more likely to live. Poor neighborhoods and schools are less likely to have the resources that promote healthy child development and are more likely to be settings that expose children to additional risk factors, such as violence, availability of drugs and alcohol, environmental toxins, poor air quality, and inadequate housing and outdoor play spaces. Gershoff, Aber, and Raver (2003) also describe policy- and program-level interventions that may be effective in reducing the negative effects of poverty on children. For example, universal Early Head Start focuses on improving child development, family development, and staff and community development.

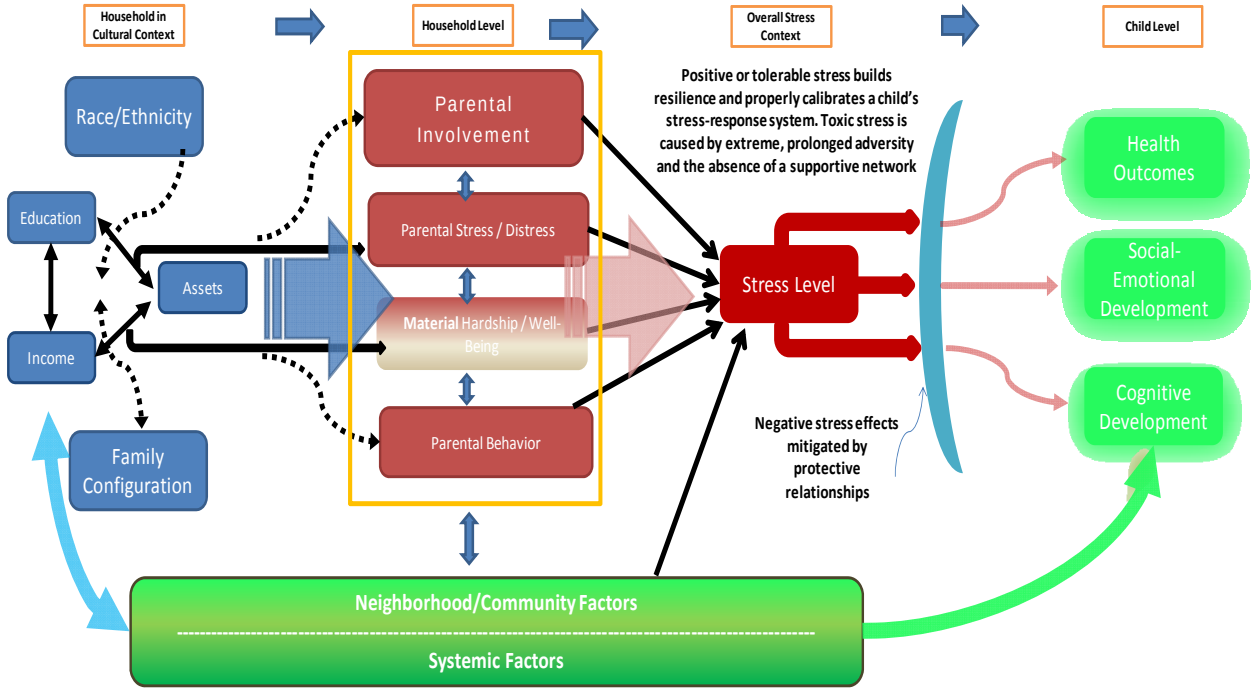
Research on the income–achievement gap as a formidable societal problem and the neurocognitive and biological mechanisms that might account for income-related deficits in academic achievement is emerging (Evans 2009). Research shows that childhood poverty is inversely related to working memory in young adults and that this relationship is mediated by elevated chronic stress during childhood.

Again, these are complex sets of relationships that are difficult to summarize briefly, but there is empirical data that begins to suggest how some of these various components work together. Low SES households are more likely to have features that impede healthy child development than affluent ones. Material hardship, of course, is much more prevalent among impoverished households (Danziger, et al., 2000; Short, 2005). However, other factors play a significant role as well; parental educational attainment, for example, is generally lower in poorer households, which results in a less cognitively stimulating environment for children (Davis-Keane, 2005; Davis-Keane & Sexton, 2009; Guo & Harris, 2000; McLoyd, 1998). Different explanations exist for the lower quality of parental involvement in poor households. Whether rooted in stress, economic hardship, or some combination thereof, however, the trend exists that low SES parents are less successful at maintaining a high quality home environment and are less able to exert social control over their children (McLeod & Shanahan, 1993; Sampson & Laub, 1994).

Dynamic models that incorporate overall stress context

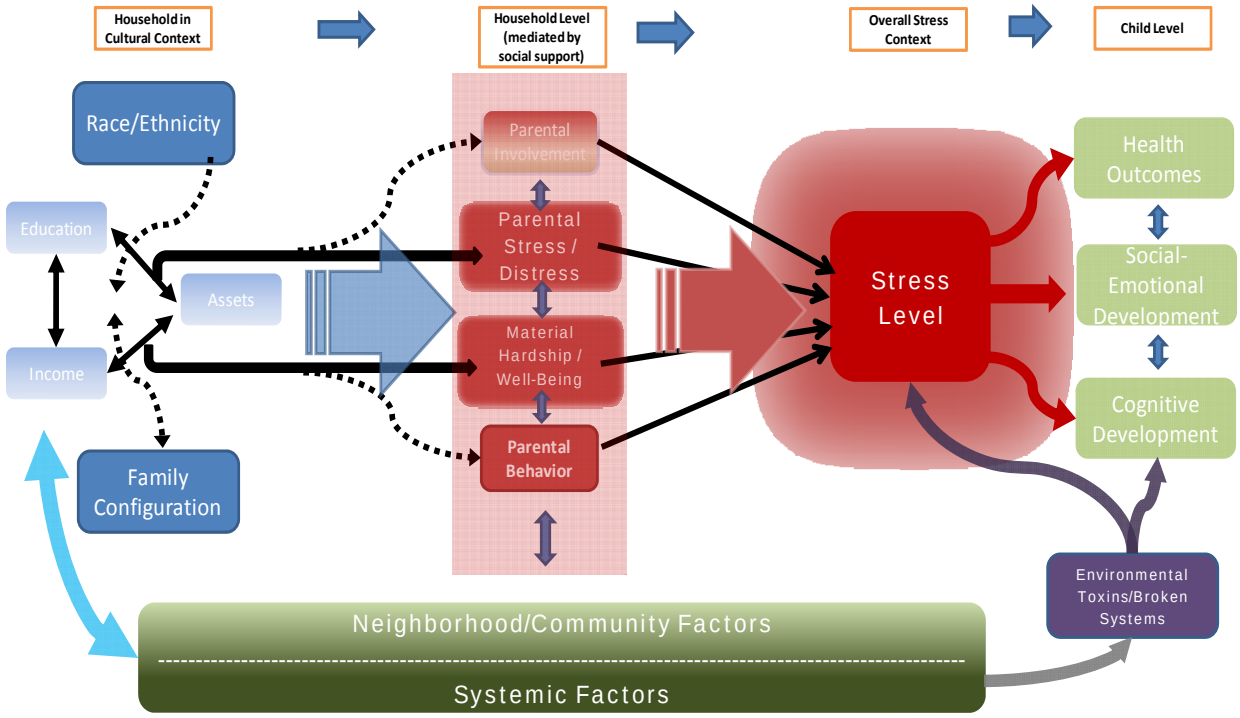
To demonstrate the dynamic nature of our proposed models and illustrate a few key points, we attempt to distinguish two households, one in a situation of tolerable stress and the second in a situation of toxic stress (Figures 2 and 3).

Figure 2: Tolerable Stress Household



In a tolerable stress household (Figure 2), parental education, income, and assets are relatively stronger; this translates to less severe levels of material hardship and an increase in the degree of parental involvement. As a result, the overall stress context is not particularly severe to begin with, and the effects on the child(ren) of any stressful circumstances that exist are mitigated by protective relationships and resources that are available due to the presence of assets or greater overall SES. There is also a strong correlation between positive neighborhoods and systems and assets. Concomitantly, neighborhood/community/systemic factors are generally more supportive and engender positive child development. All of these things combined lead to a situation where a child has the possibility of living up to his or her highest potential and to reach young adulthood with multiple positive options.

Figure 3: Toxic Stress Household



In households where children experience toxic stress levels (Figure 3), education, income, and assets are all likely to be at much lower levels. As such, material hardship and parental distress are less manageable; parental involvement is less frequent or of lower quality; and there is a greater occurrence of mental health issues or poor parental behavior like substance abuse. Neighborhood and local systems are generally more likely to have few beneficial resources and allow exposure to harmful influences, such as violence and negative role models (or the child experiences equally harmful frequent relocations, including bouts of homelessness). The overall stress context is therefore extremely high, and children, in the absence of protective relationships, face direct neurological consequences. Social-emotional and cognitive development suffer in turn.

The model is a substantial explanation of early developmental gaps between poor and non-poor children providing a fundamental generic framework illustrating the salience of income, assets, and education on developmental outcomes. However, as stated above, the household level variables are significant as well and can have a profound impact on child outcomes. For example, the literature on the effects of maternal depression on developmental outcomes is compelling. Yet, even depression may be exacerbated by lack of economic security.

Major Implications and Conclusion

Building upon the models outlined in this document, there are several implications that follow.

Communities need a better way to identify children and households at risk. Then once identified, they need to be offered a variety of options for enrichment and support with several alternate entry points. In addition to screenings and diagnostic tools within local communities, better ways to measure risk factors are required. Presently the most relevant policy lever is the threat of removing a child from their home of origin and the termination of parental rights. This may be necessary in extreme circumstances of abuse and neglect. However, in general, this policy is destructive to the child and the parent. When poverty or mental illness is the primary issue, a less traumatic option and aligned system of supports and interventions would be beneficial. Although the most immediate need will be to offer better emergency support and preventive interventions for the most marginal in society (low-income, low-wealth households facing multiple barriers), some systems may need to be retooled to assist a wider range of households. With alternate entry points, that might include drop-in options as well as immediate referrals by qualified professionals, children can get required attention when it is most needed.

With sustained unemployment and the erosion of work-based benefits, the number of families at-risk multiplies. Many workers are facing cuts in health care and pension or retirement benefits. And even more have no dental benefits, vision care, mental health services, or disability coverage. As more households lose jobs and benefits, the number of children in need and potentially at risk for toxic stress increases. Creative ways to provide more extra-familial support would be helpful.

Ideally, options for educational enrichment can be aligned with interventions that improve family economic security by increasing income, assets, and education. In times of crisis, short-term interventions may be necessary, but in the long-term, the most valuable strategy for reducing toxic stress is to help households become more economically secure. This way, households will have more resources to provide for themselves. For example, school enrichment activities can be more valuable when aligned with asset-building strategies or other ways to build economic security. For example, a student may not be able to make the most of available activities if they require eyeglasses, individual tutoring, mental health counseling, or don't have a safe and quiet place to do homework. In a time of decreasing resources, it is unrealistic to expect overburdened school and other service systems to meet the needs of all children. When a household has regular income, more education, and modest levels of wealth, they are in a much better position to make the appropriate decisions to invest in their child's well-being.

Multiple public systems are in direct contact with the target populations. The systems listed below are a snapshot of those that could potentially be reformed and realigned based on developmental data. Each system includes a common range of components and issues that adds to the complexity (Table 1).

Table 1. Public systems, components, and issues

System	System components	Common issues
Child welfare	Hierarchy	Line workers have the most direct contact with children and families but have the least amount of education
Early care and education	Licensure and standards	Senior staff make significant decisions but are in least contact with children and families
Education	Protocols	Cultural and language barriers exist in serving the most vulnerable
Health care	Theories of change	Challenges of underserved communities have been historically ignored
Juvenile justice		
Mental health		
Youth development		
Urban planning		
Environmental protection		

Even though the dynamic triangle of low-income, low-wealth, and low-education are significant problems themselves, these are typically associated with other intractable problems such as health disparities and environmental toxins. Even when parents are doing the best they can with limited resources, biological damage and chronic health problems can undermine academic achievement.

Addressing the environmental precursors of disparities is crucial. Despite significant improvements in environmental protection over the past several decades, millions of Americans continue to live, work, play, and attend school in unsafe and unhealthy physical environments. Unfortunately many zoning, industry, and governmental practices and policies have had adverse impacts on poor people, people of color, and children. Lack of assets, income, and education has consigned many populations to substandard housing, unhealthy environments, and denied their right to live in a safe environment. Eliminating environmental health disparities will make us a much stronger nation, and will result in exponential gains for America's children.

Child Savings Accounts can be a powerful add-on program that enhances other interventions. For low-to-moderate-income children that live within a context of positive or even tolerable stress, an account in their own name or incentivized programs that increases the resources available for college or other asset-building purposes could greatly improve the odds for academic success, especially if offered from birth. They might help reduce some of the worry about the cost of a college education and clarify options for the child's future. Low-to-moderate-income children that live within a context of toxic stress, however, will likely need to receive support and interventions to alleviate the physiological stress response before they might realize the predicted benefits of a Child Savings Account. Thus, a child account and any associated incentives might lead to improved test scores, better grades, and a higher likelihood of college completion, but only once a child's brain, hormones, and reactivity are in a state that they can learn and respond in a developmentally appropriate way.

When in an unsafe and physically damaging environment, a child must have extraordinary psychological and inner strength to make the tough choices necessary to achieve academic success—and if this toxic environment begins from birth, it may be biologically improbable for them to excel.

When designing policies for children, it would be advisable to align forces in a way that are mindful of other constraints. As mentioned above, accounts alone might not address the more significant issues and compounded problems that come with exposure to toxic stress. If a universal Child Savings Account policy were passed, local practitioners should consider designing a comprehensive strategy for the most disadvantaged children, schools, and neighborhoods. This might include things such as a mentor, tutoring, dental and medical attention, counseling, meals, and an emergency fund to pay for academically relevant expenses. In addition, these child accounts might be used as part of a dual-education strategy. This would mean offering an aligned IDA-style adult account for the parent or caregiver along with the Child Savings Account. This could include allowing a high-touch alternative for poor households (less than 200% of federal poverty line) that includes a matched savings account, intensive counseling around education and supporting the child academically, as well as affordable options to move if living in a toxic environment.

Together, the models mentioned above underscore the extent to which life outcomes are influenced by a dynamic interplay between the cumulative burden of risk factors and the buffering effects of protective factors that can be identified within the individual, family, community, and broader socioeconomic and cultural contexts.

Conclusion

The models presented here are more of a starting point for discussion rather than a final statement. Children, families, and the neighborhoods in which they live are dynamic and sometimes react to shifting circumstances in ways that are difficult to predict. Our models attempt to synthesize many of the recent and evolving literatures in a way that can lead in productive new directions. The correlation between household socio-economic status and developmental outcomes is well-known and has been discussed in multiple disciplines. What these models offer is a lens for not just highlighting persistent and growing inequality on multiple dimensions amongst U.S. households and then documenting subsequent consequences for children, but also providing a way to think about how such inequality is likely to influence what happens within households, neighborhoods, the biological circuitry of children, and their educational outcomes. These are effects that may persist throughout their lifetime. Exploring commonly discussed direct and mediating influences through the lens of the overall stress context faced by a child allows for several sets of conversations. First, how can the economic security of households be improved in ways that can be demonstrated to strengthen household interactions and reduce biological indicators of toxic stress? Second, if the reality is such that the economic circumstances of a child's household are not likely to change and a situation of sustained toxic stress is apparent, what sorts of immediate interventions can provide a web of support and enrichment to mitigate the worse predicted outcomes for children? Third,

attending to environmental toxins is a critical priority in assuring that educational outcomes are strong. Ignoring this critical aspect will result in futile attempts to spur development. And finally, what are ways to influence mainstream governmental and extra-familial systems and policies in manners that either prevent situations of toxic stress in the first place or react quickly and appropriately when they do occur?

Collectively, advances in the field underscore the need for a new era in child and adolescent policy and practice. Generic policies and programs that focus on present priorities such as enhanced staff development, increased quality improvement, appropriate measures of accountability, and expanded funding to serve more children and families are not enough. The streams of evidence from biology and neuroscience need to be better integrated with conversations about policy and promising interventions. For example, passing a universal Child Savings Account policy could make a substantial difference in the lives of most children, but may not be enough for children living in the context of toxic stress. Stated simply, current best practice must be viewed as a promising starting point, not a final destination. Grappling with these questions will not lead to easy answers, but might help provide partial solutions that can begin to break the link between household disadvantage and educational and developmental outcomes.

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Endnotes

[i] Measurement

Checklist measures of major life events.

Major stressful life events instruments ask respondents to report which of a list of events (ranging from 10 to 200) happened to them in a specific time line, usually the last year. The events on the list are supposed to be representative of the population of major stressful life events that occur in people's lives. Examples of events include: death of a loved one, loss of a job, being divorced, moving, and going to court. In general, the idea of life events instruments is that whatever major events do to us (e.g., require adaptation, induce negative affect and cognition), this accumulates as the number of events accumulate; the more events, the greater the stress. Some scales make explicit assumptions about the underlying cause by weighing events on certain dimensions instead of just counting the number of events. Examples of such dimensions include: the amount of adaptation required as determined by objective judges and the negative impact of each event as weighted by the respondent or in some cases by judges. Weighting schemes, no matter what their underlying assumptions may be, have not proven to add substantially to the prediction of either mental or physical health outcomes.

Measurement of Stress: Many of the studies of stressful life events and health have used the Schedule of Recent Experiences, an instrument developed in the mid 1950s, or the Social Readjustment Rating Scale, an elaboration of this instrument developed by Holmes & Rahe in the mid 1970s. These instruments are not considered state-of-the-art at this time. A detailed history of the evolution of major stressful life event scales can be found in Cohen, Kessler and Underwood Gordon (1995; Chapter 1) and Turner & Wheaton (1995). There are a range of complex questions involved that cannot be addressed in this paper.

There is no life event instrument that is appropriate for all populations or one that is generally accepted in the field. An instrument often used in large general population surveys is the PERI life events scale (Dohrenwend et al., 1984). Lists of major life events scales designed specifically for various populations, e.g., children, adolescents, adults, and the aged, are provided by Turner and Wheaton (1995). An appropriate scale is supposed to have items that represent the population of events that occur in the population under study. This raises questions about the sensitivity (appropriateness) of any of the standard life events instruments for those studying lower SES, specific ethnic populations and young children.