NON-SCHOOL SOCIAL POLICY AND THE ACHIEVEMENT GAP BETWEEN CLASSES

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I'd be lying if I said this dissertation wasn't primarily dedicated to me. I think I made every mistake possible and still survived. I'll never be satisfied with the pages that follow, but I'm happy that I can tell my current students who worry and fret about how to approach their dissertations that they could make worse decisions along the way . . . and still finish.

I hope my experiences help my current and future students and my future work helps better the lives of the poor and the oppressed.

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Chapter I

Exploring Options for Closing the Achievement Gap

In the United States, children from upper-class households significantly out-perform children from lower-class households on virtually every measure of educational achievement and attainment. This gap has worried citizens and policymakers for decades and, as such, has been the focus of countless research studies and policy interventions. Despite some narrowing in the 1970's and 80's, progress toward closing the black-white achievement gap has essentially stalled out over the past 25 years, and new evidence suggests that the gap between low- and high-income students has actually grown during this time. The gravity of the problem combined with the recent lack of progress merit a re-examination of the strategies being pursued to close the achievement gap.

One of the (re-)emerging debates in education policy surrounds the efficacy of schools versus society in influencing the academic performance of children. A growing number now call for social reform outside of schools, with the goal of reducing poverty, in addition to (or even instead of) educational reform to close the achievement gap.

The debate between those who want to fix society and those who want to fix schools may never end, but a third option might exist: addressing the mediators between poverty and academic performance. In short, aiming to make poverty less harmful to kids rather than simply trying to end it or ignore it while pushing schools to do better.

The largest shortcoming of this option is that, while significant reason exists to believe that reducing the impact of poverty could improve students' performance in school, the

evidence to support such a strategy is scattered across various fields and disciplines. As such, it remains unclear which social factors and environmental conditions to which children living in urban poverty are more likely to be exposed also significantly impact their academic performance – and which of these factors and conditions can be altered by non-school social policy.

Statement of Purpose

This dissertation strives to lay this groundwork by, first, reviewing and synthesizing the evidence and theory that various social factors and environmental conditions mediate the relationship between poverty and educational performance and, second, exploring the ability of public policy to act on these mediating variables. This dissertation strives to inform the debate regarding the efficacy of policy directed at schools versus society, and begin to answer the question of whether and how non-school social policy can narrow the achievement gap between classes.

To do this, the dissertation is divided into three papers plus introductory and concluding chapters. Chapter 1 introduces the papers and reviews evidence on the achievement gap, discusses options for narrowing the achievement gap, and presents the methodology used in the three papers. The first paper, Chapter 2, reviews the evidence and theory linking 21 different factors/conditions disproportionately experienced by children living in urban poverty with academic performance. The second and third papers, Chapters 3 and 4, synthesize all the available empirical evidence and deeply examine the theory linking homeownership and stress with academic performance. The conclusion, Chapter 5, discusses the implications for research, policy, and practice. Together, they strive to inform research, policy, and practice and examine the ways in which non-school social policy and narrow the achievement gap between classes.

The Achievement Gap

Racial achievement gap

Black students, on average, score as much as one standard deviation below white students on standardized tests (Jencks & Phillips, 1998). While the authors label this the "Black-White Test Score Gap," the consensus term soon became "achievement gap" (C. V. Meyers, 2012) which has been used more widely to refer to both the gaps in achievement between different races and ethnicities, and between those of different classes or socioeconomic backgrounds (J. Murphy, 2009). This dissertation focuses on the gap between different classes.

Socioeconomic achievement gap

Academic performance differs widely between students of different social classes across a long list of indicators, including (but not limited to): standardized test scores, grades, graduation rates, college entrance exams, college matriculation, college graduation, and completion of a graduate degree (C. V. Meyers, 2009).

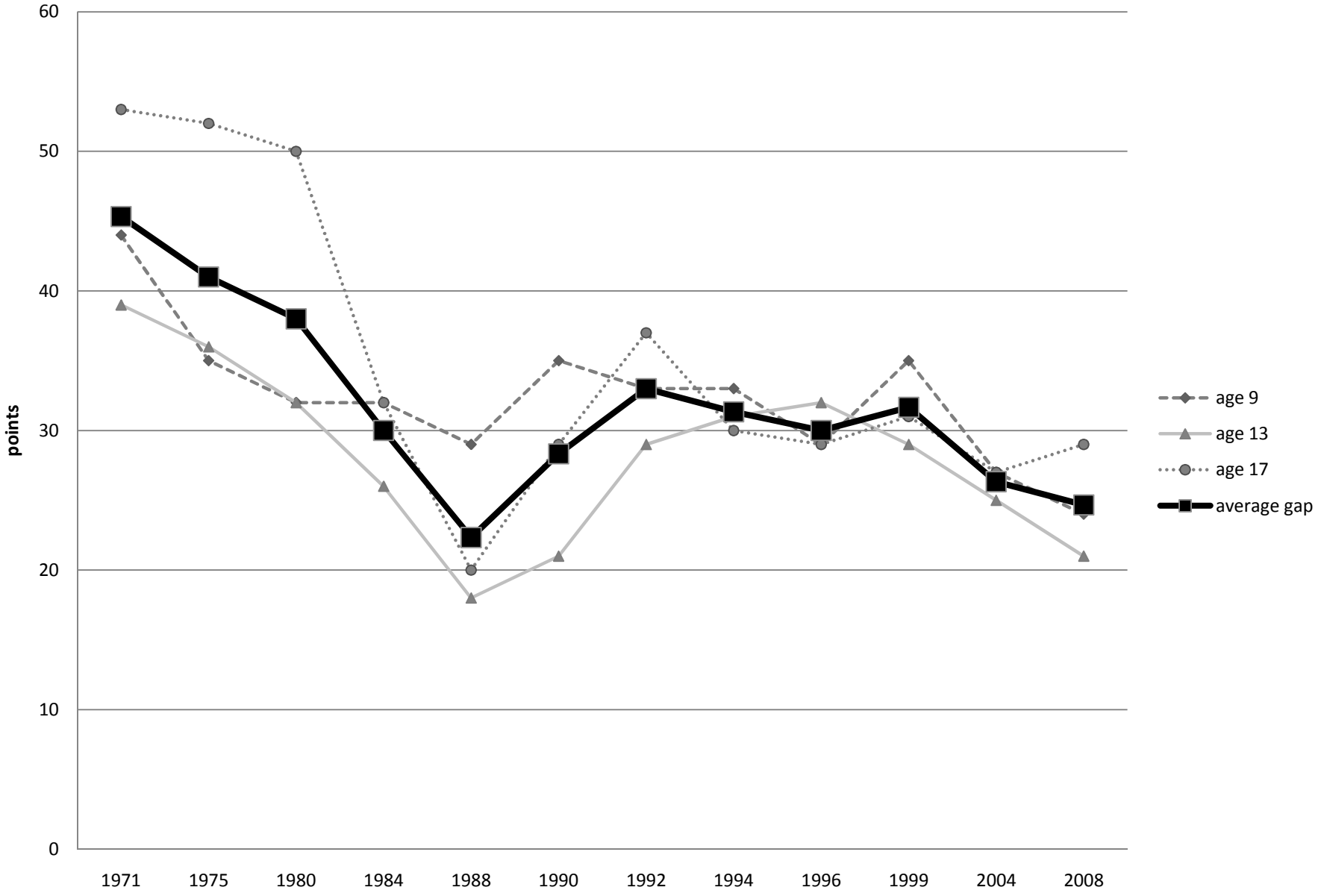
Trends in achievement gaps

Perhaps of greater concern is that while the Black-White test-score gap narrowed steadily during the 1970's and 80's, progress has essentially halted during the past quarter-century (see figures 1 and 2 for trends in NAEP reading and math scores over the past 40 years).

This change in trends may result from changes in families (Berends, Lucas, & Peñaloza, 2008), the re-segregation of schools (Condron, 2009) and/or a myriad of other factors (Covay, 2010). Neal (2005) argues that we do not really know why progress stalled, but that it *is* clear

Figure 1: Black-White Achievement Gap on NAEP Math Tests

Figure 2: Black-White Achievement Gap on NAEP Reading Test



that progress has stalled based on a variety of measures. He also points out that most of the narrowing during the previous two decades occurred because of gains by Blacks in the middle and at the top of the distribution while those at the bottom largely remained the same. The timing of the halt in progress corresponds roughly with the reversal of the desegregation movement of the past 40 years (Berends & Penaloza, 2010; Vigdor & Ludwig, 2008) and also with widening economic inequality between both Blacks and Whites and rich and poor (Magnuson & Waldfogel, 2008; Mayer, 2001).

Given the recent widening of wealth and income inequality, perhaps it should not be surprising that a new paper finds that the test-score gap between students from high- and low-income families (90th vs. 10th percentile) has grown by 30-40% over the last 25 years (Reardon, 2011) and is now approximately twice as large as the black-white achievement gap (the opposite was true 50 years ago).

Additional research along these lines may or may not replicate these findings since measuring socio-economic status (SES) remains both complicated and the points of the distribution at which people are defined as rich or poor is somewhat subjective. Reardon's decision to measure rich and poor as the 10th and 90th percentiles may seem extreme to some; particularly considering the fact that roughly one-third of the U.S. population is non-white and 30% have a 4-year degree (meaning that the majority of college-educated adults fall below the 90% cut-off and the majority of non-whites are above the 10th percentile cut-off). At the same time, Reardon's efforts represent a first attempt at measuring this gap and, particularly given the number of assessments included in his calculations, the 30-40% number is strikingly large -- especially since the lower classes and the bottom of the achievement distribution already lag farther behind wealthier students and those at the top of the distribution than in most other developed countries.

Regardless of the explanation, the stalling – and possibly reversal – of progress merits a re-examination of the ways in which we are attempting to narrow the achievement gap.

Significance of Achievement Gaps

This gap between classes presents two types of concerns. The first is a set of moral concerns regarding equity. The second is the ripple effects on the American economy and the function of the country as a whole.

Moral

Most Americans would agree that children should have equal opportunities to learn regardless of the income and social status of their parents. Indeed, from 2002-06 The Phi Delta Kappan/Gallup annual poll of attitudes toward public schools asked about perception of the achievement gap: about two-thirds regularly agreed that closing the gap was very important, and around 90% typically agreed that it was very or somewhat important (L. C. Rose & Gallup, 2006). Rawls (1971) argues we can determine what is just and equitable by imagining that we are all under a "veil of ignorance". In such a situation, nobody would know to what life-circumstance they would be born and would be forced to agree what would be fair and just knowing that birth parents, physical, and mental abilities were to be randomly assigned subsequent to this agreement. Were Americans randomly assigned to living situations at birth, it seems unlikely that they would agree that the current educational disparities are fair.

This is particularly true since academic performance affects lives well beyond school. Poor educational outcomes lead to poor physical and mental health outcomes (Reynolds & Ross, 1998; Sansani, 2011); employment and earnings (Kerckhoff, Raudenbush, & Glennie, 2001); crime (Lochner, 2011); and mortality (Galea, Tracy, Hoggatt, DiMaggio, & Karpati, 2011; Miech,

Pampel, Kim, & Rogers, 2011). And the returns to education continue to grow (Cutler, Lange, Meara, Richards-Shubik, & Ruhm, 2011). In other words, educational disparities are high-stakes: poor academic performance carries with it increasingly large negative consequences throughout one's life course.

Economic

Not only does academic performance affect one's own life, the underperformance of a large segment of the population has serious economic repercussions for the country as a whole. Given education's strong relationship with future earning levels, criminal behavior, health, and a myriad of other indicators of productivity and success, the economic costs may far exceed what many imagine. Indeed, cost-benefit studies of some successful interventions have shown benefits far exceeding costs due to the wide range of benefits.

In the case of the Perry Preschool Project, the authors calculated that there were $12.90 in benefits for every $1 spent – largely because of a reduction in crime among the treatment group (Belfield, Nores, Barnett, & Schweinhart, 2006; Nores, Belfield, Barnett, & Schweinhart, 2005). A similar analysis of the Abecedarian preschool program found a cost-benefit ratio of 2.5:1, in part due to higher lifetime earnings and lower healthcare costs for those in the treatment group (who were less likely to take up smoking) (Barnett & Masse, 2007). An analysis of the impact of low achievement by a team of economists examining a variety of areas (e.g. employment, health, welfare, etc.) concluded that each high school dropout imposes a net cost of $127,000 on the country (Belfield & Levin, 2007).

This finding serves as empirical evidence supporting a philosophy many have long espoused – as Martin Luther King, Jr. said in his Nobel Prize acceptance speech (1964), "The rich must not ignore the poor because both rich and poor are tied in a single garment of destiny. All

life is interrelated, and all men are interdependent". Indeed, one estimate is that childhood poverty costs our nation about $500 billion (equal to about 4% of GDP) annually due to the effects on productivity, health, and crime (Holzer, Schanzenbach, Duncan, & Ludwig, 2007).

Lastly, inequality itself may be responsible for negative health (Marmot, 2004; Wilkinson & Pickett, 2010) and economic (Jencks, 2002; Stiglitz, 2012) effects at the societal level. Indeed, recent economic research has pointed at rising inequality as a major cause of the Great Recession (see, for example: Galbraith, 2012; Rajan, 2010).

In short, significant reason exists to believe that raising the academic performance of children living in urban poverty and reducing inequality in academic outcomes would yield significant economic benefits for the nation as a whole in the long run.

Causes of the Achievement Gap

While the size and trends of the achievement gap is relatively straightforward, the reasons that children from lower socioeconomic backgrounds perform worse academically are more complex.

Income

While study after study finds that students with higher-income parents do better academically, on average, than those with lower-income parents (see, for example: Blau, 1999; G. J. Duncan, Brooks-Gunn, & Klebanov, 1994; Sirin, 2005), the causal mechanisms involved remain somewhat less clear. Studies have documented direct income effects that impair child development (Blau, 1999), reduce attention to child care (Banerjee & Mullainathan, 2008), increase stress and drains cognitive control and willpower (Spears, 2011) and increased ability to

purchase more educational resources and experiences (Kaushal, Magnuson, & Waldfogel, 2011) among other factors.

Wealth

Fewer studies have examined wealth instead of, or in addition to, income – likely because data on the former are much harder to obtain. Wealth is also a significant predictor of academic achievement (see, for example: Shanks, 2007; Yeung & Conley, 2008) and, oftentimes, is found to be a stronger predictor than income (Orr, 2003). That wealth would be a stronger predictor of achievement than income makes sense. One can imagine that two families with equal incomes would have unequal resources if one had a stock portfolio, money in the bank, and home equity while the other lived only on earned income.

Various studies have found that increased wealth raises expectations for children (Zhan & Sherraden, 2003); makes it easier for families to afford to enroll their child in college (Conley, 2001; Lovenheim, 2011) and for that child to remain enrolled in college (Elliott & Nam, 2012); and to spend more money (Case, Quigley, & Shiller, 2013).

Less clear is how, exactly, these differences in economic well-being affect academic performance. In addition to some of the factors listed above, copious evidence exists that students from poorer families develop differently physically and neurologically (see, for example: G. J. Duncan, et al., 1994; G. J. Duncan, Yeung, Brooks-Gunn, & Smith, 1998; Evans & Kantrowitz, 2002; McLoyd, 1990), which adds numerous factors to a long list of variables that might mediate the relationship between poverty and achievement.

School Quality

In addition to differences in lifestyle and development, students from low-income families also attend schools that evidence lower achievement levels than students from higher-income families. For example, only 17% of 4th graders at high-poverty schools (> 75% eligible for free/reduced-price lunch) scored "proficient" or above on the NAEP math exam compared to 60% of students at low-poverty schools (<20% eligible for free/reduced-price lunch). Similarly, high school students attending high-poverty schools are far less likely to graduate (68 vs. 91%) and only about half as likely to attend college (28 vs. 52%) as those in low-poverty schools (Aud et al., 2010).

High-poverty schools differ in multiple ways that may lead to this large disparity in outcomes. For example, teachers leave high-poverty schools at almost twice the rate as they do low-poverty schools (R. M. Ingersoll, 2004). The result is that higher-poverty schools have far more inexperienced teachers – which partly explains why teachers in high-poverty schools tend to be less effective, as measured by value-added scores than do teachers in low-poverty schools, with the largest difference found at the bottom of the distribution (Sass, Hannaway, Xu, Figlio, & Feng, 2010). Besides teacher quality, a bevy of research points to ways in which the climate, culture, and environment differ inside high-poverty schools. For example, a study in Washington found that teachers In high-poverty schools were five times as likely as teachers in low-poverty schools to indicate that discipline problems were serious enough to make them consider quitting (Elfers, Plecki, & Knapp, 2006).

Non-school factors

In the 1960's, Congress commissioned a study largely to confirm that students in poorer schools (particularly Black students in segregated schools) lagged behind because their schools

had fewer resources. Instead, the report (Coleman et al., 1966) found that non-school factors are stronger predictors of the achievement of a given student than in-school factors. The finding has been replicated countless times over the past forty plus years (see, for example: Alexander, Riordan, Fennessey, & Pallas, 1982; Hauser, 1972; Sirin, 2005). The current consensus is that home background factors predict about two-thirds of achievement and school factors predict about one-third (Rothstein, 2004). Indeed, if there is anything upon which education researchers agree it is that student achievement is influenced more by non-school factors than in-school factors -- and the evidence is *overwhelming*.

Pre-school gap

The relative importance of non-school factors can be seen early on; at the time that students begin school, a large gap in achievement already exists (Lee & Burkam, 2002). Racial gaps are non-existent in infants, but observable in toddlers, so the causes are almost certainly environmental rather than genetic (R. G. Fryer & Levitt, forthcoming). Indeed, future performance can be predicted with startling accuracy early on. A longitudinal study of children in Baltimore found that each additional absence from school in first grade was associated with a 5% greater chance of that child dropping out before the end of high school (Alexander, Entwisle, & Horsey, 1997).

Summer growth in gap

Not only is the achievement gap present when students begin school, it grows during summer breaks (Borman & Benson, 2010; Downey, von Hippel, & Broh, 2004; Entwisle & Alexander, 1992; Heyns, 1978). The growing gap between high- and low-SES kids during summer months eventually results in high schoolers who are more likely to be assigned to

different tracks despite similar ability earlier in life and decreases the odds of low-SES students both graduating from high school and enrolling in four-year colleges (Alexander, Entwisle, & Olson, 2007).

Summary

As a result of the growth in the gap before starting school and during breaks from school, our best estimate is that about three-quarters of the gap is formed outside of school and about one-quarter is formed while students are in school (J. Murphy, 2009). This makes sense when we consider that kids spend only about 14-15% of their waking hours in schools from birth through high school[1].

Though the achievement gap can appear deceptively simple, the reality is that it is the result of a tangled web of myriad causes. As such, a simple solution is unlikely. Instead, a range of solutions should be on considered.

Closing the Gap: Different Strategies

While the evidence that poverty harms the academic performance of students is clear, a solution is less so. If we envision a simple model with the poverty level of students on the left and academic performance on the right, a large arrow would point from left to right since the two are strongly – and causally – correlated. But the true picture is more complex. There are any number of mediators between poverty and performance – students from low-income

[1] If a student spends 7 hours per day in school and attends 180 days of school for 13 years, they spend 16,380 total hours in school. Assuming 16 waking hours per day for 18.5 years, the average child would spend 108,114 hours awake from birth through high school. 16,380/108,114 = 15.15%. A more realistic estimate is probably to assume that students attend 12.5 years of school on average for 6.5 hours/day 170 days per year, but sleep 9 hours per day, which would yield an estimate of 13.97%. Some students would spend far more time in school if they sleep longer hours and attend schools with longer days/years, while others would spend far fewer hours if they sleep less, attend school less regularly, and/or drop out of school before graduating.

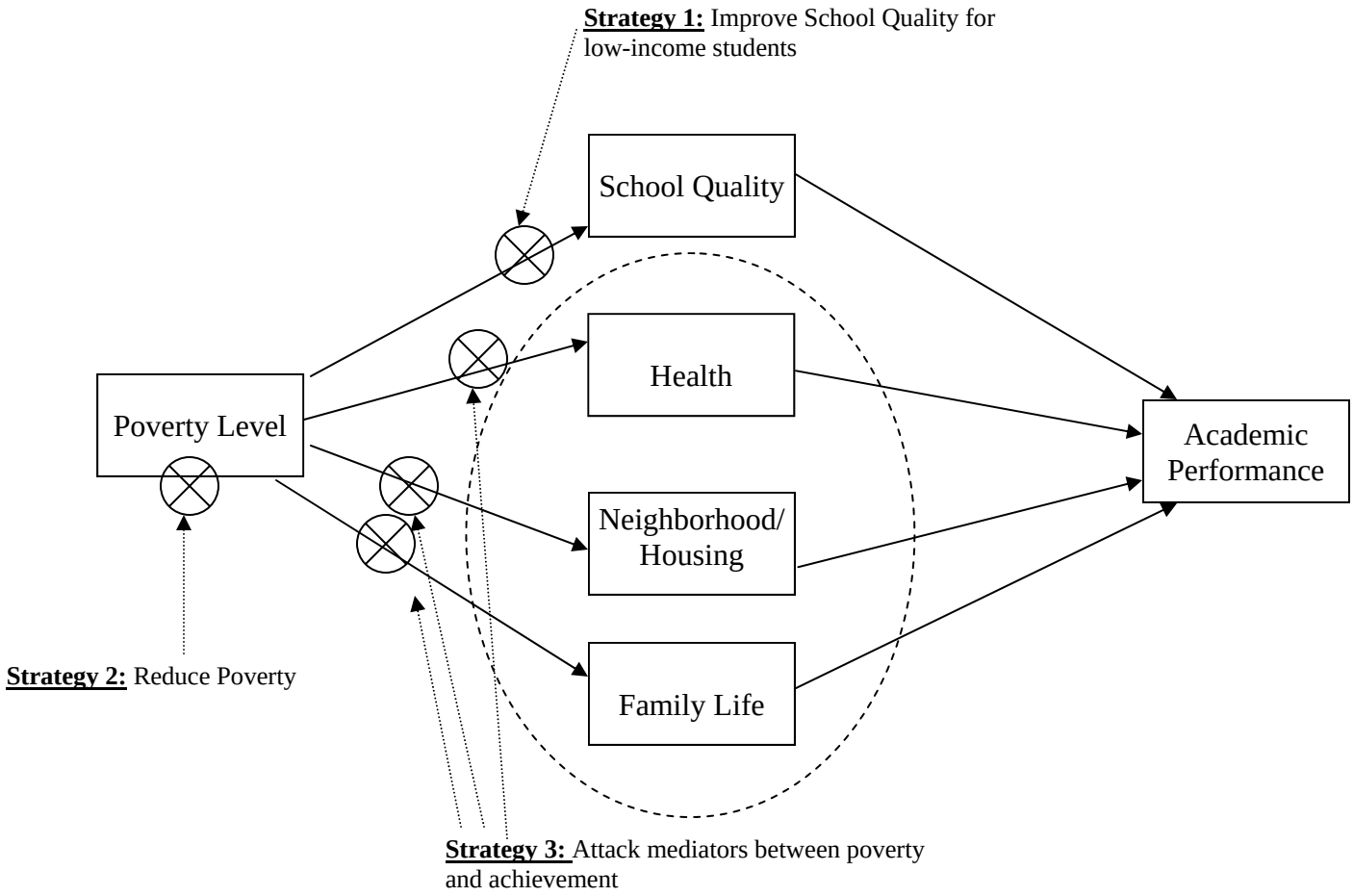
families do not perform worse in school solely because their family has less money. If the goal is to improve the performance of students living in poverty, then three fundamental types of approaches seem possible: (a) Attempt to overcome the effects of poverty through schooling; (b) Attempt to reduce poverty in order to boost achievement; or (c) Attempt to act on the mediators between poverty and academic performance. Figure 3 displays these three different strategies.

Option 1: Improve Schooling

Context. In the nearly 60 years since the *Brown* decision, countless education reforms have attempted to reduce or eliminate inequality in educational performance. The success of these reforms has been mixed – which merits a more complete analysis that is outside the scope of this dissertation – but we can group these various proposals, policies, and strategies into five broad categories:

1.) Equalize Resources. The 1897 *Plessy v. Ferguson* decision set the standard of "separate but equal" as a lawful goal; for the next sixty or so years schools were separate, but definitely not equal. While *Brown v. Board of Education* (1954) outlawed such separation, the desired equality never materialized. A touchstone book on inequalities in education (Kozol, 1991), has as its main thesis that we should eliminate funding and resource inequalities between inner-city and suburban schools in order to close the achievement gap. In the same vein, countless equity lawsuits have been filed across the country demanding different allocation of state resources so that poorer districts receive funding more in line with that of

Figure 3: Conceptual map of relationship between poverty and achievement and three different strategies for narrowing the achievement gap



wealthier districts. In short, there was, and in some circles still is, a real belief that equalizing school resources will also equalize academic performance.

2.) Integrate Schools. One of the most immediate reforms after the *Brown* decision was the integration of schools. In many cases, it was simply to comply with the law – but in others it was a strategy aimed at shrinking achievement gaps. Indeed, an oft-ignored finding of the so-called "Coleman Report" (Coleman, et al., 1966) is that the socioeconomic status of one's peers in school matters – that attending a school with higher-SES peers is associated with higher achievement. As such, busing programs began and, in some places, continue to this day. Some districts started magnet schools aimed specifically at drawing students of different races and backgrounds to the same school (Smrekar & Goldring, 1999). Some started "detracking" schools in order to end within-school segregation (Argys, Rees, & Brewer, 1996). The goal of these integration strategies, broadly defined, was to expose all children to the same peers and the same educational resources, norms, and opportunities in hopes that this would equalize academic performance.

3.) Enhance High-Poverty Schools. While many funding reforms designed to equalize resources between schools located in poorer and wealthier districts have reduced financial inequalities (S. Murray, Evans, & Schwab, 1998), the achievement gap persists. In response, many now propose that high-poverty schools be given disproportionately *more* resources to overcome the disadvantages their students face. Adequacy lawsuits have demanded that all students receive an adequate education, which oftentimes costs more for some students than for others. As a result of *Abbot v. Burke* in New Jersey, there are now 31 "Abbot Districts" that were among the poorest at the time of the decision and now receive a disproportionate amount

of state funding (E. M. Walker & Gutmore, 2002). In some places, boarding schools (such as the Milton Hershey School or the SEED Foundation schools in Baltimore and Washington, D.C.) target disadvantaged students. Similarly, Title I funding is directed only to the neediest students and schools and Head Start pre-school programs available only to low-income children. These reforms aim to give the poorest the most in order to reduce disparities in outcomes.

4.) Choice and Competition. Following the passage of *No Child Left Behind*, many are now pushing a new strategy: do more with what we have. The accountability movement is designed to ensure that all exert maximum effort and that schools that do not succeed are reprimanded and subjected to further scrutiny. When a school is deemed in need of improvement under NCLB, it does not receive additional federal help (some of the money is actually redirected from the school into outsourced after-school tutoring and to transport students to other schools) but, rather, teachers and administrators are effectively told to work harder. Supporters of charter schools, vouchers, and merit pay all make similar arguments regarding the introduction of the free-market to increase efficiency in education.

5.) Target low-income schools for improvement. Woven throughout and within these various types of reforms are attempts to improve schools, particularly targeted at the lowest-performing and lowest-income schools. Examples include Teach for America and The New Teacher Project, which recruit thousands of recent college grads and mid-career professionals who have excellent credentials but no teaching license to teach in the highest-needs schools. There is also a long list of school improvement and turnaround programs including curricula, re-structuring, and a myriad of types of professional development for teachers and principals. The

latest in this string is the push from Arne Duncan for districts to turn around the 5,000 lowest performing schools in the country by reconstituting, privatizing, or re-structuring these schools.

Drawbacks. While all five reform strategies have merit, none have, as of yet, succeeded in closing the achievement gap. The reasons for this are numerous – and advocates of various reform efforts would doubtless argue that it is due to the limited spread of their pet reform. Some of these advocates might be right; the possibility certainly exists that we have yet to find the right cocktail of school reforms. But it is also possible that reforming schools might not be the most effective lever to pull when trying to narrow the achievement gap – or at least that reforming schools is not enough. Given the limited time that students spend in school and the fact that they are not in school during their most formative years, looking at options that impact life outside of school seems prudent.

Option 2: Reduce Poverty

Context. If school reform has been unable, as of yet, to close the gap in achievement between student from low- and high-income families, the possibility exists that reducing income inequality may be a more effective method to narrow the gap in achievement. In other words, if poverty causes low achievement, then reducing poverty should also reduce low achievement. Pulling families out of poverty, however, may be no less difficult than turning around schools exhibiting low achievement.

The history of social welfare policy in the United States is a long and sordid one and an exhaustive evaluation is outside the scope of this dissertation. From orphanages to public housing to food stamps to workfare and beyond, a long list of policies have been enacted in an

effort to reduce poverty in the United States; some have succeeded, some have failed, and most have earned mixed reviews. It is worth noting, though, that these efforts have rarely been mounted in the name of reducing educational inequality.

One could argue, therefore, that the potential for anti-poverty reforms to impact educational performance is, to some extent, untapped. Rothstein (2004), Anyon (2000), and others, have suggested that we should reform society if we want to improve schools. Anyon, for example, (2005, p. 3) speculates that "economic justice may be a prerequisite for educational justice".

While copious evidence exists that income and wealth influence achievement, surprisingly little empirical evidence exists on the effects of raising income. One new paper (Dahl & Lochner, Forthcoming) estimates that a $1,000 increase in income from changes in the Earned Income Tax Credit program is associated with a .06 standard deviation increase in both reading and math scores – with more disadvantaged students benefitting disproportionately. Another study examines an exogenous source of income – lottery winnings – and finds that families that win lotto monies subsequently improve their health status (Lindahl, 2005), indicating one possible pathway through which an increase of income could result in an increase in academic achievement.

Additionally, an experiment using a negative income tax was conducted in four locations during the 1970's. In the experiment, low-income families were divided into control groups and treatment groups that were exposed (or not exposed) to a negative income tax – that is, they were guaranteed a certain income and their subsidy decreased as their income increased. The study of academic performance in Gary, Indiana (Maynard & Murnane, 1979) is the most comprehensive.

The authors found that students in grades 4-6 scored more than one quarter of a standard deviation higher on standardized math and reading tests than did those in the control group and that this advantage grew over time; those who had been in the experiment for four years had an advantage of about one-third of a standard deviation. For students in grades 7-10, however, there was no significant difference in achievement. These results were consistent with studies conducted on the other locations, including urban New Jersey (Mallar, 1977) and a group of rural areas (Maynard, 1977). In short, empirical evidence that raising income has subsequently raised achievement exists, but is somewhat limited in scope.

Drawbacks. Because the relationship between poverty and achievement is a complex one mediated by a large number of different variables, a small, temporary increase in income seems unlikely to have large effects in the long-run. Blau (1999, p. 261) argues that "Policies that affect family income will have little direct impact on child development unless they result in very large and permanent changes in income."

Given the dearth of evidence on the transformative powers of income on academic performance, the likelihood of bold policies designed to substantially raise the incomes of low-income, urban families over long periods of time are unlikely to find enough political support to pass Congress – particularly given the current context of massive budget deficits and acrimonious partisanship. The last major overhaul of federal anti-poverty policy was the welfare reform passed in 1994 – which decidedly curtailed benefits for many low-income Americans. Indeed, research has found that discourse in both the media (M. Rose & Baumgartner, 2013) and in Congress (Guetzkow, 2010) has been increasingly hostile toward the poor over the past few decades – which is likely a large part of the reason that there has been little indication that any major new proposal is on the table now or will be in the near future, particularly one which

significantly *expands* benefits to low income families. So while an optimist might argue that eradicating poverty has the potential to eradicate the achievement gap, a pessimist could argue that such an argument is merely theoretical – and will remain merely theoretical for the foreseeable future.

A political climate hostile to a dramatic expansion of anti-poverty policy is far from the only major obstacle to this approach, however. There is serious doubt in many circles that poverty will, or even can, ever truly be eradicated. The Bible quotes Jesus telling his disciples that, although he will not always be present, "you always have the poor with you" (Matthew 26:11; Mark 14:7). Indeed, in any form of capitalism some will always have more than others.

Even if we assume that eradicating poverty is politically and pragmatically possible in the near term, there is no guarantee that a reduction in poverty rates will have an immediate and dramatic impact on achievement levels. The relationship between poverty and achievement is mediated by a tangled web of psychosocial, cultural, and environmental factors and conditions, and many of these may not change, particularly in a quick or dramatic fashion, even after families are elevated from poverty. In short, eradicating poverty is difficult, controversial, and complex – and the nature of the ties between poverty and achievement make it likely that the achievement gap would not subsequently disappear both immediately and completely.

Option 3: Address Mediators

Context. While reducing poverty is a worthy goal for a myriad of reasons, it may prove easier to instead aim to reduce the effect that poverty has on students' academic performance. Rothstein (2004) concludes that "eliminating the social differences in student outcomes requires

eliminating the impact of social class on children in American society" (p. 149). In other words, altering the experiences of children raised in poverty in ways that subsequently boost achievement may prove as efficacious as either trying to improve schooling or reduce poverty. Researchers have found countless mediators between poverty and achievement, so finding the factors and conditions that both most influence achievement and are most easily malleable by policy may be a worthwhile endeavor.

While numerous studies find strong relationships between many social factors or environmental conditions and academic performance, few studies have examined the effects of a change in an actual policy (or at least an experiment designed to simulate a policy change) on subsequent academic performance. Below, I identify four policy changes or experiments on which rigorous empirical studies have been conducted linking them with school-related outcomes (See Table 1 for a brief comparison of the four).

***Gautreaux*.** In 1976, the Illinois State Supreme Court ruled that public housing residents could reside in both Chicago and the surrounding suburbs. Subsequently, thousands of families were offered housing vouchers to either continue to live within city limits or to move to surrounding suburbs. Kaufman & Rosenbaum (1992) argue that the location of residents was exogenous because residents were usually placed on a long waiting list and subsequently took the first available opening regardless of location. They examine the academic performance of students who moved to suburban areas compared to those that did not seven years after relocation.

The authors hypothesize that families that move will find themselves comparatively poorer relative to their neighbors and that students will be more likely to drop out of school and less likely to obtain jobs (the "relative disadvantage hypothesis"). Instead, they find that the

Table 1

Policy/Experiment	Context	Results
Gautreaux Decision *Chicago, IL*	A court ruling in 1976 led to low-income residents being offered housing vouchers to live either in Chicago or in wealthier suburbs. Studies compare families that stayed in high-poverty neighborhoods in the city to those that moved to low-poverty districts outside the city.	Students who moved to the suburbs were four times less likely to drop out of school, twice as likely to enroll in college, and seven times as likely to enroll in a four-year college. Those who entered the labor force were in higher-paying jobs.
Closure of High-Rise Public Housing Towers *Chicago, IL*	With many clusters of high-rise public housing becoming gang-riddled and violent, the decision was made to close down these towers and move residents elsewhere. Jacobs compared former residents of towers closed for maintenance and other plausibly exogenous reasons to residents of towers in the same development that remained	There were no statistically significant differences in achievement between movers and stayers, but point estimates grew over time. Families tended to move to neighborhoods close by with similar levels of poverty and similar schools.
Moving to Opportunity *Baltimore, MD, Boston, MA, Chicago, IL, Los Angeles, CA, New York, NY*	A five city experiment where low-income families received vouchers to move to low-poverty census tracts, regular section 8 vouchers, or continued with their present housing. Studies compare those who received vouchers to move to low-poverty census tracts to those who received no voucher	47% of treatment households used the voucher to move to a lower-poverty neighborhood, but many moved back to higher-poverty neighborhoods in subsequent years. No statistically significant differences in achievement were detected except in Baltimore and among African-Americans. But researchers have found differences in mother's mental health and other outcomes.
New Hope Project *Milwaukee, WI*	A three-year experiment beginning in 1994 in which low-income adults in two areas of Milwaukee were offered job search assistance or a volunteer job. Those who worked at least 30 hours/week were also given an earnings supplement, subsidized health insurance, and subsidized child care.	Evaluations were conducted after 2, 5, and 8 years. Treatment group students scored higher on standardized tests at the 5 year mark, but effects faded out by year 8 (5 years after the program ended). Even at year 8, however, New Hope students were less likely to receive poor grades in school or attend remedial summer school and reported higher levels of school engagement, higher school expectations, and more hope for the future. Results were more positive for boys than girls.

opposite occurred. Students who moved to the suburbs were four times less likely to drop out, twice as likely to enroll in college, and seven times as likely to enroll in a four-year college. And those who moved on to the workforce took higher paying jobs.

But the study was somewhat limited. Out of about 4,000 families who participated in the voucher program they examined 107 who moved in 1982. In 1989, they were able to track down only 66% of the original participants for follow-up interviews. Additionally, the categorization of residents into either urban/poor or suburban/middle class neighborhoods is rather rough and might be misleading in some cases. Not all urban areas are poor and not all suburban areas are wealthy. Lastly, even if the differences in performance are a direct result of the move, it is unclear whether the gains were caused by the move to a better neighborhood, the move to a better school, or a combination thereof.

***New Hope Project*.** Beginning in 1994, low-income residents in two areas of Milwaukee participated in an experiment in which those in the treatment group received job placement assistance. Those who worked 30 hours per week were also given an earnings supplement that pushed them above the poverty line and offered both subsidized health insurance and child care. Two years after the program ended, treatment group children scored significantly higher on standardized math and reading tests, but effects had faded out three years later. Even five years after the program, however, parents of treatment group children were less likely to report that their kids received poor grades in school, and students were less likely to attend remedial summer school and reported higher levels of school engagement and school expectations, and were more optimistic about the future (Huston, Walker, Dowsett, Imes, & Ware, 2008).

In many ways, the New Hope project represents the most comprehensive effort to date to alter families' lives outside of school and, then, subsequently measure the impact on their

children in school. The program helped families earn more money, receive better health care, and access child care. But a change in the home lives of the family – not just what type of home and neighborhood they live in, but also how they experience their home and neighborhood – was not part of the experiment.

***Moving to Opportunity*.** From 1994-97, the Moving to Opportunity (MTO) experiment was conducted in five American cities: Baltimore, Boston, Chicago, Los Angeles, and New York. Families were divided into three groups: a control group, a group eligible for regular section 8 vouchers, and a treatment group that received vouchers to move to housing in low-poverty census tract.

Numerous studies analyzed different outcomes in each city, but one study (Sanbonmatsu, Kling, Duncan, & Brooks-Gunn, 2006) examined the effects on educational outcomes across all five cities. The results are somewhat difficult to interpret, because only 47% of those in the treatment group used the voucher to move and many of those who did later moved back to neighborhoods with higher poverty. As a result, families in the treatment group tended to live in neighborhoods that were only slightly less impoverished and attend schools that were slightly higher performing than those who were in the control group.

The authors find that, across the board, there are no statistically significant differences between those in the treatment group and those in the control group. There are, however, statistically significant positive results for students in Baltimore and for African-American students in reading. The authors conclude that their findings indicate that "achievement-related benefits from improved neighborhood environments alone are small" (p. 650). Given the low rates of relocation from and high rates of return to high-poverty neighborhoods, this statement may not be fully justified. Regardless of the actual effects of moving to a "better"

neighborhood, however, it seems reasonable to conclude that, at least in this case, offering vouchers to move to lower-poverty neighborhoods did not seem to greatly impact achievement.

Demolition of Chicago high-rise housing projects. In the 1990's, Chicago made a concerted effort to demolish high-rise housing projects in developments that had become notorious for gang violence. Jacob (2004) examined the educational outcomes of those who moved from the projects from 1991-2002. To prevent endogeneity, he used only families who were moved from buildings that were closed for reasons of maintenance (for example, a broken boiler or burst pipe), which he argues should be exogenous, and compares these families to residents in different buildings from the same complex who remained.

Jacob finds no statistically significant difference in achievement, but point estimates are consistently in a direction that would indicate the possibility of a small effect. Students score noticeably (though not statistically significantly) higher four years after moving than one year after moving. Indeed, given the tumult associated with forced removal from public housing (Venkatesh, 2008), we might expect that a move would lead to an immediate decrease in achievement. That he finds positive point estimates four years later may indicate that an interpretation of no effect is incorrect.

Additionally, the study faces many of the same problems that those analyzing Moving To Opportunity do – namely that families, on average, did not move to significantly different neighborhoods. The residents in the study live, on average, 1.25 miles from their original residence, and almost all still live in high-poverty census tracts and attend schools with large minority populations and low test scores. In this way, we might not expect to see large differences after moving from public housing – family dynamics would likely remain nearly identical, as would school environment in many cases, and the change in neighborhood environment simply might not be that large.

***Summary*.** These four studies provide mixed evidence on the ability of changes in non-school social policy to affect change in academic performance. Gautreaux seemed to indicate that rather small changes in policy could dramatically change lives. But MTO dampened much of that enthusiasm. Two things about the collective evidence are worth noting, however: 1.) In all of the above studies in which assessments were conducted at an earlier and later time point (while the policy/experiment was still under way), the later assessment found more positive results than the earlier one – indicating that it may take a long time to realize the full effects of non-school social policy; 2.) The scope of social issues impacted by these policies – particularly each one individually, but even when examined collectively – is somewhat small. A myriad of social factors are associated with academic performance, but these policies and experiments touch on only a few. To determine how non-school social policy can narrow the achievement gap, a wider examination of the research needs to be undertaken.

Drawbacks. Together, the studies reviewed above provide only a sliver of evidence that non-school social policy can reduce the impact of poverty on achievement in a meaningful way. Additionally, it is unclear that non-school social policy can act on many factors, particularly in the near term. Parents of different classes tend to have different parenting strategies (Lareau, 2003), something that may be beyond the scope of all but the most intensive and interventionist policies. And a great deal of what children learn seems to depend on what happens in their homes. In one oft-cited study (B. Hart & Risley, 1995), researchers found that children from upper-class homes heard millions of more words before the start of school than did their lower-class peers and that, subsequently, they had a much larger vocabulary. It is hard to imagine a

feasible and scalable policy that would dramatically increase the number of words spoken to toddlers by their parents.

Conclusion

The first two options are fields unto themselves: evaluating the ability of schools to impact students or of public policy to impact poverty is well beyond the scope of a single study. Additionally, there is significant reason to believe that the potential for either strategy to achieve far greater success than the current system is limited.

If we use Goldilocks as a metaphor, we might consider the school reform option "too cold" since countless reforms have been tried with varying degrees of success and have yet to close the gap and the effect that schools can have on children is limited by the relatively small amount of time they spend there. While finding a newer, better policy is certainly not out of the question, experiments with in-school reforms have far outpaced the relative influence of schools on academic performance. Similarly, attempting to eradicate poverty might be considered "too hot;" both because it is a political minefield and because it is *extremely* difficult. While any number of policies may chip away at the poverty rate and produce marginal gains in achievement, it seems unlikely that reformers can enter that particular arena and emerge with a stunning success.

As such, this dissertation investigates the third option – which might be "just right". While research on school reform and poverty alleviation can fill multiple volumes, the research on the mediators between poverty and academic performance (particularly regarding the ability of non-school social policy to reduce the effects of these mediators) remains relatively scarce. Given the vast difficulties experienced by policymakers who have tried to fix schools or end poverty, it may be valuable to investigate the ways in which poverty influences academic performance and the extent to which policy can ameliorate these effects.

The aim of such an investigation is to avoid the ideological debate that arises when discussing the causes of poverty and the decisions made by those who end up living in poverty. This investigation will do so in three ways. The first is that the focus will be on children – who are too young to have made decisions that resulted in their living in poverty. The second is that the investigation will focus on experiences that are the *result* of living in poverty instead of decisions that may have led to a family living in poverty. Third, it will focus on factors and conditions that are concrete and tangible rather than abstract ideas that are subject to debate regarding whether or not they actually exist.

Significance

We need such an investigation for three major reasons. First, as discussed above, the achievement gap between the upper and lower classes is large, possibly growing, and negatively affects both innocent children and our country as a whole in myriad ways.

Second, when we observe economic, social, cultural, and educational trends of recent decades, it becomes apparent that the largest changes are the ever-growing differences between those at the top and those in the middle. In indicator after indicator, those with college degrees are doing *far* better relative to those in the middle than ever before. In this sense, those in the middle are relatively more similar to those at the bottom than ever before. As such, a thorough investigation of the effects of environmental conditions and social factors on those living in poverty likely carries over to those near-poverty and/or members of the working class.

Third, even if non-school social policy interventions are the most effective way to proceed, we need to know more about how to design these interventions. Researchers need to be guided toward the factors/conditions most deserving of further scrutiny while practitioners

and legislators need to know which factors/conditions deserve the most attention as part of new interventions. This dissertation aims to help both groups.

Cautions

Before beginning the examination of the potential of non-school social policy to alter the mediators of poverty and achievement and, subsequently, narrow the achievement gap, let me be clear on what I am *not* arguing. Recently, a group of researchers and other education experts formed what has come to be called the "Broader, Bolder Coalition" to propose attacking the achievement gap by focusing mainly on social reforms (Economic Policy Institute, 2008b). The group writes that

> *Despite impressive academic gains registered by some schools serving disadvantaged students, there is no evidence that school improvement strategies by themselves can close these gaps in a substantial, consistent, and sustainable manner. Nevertheless, there is solid evidence that policies aimed directly at education-related social and economic disadvantages can improve school performance and student achievement. (Economic Policy Institute, 2008a)*

Critics often counter by naming exceptional schools that have made large strides toward closing the achievement gap (see, for example: Whitman, 2008) – a somewhat curious argument, since the general rule of social science is that the exception does not disprove the rule. But, regardless of whether schools can, in fact, close the achievement gap by themselves it may be the case that social reform is a more effective or efficient strategy.

At the same time, it is unclear that their statement is true – that we, indeed, have "solid evidence" that altering non-school social policy can effectively alter academic performance. This dissertation, however, intends to explore the extent to which the evidence that non-school social policy can narrow the achievement gap is, indeed, "solid" and inform the next steps taken by policymakers when designing such reforms and researchers when studying such reforms.

Some might take umbrage at the implication that schools alone cannot close the achievement gap. One could easily assume that the group is implying that schools are

ineffective or not worth our time and effort. In reference to Rothstein's call for comprehensive social reform, Heyneman (2005) writes that "In essence, it appears that the terms of the debate have remained largely unchanged and repetitive. There seem to be consistent schools of thought over time – either that the schools are ineffective or effective" (p. 4).

It is *not* my intention, however, to pit school reform *versus* social reform; they need not be enemies. Nor is it my intention to call into question the effectiveness of schools – indeed, an examination of non-school social policy should be undertaken regardless of the effectiveness of schools. Even if schools can work miracles, it remains possible that social reforms can do so more efficiently. Rather than viewing social reform as a substitute for school reform, we should see them as possible complements. An investigation of the efficacy of non-school social policy should not be construed as an attack on the ability of schools to educate children. Instead, it should be seen as an alternative, or even complementary, hypothesis worth testing if we are serious about closing the achievement gap.

Similarly, it is *not* my position that we should stop any efforts to reduce poverty – or only aim policies at changing the experiences and behaviors of the poor instead of changing their income levels. It is entirely possible – if not eminently likely – that some amount of school reform and poverty reduction is both desirable and necessary to significantly narrow the achievement gap. This dissertation focuses instead on the mediators between poverty and achievement both because there is reason to believe that addressing these may be the most efficient way to narrow the achievement gap and because that strategy has been studied far less than the other two.

In the end, policymakers will likely need to borrow strategies and understand findings from all three approaches. For example, it may be hard to envision actions that can be taken by federal, state, county, or city governments that would change such day-to-day factors as

parenting strategies or the number of words spoken by parents, possibly making schools a better vehicle for delivery of many services. "Community schools" with multiple services built in have experienced some success (Dryfoos, Quinn, & Barkin, 2005), and health clinics in schools have somewhat of a mixed record but have also achieved some notable successes (N. G. Murray, Low, Hollis, Cross, & Sally M. Davis, 2007).

The Harlem Children's Zone (HCZ) has been highlighted as an example of even more comprehensive services delivered in conjunction with schools. The foundation combines multiple charter schools with comprehensive services ranging from delivery of fresh fruits and vegetables to "Baby College" for pregnant mothers, and recruits all residents living in a 97 square block area in Harlem to participate (P Tough, 2008). Though it is too early for final and formal evaluations, some early results were encouraging (Dobbie & Fryer, 2009) and people took notice. As a result, fifty urban neighborhoods have been awarded start-up grants by the federal government to attempt to replicate what has been undertaken in Harlem.

A later version of the study, however, attributed the positive results solely to the schools in the zone based on the fact that students from outside the zone who attended the zone's charter schools performed better on standardized tests than students living in the zone and attending other schools (Curto, Fryer, & Howard, 2011). Additional research needs to explore the degree to which each group of students were actually receiving the services of HCZ (many services are rendered at the school level, so students from outside the zone may end up receiving more services if they attend the local charter schools than neighborhood kids do if they attend other schools) in addition to long-term measures of academic performance including high school graduation and college enrollment.

While many argue that non-school social policy should supplement schooling if we want to close the achievement gap, it looks increasingly likely that at least some of these services will

be rendered by, or at least in conjunction with, local schools. Similarly, it is likely that attempts to improve the lives of the poor, reduce poverty, and improve schooling will all impact each other. While this has spurred a debate in some sectors as to whether poverty must be fixed before schools can be fixed or vice-versa, in the end, it is likely that reducing poverty will reduce achievement *and* that improving schools will reduce poverty.

Finally, even if non-school social policy *can* consistently impact academic performance in a significant way, it remains unclear to what extent we should focus on this as a means of closing the achievement gap. The situation may be akin to health care. While the cessation of smoking or adoption of a healthier diet would likely benefit a patient more, the hiring of an additional doctor or purchase of better equipment may simply be easier. Similarly, creating new schools or hiring more teachers may simply be easier than trying to change social conditions.

If looking only at educational outcomes, non-school social reforms must ultimately prove more effective and more efficient than school reforms to justify a shift in focus and resources (any other positive or negative of social policies should, of course, be considered by both ethicists and society at large). One could imagine a scenario in which a number of social reforms yield positive results, but of a low magnitude and at high cost. In this case, school reforms might be a better alternative. Proponents of all three methods should keep an open mind: the goal should be to narrow the achievement gap by (almost) any means necessary, rather than proving one's own pet theory correct.

Regardless of which method (or combination of methods) is most efficient, we first need a better understanding of how poverty is affecting kids, which factors/conditions are most hindering students' academic performance, and which are most likely to be altered by non-school social policy and/or overcome by educational policy. Unfortunately, the research on

these factors/conditions is both underdeveloped and strewn across numerous fields and disciplines.

Methods

In order to make sense of a vast array of data, I conduct a systematic research synthesis of literature that spans numerous fields and disciplines. One challenge when conducting research syntheses is doing so in a way that is as objective and comprehensive as possible. Traditional narrative research syntheses leave readers guessing regarding the standard of evidence applied (Johnson & Eagly, 2000), and narrative syntheses relying on the author's own mental inference test can understate actual relationships found by research and paint a fuzzier picture than actually exists (Cooper & Rosenthal, 1980). Additionally, they often focus on only a few studies known to the author rather than an exhaustive survey of the field (G. V. Glass, 1976). When done systematically, however, a research synthesis can offer both new and accurate information about a field. Feldman (1971, p. 86) argues that "systematically reviewing and integrating . . . the literature of a field may be considered a type of research in its own right – one using a characteristic set of research techniques and methods".

To do this, Taveggia (1974) recommends authors complete six tasks: retrieve, index, and code studies, and then accumulate comparable findings, analyze the resulting distributions, and report the results. I complete these six tasks, but under the 7-step framework proposed by Cooper (2010): (1) formulate the problem; (2) search the literature; (3) gather information from studies; (4) evaluate quality of studies; (5) analyze and integrate study outcomes; (6) interpret the evidence; and (7) present the results.

Formulating the Problem

The factors and conditions that seem to have the strongest relationship with academic performance and the greatest potential to be impacted by non-school social policy will be subject to further scrutiny based on the following theory: First, certain negative environmental conditions and social factors disproportionately affect low-income urban households, subsequently negatively impacting the academic performance of children from these households. At the same time, higher-income households are affected differently by the same factors and conditions, which raise children's academic performance relative to other households, resulting in a gap in the achievement between children from low- and high-income households (see Figure 4).

Second, in order for non-school social policy to reduce the achievement gap, it would first have to alter a condition or factor so that it does not negatively impact low-income households to the same extent as before. This reduction would have to subsequently increase the academic performance of children from these types of households, resulting in a smaller gap in achievement between children from low- and high-income households (see Figure 5).

I used the following criteria to determine which factors and conditions are most likely to fit the second model:

1.) Disproportionately experienced by low-income, urban families

2.) Evidence of a non-spurious relationship

3.) Theoretical justification of a causal mechanism

4.) Evidence of time-order effects

5.) Policy Actionable

In short: only factors that disproportionately affect low-income, urban families can reasonably be assumed to widen the achievement gap between social classes in urban areas. Additionally, we must have strong evidence of causality in order to conclude both that a

Figure 4: Conceptual map of relationship between an example social condition or environmental factor experienced disproportionately by the urban poor and the formation of an achievement gap

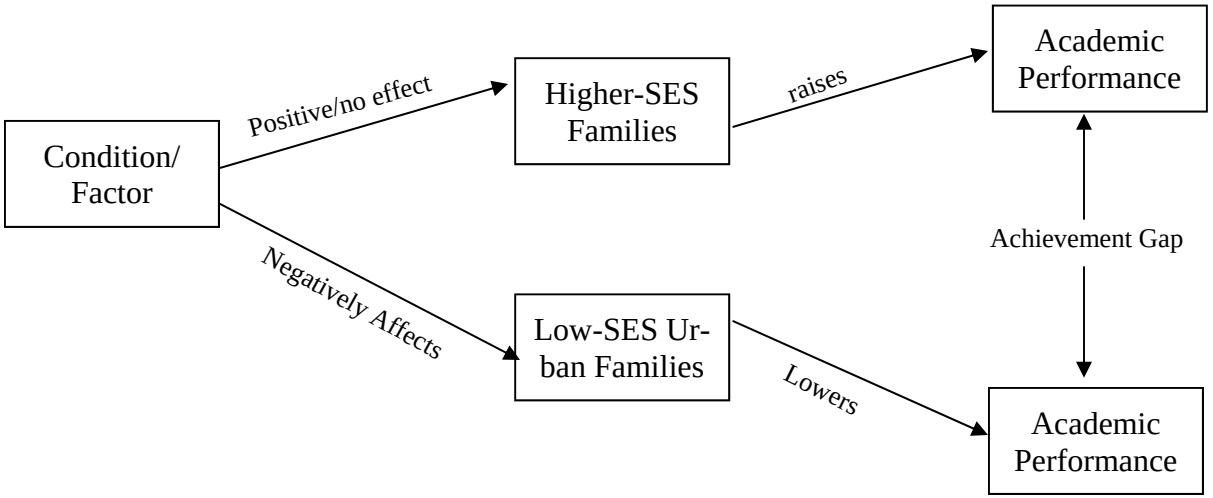
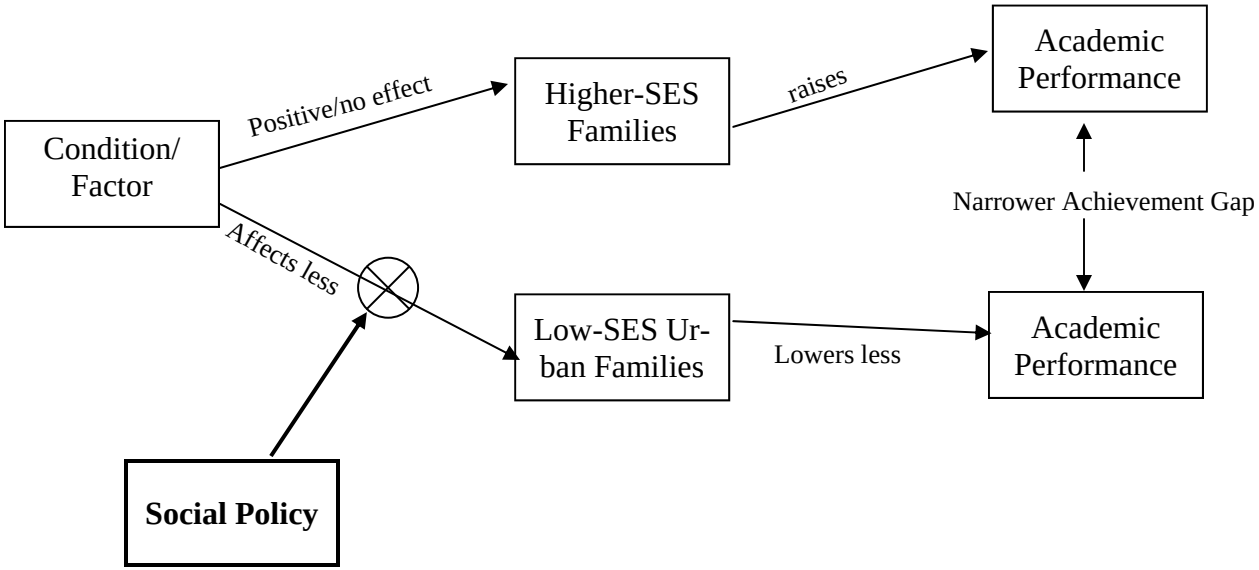


Figure 5: Conceptual map of how a social policy can intervene to affect a particular social condition or environmental factor experienced disproportionately by the urban poor and the formation of an achievement gap



factor/condition is widening the achievement gap and that public policy may be able to act on the factor/condition in such a way so as to reduce the achievement gap. Different authors and different fields' norms suggest different guidelines for determining causality, but the general model for social science research is that evidence must meet the final three criteria above. We must have evidence that the particular factor is correlated with academic performance, and not simply in a spurious manner. To make this conclusion, we must have theoretical evidence of a causal mechanism. And to be sure that altering this factor or condition might subsequently alter academic performance, we must have evidence of time-order effects (i.e. when a factor condition is changed, academic performance also changes at a later point in time).

Efforts were made to identify factors/conditions that meet all five of these criteria, but very few studies meet the fourth. The first criterion served as a cut-off point for inclusion in the initial review, which discusses 21 different factors and conditions. I then use these criteria to assess the overall state of the evidence on each factor and also to select two factors for further scrutiny. The first three criteria were used as gatekeepers (i.e. only those with a clear "yes" answer were eligible for deeper analysis).

In chapter 2, I rate each of the 21 different factors/conditions on the first three criteria using the rubric displayed in Table 2. Each factor/condition is rated 0-3 (no evidence, weak evidence, moderately strong evidence, strong evidence) on the strength of the empirical evidence linking it with academic performance, on the strength of the theory supporting one or more causal mechanisms that would explain such a relationship, and on the ability of policy to change the factor/condition in ways that would subsequently narrow the achievement gap. Only factors/conditions that are linked with poverty are included. Those with scores of 3 or lower across the three criteria are deemed lacking sufficient evidence to merit attention in practice or policy at the moment, those with scores between 4 and 6 are deemed moderately

Table 2: Rubric for Evaluation of Factor/Condition

Criteria

score	Empirical Evidence	Theory	Policy Malleability
0 (None)	No evidence of a correlation between factor and academic performance	No evidence of a causal mechanism between the factor and academic performance	No evidence that past interventions have been able to alter the factor/condition or reason to believe future interventions will
1 (Weak)	Evidence of correlation between factor and academic performance in multiple studies	A causal mechanism is proposed, but only weakly supported by other literature	Past interventions have had little to no effect and it appears difficult for future interventions to do so
2 (Moderate)	Evidence of correlation between factor and academic performance in multiple studies that also control for possible mediating and moderating variables	Multiple studies theorize the same causal mechanism and support their theory with empirical literature	Multiple past interventions have significantly changed the factor/condition and reason exists to believe that future interventions can do better
3 (Strong)	Evidence of strong association between factor and academic performance across many studies using varying methodologies that also control for possible mediating and moderating variables	Many rigorous studies, using varying methodologies, provide both empirical evidence of a causal mechanism and reference a wide range of supporting literature	Many rigorous studies, using varying methodologies, find practically and statistically significant effects of interventions and reason exists to believe future interventions can do better

supported by the evidence, and those with scores of 7 or higher are deemed strongly supported by evidence and are considered for deeper analysis in the next two chapters.

In chapters 3 and 4, I rate each article and then the body of evidence as a whole on the final three criteria using two additional rubrics (see Tables 3 and 4).

Searching the Literature

I define academic performance to include not only scores on standardized tests but also grades, high school graduation, and college attendance. The ultimate aim was to include the best empirical and theoretical pieces available. To do this, I limited the sample to empirical articles published in peer-reviewed journals and seminal books (published by academic presses and frequently cited in published journal articles). In order to increase the relevance of the articles included, I limited the sample to those using samples of children in the United States.

A comprehensive search of the literature was conducted to identify which social factors and environmental conditions might mediate the link between urban poverty and academic performance. The initial step was a wide variety of keyword searches in multiple research databases (Google Scholar, ERIC, ProQuest). I also read through all tables of contents of the top journals in relevant fields[2] since 2000 and downloaded relevant articles. To avoid only looking backward from the most cited articles, I used Google Scholar to see which articles had cited the articles I collected and also downloaded relevant articles from those lists. I then took these articles and a number of relevant books, read through them, chased citations as I went, and mined the bibliographies for additional citations of interest.

[2] I began with the five top journals in education policy based on reputation and ISI citation index: (*Educational Evaluation and Policy Analysis, Sociology of Education, American Educational Research Journal, American Journal of Education, and Educational Researcher)*, and then moved on the top journal in relevant fields/disciplines (*Child Development, Journal of Policy Analysis and Management, Urban Affairs, American Sociological Review, and American Economic Review)*.

Table 3: Rubric for Evaluation of Single Article

Criteria

score	non-spurious relationship	causal mechanism	time-order effects
0 (None)	no evidence of a correlation between factor/condition and academic performance	no evidence of a causal relationship between the factor and academic performance	no evidence of a longitudinal relationship between factor and academic performance
1 (Weak)	evidence of correlation between factor/condition and academic performance	A causal mechanism is proposed, but only weakly supported by other literature	weak evidence of a longitudinal relationship based on cross-sectional data
2 (Moderate)	evidence of relationship between factor/condition and academic performance controlling for possible mediating and moderating variables	A causal mechanism is proposed and strongly supported by other literature	evidence of a longitudinal relationship between factor/condition and academic performance controlling for possible mediating and moderating variables
3 (Strong)	evidence of statistically and practically significant relationship between factor/condition and academic performance across multiple models controlling for possible mediating and moderating variables	A causal mechanism is proposed and strongly supported by both empirical results and other literature	evidence of statistically and practically significant longitudinal relationship between factor/condition and academic performance across multiple models controlling for possible mediating and moderating variables using

Table 4: Rubric for Evaluation of Literature Base

score	*Criteria*		
	non-spurious relationship	**causal mechanism**	**time-order effects**
0 (None)	no evidence of a correlation between factor and academic performance	no evidence of a causal relationship between the factor and academic performance	no evidence of a longitudinal relationship between factor and academic performance
1 (Weak)	evidence of correlation between factor and academic performance in multiple studies	A causal mechanism is proposed, but only weakly supported by other literature	weak evidence of a longitudinal relationship based on cross-sectional data
2 (Moderate)	evidence of correlation between factor and academic performance in multiple studies that also control for possible mediating and moderating variables	multiple studies theorize the same causal mechanism and support their theory with empirical literature	multiple studies observe a change in academic performance over time that is correlated with a change in a particular factor
3 (Strong)	evidence of strong association between factor and academic performance in at least five studies of various methodologies that also control for possible mediating and moderating variables	multiple studies, using both quantitative and qualitative methodologies, provide both empirical evidence of a causal mechanism and reference a wide range of supporting literature	multiple empirical studies, using both quantitative and qualitative methodologies, observe a change in academic achievement both before and after a particular factor changes in students' lives

Additionally, over the course of four years spent reading through and compiling this literature I subscribed to table of contents alerts for the top journals in the field, Google Scholar updates for new articles in the field, and RSS feeds of blogs that list newly published articles.

In this sense, the collection of articles has never truly stopped – there will always be something newer published next week – but the search was temporarily halted in order to complete this paper at the point at which redundancy was obvious: that is, when the latest papers collected cited mostly other papers that have already been collected and little new information could be found through further searching.

Gathering Information from Studies

After collecting all relevant articles, the results of each article were coded and entered into a database containing the sample characteristics, the factor/condition being studied and how it was measured, the outcome variable and how it was measured, the direction of the relationship (positive, negative, or zero), the method used, whether the study was longitudinal or cross-sectional (and, if longitudinal, the duration of the study), whether the study was experimental, quasi-experimental, or correlational, and whether the study used primary or secondary data.

I then used these codes to sort and cluster studies as I went. The first decision was to group the studies under three umbrellas: housing/neighborhoods; health/health care; and family/home. I continuously refined sub-categories as I accumulated literature and currently have sorted studies into 20 different groups by the factor/condition being studied. Some of these groups were straightforward (e.g. all studies on the effects of homeownership fit neatly together) while others were collections of related factors (e.g. nutrition encompasses a number of different influences on nutrition).

This database allowed me to systematically review the evidence and synthesize the findings in a way that avoids biases common in narrative literature reviews (Cooper, 2010).

Evaluating the Quality of Studies

Because the sample was limited to peer-reviewed journal articles, no studies within these parameters were completely excluded from the review. Studies were given more weight, however, if they had larger samples, used more rigorous methods, were longitudinal, used primary data, and/or were more recently published.

In order to mitigate unavoidable bias when judging article quality (Cooper, 2010), I code these aspects of the article before reading the findings whenever possible. I readily acknowledge, however, that there is no truly objective measure of the quality of an article and that researchers cannot completely free themselves of bias when judging articles.

I refrained from entirely dropping studies in part to combat this bias. Slavin(1986), for example, argues that

> *Reviews of social science literature will inevitably involve judgment. No set of procedural or statistical canons can make the review process immune to the reviewer's biases. What we can do, however, is to require that reviewers make their procedures explicit and open, and we can ask that reviewers say enough about the studies they review to give readers a clear idea of what the original evidence is (p. 7).*

In meta-analyses that aim to find a precise quantitative estimate of effect sizes across a topic, precise judgment and weighting of quality is more of a concern than in this format. Given the limited sample, the wide-ranging nature of this synthesis, the fledgling status of many of these research fields, the unavoidable bias mentioned above, and the fact that the majority of research findings may be false (Ioannidis, 2005), I err on the side of inclusivity and transparency. I aim to provide enough objective information on the studies included in this synthesis to allow readers to judge for themselves whether or not they agree with the conclusions.

Analyzing and Integrating the Outcomes of Studies

While meta-analysis has increasingly been used to quantitatively analyze research syntheses, most factors/conditions examined in this paper fall into two of Cooper's (2010) four situations in which a meta-analysis is *not* appropriate. First, the conceptual hypotheses and measures used vary widely from study to study – authors define and measure similar outcome variables in different ways and control for different factors. Second, research is quite limited on many of these factors – for most, ten or fewer studies have been published in peer-reviewed academic journals. These make a meta-analysis possible but not appropriate.

Another option is "best evidence synthesis" (Slavin, 1986, 1995), in which the researcher discusses only the best evidence available (the cut-off for which differs by topic). I utilize a number of strategies from this methodology (e.g. establishing a firm cut-off and creating a table of study characteristics and results that includes sample size, duration, methodology, and outcome) but not enough rigorous studies on similar topics exist to pool effect sizes in the way that Slavin recommends.

Instead, I discuss the findings and methods of each study analyzed, display a table summarizing the studies' results, and examine both the progression of the literature over time and the differences and similarities in methods and results between studies. In this way, I provide a comprehensive analysis of what the studies say both individually and collectively.

Interpreting the Evidence

In order to interpret the collective findings of the literature, I rate the collective findings on the rubric above. In addition to synthesizing and evaluating empirical results, I explore the theory behind the relationship between each item and academic performance. Each theoretical review dissects and displays in graphical form the theory linking the particular factor/condition

to academic performance. The theoretical reviews attempt to establish a concept map of the links between that particular factor/condition and academic performance that would explain a causal mechanism.

In addition to the need for a theoretical causal mechanism to claim causality, the lack of research on the impact of social reform on academic performance in most areas made the theoretical reviews particularly important. The research linking factors/conditions with behaviors and traits tightly linked with academic performance, including cognitive ability (e.g. IQ), cognitive function (e.g. working memory), and effort in school receives particular attention in these theoretical reviews.

Presenting the Results

In addition to the rubric and concept map, I critically examine the state of research in that field not only on the degree to which we can conclude causality (based on the presence of non-spurious relationships, theoretical causal mechanisms, and time-order effects) but also the strengths and weaknesses of the literature and what additional research is needed to further strengthen the literature base.

Finally, in the last chapter I explore the literature linking non-school social policy changes to the factors/conditions most strongly linked with academic performance (based on the rubric above), this time examining research where the selected factors/conditions are the dependent variable. Since little research linking policy to academic performance exists, it is necessary to piece together the research linking social conditions and environmental factors to academic performance with the researching linking public policy to social conditions and environmental factors. The end result provides insight into the question of whether and how non-school social policy can narrow the achievement gap.

Conclusion

Many, if not most, in the field of education regard the achievement gap as the most critical problem facing our nation's schools. While various in-school solutions have been discussed and studied for decades, research on out-of-school policies has been comparatively scant. A cursory glance at the causes of the achievement gap makes it obvious that improving schools is not the only possible strategy.

We essentially have three choices if we want low-SES students to catch up to high-SES students. The first is to improve the schools they attend to make up for other disadvantages they face. Given current trends and limits on school efficacy, this may be an uphill battle. The second is to work toward eradicating poverty – leaving no low-income students to lag behind. This would likely prove even more difficult than transforming the in-school experience of millions of students. The third is to try to reduce the impact that poverty has on educational outcomes by altering some of the mediating variables between poverty and academic performance.

This strategy of addressing mediators has logic behind it, but evidence is lacking that this is actually feasible. In short, we have plenty of reason to believe that non-school social policy might significantly narrow the achievement gap, but little evidence that it has or will. This dissertation investigates the potential of out-of-school reforms and provides both a preliminary answer to those who ask whether and how non-school social policy can close the achievement gap and a starting point for research in an area that is drawing increasing attention. The findings should prove useful to both researchers designing studies on the effects of non-school social policy and policymakers designing interventions designed to narrow the achievement gap.

In the chapters that follow, I present three papers that examine whether and how non-school social policy can narrow the achievement gap in addition to a concluding chapter that discusses the findings and implications.

In chapter two, I piece together research on 22 different factors and conditions from across a wide range of disciplines and fields and discuss the strength of the evidence and theory supporting each one in addition to recommendations and implications for research, policy, and practice.

Based on the results of this review, I select two for further scrutiny as illustrative examples and conduct a systematic research synthesis on homeownership and stress in chapters three and four.

In chapter five, I explore different options for policy interventions designed to alter these factors and conditions. I conclude with a discussion of themes and lessons that emerge from dissertation in addition to the implications for research, policy, and practice.

Chapter II

Theory and Evidence

We know that children living in poverty perform significantly worse in school and that these differences in performances stem mostly from their experiences outside of school. But what, exactly, is it about living in poverty that harms children's academic performance? And can social policy mitigate the effects of poverty in ways that will narrow the achievement gap? To begin to answer that question, I explore the evidence that a wide range of environmental conditions and social factors experienced disproportionately by those living in poverty negatively impact academic performance. I focus on both areas that merit further exploration by researchers and areas that merit intervention by legislators and practitioners.

I first briefly describe some of the most frequently cited theories underpinning these relationships. I then briefly discuss the links between poverty and each of the factors/conditions in addition to the evidence and theory linking the particular factor/condition to academic performance and the ability of social policy to act on that factor/condition. I conclude by rating the strength of the overall evidence, the alignment of the evidence with various theories, and the degree to which these factors/conditions are policy malleable based on the rubric presented in chapter 1.

In total, I discuss 21 different factors/conditions on the first three criteria using the rubric displayed in chapter 1. Each factor/condition is rated 0-3 (no evidence, weak evidence, moderately strong evidence, strong evidence) on the strength of the empirical evidence linking it with academic performance, on the strength of the theory supporting one or more causal

mechanisms that would explain such a relationship, and on the ability of policy to change the factor/condition in ways that would subsequently narrow the achievement gap. Only factors/conditions that are linked with poverty are included. Those with scores of 3 or lower across the three criteria are deemed lacking sufficient evidence to merit attention in practice or policy at the moment, those with scores between 4 and 6 are deemed moderately supported by the evidence, and those with scores of 7 or higher are deemed strongly supported by evidence and are considered for deeper analysis in the next two chapters.

Theory

Neighborhood Effects

Though a wide array of social conditions influence children's academic performance, researchers and policymakers have focused more on the links between housing and neighborhoods and educational outcomes; from the Gautreaux decision to the MTO experiment and beyond. The results of this strand of policy and research have run a wide gamut. A recent review of the literature (DeLuca & Dayton, 2009) concludes that:

> *Housing programs have successfully helped poor parents move to safer and less disadvantaged communities and, in some cases, less segregated neighborhoods . . . Despite the ability for some of these programs to bring about context changes, it appears much more difficult to improve the educational outcomes of children. Early Gautreaux results suggested large benefits for children moving to the suburbs, but . . . more recent MTO research concludes that neighborhood change is not enough to substantially improve schooling quality or educational outcomes.*

In short, while there may be sufficient reason to believe that housing policy *can* positively and significantly impact the academic performance of some of the poorest Americans, there is as of yet no conclusive evidence that we know how to do this on a consistent basis.

One reason behind the contradicting findings for researchers and frustrating results for policymakers may be the lack of a clear consensus on a theoretical framework outlining the relationships between potential levers of housing policy and academic performance. In their introduction to the *Neighborhood Poverty* series, Gephart and Brooks-Gunn (1997) write that

> *Multiple theoretical perspectives, fragmented by discipline and often by method, provide partial, potentially complementary (but sometimes conflicting) guidance about the characteristics of neighborhoods that may affect the development of children, youth, and families, and about the mechanisms through which such characteristics affect families and individuals. (p. xvii)*

Although the field has come a long way in the 16 years since, the problem they identify has never been fully resolved.

Why would these policies have led to changes in children's educational performance? While the theory supporting such a relationship is been well developed in some areas, it remains highly fragmented – particularly across different disciplines. In other words, while theoretical models regarding parts of the story abound, we do not yet have an all-encompassing theoretical framework. Jencks & Mayer (1990) divide theories relating neighborhoods to child development into three groups: epidemic models, collective socialization models, and institutional models. Models based on theories grouped under these umbrellas generally work as follows:

Epidemic models. Epidemic models theorize that neighborhood characteristics spread much like disease spreads – from person to person. For example, one person decides to use drugs, then another, then another, and so on (or, perhaps, read Shakespeare). In this way, peer norms are the main driver of individual behavior; those raised in neighborhoods where going to college is the norm are more likely to attend college, and those raised in neighborhoods where dropping out of high school is the norm are more likely to drop out.

Collective socialization models. Collective socialization models hold that values are derived from adults that live in the neighborhood. Adults both serve as examples to which children should aspire and enforce rules within the neighborhood. These models would theorize that people who grow up in neighborhoods where drug dealers are idolized would be more likely to deal drugs when they come of age while those who grow up in neighborhoods full of shopkeepers would be more likely to open their own store. And people who grow up around college graduates would be more likely to attend college themselves.

Institutional Models. Institutional models underline the importance of adults from outside of the neighborhood; particularly those in positions of authority (teachers, police, etc.). Theories under this umbrella posit that children from poorer neighborhoods interact with different outside authority figures and/or are treated differently by outside authority figures. Children treated with more respect and concern by these authority figures would then stand a better chance of graduating from high school or avoiding jail.

Discussion. Theories under all these umbrellas overlap with one another and often predict similar outcomes (for example, that students in poorer neighborhoods will be less likely to graduate). Both because of that fact and because they all have empirical backing, we should consider all three when predicting and studying how social policy might impact academic performance.

That those in lower classes live in worse housing is not seriously questioned. Indeed, the local home values seem to explain differences in school-wide achievement that other background variables do not (Kane, Staiger, & Samms, 2003). This may be due in part to those with means opting to move into neighborhoods zoned for better schools, but is also likely the

result of a more complicated relationship between homes and neighborhoods and various behaviors and actions. For example, it has been theorized that perception of disorder in one's surroundings leads to other negative behaviors (Franzini, Caughy, Nettles, & O'Campo, 2008; Sampson & Raudenbush, 2004). Hastings (2009) posits that neighborhood effects are compounded by a vicious cycle wherein poorer neighborhoods need more services and the situation is exacerbated when government officials fail to recognize, and subsequently act on, this condition.

Stress Theory

Based on developmental research, Shonkoff & Phillips (2000) add stress theory as a fourth group of neighborhood effects theories, but it is more often cited by health researchers. Stress Theory posits that stressors more common in poorer neighborhoods (which might range from crime to lead paint) have deleterious effects on children. These negative effects add up to create stress and inhibit development. A recent advance in the study of stress was the creation of the Adverse Childhood Experiences (ACE) survey (Felitti, 2002), which measures accumulated stress through exposure to various stressors in childhood and strongly predicts later health and academic outcomes. Stress theory would predict that children exposed to more negative experiences would be more distracted, less focused, more stressed, and lower achieving in school.

Ecological Systems Theory

Widely used by those who research both neighborhoods and family/home conditions and their effect on child development, ecological systems theory (Bronfenbrenner, 1979) and the bioecological model (Bronfenbrenner & Morris, 1998) theorize that children affected by

people and institutions in five different nested levels: immediate friends, family and surroundings (the microsystem); the relationships between these immediate surroundings (the mesosystem); the outside experiences of immediate friends and family (the exosystem); the cultural context in which one lives (the macrosystem); and the historical context in which one lives (the chronosystem). Each system influences each child differently and to different extents depending on both the degree of exposure to, and context of, each.

Students who experience problems in their immediate surroundings (e.g. family conflict), relationships between these different groups (e.g. a poor relationship between their church and parents), extended social systems (e.g. a parent working in a stressful job), cultural context (e.g. high rates of poverty and unemployment), and/or historical context (e.g. racial discrimination) would be expected to perform worse in school.

Resources

Resources likely matter both directly and indirectly. In the most direct sense, more money enables families to purchase more goods to aid their children's learning. For example, a recent study using two national databases found that families who earn more money or begin earning more money spend more on physical items like books and toys in addition to enrichment activities like sports and art classes (Kaushal, et al., 2011).

More indirectly, economists argue that a lack of resources diverts attention away from other tasks. For example, focusing attention on finding adequate food or water decreases the amount of attention a parent can focus on their child's physical health or the homework due the next day (Banerjee & Mullainathan, 2008).

The former predicts that a child with more stimulation at home and more activities outside the home will perform better in school because he/she had more learning experiences;

the latter predicts that a child whose parents have to spend less time and energy ensuring basic needs are met will perform better in school because he/she received more attention and care.

Non-Cognitive Factors

Recent writings have focused the attention of researchers (Heckman, 2000) and the public (Paul Tough, 2012) on the non-cognitive traits of students, with some evidence that they may be stronger predictors of school success than cognitive skills (see, for example: Duckworth & Seligman, 2005).

Some group self-control together with attention as psychological effects of poverty (Mullainathan, 2011) since the stresses encountered by those living in poverty can deplete both over time (Spears, 2011), but I instead include self-control with non-cognitive factors.

Tough lists grit, self-control, zest, social intelligence, gratitude, optimism, and curiosity as the seven factors "especially likely to predict life satisfaction and high achievement" (p. 76). Students whose environments foster development of these traits would be more likely to earn higher grades, score higher on tests, and graduate from high school and college.

Culture of Poverty

Popularized by Oscar Lewis (Lewis, 1966) and "The Moynihan Report" (Office of Policy Planning and Research, 1965), the "culture of poverty" theory essentially argued that people living in poverty had developed a destructive culture that perpetuated the cycle of poverty. Lewis later clarified (1971) that he believed that:

> *The people in the culture of poverty have a strong feeling of marginality, of helplessness, of dependency, of not belonging. They are like aliens in their own country, convinced that the existing institutions do not serve their interests and needs. Along with this feeling of powerlessness is a widespread feeling of inferiority, of personal unworthiness . . . People with a culture of poverty have very little sense of history. They are a marginal people who know only their own troubles, their own local conditions, their own neighborhood, their own way of life. Usually, they have neither the knowledge, the vision nor the ideology to see the similarities between their problems and those of others like themselves else in the world (p. 21).*

Lewis continues on to argue that although he believes those living in poverty had changed their culture, that these changes were not all negative. He argues, for example, that a focus on the more immediate present rather than long-term planning could lead to a more joyful and carefree life.

Though largely discredited and ignored in recent decades (Small, Harding, & Lamont, 2010), the "culture of poverty" hypothesis has made a recent comeback among scholars (P. Cohen, 2010) – but this time with a different meaning. Rather than focusing on the shortcomings of those living in poverty, the focus has shifted to examining how living in poverty affects the culture of families and neighborhoods. In this sense, Lewis may have been right that those living in poverty can feel outcast, isolated, and hopeless – but scholars now see these as an outcome rather than cause of poverty. Scholars investigating the relationship between culture and poverty would expect students who are more isolated, feel less hope for the future, and engage in less long-run planning to perform worse in school.

Summary

The theories discussed above all influence the research presented below and make appearances in a wide range of articles and topics. Indeed, researchers from different fields and disciplines often cite different theories in order to support similar arguments. Collectively, they predict that children with more stress, fewer resources, strained relationships, more chaotic

surroundings, and worse role models will earn lower grades, perform worse on tests, drop out more frequently, and earn fewer degrees.

Evidence

I argue in Chapter I that the evidence that social policy can close the achievement gap is both scattered and limited. But this does not mean that relevant studies are few and far between. Indeed, studies linking poverty, environmental conditions and social factors, and academic performance – though scattered across many fields and disciplines – are quite abundant. This dissertation explores environmental conditions and social factors disproportionately experienced by children living in urban poverty and the links between these experiences and their academic performance. It, additionally, includes an exploration of the ways in which social policy might act on these various factors that mediate the relationship between poverty and achievement.

Social policy, generally defined, consists of education, health care, housing, welfare, social security, unemployment, family services, and sometimes aspects of the criminal justice system depending on which definition one uses (Midgley, Tracy, & Livermore, 2000). For the purposes of this dissertation, I limit the discussion to social policy outside of schools (which I refer to as "non-school social policy") and divide it into three broad categories: housing and neighborhoods, health and health care, and family and home environment. I then divide each broad category into narrower factors and conditions. These factors and conditions, however, often overlap to some extent or could be split into further sub-groups – there is no perfect way to divide up the research. Additionally, it should be noted upfront that none of these factors/conditions are individually responsible for the achievement gap and changing only one

of the 21 will not close the achievement gap. Educational disparities are caused by myriad factors (as evidenced below) and changing one thing will never end them.

We *do* have solid evidence of relationships between numerous factors/conditions within these three categories and the academic performance of children. Not only are social problems and academic performance correlated, but many social problems disproportionately impact poor, minority students. In that sense, there is strong reason to believe that alleviating social ills would disproportionately help those who tend to score the lowest – and, as a result, lead to a narrowing of the achievement gap.

In this section, I provide a brief overview of the relationships that might exist within these three areas. I focus on the achievement gap between classes rather than between races. Because class and race are so tightly intertwined, causes and solutions mostly overlap. But I omit a serious examination of racism and any adverse impact it may have on achievement and attainment. Though race matters and deserves further attention, I focus on class because "race is important but socioeconomic status is the critical issue" (J. Murphy, 2009) – or, as Rothstein (2004, p. 52 cited by Murphy, p. 19) puts it "social class matters more than race" – and because, as discussed earlier, the achievement gap between students of different incomes seems to be growing while that between blacks and whites has held steady (Reardon, 2011).

Lastly, I focus on causes of the achievement gap in urban areas. I choose to focus on urban areas because high rates of poverty are present in these areas, the country is steadily urbanizing (U.S. Census Bureau, 2012), and because these areas have a high density of social services and corresponding research. Additionally, students eligible for free/reduced price lunch in large city districts performed somewhat worse than did eligible students in the rest of the nation's schools (Uzzell et al., 2010). While rural students, in many cases, lag just as far behind as those in the inner-city, the causes of this deficit are somewhat disparate – and solutions are

likely to be as well. As such, the role of social policy in influencing the achievement of rural youth merits a separate analysis.

Housing/Neighborhoods

That lower-income families live in both lower-quality homes and less desirable neighborhoods is not seriously questioned. A wide range of literature finds that neighborhood context matters when it comes to academic performance. The difficulty is in parsing how and why different features of neighborhoods and housing matter, why, and determining how policy can impact these features.

Determining the size and magnitude of "neighborhood effects" on academic outcomes has proven both difficult and somewhat contentious. While a correlation between neighborhood poverty and academic achievement is readily evident, disentangling the effects of the neighborhood in and of itself presents a much more difficult challenge. Aaronson (1998) argues that estimates of neighborhood effects are biased by the fact that families choose where to live. But, using data on siblings at least three years apart, he finds that moving to a neighborhood with a 10% higher poverty rate was associated with a 7% drop in the likelihood of graduating from high school. Multi-level modeling has also addressed various methodological concerns and repeatedly found empirical evidence of effects (see, for example: Garner & Raudenbush, 1991). But despite these sophisticated quantitative models, it remains unclear in exactly what ways neighborhoods influence achievement independent of other factors (Sampson, Morenoff, & Gannon-Rowley, 2002).

Another study attempted to simulate an experiment by matching similar students using longitudinal data from Chicago and found that African-American students who spent more time living in poverty had verbal achievement scores that lagged about a year behind those who

spent less (Sampson, Sharkey, & Raudenbush, 2007). A somewhat similar study (Harding, 2003) used counterfactual models to try and estimate the effects of moving to a wealthier or poorer neighborhood and found that those who moved to poorer neighborhoods less likely to complete high school and more likely to become pregnant as a teenager. While it makes intuitive sense that living in a less desirable neighborhood would negatively impact children, changing neighborhoods is no small task.

The relevant question, though, for researchers, legislators, and practitioners is exactly what it is about poorer neighborhoods that impacts performance (and then whether/how we can change them). As Fisher (2013) puts it, "What *about* the context matters and "how does it work" (p.8). Below, I discuss the factors and conditions repeatedly highlighted in the research literature.

Disorder. While disorder may be a nebulous and subjective concept, it has been a major focus of research – particularly on crime – over the past 30 years. Much of this started as a result of "Broken Windows Theory" (Wilson & Kelling, 1982), which hypothesized that small signs of disorder (e.g. broken windows) would spread throughout neighborhoods. Police in New York City and elsewhere began cracking down on minor infractions like these in an attempt to curb crime. Crime rates fell after the advent of these policing methods, and researchers have been trying to determine causality ever since.

***Links to* poverty**. What we do not dispute is that disorder (ranging from broken windows to chaos in the streets) makes neighborhoods less desirable and, therefore, homes there less costly. Upper and upper-middle class residents often pay huge premiums to live in gated communities, secluded developments, and/or communities with strict homeowners' associations (Fischel, 2003) in part to avoid disorder.

Empirical evidence. Not many researchers, however, have linked disorder with academic performance. A large-scale study in Canada (Kohen, Brooks-Gunn, Leventhal, & Hertzman, 2002), though, found a negative relationship between disorder (interviewer ratings of fronts of buildings) and the verbal ability of young children.

One stumbling block in quantifying the effect of disorder on children's academic performance is that disorder is perceived differently by different people. Racial and economic context were stronger predictors of perceived disorder than objective observations by external evaluators in a study in Chicago (Sampson & Raudenbush, 2004), but poverty was a stronger predictor in a study in Baltimore (Franzini, et al., 2008).

Theory. A number of researchers have been highly critical of the theory. One large study of Chicago (Sampson & Raudenbush, 1999) argues that the relationship is spurious – after assessing social and physical disorder across the city, they find that the collective efficacy of neighbors explains both disorder and crime rates. Another study of MTO finds no evidence of direct effects of neighborhood disorder on crime (Harcourt & Ludwig, 2006).

The most compelling evidence that the relationship *is* real comes from a series of experiments conducted in the Netherlands (Keizer, Lindenberg, & Steg, 2008). The authors repeatedly found that people were at least twice as likely to ignore injunctive norms (e.g. rules against littering, trespassing, and stealing) when they witnessed disorder and other rules being broken (e.g. graffiti, illegal firecrackers, and shopping carts strewn about a grocery store parking lot).

The authors argue that seeing signs of inappropriate behavior results in people prioritizing the descriptive norm (what they perceive to be happening – in this case, something bad) over the injunctive norm (what society dictates people *should* do) and ultimately more inappropriate behavior – in line with epidemic models of neighborhood effects.

In addition to the evidence of the spreading of inappropriate behavior (which could reduce attendance and study time and worsen behavior problems in schools), separate studies have found that disorder increases stress, resulting in less sleep (Hill, Burdette, & Hale, 2009) and more child maltreatment in the home (Keyes et al., 2012), and that disorder negatively impacts community care and vigilance (Pitner, Yu, & Brown, 2013), all of which could directly or indirectly impact academic performance.

Policy malleability. Policy can act on disorder in two broad ways. The first is attempting to reduce it in current neighborhoods by, for example, changing policing or instituting neighborhood clean-ups. "Broken Windows" policing has had mixed success in this regard (Harcourt & Ludwig, 2006). The second is by moving families to neighborhoods with less disorder or replacing whole developments with new ones that aim to be less disorderly. Programs like MTO have had mixed success attempting the former (DeLuca & Dayton, 2009) while public housing redevelopment has had mixed success attempting the latter (Curley, 2010a). Overall, disorder seems like a rather nebulous problem that likely only changes slowly over many years with concerted effort.

Summary. Despite the measurement difficulty, mixed empirical evidence on crime, and sparse evidence on educational outcomes, there is a strong theoretical basis to believe disorder may impact academic performance. We have both evidence and reason to believe that policy can change disorder, but it is unlikely to be a quick fix. Overall, I rate disorder thusly:

Empirical Evidence: 1

Theory: 3

Policy Malleability: 1

Total: 5

Recommendations for research, policy, and practice. "Disorder" means different things to different people – spanning physical and social conditions – but more chaos may stress families, lower expectations, and increase crime; all of which can negatively impact performance in school; all of which means that researchers should devote more attention the potential impacts of disorder on academic performance. Until we have stronger evidence, though, practitioners and legislators should probably prioritize other factors/conditions when they have limited resources.

Violence and crime. Closely related to disorder are measures of crime and violence. Indeed, much of the research on disorder uses crime or violence as the outcome variable. Perhaps because crime is easier to objectively measure than disorder, there is also more research on its effects.

***Links to* poverty**. A study of inner-city children found that the majority had been exposed to crime and violence and that higher exposure to violence was associated with more anxiety, lower grades, and more school absences (Hurt, Malmud, Brodsky, & Giannetta, 2001).

Empirical evidence. Another study in Maryland found that 3rd-5th grade students who lived in neighborhoods measured as more violent and rated by kids as less safe scored significantly lower on state math and reading tests (Milam, Furr-Holden, & Leaf, 2010). A study in Chicago found that African-American children living in the same neighborhood as a recent homicide scored at least half of a standard deviation lower on vocabulary and reading assessments within a week of the event (Sharkey, 2010). And a recent study of African-American males in high school used structural equation modeling to conclude that exposure to violence reduced feelings of safety, perceived parental support, and school involvement, which reduced self-esteem, hours spent studying, and grades (Patton, Woolley, & Hong, 2012). The

consistent findings of different researchers using different methods in different locations strongly indicate that this relationship is not spurious.

Theory. Different researchers have found evidence of many different – though related – pathways through which crime and violence could affect academic performance. Various studies have found that individuals living in neighborhoods with high rates of crime and disorder are less trusting and feel more powerless (Ross, Mirowsky, & Pribesh, 2001); report more stress, leading to more depression, anger, hostility, mood changes, and lower self-esteem (Ewart & Suchday, 2002); exhibit more behavior problems (Thompson & Massat, 2005); are more likely to experience PTSD (Goldmann et al., 2011); and that children who feel less safe in their communities are more likely to be obese (D. Duncan, Johnson, Molnar, & Azrael, 2009). And another study of children in Chicago recently exposed to homicide in their community found that they exhibited shortened attention spans and less impulse control – and that their parents experienced more acute distress – within a week of the murder (Sharkey, Tirado-Strayer, Papachristos, & Raver, 2012). The literature presents multiple plausible pathways through which crime and violence could affect academic performance. Disentangling exposure to violence, correlates of violence, psychological results of violence, and mediators of the effects of violence, however, is complicated (Foster & Brooks-Gunn, 2009), and crime and violence certainly affect different students and neighborhoods differently.

Policy malleability. Given that all of the above research focuses particularly on impoverished urban neighborhoods, it seems particularly likely that effects are felt most acutely in these areas. Crime rates have fallen considerably in these areas over the past 20 years, though likely for myriad reasons (see, for example: Dietrich, Douglas, Succop, Berger, & Bornschein, 2001; Nevin, 2007). Reducing crime and violence is certainly feasible, if often difficult.

Summary. Though the main effects are likely indirect (exposure to crime and violence appear to be mediated largely by stress manifested in various forms), and research linking them to academic performance is somewhat limited, the evidence is nonetheless fairly compelling that crime and violence likely negatively impact the performance of children in schools. Overall, I rate the research thusly:

Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations for research, policy, and practice. Researchers still need more longitudinal evidence on the before-and-after effects of exposure to crime and violence, but the overall evidence and theory is more than strong enough to merit attention from legislators and practitioners. Crime/violence reduction strategies should focus on many different causes of crime (e.g. poverty, environmental toxins, social networks, etc.) in many different ways and researchers should continue to learn about which types of interventions, policing, and consequences work best in which situations.

Social organization of neighborhoods. Much of the research on crime, violence, and disorder – particularly as they relate to the development and academic performance of children – also links the three to the social organization of neighborhoods. Indeed, a wide range of research finds that the social organization of neighborhoods – measured in various ways – influences crime rates. We can generally divide this research into studies on neighborhood social conditions, social networks, peers, and role models.

***Links to* poverty**. As with the sections above, neighborhoods that are more chaotic and have looser ties between neighbors are likely less appealing to prospective homeowners, leading to income gaps in these characteristics. But, as I discuss below, these traits also lead worsen neighborhood conditions in many ways that would drive down property prices in a neighborhood.

Empirical evidence. The field really began when a seminal study concluded that students in Catholic high schools had tighter bonds with their peers and the community – more "social capital" – and were less likely to drop out as a result (Coleman, 1988). More recently, a team of researchers found that neighborhood-level social capital in three Midwestern cities was positively associated with school-level achievement (Woolley et al., 2008). For whatever reason, researchers have focused more on criminal and developmental outcomes of the social organizations of neighborhoods – and difficulty in measuring social capital also limits the amount of research in the field.

Theory. In terms of neighborhood conditions ,"community social disorganization" (including more mobility and family disruption) increased crime in Great Britain (Sampson & Groves, 1989) and child maltreatment in the United States (Coulton, Korbin, Su, & Chow, 1995) neighborhood-level "social control of children" reduced adolescent delinquency in Chicago (Sampson, 1997), and "social disorder" predicted more violent offenses in low-income, African-American neighborhoods (Pitner, et al., 2013). In terms of social networks, researchers have found that "collective efficacy" (cohesion among, and willingness to intervene of, neighbors) reduced violence in Chicago (Sampson, Raudenbush, & Earls, 1997).

The large amount of research on other outcomes of the social organization of a neighborhood, however, offers numerous pathways through which it may influence academic performance. Epidemiologists know that the social environment can affect the spread of

disease and risk factors (Yen & Syme, 1999) and collective efficacy seems to have reduced mortality in Chicago neighborhoods during hot summer months (Browning, Feinberg, Wallace, & Cagney, 2006). In addition to increasing crime, social disorder in a neighborhood may decrease community care and vigilance (Pitner, et al., 2013). In general, tighter and more structured relations between members of a community may help the community keep watch over its children; reduce the disorder, crime, and violence to which children are exposed; foster stronger relationships; and reduce stress and health problems. All of these could reasonably be expected to impact the performance of local students in school.

At the same time, tight social bonds can foster illicit behavior as well – which is where peers and role models can come into play. Various studies, for example, have found social capital spurred organized crime (Browning, Feinberg, & Dietz, 2004) and fostered "downward-leveling social norms" (Stanton-Salazar & Dornbusch, 1995). The myriad outcomes speak to the influence of the social organization of neighborhoods, but also offer a caution that close relations alone are not enough.

Policy malleability. Changing relations between neighbors and organizational characteristics of a neighborhood is awfully difficult from a distance. While individual civic organizations, community centers, churches, and the like may have success, federal and state-level policies should not be expected to dramatically improve the social organization of individual neighborhoods.

Summary. While researchers have increased their focus on the social organization of neighborhoods recently, few articles have examined how this affects academic performance. There is strong theoretical backing behind changing these factors, but doing so will likely prove difficult.

Overall, I rate social organization of neighborhoods thusly:

Empirical Evidence: 1

Theory: 3

Policy Malleability: 1

Total: 5

Implications for research, policy, and practice. In theory, the social organization of a neighborhood may have large effects. In practice, the concept is so nebulous and research so sparse that it remains difficult to reach firm conclusions. As such, the topic deserves further scrutiny by researchers but legislators and practitioners should probably focus limited resources elsewhere while keeping a watchful eye out for the effects of interventions on social ties.

Physical conditions. The fourth, and final, factor intertwined with disorder, crime, violence, and social organization are the physical conditions of a neighborhood and its housing. The relationships between these four are fairly well-established, though sometimes lacking in detail and clarity.

***Links to* poverty**. Much the same as those previously discussed, the physical condition of housing and other buildings depresses home prices in a neighborhood, leading to neighborhoods stratified by income and physical condition. Additionally, lower-income residents are less able to pay to fix problems, more likely to rent (leaving responsibility to the landlord), and live in neighborhoods with less local tax revenue, all of which combine to reduce spending on physical maintenance of buildings.

Empirical evidence. One study found that parental perceptions of neighborhood distress (e.g. abandoned/run-down buildings, crime, and violence) predicted school problems of their adolescent children (S. A. Meyers & Miller, 2004). Another found that residence in better

quality neighborhoods (again, using abandoned/run-down buildings, crime, and violence in addition to the degree people cared about what happened in the neighborhood) predicted reading achievement, but not math achievement, of Latino students (Eamon, 2005). And a third found that poor physical conditions reduced achievement progressively more as students moved from 1st to 8th grade (Woolley, et al., 2008). Together, these studies offer a wide range of evidence that any number of physical conditions likely matter, but little indication as to which ones matter most.

Theory. Theories behind these relationships tend to focus on stress. One study found that neighborhood deterioration predicted stress, depressive symptoms, and well-being because better conditions increased social contact and social capital while reducing fear of crime (Kruger, Reischl, & Gee, 2007). As previously discussed, another theory is that more problems and fewer resources may distract parents and reduce both productivity and the degree they can care for their child (Banerjee & Mullainathan, 2008). Physically deteriorated houses may also expose children to contaminants, increasing asthma and other health problems (E. Rosenbaum, 2008). In a different vein, a neighborhood's physical condition may influence the way that Principals and teachers interact with local communities (Cohen-Vogel, Goldring, & Smrekar, 2010). And a forthcoming study using longitudinal data finds that poor housing quality is associated with poorer emotional and behavioral functioning and cognitive skills (Coley, Leventhal, Lynch, & Kull, in press). The broad range of outcomes associated with physical conditions could indicate that they systemically affect multiple areas of people's lives or just that the research is scattered and has not yet reached a consensus.

One limitation of the research is that different people perceive the same social and physical environments differently. One study found, for example, that White residents perceived the same conditions as worse than Black and Hispanic residents (Schulz et al., 2008).

Another is that the category is broad and includes a myriad of factors that affect children's lives in varying ways and to varying degrees.

Policy malleability. Changing the physical conditions of neighborhoods is conceptually straightforward: renovate and repair buildings, streets, parks, etc. Only money and a dash of political will are needed to complete such projects. Repairing and renovating privately owned homes, though, offers more challenges. Excepting government buyback of homes, policies will need to act indirectly – subsidies, incentives, fines, and so on.

Summary. Similar to many of the above factors, the research is somewhat limited regarding the effects of neighborhood/housing physical conditions on academic performance. Despite the breadth of the category and the limited research, both the empirical and theoretical evidence offer fairly compelling reason to believe that, at the very least, some aspects of the physical condition of the built environment indirectly affect academic performance. And the policy avenues to change are fairly straightforward, though large-scale fixes are costly and wholesale changes of privately owned property will likely take years. Overall, I rate physical conditions thusly:

Empirical Evidence: 2

Theory: 2

Policy Malleability: 2

Total: 6

Recommendations for research, policy, and practice. Researchers should continue to work toward a consensus regarding exactly which conditions affect people in which ways, and until that point legislators and practitioners should probably consider most physical conditions as a secondary objective.

Public housing. When the average citizen thinks of dilapidated housing and neighborhoods with high rates of disorder, crime, and violence and low social cohesion, public housing likely comes to mind. The empirical evidence, however, is not as clear as public stereotypes.

***Links to* poverty**. Though many public housing developments were initially aimed at middle-class residents, most serve low-income residents almost exclusively.

Empirical evidence. Currie & Yelowitz (2000) use an instrumental variables approach to cast some doubt that these developments actually harm children's achievement. Since public housing rules grant separate bedrooms to opposite sex children, families with two boys or two girls were placed in a two bedroom apartment while families with one boy and one girl would be placed in a three bedroom apartment – making the latter more likely to seek residence in a public housing development. The authors exploit this exogenous difference to compare two-child families with same- and mixed-gendered pairs of children and find that families living in public housing reside in less crowded apartments and are less likely to live in large, dense, developments and, perhaps as a result, are 11% less likely to have been held back in school based on child's age and reported school level. On the other hand, cities with more large, dense developments may influence academic performance differently; a research report from New York City (Furman Center & Institute for Education and Social Policy, 2008) found students living in public housing perform noticeably worse on standardized tests than do other students even when controlling for other background variables.

Theory. Many expect that residing in public housing would harm academic performance if the development is crime-riddled, dilapidated, and chaotic. But most developments do not fit these stereotypes.

Policy malleability. Much like physical conditions, moving residents out of public housing is conceptually straightforward – simply bulldoze and current units and lease the land to private developers. In reality, though, this not only presents ethical, financial, and political problems but may result in residents moving to lower-quality housing and/or neighborhoods in which they do worse.

Summary. The stock of public housing, of course, varies widely across the nation – as, most likely, does the experience of the residents who live there. As a result, the sparse evidence that exists indicates that public housing itself is likely not among the main reasons that low-income children perform poorly in school. Overall, I rate public housing thusly:

Empirical Evidence: 0

Theory: 1

Policy Malleability: 2

Total: 3

Recommendations and implications for research, policy, and practice. Researchers should continue to work on isolating the aspects of public housing that influence academic performance (which likely include many of the factors/conditions explored in this chapter). Until that point, legislators and practitioners should probably focus more on community and housing conditions than whether housing is public or privately managed.

Crowding. Another factor closely associated with dilapidated neighborhoods is crowding – both within neighborhoods and within homes.

***Links to* poverty**. Given that Americans tend to value personal space, those with fewer resources can afford to purchase less of it and end up living in closer physical proximity to both other household members and neighbors. As a result, low-income families are many times

more likely to live in crowded homes (more than 1 person per room) and have less space adjacent to their homes and park space available for their use (Evans & Kantrowitz, 2002).

Empirical evidence. A re-analysis of the Kansas Language Acquisition data found that parents in more crowded homes were less verbally responsive to their children and that children's vocabularies grew more slowly as a result (Evans, Maxwell, & Hart, 1999). Another study found that home crowding negatively affected academic performance and classroom crowding impacted both academic performance and classroom behavior (Maxwell, 2003). While both studies are compelling, a broader base of evidence is needed.

Theory. We do, however, have some good reasons to believe that a causal mechanism exists. One study found that crowding leads to unwanted social interaction, which causes psychological distress and harsher parenting techniques (Baum & Paulus, 1987). A recent review of research on housing found considerable evidence that crowding impacted children's health (Leventhal & Newman, 2010) while research in India found that residential crowding not only decreased achievement, but increased both blood pressure and parent-child conflicts (Evans, Lepore, Shejwal, & Palsane, 1998). And a forthcoming paper finds that fewer bedrooms per child in the family home during childhood increases the degree to which adults are prone to inflammation – a major marker of disease risk – later in life (Carroll, Cohen, & Marsland, in press). These indicate that crowding may be a significant source of stress and affect both mood and physical health as a result.

Policy malleability. Crowding may be particularly hard to combat at that macro level (since it would require a considerable increase in built housing) – though a recent study did find that housing voucher recipients moved to less crowded homes (Lindberg et al., 2010).

Summary. The research base on crowding is even less well-developed than those on other related factors. The empirical evidence is extremely limited, though the theory is more

developed with the most likely pathway being that crowding impacts students through increased stress and decreased health – though it may also affect social relationships. Overall, I rate crowding thusly:

Empirical Evidence: 1

Theory: 2

Policy Malleability: 1

Total: 4

Recommendations for research, policy, and practice. Overall, it seems likely that crowding contributes to the achievement gap but that the effects are probably mostly small and indirect. As such, researchers need to determine both the magnitude of the effects and mediators between crowding and school success. Legislators and practitioners should probably avoid massively expensive interventions to expand the size of houses and apartments but should explore ways to make tighter confines less stressful (e.g. placement of walls, windows, access to open areas, etc.).

Noise. The final neighborhood-level stressor I discuss is noise. Research on noise has been largely confined to a small sub-field and ignored by education researchers.

***Links to* poverty**. The noisiness of highways, airports, train tracks, factories, and other features reduce the desirability of a neighborhood and depress local home prices. As a result, lower-income children are more likely to live in noisier environments than their better-off peers (Evans & Kantrowitz, 2002), which research has long found increases stress (D. C. Glass & Singer, 1972).

Empirical evidence. This can be seen both at home and in schools. One study in New York City compared students on the side of a school right next to elevated train tracks and found

that they performed worse than those on the opposite, quieter, side of the school. After installing noise dampening devices on the tracks and heavy insulation in the ceiling, noise was reduced and test scores were equal the following year (Bronzaft, 1981), though methods were shaky – mostly relying on the word of principal that students were comparable across years. A similar forthcoming article finds evidence that attending school near London's Heathrow Airport (resulting in more airplane noise in the classroom) negatively affects reading comprehension six years later (Clark, Head, & Stansfeld, in press).

Theory. Other studies have found associations between levels of noise and language acquisition (Evans & Maxwell, 1997) and reading ability (Maxwell & Evans, 2000). One study used apartment buildings next to highway buildings to study the effect of household noise on children's verbal abilities (S. Cohen, Glass, & Singer, 1973); higher floors were less noisy and, controlling for other background factors, the children that lived there also scored higher on assessments of both their auditory perception and verbal achievement.

Studies on the effects of noise exposure also found that students exposed to more noise exhibited higher blood pressure and shorter attention spans (S. Cohen, Evans, Krantz, & Stokols, 1980) in addition to more socio-emotional problems (Evans & English, 2002) and that neighborhood noise predicted more feelings of powerlessness (Ross, et al., 2001).

Empirical evidence. The ability to reduce noise will vary widely across different environments. Not many local governments, for example, will want to close an airport to reduce background noise for nearby neighbors. Other public projects, like highways, can be built with more noise-reducing features and, in some cases, farther from homes, and building codes can be changed for homes in noisy areas to require more noise-dampening insulation, but most policies will lead only indirectly to small changes in noise levels.

Summary. Again, it seems unlikely that noise has direct and large effects in most instances on academic performance, but extreme cases certainly merit further attention – as do the possible socio-emotional consequences of noise exposure. Overall, I rate noise thusly:

Empirical Evidence: 1

Theory: 2

Policy Malleability: 2

Total: 5

Recommendations for research, policy, and practice. While the direct effects may not be large for most students, however, the fact that noise is tangible, easily measurable, and sometimes easily reduced makes it a prime candidate for social policy intervention. As such, researchers should strive to learn what levels of noise have small and large effects while legislators and practitioners should probably make noise a secondary priority in all but the worst cases.

Homeownership. While neighborhoods matter, clearly not all neighbors achieve equally. One difference between residents of the same neighborhood is renting versus owning a home. Legislators from across the political spectrum often see homeownership as a worthwhile aspiration for virtually all Americans, and homeownership rates across the country have steadily risen over the past century (A. F. Schwartz, 2010).

***Links to* poverty**. Owning a home requires a good bit of financial wherewithal, so homeownership rates vary widely between classes. On average, homeowners make roughly twice as much money ($64K vs. $33K), possess fifty times as much wealth ($243K vs. $5K), and are more than three times less likely to be in poverty than renters (A. F. Schwartz, 2012).

Empirical evidence. Multiple studies find a positive relationship between homeownership and academic performance, even after accounting for other variables. Partially as a result of these changes in behavior, they find the children of homeowners may stay in school longer and be less likely to become pregnant as a teenager (Green & White, 1997). Aaronson (2000) and others argue that part of the explanation may be family characteristics that are associated with homeownership, but even after controlling for these he still finds argues that homeownership makes a significant contribution to achievement due to increased residential stability. After becoming homeowners, families may experience better home environments, fewer child behavior problems, and have children with higher cognitive achievement (Haurin, Parcel, & Haurin, 2002). More recent studies, however, question these earlier results and find no statistically significant impact of homeownership on achievement when using quasi-experimental research designs (See, for example: Barker & Miller, 2009; Holupka & Newman, 2012; Mohanty & Raut, 2009). The mixed evidence muddies the water on the issue.

Theory. Why the relationship? Homeownership may produce positive externalities, as homeowners subsequently experience higher incomes later in life (Di, 2007); invest more in social capital (DiPasquale & Glaeser, 1999); have higher rates of political engagement (Engelhardt, Eriksen, Gale, & Mills, 2010); save more money (Grinstein-Weiss, Key, Guo, Yeo, & Holub, 2011); move less frequently (See, for example: Galster, Marcotte, Mandell, Wolman, & Augustine, 2007; Holupka & Newman, 2012); have higher expectations for the future (Elliott, Kim, Jung, & Zhan, 2010); have higher self-esteem (Balfour & Smith, 1996); focus more on the future (Michael Sherraden, 1991); often move to better neighborhoods (A. M. Santiago et al., 2010); and live in homes in better physical condition (Spivack, 1991). The evidence on residential stability, community engagement, home environment, and asset-building are

particularly compelling and merit attention on their own, but the possible effects of homeownership on future orientation, personal status, expectations/aspirations, and physical housing conditions make homeownership that much more interesting.

Policy malleability. The tangibility of homeownership makes it easy target, but short of giving homes to people the path can be long and winding. Options include incentivizing saving with Individual Development Accounts (Grinstein-Weiss, Chowa, & Casalotti, 2010) which has increased saving among participants (Grinstein-Weiss et al., 2009); building more affordable owner-occupied homes – which could follow various models, including New York City's (Chellman, Ellen, McCabe, Schwartz, & Stiefel, 2011), Montgomery County, Maryland(H. L. Schwartz, 2010), Habitat for Humanity, or HOPE VI (Turner, 2009); offering homeownership and financial management classes – one study found that pre-purchase homeownership counseling reduced the rate of mortgage delinquency at day 90 by 19% overall and by up to 34% in the most effective programs (Hirad & Zorn, 2001); and offering mortgage assistance.

Summary. Overall, the empirical evidence is mixed but the theory is strong. The effects of homeownership are tough to disentangle, but we have strong reason to believe that homeownership affects a wide array of factors associated with academic performance even if the effects may not be immediate or direct. Overall, I rate homeownership thusly:

Empirical Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations for research, policy, and practice. Increasing homeownership rates among lower-income families, of course, is no panacea – as evidenced by the recent sub-prime mortgage crisis. Researchers should continue to investigate the long-run and indirect

consequences of homeownership with a particular emphasis on before-and-after studies of people who purchase homes and longitudinal analyses of interventions and policies designed to encourage homeownership. Practitioners and legislators have every reason to believe that a primary focus on homeownership will yield benefits but, given the mixed research results, should keep an eye on the factors above rather than making homeownership the sole goal.

Mobility and homelessness. The most compelling evidence regarding possible effects of homeownership is regarding increased residential stability. Mobility is widely studied, often in tandem with homelessness (partly because homelessness is most frequently experienced by those who are highly mobile and partly because mobility often leads to homelessness). Indeed, the effects can be tough to disentangle.

***Links to* poverty**. The largest contributing factor to homelessness and mobility is the ability to afford a residence, so higher-income families are of course less likely to be affected than low-income families.

Empirical evidence. One study of homeless children found that that mobility negatively impacted achievement while homelessness did not (Buckner, Bassuk, & Weinreb, 2001). Another review, however, finds that homeless children's lives are similar to other low-income children's lives in all areas except for residential mobility and isolation (P. M. Miller, 2011).

Mobility may have particularly strong effects on children earlier in life, though children also tend to move less frequently as they grow older (G. M. Ingersoll, Scamman, & Eckerling, 1989). One study finds that moving to different residences as a child decreases the odds of high school completion (Haveman, Wolfe, & Spaulding, 1991). Another finds that student mobility harms not only their own achievement but the achievement of their school peers (Hanushek, Kain, & Rivkin, 2004). A forthcoming study of homeless and highly mobile students found that

about half seemed quite resilient and performed no differently than their peers, but that overall math and reading achievement were lower (Cutuli et al., in press). And a review of six neighborhood factors found that residential mobility was the most strongly related to academic performance (Leventhal & Newman, 2010). Together, they offer compelling evidence that children who move frequently perform worse in school.

Empirical evidence. Disentangling the causes of mobility from its effects is difficult (e.g. whether a child struggles because they moved so often or because of the financial and other issues that led to them moving so often), but a range of studies offer evidence of multiple pathways through which mobility and homelessness could influence academic performance. One study found that homelessness increases stress and depression in mothers (Banyard & Graham-Bermann, 1998). Another study found that housing uncertainty reduced patience in children and speculated that the increased preference for short-term benefits could lead to higher drop-out rates (Anil, Jordan, & Zahirovic-Herbert, 2011). A study of children's executive function skills found that they are even more important when predicting the success of homeless and highly-mobile children than other children (Masten et al., 2012), which aligns with a forthcoming study that finds that, among poor children, moving three or more times in the first five years of life significantly increases attention problems and internalizing/externalizing behavior associated with behavior problems (Ziol-Guest & McKenna, in press). And a recent review of the research finds evidence the homelessness (which affects over one million children) negatively affects physical and mental health in addition to academic achievement (Tobin & Murphy, 2013). Together, the studies offer compelling evidence that mobility and homelessness affect families and children in ways that make sense on face – it is hard to imagine either not being destabilizing, stressful, and even humiliating.

Policy malleability. Fighting homelessness is conceptually straightforward – make sure families have a place of their own to live – but practically difficult. Providing more shelters and/or public housing is one (potentially costly) option, but some families may prefer to stay with relatives or find their own way instead.

Summary. Overall, there is fairly solid evidence that mobility negatively affects many children – though it remains unclear exactly what effects homelessness has on top of the mobility piece. Indeed, the effects of homelessness seem to vary widely depending on the student and the context – which makes sense given the wide spectrum of homelessness experienced by children ranging from living in parks to relatives' homes for a few days or over the course of many years. Overall, I rate homelessness/mobility thusly:

Empirical Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations for research, policy, and practice. More research is needed to disentangle the effects of mobility versus homelessness and the differential effects of different types of mobility and homelessness on different children. Nonetheless, even if mobility is the real driver of negative effects, reducing homelessness would simultaneously reduce mobility. Given the empirical evidence and well-supported theory, mobility and homelessness certainly deserve a spot near the top of the list of factors researchers should investigate and practitioners and legislators should seek to address – particularly since current policy seems to only address the needs of small sub-groups of homeless families (Shelton, Mackie, van den Bree, Taylor, & Evans, 2012).

Discussion. Considerable evidence exists that neighborhood and housing factors/conditions affect children's academic performance through a variety of pathways that align with the theories discussed earlier and should be taken into account by legislators and practitioners and investigated further by researchers. A few trends emerge across the factors and conditions reviewed above.

We should be concerned about the stressors to which students are exposed. Research on disorder, crime, violence, noise, crowding, physical conditions, and mobility all consistently find that children reacted to elevated levels of these factors in ways consistent with stress reactions, including worsened physical and mental health, reduced non-cognitive abilities, and increased behavior problems. One rule of thumb when designing housing and neighborhood interventions should be that reducing stressors is likely to produce positive outcomes.

We should also be concerned with the normative behaviors to which students are exposed in their neighborhoods. In housing policies designed to move students to lower-poverty neighborhoods, new residents likely see more employed neighbors and fewer who engage in illicit activities than residents in many impoverished neighborhoods. Since seeing rules broken can encourage people to break other rules (Keizer, et al., 2008), it stands to reason that seeing fewer rules broken may also lead residents to comply with other rules (e.g. paying attention in class or completing homework). Exposure to more socially responsible behavior may positively influence the aspirations of child residents; in an extreme case, it may mean that a child who previously idolized a drug dealer now idolizes a nurse or police officer. It may mean that graduating from high school and attending college is seen as something that most people tend to do and to which a child should aspire. In this sense, the isolation described by the "culture of poverty" theorists can reduce aspirations. Five years after the conclusion of the New Hope project, the treatment group children were still significantly more optimistic about their

future, and boys had significantly higher expectations for their academic performance (Huston, et al., 2008). Housing changes may affect students similarly.

And we should be concerned with how residents relate to/with their neighbors. Research on the social organization of neighborhoods, homeownership, and mobility all find largely positive effects of increased communication and cooperation between residents of a neighborhood. Increased residential stability and decreased disorder, violence, and crime likely lead more neighborhood stability and interaction and a subsequent increase in social capital. Neighborhoods in which people know each other and look after each other likely foster children who grow up with healthier habits and a more positive outlook on life.

Research on these topics should also consider two ideas currently absent from most research linking neighborhoods and housing with academic performance and related outcomes.

First, when investigating neighborhood effects we would do well to remember that a family's social network is only loosely coupled with their neighborhood. As such, we should not expect to find large effects, in most cases, of the immediate neighborhood in and of itself. Nor should we interpret small or null results when measuring neighborhood influences as evidence that the environment and context in which a child grows up does not matter. As Bronfebrenner and others argue, the most immediate relationships for a child are not just the people in their neighborhood but the people in their family, their church, their school, and so on. The conditions and people involved with these institutions should be taken into account when measuring the influence of immediate surroundings on children.

Second, almost none of the research above examines policy interventions or before-and-after exposure to the various factors/conditions. The vast majority of the research is cross-sectional and the longitudinal research usually just measures children over time rather than children who change living conditions. In some of the cases above, significant interventions

already exist (e.g. homeownership programs and homeless shelters) that scream for program evaluations that investigate their effects on academic performance.

Together, the evidence and theory on housing and neighborhood factors/conditions paint a picture of a complex relationship between place and student performance. None of the factors/conditions above are likely to result in immediate, large, and direct improvements for most children, but all merit further investigation by researchers and attention from legislators and practitioners. Given the indirect and intertwined relationships, all three groups may want to consider neighborhoods and housing more holistically when conducting research and designing or implementing policy or interventions. Given limited resources and attention, however, that will not always be possible. In such cases, an evaluation of the empirical evidence, theory, and policy malleability find strong support that policy aimed at homeownership, homelessness/mobility, and crime/violence can narrow the achievement gap and merit direct attention; moderate evidence that policy aimed at disorder, social organization, physical conditions, and noise can do the same and merit secondary consideration; and little evidence that public housing should receive significant individual attention – though attributes of different developments certainly deserve further scrutiny.

Health and Health Care

A wide body of literature consistently finds that those who with fewer financial resources experience far more health problems; from asthma to zinc deficiency (see, for example: Egbuonu & Starfield, 1982; Kelly, Madeleine, Carolyn, Tod, & Raoul, 2006; E. Rosenbaum, 2008). Indeed, the most convincing section of Rothstein's (2004) book is his writing on health and academic performance. Other attempts to identify health problems disproportionately affecting poor and minority children that also influence achievement have

focused on specific diseases and narrow problems like lead poisoning, ADHD, asthma, and breakfast consumption (Basch, 2010; Currie, 2005), but I focus on larger issues and umbrella issues that cause or encompass these diseases and narrower problems.

Reviews have found that SES is associated with a wide range of health and socio-emotional outcomes in children (R. H. Bradley & Corwyn, 2002); that the links between SES and child health likely play a role in the intergenerational transmission of status (Currie, 2009); that both poverty and inequality negatively impact children's health (Feudtner & Noonan, 2009); and that the most recent evidence supports links in both directions between health and education (Eide & Showalter, 2011). Forthcoming research finds that inequality of health outcomes and mortality rates have not changed in the past century (Haines, In Press). And one estimate is that as much as one-quarter of the school readiness gap between Black and White children may be explained by health (Currie, 2005). Plus, health does not only affect academics; effects of poor health continue past school and affect employment and earnings later in life (Haas, Glymour, & Berkman, 2011).

The impacts of poverty on health and health on education are complex and follow multiple pathways (McLoyd, 1998). At the neighborhood level, neighborhoods with more cohesion and with community health care options fostered better health (Aysola, Orav, & Ayanian, 2011) as did higher rates of social capital (Carpiano, 2006) and more collective efficacy (Sampson, 2003). Physiologically, more time spent in living in poverty earlier in life was associated with more inflammation later in life (Carroll, et al., in press). And in the long-run, every 10 percentage points above a 20% poverty rate in a neighborhood in which one resides increased the odds of mortality by 89% (Do, Wang, & Elliott); likely because neighborhood disadvantage is significantly associated with multiple biological risk factors (King, Morenoff, &

House, 2011). A review of international research on urban kids finds similar results (De la Barra, 1998).

As the section unfolds, the reader will see that a wide number of health conditions are both disproportionately experienced by lower SES families and – to varying degrees of certainty – linked to academic performance. Below, I explore the factors/conditions that receive the most attention in the research literature.

Nutrition. As Americans' health has worsened in recent decades, attention has increasingly been directed to our diet.

***Links to* poverty**. Studies have found that low-income families in areas with low access to food stores purchase fewer fruits and vegetables (Kyureghian, Nayga, & Bhattacharya, 2013); that diets high in sweets and fats cost less than those high in fruits and vegetables (Drewnowski, Darmon, & Briend, 2004); and that changes in income result in the purchase of higher-quality vegetables (Kuchler, 2011) – all of which are important findings given the significant role fruit and vegetable consumption plays in psychological well-being (Blanchflower, Oswald, & Stewart-Brown, 2012). This has led to a call for educational researchers to pay more attention to the food served in schools (Weaver-Hightower, 2011) – which makes sense, but we should remember that most students consume far more food outside of school than inside.

Empirical evidence. One recent study, controlling for student background by using propensity score matching, found that inner-city students who consume fast food at least four times per week score a full one-half of a standard deviation lower in both math and reading than those who eat fast food 0-3 times per week (Tobin, 2013). Another study found that the nutritional quality of children's breakfast predicted reading and math scores independent of SES

(O'Dea & Mugridge, 2012). Indeed, a review of the literature found strong evidence of a link between breakfast and academic achievement for low-income children (Basch, 2010).

Theory. A number of studies have linked various nutritional factors with lower cognitive functioning – from iron deficiency (Halterman, Kaczorowski, Aligne, Auinger, & Szilagyi, 2001) to breakfast consumption (Kleinman et al., 2002; J. M. Murphy et al., 1998).

In another study, (Schoenthaler, Amos, Eysenck, Peritz, & Yudkin, 1991), students in New York City were given vitamin-mineral supplements or placebos in different amounts. Students who were given the vitamin-mineral supplements performed significantly better on IQ tests, and students who received larger doses performed better than those who received smaller doses. Over the years, this study and other similar trials were the subject of much scrutiny. A larger, double-blind study using vitamin/supplements and placebos replicated the consistent finding that students taking the supplement gain about three additional IQ points over a three month period (Schoenthaler, Bier, Young, Nichols, & Jansenns, 2000).

In terms of figuring out why and how nutrition affects academic performance, most studies have focused on cognitive function; a review of the literature on the influence of children's diet on their cognition found plentiful evidence that "diet can influence the development and functioning of the brain" (Benton, 2008, p. 25).

It stands to reason that those who are hungry or malnourished will not perform as well as those who are not, but the impact of nutrition on performance likely extends to consumption of particular vitamins and minerals, processed foods, fresh fruits/vegetables, and the timing of consumption (e.g. eating breakfast). A growing body of literature details the ways in which poverty impacts these choices and how these choices impact children's physical and emotional well-being and ultimately their academic performance.

Policy malleability. Beyond income, nutritional choices are affected by what is available in school, in the neighborhood, what children see on TV (Wiecha et al., 2006), and myriad other factors. School health programs have had some success improving nutrition (N. G. Murray, et al., 2007), but people can be stubborn about what they eat. In one experiment, for example, students were either told that they should eat more fruit, told that that their friends eat lots of fruit, or told nothing; those who were told to eat more fruit actually reported eating less fruit than the control group (though, in reality, consumed similar amounts), while the students who were told that their peers eat lots of fruit consumed significantly more (Stok, de Ridder, de Vet, & de Wit, 2013). Changing not only the purchasing habits but the consumption habits of families, yet alone their children, is likely tricky for large-scale policy to accomplish but there is much that individual schools, organizations, and communities can do to improve nutrition.

Summary. Significant details are missing regarding exactly which aspects of nutrition are most important, and changing eating habits may be particularly hard, but we have enough empirical evidence to proceed, particularly given the strong theory backing this evidence. Overall, I rate nutrition thusly:

Empirical Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations for research, policy, and practice. The moderately strong evidence and very strong theory in addition to the ease with which one can grasp the topic make nutrition deserving of more attention when studying and trying to narrow the achievement gap. As such, researchers should focus both on figuring out which aspects of nutrition matter and how change

those consumption habits while legislators and practitioners should make healthier eating in general a focus of interventions designed to narrow the achievement gap.

Physical fitness. A wide body of literature links physical activity and physical fitness with race and income and, increasingly, cognitive performance.

***Links to* poverty**. A study of different types of populations in the U.S. found that lower-income and urban residents exercised far less than higher-income and suburban residents and reported fewer parks and other places to work out nearby (Parks, Housemann, & Brownson, 2003). A study in England observed more than four times as many adults running in a high-SES neighborhood as in a low-SES neighborhood (Nettle, 2011). While team sports are often available in low-income areas, fitness centers and activities requiring specialized facilities (e.g. swimming or golf) are less common (Saint Onge & Krueger, 2011).

Empirical evidence. A number of small-scale studies have examined how these fitness discrepancies might impact achievement discrepancies. A study of 3rd and 5th graders in Illinois found that higher aerobic fitness and lower BMI were associated with higher achievement scores in math and reading (Castelli, Hillman, Buck, & Erwin, 2007). A study of 4th, 6th, and 8th graders in Massachusetts found that those who passed more physical fitness tests were more likely to pass state reading and math tests (Chomitz et al., 2009). A study of 5th graders found that aerobic capacity significantly predicted academic achievement on state tests in four subjects independent of BMI and demographic factors, but that the correlation between other measures of fitness (e.g. abdominal strength and flexibility) and achievement disappeared after controlling for other factors (Wittberg, Northrup, & Cottrel, 2009). And researchers in other countries have reached similar conclusions: for example, a study of 9th grade students in Sweden found that academic achievement was positively associated with physical activity and

fitness for girls and with physical fitness for boys (Kwak et al., 2009). While the studies are mostly small, as a body the wide range of studies offer compelling evidence that *something* about fitness matters.

The topic has received increasing attention the past decade, and reviews of the research have reached different conclusions as time has passed and evidence has accumulated. An earlier review concluded that there was solid evidence regarding physical activity's impact in the short-run but little evidence of long-run effects on academic achievement (Taras, 2005). A few years later, another review of the research cautioned that while positive associations exist between physical fitness and both academic achievement and cognition, the studies were mostly correlational and provide only weak evidence that an intervention the increased physical fitness would subsequently increase academic performance (Keeley & Fox, 2009). Two reviews conducted the next year concluded that there is mounting evidence that physical activity is positively associated with academic performance (Trudeau & Shephard, 2010) and that an "emerging literature" supports various ways that physical activity and fitness can impact cognitive function and educational outcomes (Basch, 2010). And the most recent review compiled 125 studies – 53 of which were from the past 5 years – and found both that the majority find positive effects of physical activity on factors related to academic achievement and that methodology has improved in recent years (Howie & Pate, 2012). The differing conclusions over time are consistent with both confusion regarding exactly what about fitness impacts academic performance in what ways and with a nascent and developing field of research.

Theory. Why the link? A review of the psychological literature on both animal and human research concludes that exercise enhances children's executive function (Tomporowski, Davis, Miller, & Naglieri, 2008). Indeed, studies have found that children with higher aerobic capacity perform better on tests of executive control (Hillman, Buck, Themanson, Pontifex, &

Castelli, 2009) and that more physically active children demonstrate more attentional control (Winneke, Godde, Reuter, Vieluf, & Voelcker-Rehage, 2012) . Indeed, a recent meta-analysis of the research finds consistent evidence of positive effects of acute physical exercise on executive functions (Verburgh, Königs, Scherder, & Oosterlaan, 2013).

This is likely rooted in physiological changes. A study of mice found evidence that physical activity spurred biogenesis, which is directly related to the functioning of the nervous system (Steiner, Murphy, McClellan, Carmichael, & Davis, 2011); this aligns with a study of children that found those with the highest levels of fitness had the most cognitive control, indicating the highest-functioning neural networks (Voss et al., 2011). A review of the research finds promising evidence that, due to the effect on neural functioning, exercise programs may be positive interventions for children with ADHD (Berwid & Halperin, 2012). Given the evidence of aerobic exercise on neural functioning, a new study using rats tested whether resistance exercise had similar effects and found that it does – observing improved spatial learning and memory after 8 weeks of training (Cassilhas et al., 2012). A recent review finds evidence from neuroimaging studies that physical activity improves brain structure and function but also may decrease drug usage (Hillman & Drobes, 2012). In short, physical activity and fitness improve overall physiological functioning in myriad ways and this improved functioning should improve brain functioning and behavior in ways that increase learning.

Lastly, activity and fitness may promote not just cognitive functioning, but psychosocial functioning. A forthcoming study finds that girls who engaged in high levels of physical activity had higher self-efficacy, felt more supported by friends and family, and practiced better self-management strategies (Taverno Ross, Dowda, Beets, & Pate, in press).

Policy malleability. While increasing physical fitness can be very difficult, it also may be easier for schools and communities to envision small, tangible steps they can take. The most

obvious step for schools to take is to increase physical education time: indeed, a recent analysis found that girls who spent more time (70-300 minutes/week) in physical education while in school outperformed those who spent less (0-35 minutes/week) (Carlson et al., 2008) and an earlier experiment found that a doubling of physical education time yielded higher test scores (Sallis et al., 1999). Another school-based intervention offered children the opportunity to win prizes if they walked or rode their bikes to school and observed a 16% increase in bike ridership (Cuffe, Harbaugh, Lindo, Musto, & Waddell, 2012). Outside of school changes, though, will likely prove more difficult.

Summary. Overall, both the evidence and theory supporting the notion that physical activity and fitness improve academic performance are quite solid, but significant gaps in knowledge remain. The dosage and type of activity certainly matters, for example, and we need to know when returns to fitness are at their peak in order to efficiently allocate time and resources. Overall, I rate physical fitness thusly:

Empirical Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations for research, policy, and practice. Researchers should focus on learning exactly what types of activities and which attributes matter most – and to what degree – in addition to examining both the efficacy of programs designed to increase activity/fitness and the trade-offs of spending more time in, say, gym class than math class. Legislators and practitioners should make increased physical activity and fitness a major focus of interventions, but not at the expense of all other factors – it would certainly be a mistake, for example, if a

summer program aimed to improve achievement solely by putting kids through aerobics all day without addressing nutrition or other areas of health yet alone cracking open a book.

Obesity. Recently, public attention has increasingly focused on the fast-rising obesity rates in the United States. Given that nutrition and physical fitness both seem to influence academic outcomes, there is reason to suspect that obesity (which is closely related to the two) may as well.

***Links to* poverty**. The evidence that obesity hits high-poverty areas harder, however, is mixed. An earlier paper noted that children were four times more likely to be classified as overweight in 2000 as they were in 1965, but found no evidence that poor children were more likely to be overweight (Hofferth & Curtin, 2005). More recent research, however, found that BMI was negatively correlated with income for all demographic groups of students other than Black males (Murasko, 2011) and that family poverty, parental education, and school-level poverty all predict obesity in students (Martin, Frisco, Nau, & Burnett, 2012).

Neighborhood research, meanwhile, suggests that inner-cities are hit disproportionately by obesity (Lopez & Hynes, 2006); that those who express more concerns about neighborhood safety are more likely to be obese (D. Duncan, et al., 2009); and that neighborhoods with fewer supermarkets/food stores and fitness facilities, more commercial land usage, and lower income experience more obesity (Black, Macinko, Dixon, & Fryer, 2010). Similarly, one study finds that each additional Wal-Mart constructed per 100,000 residents raises obesity rates by 2.3 percentage points and may account for over 10% of the rise in obesity over the past 25 years (Courtemanche & Carden, 2011); while Wal-Marts are not concentrated in the inner-city, businesses that sell similar goods may have similar effects. And another study found that

students who participated in organized summer activities (versus remaining in parent care) were less likely to become obese the following year (Mahoney, 2011).

Empirical evidence. The evidence regarding obesity's impact on academic performance is similarly mixed. Numerous studies find an association between obesity and academic performance, but obesity may not be the real driver. One study finds that children's weight was negatively associated with their reading, math, and science scores, but that the relationship disappears after controlling for fitness, blood pressure, and demographic factors (Cottrell, Northrup, & Wittberg, 2007). Another study using instrumental variables finds that a one standard deviation weight gain (25-30 pounds) is associated with a 4-5 percentile point lower GPA among 14-17 year-old white females, but finds little evidence of a relationship among other groups (Sabia, 2007). Another study found that overweight students earned lower grades (.4 GPA points), earned lower reading scores, attended school less frequently, earned more detention, participated in fewer sports, and were less fit – but they used fitness as an outcome variable rather than controlling for it (Shore et al., 2008). A study of West Virginia, meanwhile, finds relationships between obesity and reading proficiency in high-poverty districts, but not in other districts (Gurley-Calvez & Higginbotham, 2010). And a study in South Carolina finds no relationship between obesity and test scores after controlling for SES (Baxter, Guinn, Tebbs, & Royer, 2013).

Theory. Evidence regarding a possible causal mechanism linking obesity and academic performance is somewhat sparse. One study finds that obesity was negatively related to reaction time and an overall decreased ability to exercise cognitive controls, but nutrition and fitness levels were not examined as possible mediators (Kamijo et al., 2012).

Policy malleability. Altering obesity may prove even tougher than changing nutrition or physical fitness since one can change one and compensate by changing the other (e.g. exercising

more but also eating more). Policies aimed at changing either are likely to have positive effects, though (even if they do not change obesity). Increasing time spent in physical education, for example, reduced BMI increases in girls between kindergarten and first grade in one study (Datar & Sturm, 2004).

Summary. Overall, the evidence points toward fitness and nutrition as the real drivers of academic performance rather than obesity. Indeed, many in the medical community are starting to recognize obesity as a *symptom* (often of metabolic syndrome) rather than a problem in and of itself. Overall, I rate obesity thusly:

Empirical Evidence: 1

Theory: 1

Policy Malleability: 1

Total: 3

Recommendations for research, policy, and practice. Functionally, it may not really matter whether obesity is affecting academic performance independent of fitness and nutrition since interventions aimed at reducing obesity would almost certainly aim to increase physical fitness and/or nutrition in order to accomplish this. In other words, trying to reduce obesity will likely yield positive results.

There are, however, social dynamics worth considering: obesity may be "contagious," according to one study that finds that students' behaviors are altered by their friends' obesity-related behaviors (exercising, playing sports, watching TV, playing video games, sleep deprivation, breakfast consumption, fast food consumption, fruit/vegetable consumption, and calorie-dense snack consumption) (Ali, Amialchuk, & Heiland, 2011). In this sense, interventions aimed at reducing obesity, or improving nutrition/fitness, should take students' relationships

into account. It is also possible that obesity affects self-image and psychological well-being in ways that negatively impact performance.

In the end, obesity itself is probably not a significant driver of the achievement gap, but reducing obesity may still be a worthy goal – and may necessitate addressing sleep and stress in addition to nutrition and fitness. As such, researchers should continue to try to disentangle the effects of obesity from those of nutrition and fitness while also investigating the outcomes of interventions aimed at reducing obesity while legislators and practitioners should probably proceed with interventions aimed at obesity with the caveat that they keep an eye on fitness, nutrition, and other factors rather than making obesity reduction the sole goal.

Mental Health. Given the evidence above regarding the relationship between poverty and both stressors and cognitive functioning, it makes sense that mental health would also be a concern.

***Links to* poverty**. Indeed, a bevy of evidence exists tying poverty, neighborhoods, and environmental conditions with mental health of both mothers and children. At the individual level, a longitudinal study found that whether and how long children had lived in poverty predicted trajectories of mental health and antisocial behavior (McLeod & Shanahan, 1996). At the neighborhood level, a study of 3-year olds across 8 cities found that living in neighborhoods with higher poverty rates led to less social support and less effective coping strategy usage among mothers (Klebanov, Brooks-Gunn, & Duncan, 1994) and a forthcoming study finds that neighborhood poverty and unemployment rates led to lower social support and perceptions of neighborhood cohesion, which then led to greater internalizing symptoms among adolescents (Hurd, Stoddard, & Zimmerman, in press). Another study found that physical deterioration in neighborhoods decreased social capital and contact and increased perceptions of crime, which

led to more stress depressive symptoms (Kruger, et al., 2007) and physical conditions of the housing in which one lives may also influence mental health (Evans, Wells, & Moch, 2003). Lastly, an evaluation of experimental evidence from MTO found that those who moved to lower-poverty neighborhoods experienced significant gains in mental health and subjective well-being despite not seeing many other economic and educational gains (Ludwig et al., 2012).

Empirical evidence. Research on mental health problems tends to focus more on its causes than its educational outcomes, perhaps because it seems so obvious that negative consequences *must* follow. Multiple studies do, however, find effects of mental health issues on students: one study found that adolescent depression increased the risk of underachievement (Ferguson & Woodward, 2002); a longitudinal study that tracked students from 1st grade through 12th grade found that mental health significantly predicted GPA trajectories (Gutman, Sameroff, & Cole, 2003); and a study of college freshmen found that social support and coping strategies significantly predicted college GPA and retention (DeBerard, Spielmans, & Julka, 2004).

Theory. The "why" part of the relationship between mental health and academic outcomes is more readily apparent in many cases – students who are struggling with major mental health issues will tend to be distracted and generally function at a lower level. The relationship between maternal mental health and children's academic performance is slightly more complex. One study found that mothers' use of coping strategies significantly predicted home learning environment and home physical environment and that mothers' social support predicted home learning environment (Klebanov, et al., 1994). Maternal depression and perceived emotional support also significantly predicted child behavioral problems in another study (Leadbeater & Bishop, 1994). It stands to reason that if mothers are distracted and functioning at a lower level that this would impact children – altered parenting techniques,

reduced focus on home environment, and strained parent-child relations can all lead to negative experiences for children.

Policy malleability. Large-scale interventions to improve maternal and child mental health may be even harder to implement than interventions designed to address other factors/conditions discussed in this chapter – particularly given the widely varying conditions and causes of those conditions across the population. Taking small steps to reduce disorder, violence, and stress and improve home environments and parent-child relations will likely help, but sending teams of therapists into homes and schools may be beyond the scope of what many legislators are willing to undertake.

Summary. Overall, the evidence is very solid that poverty impacts mental health; that mental health impacts academic performance; and that we have identified multiple causal mechanisms that form a working theory to explain this relationship. Overall, I rate mental health thusly:

Empirical Evidence: 2

Theory: 2

Policy Malleability: 2

Total: 6

Recommendations for research, policy, and practice. Researchers should focus on learning which aspects of mental health most affect academic performance in addition to assessing the efficacy of large-scale interventions while legislators and practitioners should make mental health a major emphasis of interventions – but probably should not count on anything other than personal relationships showing dramatic results.

Prenatal care. Lower-income families are less likely to have health insurance and access to medical facilities, reducing the quality of prenatal care they receive.

***Links to* poverty**. It has long been known that prenatal conditions affect child development and life outcomes, including: smoking (Rantakallio, 1983), air pollution (Currie, 2011; Maisonet, Correa, Misra, & Jaakkola, 2004) substance abuse (Yumoto, Jacobson, & Jacobson, 2008), and other factors – and the evidence of such relationships has gotten stronger over time as new people (particularly economists) have used new methods to test earlier findings (Almond & Currie, 2011).

Empirical evidence. A growing evidence base supports the theory that the effects of prenatal care on health and development extend to educational outcomes. One study found that low birth weight was associated with lower math and reading scores at age 5 net of family characteristics (Goosby & Cheadle, 2009). A follow-up study compared low birth weight children to siblings and found that low birth weight also predicted slower cognitive development into adolescence and lower graduation rates (Cheadle & Goosby, 2010). Unfortunately, most research has focused on developmental and cognitive outcomes rather than academic ones.

Theory. The basic theory behind these results is pretty simple – if prenatal conditions impact health and development, they should also impact educational outcomes – though the exact relationships between various conditions in the womb and different educational outcomes present make the picture more complex. One worry of such research is that prenatal conditions may be endogenous – that those who receive less prenatal care also live in poorer neighborhoods, receive less parental care, and attend worse schools. A new working paper, however, addressed these concerns by studying twins in Florida and finds that cognitive development changes little over time independent of school effects and that neonatal health sets children on this trajectory early in life (Figlio, Guryan, Karbownik, & Roth, 2013).

Policy malleability. Baseline policy interventions are quite straightforward, but more research is needed before we can know which comprehensive design would work best. Among other options, we can subsidize prenatal care or create institutions in which low-income expectant mothers receive guidance on prenatal care. An experiment in which the lowest-income residents received income transfers resulted in better prenatal health and fewer low birth weight babies among women facing high-risk pregnancies (Kehrer & Wolin, 1979). And students who attended a school for pregnant teenagers in New Haven, CT were less likely to give birth to preterm or low-birth weight babies when they attended the school for longer periods of time (those who conceived early in the calendar year spent less time in the school due to summer vacation and served as the comparison group) (Seitz & Apfel, 1994).

Summary. Overall, the evidence and theory that prenatal care impact academic performance are quite strong – though we still need to know exactly which conditions affect children in exactly which ways. Overall, I rate prenatal care thusly:

Empirical Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations for research, policy, and practice. Prenatal care offers a particularly strong lever on which to push if we want to use social reform to narrow the achievement gap and, as such, researchers should examine the best ways to improve pre-natal care while practitioners and legislators should make improved care a major focus of interventions.

Vision. Teachers often encounter kids who complain about not being able to see what is on the board, but we do not often consider these problems when studying education policy.

***Links to* poverty**. Research has linked poverty with vision problems (College of Optometrists in Vision Development, 2000), largely because low-income families have less access to health insurance and health care and less money to spend on glasses and other remedies. The straightforward relationship between vision problems and academic problems and simplicity of designing interventions that remedy vision problems make this an eminently actionable problem for legislators and practitioners to address.

Evidence. Perhaps the most promising studies for advocates of social reform are a trio of trials involving vision therapy. One experiment in Baltimore (Harris, 2002) randomly assigned students with vision problems to either a control group or one that received vision therapy over the course of a school year. By the end of the year, those who had received vision therapy scored significantly higher on math and reading achievement tests than had those who had not. The authors conclude that eyesight is an important determinant of reading ability and that sight problems can be overcome in a scholastically relevant manner.

Another study (Orfield, Basa, & Yun, 2001) tracked the academic performance of students in an inner-city Boston school over the course of six years. They found that nearly half of the students failed a pre-screening eye test and that these students scored significantly lower on math and reading achievement tests than those who passed. Students who failed an eye exam were either provided with vision therapy, free glasses, or were prescribed glasses. After receiving treatment, students who failed the pre-screening progressed significantly faster than those who had passed.

A third study (Streff, Poynter, Jinks, & Wolff, 1990) followed kindergartners in an Ohio parochial school who were offered eyeglasses along with one hour of vision therapy and two half-hour visually based classes each week and compared them to matched students at a similar

school in a neighboring town. Students in the treatment group scored similarly on math and IQ tests in September, but statistically significantly higher by April.

Beyond the three trials, a wide range of literature has linked vision and academic performance (Maples, 2003).

Theory. The link between vision and achievement is both logical – if one cannot see, they cannot read written words – and well-supported.

Policy malleability. Conceptually, ensuring that all students who need eyeglasses actually have them is straightforward. Logistically, though, such an initiative would pose more challenges: administering eye tests, delivering eyeglasses, ensuring students wear them, and so forth. And many of the interventions discussed above include vision therapy as well. Schools could likely offer this during the school day, but would have to be convinced that it is worth students missing class to do so.

Summary. The link between changes in vision and changes in achievement is probably better documented than any other factor/condition likely to be affected by social policy and it is a reasonably easy problem to address. Overall, I rate vision thusly:

Empirical Evidence: 3

Theory: 3

Policy Malleability: 2

Total: 8

Recommendations for research, policy, and practice. The potential impacts of such interventions are limited because they do not directly impact those with no vision problems, but vision improvement interventions offer the most straightforward path through which social policy can narrow the achievement gap. Researchers should focus on the specific logistics of vision interventions (which types of therapy work best and how to get kids to wear their glasses)

while legislators and practitioners should absolutely implement interventions designed to ameliorate vision problems.

Stress. Another health problem frequently considered during daily life but not as often in discussions of education policy is stress.

***Links to* poverty**. Decades of research have explored the ways in which living in poverty increases stress (see, for example: Aneshensel, 2010; D. C. Glass & Singer, 1972). Among other factors, lower-income children experience more stress because they: experience more negative life events (McLoyd, 1990); are exposed to more violence (Foster & Brooks-Gunn, 2009), crime (Goldmann, et al., 2011) and disorder (Hill, et al., 2009); have less residential stability and are more likely to be homeless or have high mobility (Banyard & Graham-Bermann, 1998); live amidst more physical deterioration and in lower quality housing (Evans, Saltzman, & Cooperman, 2001); reside in noisier, more crowded (Evans & English, 2002), and more polluted (Evans & Kantrowitz, 2002) areas; experience more family disruption (McLanahan, 1985); and possess fewer resources with which to combat problems (Banerjee & Mullainathan, 2008). Recent studies have found that children who spent less time in poverty had both experienced less stress (Evans & Kim, 2007) and exhibited better working memory as a result (Evans & Schamberg, 2009).

Empirical evidence. This increased stress impacts academic performance in numerous ways. One study found that children who experienced more negative life events perceived lower self-competence and earned lower grades (Alva & de los Reyes, 1999). Another found that exposure to violence in the family and community increased PTSD symptoms among children, negatively impacted behavior, and reduced achievement (Thompson & Massat, 2005). A longitudinal analysis of urban elementary school children found that stressful experiences

negatively impacted achievement and increased depression and aggression (Morales & Guerra, 2006). Given the myriad causes of stress, path analyses may be particularly appropriate for analyzing its outcomes: one path analysis found that a variety of stressors at the local level harmed children's long-run physical and mental health, led to more behavioral problems, and increased the odds of both teenage pregnancy and dropping out of school (Wadsworth et al., 2008) while another found that maternal stress led to less maternal warmth, home learning stimulation, and cultural socialization, which decreased math and reading achievement of students entering elementary school (Baker & Iruka, 2013). Together, they offer compelling evidence that stress impacts academic performance.

Theory. Just as a variety of different factors raise stress levels, raised stress levels impact a variety of aspects of children's lives – many of which may subsequently influence academic performance. Research has consistently found negative correlations between stress levels and various types of brain development (National Scientific Council on the Developing Child, 2005), which may be the main pathway for stress to influence academics. Similarly, stress also affects cognitive performance: as bodies adapt to constant stress, they tend to either constantly produce high levels of cortisol (a hormone released by the body to deal with stress) or stop producing much cortisol (i.e. stress-response systems either stay on constant high-alert or become fatigued and no longer respond); in either case, individuals' cortisone reactivity is dulled and students in one study who had experienced more stress exhibited lower cortisol reactivity performed worse on tests of executive function and self-regulation (Blair, Granger, & Peters Razza, 2005). Another study found that students who had experienced more negative life events displayed less self-control as well, a strong predictor of academic success (Duckworth, Kim, & Tsukayama, 2013).

Stress and negative life events also negatively impact home environment and parenting practices (Dodge, Pettit, & Bates, 1994), which impact both the behavior (Conger, Ge, Elder, Lorenz, & Simons, 1994) and adaptability of children (Conger, Patterson, & Ge, 1995) and may make them more prone to ADHD (K. J. Anand & Scalzo, 2000). More cumulative stress exposure also impairs health (Felitti, 2002) and mental health (Ewart & Suchday, 2002).

If stress negatively impacts brain development, cognitive performance, emotional regulation, home environment, parenting, health, and mental health – all of which are related to academic performance – it stands to reason that it also impacts children's performance in school as a result.

Policy malleability. Unfortunately, just as the causes of stress are complex and numerous, the solutions may be as well. Possibilities include altering environments, increasing support, and providing children with counseling. More social support can help, but may not be enough (Gillock & Reyes, 1999). A natural experiment occurred when an American Indian casino opened, and a large number of mostly poor families began earning income supplements; children's behavior and symptoms of oppositional defiant disorders subsequently improved, but anxiety and depression did not (Costello, Compton, Keeler, & Angold, 2003). A study of after-school and weekend activities found that students who spent more time in green or natural settings experienced less ADHD (Kuo & Faber Taylor, 2004) and a forthcoming study tracked adults while walking in outdoor, green environments versus other settings and found that those in green environments displayed more mood-enhancing and restorative traits (Aspinall, Mavros, Coyne, & Roe, in press). And a meta-analysis of studies of Mindfulness Based Stress Reduction found that they tend to reduce sleep problems and improve mental health (De Vibe, Bjørndal, Hammerstrøm, Kowalski, & Tipton, 2012).

Summary. Overall, the theoretical evidence that stress impacts achievement is extremely strong and the empirical evidence to support the theory is rapidly accumulating. While altering stress through policy may be difficult, we have had past successes and solid ideas for the future. Overall, I rate stress thusly:

Empirical Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations for research, policy, and practice. In the end, no one intervention seems likely to dramatically reduce stress – but interventions aimed at altering stress levels may also alter other factors/conditions associated with academics (e.g. health, physical fitness, neighborhood conditions, etc.) and, as such, deserve our attention. Researchers should focus on determining which types of stress affect academic outcomes and how these stressors may be eliminated or overcome while legislators and practitioners should make stress reduction and coping major goals of interventions designed to narrow the achievement gap.

Teen pregnancy. Teenage pregnancy negatively impacts academic performance in two different ways: it both disrupts the life of the teenager who is pregnant and lowers the odds of success of the child of an unprepared and immature mother (Furstenberg, Brooks-Gunn, & Chase-Lansdale, 1989). This section addresses the former.

***Links to* poverty**. While there is no argument that teen pregnancy is higher among lower-income adolescents, not all would agree that this is *caused* by poverty. There is evidence, however, that teenagers are more likely to become pregnant when their parents are less educated or receive welfare and when they experience more stressful life events independent

of other predictors of pregnancy – which are all associated with living in poverty (An, Haveman, & Wolfe, 1993). A seminal book on the topic argues that girls from poor areas see pregnancy as an achievable and aspirational goal while considering many others out of reach (Edin & Kefalas, 2007). A recent study comes to a similar conclusion, arguing that teenage pregnancy is the result of adolescents opting out of the economic mainstream because they perceive themselves as unlikely to advance in society (Kearney & Levine, 2012). Together, they offer considerable reason to believe that poverty does, in fact, causally increase pregnancy among teenagers.

Empirical evidence. The link between teen pregnancy and academic performance is slightly less contentious and less complicated. One article found that becoming pregnant as a teenager decreased the odds of graduating, but not because it reduced the odds of dropping out – rather, it prevented those who had already dropped out from re-enrolling (Upchurch & McCarthy, 1990). A forthcoming study addresses the issue from a different perspective, using state testing and compulsory schooling laws as instruments and finds that decreasing dropout rates and keeping students in school longer actually decreases teenage pregnancy (Marcotte, in press). One review argues that public sentiment toward teenage childbearing is far stronger than the evidence of its ill-effects (Furstenberg, 2003), but a more recent review argues that "the association between nonmarital teen births and educational attainment is well documented" (Basch, 2010, p. 29).

Theory. The theory behind the relationship is straightforward: pregnancy and childbirth consume massive amounts of time and effort, which should make it more difficult for teenagers to attend and pay attention in school.

Policy malleability. Addressing teenage pregnancy may be quite similar to addressing vision problems; both in that it helps a minority of students while not directly affecting most others and in that the outcome is singular and tangible. Reducing – or mitigating the effects of –

teenage pregnancy, however, is slightly more complex than improving vision, given the myriad causes and emotional and personal decisions involved. One experiment, however, found that a program designed to address two broad problems of teenagers – pregnancy and school failure – reduced both in addition to behavioral problems (Allen, Philliber, Herrling, & Kuperminc, 1997). Another forthcoming study tracked youth and parents for 4 years and concludes that increasing educational aspirations, family communication, and school connectedness all reduced the odds of teen pregnancy (Oman et al., in press). Other possible levers include relationship guidance and sex education.

Summary. Overall, empirical evidence that teenage pregnancy negatively impacts academic performance is somewhat lacking, though the theory is straightforward and past interventions have met with some success. Overall, I rate teen pregnancy thusly:

Empirical Evidence: 1

Theory: 2

Policy Malleability: 2

Total: 5

Recommendations and implications for research, policy, and practice. The evidence and theory supporting negative effects of teenage pregnancy in addition to the success of previous interventions makes reducing teenage pregnancy a worthwhile goal, but the deep roots of the problem may be more difficult to address than many realize. Nonetheless, researchers should continue to investigate why teenagers choose to conceive a baby (and why they do so unintentionally) while practitioners and legislators should make reducing teen pregnancy and/or working with teen mothers a secondary concern of interventions designed to narrow the achievement gap.

Environmental toxins and pollution. Different types of pollution and environmental toxins are often examined individually, but for the purposes of this paper I lump them into one category. Most individual toxins and types of pollution affect children in similar ways and have little evidence examining the relationship between that particular chemical or problem and academic outcomes.

***Links to* poverty**. Much as neighborhoods with more crime, disorder, or noise are less desirable, so are neighborhoods and homes with more environmental toxins and pollution – meaning that prices are lower and residents are more likely to be low-income families (Currie, Davis, Greenstone, & Walker, 2013). Additionally, a lack of resources and political capital means both that environmental hazards are less likely to be addressed in the neighborhoods and homes of low-income residents and that these residents are less able to move to less polluted areas. As a result, low-income children have higher blood lead levels (Zierold & Anderson, 2004) and higher rates of asthma (Akinbami, LaFleur, & Schoendorf, 2002; E. Rosenbaum, 2008) among other symptoms. These pollutants and toxins impact health and well-being in myriad ways (see, for example: American Academy of Pediatrics Committee on Environmental Health, 2004; Evans & Kantrowitz, 2002).

Evidence. Studies linking environmental toxins and pollution with academic outcomes have mostly focused on lead exposure. A longitudinal study in North Carolina found that exposure to lead during early childhood was associated with lower reading scores years later and that higher rates of exposure were associated with even lower scores (Miranda, Kim, Reiter, Overstreet Galeano, & Maxson, 2009). These results were replicated in a recent study in Massachusetts that examined 10 years of student achievement data (Reyes, 2012). And a working paper examining children near a chemical waste depository in Chile finds that blood

lead levels not only significantly reduced achievement in school but also dramatically reduced earnings later in life (Rau, Reyes, & Urzúa, 2013).

Theory. An abundance of evidence supports the theory that a variety of toxins impact academic performance – a review of the evidence on the effects of housing on child development concluded that the strongest evidence linked environmental toxins/hazards to health outcomes (Leventhal & Newman, 2010). This evidence is particularly strong regarding lead exposure; a meta-analysis found that blood lead level significantly lowered IQ (J. Schwartz, 1994) and another paper found that it reduced brain volume (Cecil et al., 2008). One paper estimated that reducing lead exposure had not only increased IQ by between 2 and 5 points on average but that this led to hundreds of millions of dollars of economic gains (Grosse, Matte, Schwartz, & Jackson, 2002). And a seminal paper then found that lead exposure not only lowered IQ but also increased crime – including evidence that reductions in crime in recent decades were largely due to reductions in lead (particularly from discontinuing the use of leaded gasoline) (Nevin, 2000). This theory was supported by later papers that examined bone lead levels and found that it was positively associated with various antisocial and delinquent behaviors (Dietrich, et al., 2001) and that blood lead levels strongly predicted murder rates over many decades across a number of developed countries (Nevin, 2007).

Research links factors beyond lead with correlates of achievement as well. A review of the evidence on the effects of air pollution in urban areas found that different pollutants increased asthma, decreased lung capacity, caused neurological deficits and neurobehavioral changes, increased hospital admissions, decreased cognitive function and IQ, and generally impaired health and increased mortality (Schwela, 2000). Another review found evidence that air pollution restricts fetal growth and increases the odds of pre-term delivery (Maisonet, et al., 2004). A recent study found that not only did contaminated water disproportionately affect the

birth weight and gestation of infants of the least-educated mothers but that the same mothers were also the least likely to move to a different area as a result of these effects (Currie, Zivin, Meckel, Neidell, & Schlenker, 2013). A study of the Harlem Children's Zone's Asthma initiative found that 30% of children were asthmatic (twice the national average) and that a quarter of those students had recently missed school as a result of their asthma. And absences are not confined to Harlem; a review of the literature found strong evidence across 66 studies that asthma increase school absenteeism (Taras & Potts-Datema, 2005). The pathways differ by type of environmental toxin/pollutant, but the resulting effects – particularly including decreased intelligence and school attendance, and increased behavioral problems and health issues provide strong reason to believe that these collectively impact academic performance.

Policy malleability. To date, researchers have focused almost exclusively on lead and asthma when it comes to school outcomes. Nonetheless, the health consequences of other factors provide strong reason to address the issue. Due to the wide range of factors and even wider range of effects, though, knowing where to start is tough. One option is to address the health outcomes through in-school interventions; a review of the research on school health programs found strong evidence of increased academic performance of programs for asthmatic children, for example (N. G. Murray, et al., 2007). Improving housing stock or providing health education are other options – a recent intervention combined residence in a new LEED Platinum certified housing development in the South Bronx with a home-based educational module and saw reduced asthma symptoms and fewer school absences 18 months later (Garland et al., 2013). While different problems are easier to address in different locations, multiple different types of interventions have proven successful and could be replicated in the future.

Summary. Overall, a bevy of evidence supports the idea that environmental toxins and pollutants impact academic performance, and while empirical evidence linking the two is limited

policies aimed at addressing the problems have had some success. Overall, I rate pollution and environmental toxins thusly:

Empirical Evidence: 2

Theory: 3

Policy Malleability: 2

Total: 7

Recommendations and implications for research, policy, and practice. Researchers should expand beyond lead and asthma when examining school outcomes and should further investigate the efficacy of altering different living conditions and health services – the elimination of leaded gasoline, for example, seems to have had outsized effects and other environmental changes may provide similar bang for the buck – while legislators and practitioners should put lead reduction near the top of their list and keep other types of pollution in mind as well.

Discussion. Overall, solid evidence indicates that poverty affects health in myriad ways and that these health outcomes negatively affect the academic performance of low-income children. At the same time, while improving the health of the poorest children enough to allow them to both attend school more frequently and be more attentive in school may be a large step in the right direction, it seems unlikely that this alone would close the achievement gap.

The impact of poverty on health largely stems from four general aspects of life. In no particular order, they are: (a) an inability to afford health insurance and regular health care, which leads to chronic issues; (b) a lack of access to resources that facilitate a healthy lifestyle, which decrease physiological, and neurological functioning; (c) stress-inducing environmental factors, which raise blood pressure, disrupt sleep, and erode health over time; and (d) unhealthy

environmental conditions that alter the physiology of the body. Interventions designed to improve the health of low-income children could aim at any or all of these four.

A lack of resources puts regular access to health facilities out of the reach of many families and leads to less prenatal care and more undiagnosed vision problems. Expanding health insurance coverage and health care access would go a long way toward solving these problems. A recent study, for example, found that the implementation of SCHIP (which provides health insurance for lower-income children) resulted in higher attendance rates in states with wider implementation since the law was enacted in 1997. One caution, however, is that spending on health care alone may not solve the problem if it does not also address the social and environmental causes of health problems. A recent study looked at the ratio of social to health spending across all OECD countries and concluded that those with higher ratios had lower rates of infant mortality, higher life expectancy, and fewer life years lost after controlling for health expenditures and GDP (E. H. Bradley, Elkins, Herrin, & Elbel, 2011). In other words, without social spending to support the work of health care systems, money may be wasted. The same may be true of schools and social spending.

A lack of access to fresh fruits and vegetables, parks, fitness centers, and other assets and resources leads to poorer nutrition, less physical activity and worse fitness, and higher obesity rates. These are tougher issues to solve since eating and exercise habits are influenced by cultural and economic factors (e.g. what they see their friends do and what they can afford) in addition to access to services. Certainly increasing the availability of these types of assets in high-poverty neighborhoods would be a step in the right direction, but would not solve the problem alone. To fully change lifestyle habits will take more than just easier access to assets that promote a healthier lifestyle. Interventions that make healthier eating more affordable may nudge people in the right direction as well, but community-driven efforts are likely needed

to increase participation in fitness programs, cooking classes, and so on in order to significantly alter eating and exercise habits.

Stressors may be even tougher to address. No single intervention will address the majority of stressors in a home or neighborhood. To date, we lack evidence that addressing any single stressor will have larger effects than addressing others on the lengthy list. The easiest place to start would be to try and reduce violence, disorder, crime, physical decay, and other environmental sources of stress. Social causes of stress – everything from gangs to social networks to family disruptions – are likely harder to address though may be more important.

Finally, reducing pollution and environmental toxins is not difficult in theory but may be very difficult politically or economically. The tangibility and easy measurement of many pollution and toxin levels makes them ripe for intervention, but we lack detail on precisely which pollutants and toxins would yield the largest efficiencies. The educational research concentrates on lead and on asthma resulting from various air pollutants, which may be good places to start.

Perhaps more so than in other areas, health issues tend to have strong negative effects on small segments of the population and near-zero impacts on the rest. Few children have serious enough problems with vision, fitness, nutrition, asthma, or another issue to dramatically impact their achievement. For those who do suffer, however, a pair of glasses, a contraceptive, or a vitamin supplement might make the difference. And, collectively, all the factors above likely contribute significantly to the achievement gap (Currie's (2005) estimate that health problems caused 25% of the achievement gap excluded some of the factors above).

The strongest evidence of the factors reviewed above is that stress and prenatal care impact performance in school, but there is also strong evidence that nutrition, fitness, and mental health impact performance and that environmental toxins and pollutants impact a

myriad of behaviors and traits related to academic performance. Vision problems and teenage pregnancy also certainly reduce academic performance, but are more confined problems that impact smaller numbers of students. All are worth addressing as part of an intervention designed to improve living conditions of low-income children.

Vision is the easiest of all of these to address – simply providing somebody with a pair of glasses can often solve the problem – while stress is likely the hardest since the causes are so numerous. And prenatal care seems to offer the best combination of strong effects and malleability through policy intervention. Promise Neighborhoods and other social interventions should aim to act on as many of the factors above as possible, but if a policymaker or practitioner had to choose only one thing it should probably be prenatal care. Stress is at least as important to address, but can be addressed in concert with efforts to improve various neighborhood and home conditions.

Overall, this evaluation of the empirical evidence, theory, and policy malleability find strong support that policy aimed at nutrition, physical fitness, vision, stress, prenatal care, and environmental toxins/pollution can narrow the achievement gap and merit direct attention; moderate evidence that policy aimed at mental health and teen pregnancy can do the same and merit secondary consideration; and little evidence that obesity should receive significant individual attention.

Family and Home Environment

Seymour Martin Lipset, a fellow at the Hoover Institute, was overheard summarizing the results of the Coleman Report to Senator Daniel Patrick Moynihan thusly: "Guess what Coleman's found? Schools make no difference; families make the difference" (quoted in Gamoran & Long, 2006).

While the statement somewhat misinterpreted the findings of the report, the family may indeed be the most important factor in predicting achievement of children. One comprehensive study in Canada (Boyle, Georgiades, Racine, & Mustard, 2007) estimated that over one-third of variance in educational attainment is due to measurable variation in family differences.

And family life can have spillover effects on other kids as well. One study estimated that attending school with children of single parents has a larger negative effect on other kids than does attending school with low-achieving students (Carl & Caldas, 1998), arguing that peer effects mostly stem from home and family conditions.

That family life would correlate so highly with academic performance should surprise no one. Every parent operates under the assumption that the environment they create at home will influence the success of their child later in life. Less clear are the links between social policy and family life – in other words, what can legislators do that will meaningfully impact how families operate?

In the following pages I review the evidence and theory linking multiple family and home factors with poverty and with academic performance and discuss the implications for both researchers and practitioners and legislators.

Home Environment. When examining family and home influences on academic performance, researchers tend to focus most on the environment inside the home and parenting style.

***Links to* poverty**. The links between poverty and home environment may not be obvious, but multiple pathways exist. Living in higher-quality housing in a calmer, quieter neighborhood may impact the environment inside the home – eventually, less chaos outside the

house may lead to less chaos inside it (or vice-versa). Multiple studies have established a relationship between neighborhood conditions and parenting style (Leventhal & Brooks-Gunn, 2003) and have found that neighborhood poverty influences home environment (Klebanov, et al., 1994) – even net of a wide range of parental characteristics (Klebanov, Brooks-Gunn, Chase-Landsdale, & Gordon, 1997). Higher-poverty households tend to score lower on measures of home environment (Garrett, Ng'andu, & Ferron, 1994), in part due to more crowding (R. H. Bradley & Caldwell, 1984). And a study of mediators between income and income stability and the achievement of 3-5 year-olds found that higher incomes helped families provide more stimulating learning environments as a result of their increased purchasing power (Yeung, Linver, & Brooks-Gunn, 2002). Between the influences of neighborhood conditions, housing conditions, and income restrictions, living in poverty can affect home environment in a variety of ways.

Empirical evidence. Numerous studies have also found relationships between home environment and academic performance. A longitudinal study (R. H. Bradley, Caldwell, & Rock, 1988) looked at the same group of kids both when they were infants and 10 or 11 years old and found that the home environment at both ages was associated with the children's academic performance. A study of the predictors of home environment found that mothers who delayed childbirth and had higher intelligence and self-esteem levels provided better home environments net of income and other factors, but also that home environment in both pre-school and elementary school concurrently predicted achievement net of all of these factors (Baharudin & Luster, 1998). A study of the Black-White achievement gap found gaps of 9-17 points controlling for demographic factors, but the gaps were reduced to 4-13 points after controlling for home environment (Brooks-Gunn, Klebanov, Smith, Duncan, & Lee, 2003). And a study of twins adopted by different sets of parents found that family environment predicted

children's reading ability (Petrill, Deater-Deckard, Schatschneider, & Davis, 2005). In short, multiple researchers over a number of years using a variety of samples and methods have all found that home environment influences the achievement of students and widens the achievement gap.

Theory. Just as poverty influences home environment in numerous ways, home environment can influence academic performance in myriad ways. The most obvious is through changes in cognitive function; decades of research have correlated family and home environment with intelligence (See, for example: Nisbet, 1961; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). The other main branch of research on home environment studies its effect on behavior. For example, a longitudinal paper in New Zealand found that a group of adolescents displaying multiple behavior problems were mostly raised in disorganized and dysfunctional home environments (Fergusson, Horwood, & Lynskey, 1994). Researchers also focus on home chaos, a subset of environment; a study in England found that household chaos predicted behavioral problems in children over and above the influence of parenting practices (Coldwell, Pike, & Dunn, 2006) and a study of adopted twins found that household chaos predicted cognitive ability net of genetic and SES influences (S. A. Hart, Petrill, Deater-Deckard, & Thompson, 2007). Additionally, a longitudinal study of same-sex twins found that household chaos predicted both behavioral problems and IQ concurrently and longitudinally (Deater-Deckard et al., 2009). And a recent study found that an organized and clean home reduced the odds of a child displaying externalizing behaviors – which are frequently caused by parental abuse (Price, Chiapa, & Walsh, 2013). If home environment and chaos impact cognitive function, behavior, and mental health, the findings that they also impact academic performance make perfect sense.

Policy malleability. The difficulty for those designing and implementing policy, however, is figuring out how to change home environments. If income, neighborhoods, and parenting practices influence home environment, they should start there. One study finds that improved family income has strong positive effects on home environment for children born into poverty (Garrett, et al., 1994). But a recent review of seven randomized control trials of parenting interventions found that treatment group children showed no gain in cognitive development across all of the studies (S. Miller, Maguire, & Macdonald, 2012). Interventions designed to improve income and neighborhoods would aim to change a lot more than home environment, but that should be one important outcome of such an intervention.

Summary. Overall, the empirical evidence and theory supporting the relationship between home environment and academic performance are very strong and we have a fair amount of evidence that policy can change home environment. Overall, I rate home environment thusly:

Empirical Evidence: 3

Theory: 3

Policy Malleability: 2

Total: 8

Recommendations for research, policy, and practice. Given the strong evidence, researchers should continue to investigate how we can change home environments while legislators and practitioners should make home environment a top priority of interventions designed to narrow the achievement gap.

Parenting style. One major driver of home environment is parenting practices.

***Links to* poverty**. In addition to differing home environments, parents of different classes tend to utilize different parenting strategies – though many of these may be beyond the scope of all but the most intensive and interventionist of policy. How, exactly, poverty influences parenting styles, however, is up for debate. One pathway is the social environment in which families live. In a seminal work, Lareau (2000, 2003) found that middle-class parents tended to make a concerted effort to cultivate their children by scheduling them for a myriad of activities and constantly checking on them while working-class parents tended to let their children find their own way and grow naturally, which she attributes to both social norms and parents' workplace environments. And another longitudinal study found that neighborhood culture and context influenced warmth and harsh interactions among parents in high-risk communities (Pinderhughes, Nix, Foster, & Damon, 2001).

Another pathway is stress. A review of the research found that poverty diminished the emotional capacity of parents as a result of hardship and psychological distress stemming from negative life events (McLoyd, 1990). And a study of mediators between income stability and the achievement of 3-5 year-olds found that income stability led to less emotional distress, different parenting practices, and, ultimately, fewer behavioral problems (Yeung, et al., 2002). Social relationships also likely contribute to parenting differences. One study found that low-income parents were particularly susceptible to the effects of social support and were more punitive when they felt less supported (Hashima & Amato, 1994) and another study of parenting and home environment found both that family poverty negatively affected social support and that neighborhood poverty reduced maternal warmth (Klebanov, et al., 1994).

Another theory is that those living in high-poverty neighborhoods (which also have higher rates of violence and crime) are more likely to associate with peers with significant behavioral problems. Indeed, one study of 10-13 year-olds in Georgia and Iowa found that

parents were more inconsistent and resorted to harsher parenting techniques when they perceived that their child was socializing with deviant peers (Brody et al., 2001) and other studies have found that socioeconomic disadvantage increased the use of harsh, inconsistent parenting (McLoyd, 1998).

Empirical evidence. Parenting, perhaps not surprisingly, also influences academic performance. One study of parenting style found that the least educated parents were the most likely to use authoritarian or permissive parenting styles – which were negatively associated with grades, controlling for parental education and other factors – while more educated parents were more likely to use authoritative parenting styles, which were positively associated with grades (Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh, 1987). Yeung & Conley (2008) found one measure of home environment -- parental warmth -- to be positively associated with achievement, even when controlling for a bevy of other factors. A longitudinal study of Baltimore youth found that social context at age 6 predicted outcomes at age 22 as well as did later measures and that parental psychological support was a strong predictor of achievement at age 6 (Entwisle, Alexander, & Olson, 2005).

Theory. The theoretical support for a relationship between parenting and academic performance is vast, but is straightforward enough that a full review is unnecessary to convey the main points. Studies of parenting have found that material hardship increased parental stress, decreased positive parenting, and decreased cognitive skills and social-emotional competence (Gershoff, Aber, Raver, & Lennon, 2007). The relationships, norms, and boundaries established by parents play a large role in child development; when children develop cognitively, socially, and emotionally, they experience more success in school.

Policy malleability. Changing parenting styles, however, poses quite a challenge. Certainly reducing material disadvantage, negative events, and stress should alter parenting, but

may require large-scale interventions. Smaller-scale interventions may aim at changing neighborhood social and cultural norms or educating parents regarding the effectiveness of various techniques. The latter, however, likely requires ongoing support. Parenting requires constant in-the-moment reactions and even the best parents revert to base instincts and the methods their own parents used in times of stress.

Summary. The research on parenting and education deserves far more than this brief overview, but there is strong evidence that poverty affects parenting in a wide variety of ways and nobody really doubts that parenting strongly influences child development and academic performance, though is likely very difficult to change through policy. Overall, I rate parenting styles thusly:

Empirical Evidence: 3

Theory: 3

Policy Malleability: 1

Total: 7

Recommendations for research, policy, and practice. The challenge for researchers here is not establishing that parenting matters but, rather, discerning exactly what aspects of parenting matter in what ways; they should continue to investigate how a wide range of parenting practices affect success in school. And the challenge for legislators and practitioners is determining how to alter parenting techniques; they should proceed with caution given the difficulty of the task but should nonetheless put parenting style near the top of their list.

Language exposure. One aspect of parenting and home environment that bears special mention is the exposure to language of young children.

***Links to* poverty**. In one oft-cited study (B. Hart & Risley, 1995), researchers found that young children from upper-class homes heard millions of more words than did their lower-class peers and that, subsequently, they had a much larger vocabulary. Other studies have found that child-directed speech (Hoff-Ginsberg, 1991) and subsequent vocabulary growth weeks (Hoff, 2003) and years later (Rowe, 2008) differed significantly between working-class and middle-class families. Another reason for the differences is that lower-income families live in more crowded homes and parents in more crowded environments tend to speak in less complex, sophisticated ways (Evans, et al., 1999). We would naturally expect these vocabulary differences to morph into differences in a wider range of cognitive performance.

Empirical evidence. One study found that higher-SES parents not only increased language learning in very young children but that these children had higher IQs and verbal ability 10 years later (D. Walker, Greenwood, Hart, & Carta, 1994). A meta-analysis of the effects of parent-preschooler reading found that frequency of book reading explained about 8% of the variance in language growth, emergent literacy, and reading achievement (Bus, van IJzendoorn, & Pellegrini, 1995).

Theory. Much like parenting style, nobody really doubts that language exposure and vocabulary growth are related and affect academic performance.

Policy malleability. The situation also presents similar challenges to practitioners and legislators. Indeed, many find it hard to imagine a feasible and scalable policy that would dramatically increase the number of words spoken to toddlers by their parents. Various local educational efforts are underway, but it remains unlikely that a large-scale federal intervention would do much. One possibility that bears mentioning, however, is a pilot study that uses linguistic feedback devices to inform parents how many words were spoken with their child – after one educational session, non-parental caregivers increased words spoken per hour by 31%

when using the device (Suskind et al., 2013). Whether or not it would work with parents over long periods of time, though, remains to be seen.

Summary. Though more research could always strengthen the case, little doubt exists regarding the evidence or theory backing the potential impact of increasing language exposure. The lone weakness is its lack of policy malleability. Overall, I rate language exposure thusly:

Empirical Evidence: 3

Theory: 3

Policy Malleability: 1

Total: 7

Recommendations for research, policy, and practice. Given the compelling evidence that language exposure has profound long-term effects, researchers should study interventions designed to increase language exposure and vocabulary growth in young kids while practitioners and legislators should make language development a major focus.

Discussion. The research on home environment, parenting styles, and language exposure offers strong empirical evidence and compelling reason to believe that all three significantly affect children's performance in school. The links between poverty and these family/home characteristics, however, are more complex. The three main causes discussed in the literature are stress, lack of resources, and social/cultural context.

Perhaps the strongest evidence is that stress negatively impacts parenting and home environment. Negative life events – perhaps events that landed the family in poverty – including more violent and chaotic neighborhoods and worse housing conditions raise stress in ways that affect health (as discussed above) and academic performance. One of the major mediators between stress and academic performance is likely the reaction of parents to this

stress. A number of studies link increased stress with more hostility, anger, punitive actions, and worse parent-child relationships. Anger and frustration are natural reactions to stress, so it only makes sense that children of stressed-out parents would experience these more frequently. The result is that children feel less supported by their parents, experience a more negative and chaotic home environment, and experience more social-emotional problems. All of these impact the degree to which children can focus in school and on schoolwork in addition to their general behavior and health.

Families living in poverty also have fewer resources to stimulate and support their children. Toys, books, games, and so on all cost money. And lower-income families are squeezed into smaller living spaces that hinder parenting and the formation of positive home environments. Few would argue, however, that simply providing parents with these resources would close the parenting gap. While decreasing crowdedness may be cost prohibitive, providing selected resources may be cost-effective interventions. Few would advocate a program to re-do the interiors of every low-income family's home, but it may be possible to provide kids with a few more books, internet access, or a few games that spur development relatively cheaply and easily.

Perhaps the largest, and hardest to change, influence on parenting and home environment is the social and cultural context in which the family lives. It is conventional wisdom that new parents turn into their own parents once they have children of their own. In education, the adage goes that teachers teach the way they were taught rather than the way they were taught to teach. In other words, when push comes to shove, people (parents and teachers included) tend to resort to what they know rather than doing what they think is right. In this sense, breaking generations of tradition and technique may be particularly difficult. Additionally, the social and cultural norms to which parents and children are exposed in their

neighborhoods, institutions, and social circles likely exert more influence on parenting techniques than do any parenting manuals. On the one hand, parenting is unlikely to dramatically change without first altering social and cultural norms and context but, on the other, this likely takes *intensive* intervention.

Overall, intervening in family and home life in order to narrow the achievement gap makes a whole lot of sense. Family likely influences achievement more than health or neighborhoods do independently. But changing parenting and home environments offer daunting challenges to practitioners and legislators. In order to know which interventions offer the best chance of success, researchers should focus on unraveling the complex relationships between family, home, parenting, and academics and point the way toward both specific factors that matter (e.g. language exposure) and policy changes likely to change these factors. Legislators and practitioners, meanwhile, cannot afford to wait for a decade of focused research before acting; home environment, parenting practices, and language exposure should be near the top of the agenda when we create and implement policy and interventions designed to narrow the achievement gap.

Conclusion

This chapter offers brief overviews of the evidence and theory linking poverty with a wide range of environmental conditions and social factors and these factors/conditions with children's academic performance. All of these factors/conditions merit significantly more in-depth investigation – both regarding the evidence and theory linking them with poverty and with academic performance and regarding the ability of social policy to effectively alter them in ways that will narrow the achievement gap.

Overall, the theory and evidence are strong that these myriad factors/conditions mediate the relationship between poverty and academic performance. They offer significant insight into why low-SES children perform so much worse in school and offer suggestive evidence regarding strategies we might utilize to narrow the achievement gap between classes. 12 of the 21 factors are rated as having strong evidence that policy aimed at changing them will narrow the achievement gap, an additional 7 are rated as moderately strong, and only 2 are rated as weak (see Table 5).

The fact that 19 of the 21 factors/conditions discussed seem to be at least moderately strongly related to performance, though, says a lot – especially since many of them could be broken down into smaller sub-categories (nutrition or parenting style, for example, could easily contain 10 sub-factors each).

That so many factors/conditions influence academic performance strongly indicates that no one thing is *that* important. Clearly, none of these factors/conditions are sufficient to create a good student and, in fact, none of them are probably even necessary. In short, nothing matters because everything matters.

As such, pursuing policies that aim to alter only one of the factors/conditions discussed above borders on silly if the goal is to significantly narrow the achievement gap. A wide range of factors and conditions need to be addressed before that is likely to happen. That leaves us with two options if we wish to use non-school social policy to narrow achievement gaps: design comprehensive policies that address a myriad of issues or coordinate efforts between groups that are all making concerted efforts to address one specific issue.

Lastly, while 19 of the above offer evidence and theory compelling enough to merit significantly deeper investigation, so many in-depth investigations are outside the scope of this dissertation. Instead, the next two chapters synthesize more fully the research and theory on

Table 5: Results of Evaluations of Individual Factors/Conditions

	Factor/Condition	Empirical Evidence	Theory	Policy Malleability	Total
Strong Evidence	Vision	3	3	2	**8**
	Home Environment	3	3	2	**8**
	Violence/Crime	2	3	2	**7**
	Homeownership	2	3	2	**7**
	Mobility/Homelessness	2	3	2	**7**
	Nutrition	2	3	2	**7**
	Physical Fitness	2	3	2	**7**
	Stress	2	3	2	**7**
	Environmental Toxins/Pollution	2	3	2	**7**
	Prenatal Care	2	3	2	**7**
	Parenting Styles	3	3	1	**7**
	Language Exposure	3	3	1	**7**
Moderate Evidence	Physical Conditions	2	2	2	**6**
	Mental Health	2	2	2	**6**
	Noise	1	2	2	**5**
	Teen Pregnancy	1	2	2	**5**
	Disorder	1	3	1	**5**
	Social Organization	1	3	1	**5**
	Crowding	1	2	1	**4**
Weak Evidence	Public Housing	0	1	2	**3**
	Obesity	1	1	1	**3**
	Average	*1.81*	*2.57*	*1.71*	

two of the factors discussed above that (a) seem particularly likely to impact performance (i.e. rate 7 or higher); (b) lack a recent or comprehensive review or synthesis of the literature; (c) impact families and children in a wide variety of ways; (d) are particularly likely to be policy actionable; and (e.) tie in with a large number of factors/conditions above. I select homeownership and stress as illustrative examples because they fit these five criteria, but also because they offer widely contrasting examples: they are from different categories and areas of life; affect people in very different ways; are supported by vastly different amounts of empirical evidence; and call for very different solutions.

The next chapter discusses homeownership, a social factor that has been the subject of more large-scale policies than any of the other factors/conditions and influences myriad aspects of a family's life (including many discussed in this chapter). The following chapter discusses stress, caused primarily by a large number environmental conditions discussed above. The emerging literature on stress and academic performance merits further attention and has wide-ranging implications. Together, examinations of the two cover a great deal of ground by examining two vastly different perspectives.

Chapter III

Homeownership and the Achievement Gap

While neighborhoods matter, clearly not all neighbors achieve equally. One difference between residents of the same neighborhood is renting versus owning a home. Legislators from across the political spectrum often see homeownership as a worthwhile aspiration for virtually all Americans, and the homeownership rate across the country has steadily risen over the past century (A. F. Schwartz, 2012). But owning a home requires a good bit of financial wherewithal, so homeownership rates vary widely between classes. As such, children living in urban poverty are considerably less likely to experience living in owner-occupied housing than their wealthier peers.

On average, homeowners make roughly twice as much money ($64K vs. $33K), possess fifty times as much wealth ($243K vs. $5K), spend 50% less of their income on housing (20% vs. 30%), and live in homes that are four years newer (32 vs. 36 years) than renters. They are also seven times less likely to not own a car; more than three times more likely to live in a single-family detached house; over 50% more likely to possess a bachelor's degree; and more than three times less likely to be in poverty than renters (A. F. Schwartz, 2012). And disparities between homeowners and renters have grown in recent decades. In 1988, the average renter made 56% what the average homeowner makes; in 2008 they made only 51% (A. F. Schwartz, 2012). And the average wealth of homeowners increased 39% between 1998 and 2007 while the average wealth of renters decreased 6% (Bucks, Kennickell, Mach, & Moore, 2009).

In short, homeowners and renters vary significantly across a broad spectrum of demographic characteristics. As such, it should be no surprise that the studies below consistently find that children of homeowners outperform children of renters academically. The key methodological question hanging over these studies, though, is the extent to which this is the result of families more likely to raise higher-achieving children self-selecting into owned homes versus the extent to which a true "homeownership effect" exists.

Evidence

The past 16 years have seen a flurry of activity on this topic; I found 12 studies published during this time that fit my criteria (see Table 6). I summarize and review them in chronological order below.

Articles are reviewed individually based on the rubric presented in Chapter 1 (Table 2). Articles are rated 0-3 (no evidence, weak evidence, moderately strong evidence, or strong evidence) in each of three categories: the degree to which the results show a non-spurious relationship between homeownership and academic performance, demonstrate a causal mechanism to explain such a relationship, and display time-order effects to link changes in academic performance to a change in homeownership. Articles that score under 3 are considered weak evidence, those that score between 4 and 6 are considered moderately strong evidence, and those that score 7 or above are considered strong evidence that homeownership will affect academic performance.

Green & White (1997)

The first researchers to quantify the effects of homeownership on academic performance were Green & White (1997). Using three different datasets, they estimate that 17

Table 6: Summary of Main Findings of Articles on Homeownership

Author(s)	Year	Main Outcome	Longitudinal	Methodology	Data	Direction
Green & White	1997	Attainment	No	Correlational	Secondary	+
Boehm & Schlottman	1999	Attainment	No	Correlational	Secondary	+
Aaronson	2000	Attainment	No	Quasi-Experimental	Secondary	0
Haurin, Parcel, & Haurin	2002	Achievement	No	Quasi-Experimental	Secondary	+
Harkness & Newman	2003	Attainment	No	Correlational	Secondary	+
Zhan & Sherraden	2003	Achievement	No	Correlational	Secondary	+
Galster et. al.	2007	Attainment	No	Quasi-Experimental	Secondary	0
Barker & Miller	2009	Achievement	Yes (4 yrs)	Quasi-Experimental	Secondary	0
Mohanty & Raut	2009	Achievement	No	Quasi-Experimental	Secondary	0
Elliot et. al.	2010	Achievement	No	Correlational	Secondary	0
Kim & Sherraden	2011	Attainment	No	Correlational	Secondary	+
Holupka & Newman	2012	Achievement	No	Quasi-Experimental	Secondary	0

and 18-year olds are between two and nine percentage points more likely to still be in school or have graduated when they reside in owner-occupied housing. They consistently find decreasing returns to homeownership with higher incomes and higher returns – as high as 27 percentage points – in the lowest income brackets.

They note vast differences in residential stability in their sample: renters have resided in their current homes for an average of 4 years versus the 11 years homeowners have resided in theirs. They find that tenure of residence is a predictor of school enrollment but also that homeownership predicts enrollment net of tenure (at 4 years of residence, they estimate that children of homeowners are still 7 percentage points more likely to be enrolled/graduated than children of renters net of demographic factors).

They also find that 18 year-old girls are slightly less likely to have given birth (11% vs. 13% overall and 30% vs. 34% among high-poverty families) in home-owning households.

As with all the papers that follow, they worry about selection effects. To address this, they run a bivariate probit model that they deem the "endogenous switching model" to test the effects of personal characteristics on homeownership choices and determine whether this is what really drives the returns to homeownership (i.e. that more responsible parents buy homes and raise higher achieving children rather than that owning a home makes parents more responsible and improves the outcomes of children) and find no evidence to support this hypothesis.

They end by estimating that households led by a high school graduate earn $344,000 more than households led by those without a high school degree and make a back of the envelope calculation that if homeownership increased graduation rates by 9% among a sample of low-income families that children of these families would earn at least $31,000 more, on average, in their lifetimes.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 2

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 1

Total: 5 (Moderately Strong Evidence)

The article appears to offer compelling evidence that homeownership matters and can dramatically affect the lives of low-income children, but researchers in follow-up studies were less convinced than they that selection effects were not biasing the results.

Boehm & Schlottman (1999)

These findings were replicated soon afterwards by Boehm & Schlottman (1999). Using a multinomial logit model and a sample consisting of young adults observed 10 years after leaving their parents' households, they find large returns to homeownership. A back-of-the-envelope calculation estimates that homeownership dramatically increases the odds of a student graduating from high school (25.1% increase), attending school past high school (24% increase), and earning a college degree (116.9% increase), net of the effect of home price and a variety of socio-economic and demographic factors (though, notably, not length of time at residence). They also find that average house value only significantly impacts the rate of college graduation but not other levels of educational attainment.

Additionally, they explore some other areas homeownership may affect. Though the direct effects on wages are insignificant, they calculate that the increased education results in annual earnings $7,497 higher and an additional $155,344 in lifetime earnings. And they estimate that living in an owner-occupied house as a teenager increases the odds of owning a house 10 years later by 59.3% net of other factors.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 2

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 1

Total: 5 (Moderately Strong Evidence)

The Boehm & Schlottman piece is unique in that it uses such a long lens. While many of the other studies focus on kids who currently attend or just finished school, they look at kids who are 10 years past that point. And they look not only at short-run effects like test scores but long-run effects like future wages and homeownership.

Aaronson (2000)

Aaronson (2000) was the first to push back against these findings, arguing that some of the positive effects of homeownership identified in other studies are actually driven by family characteristics associated with homeownership, such as residential stability. When running probit models similar to Green & White's he finds homeownership related to high school graduation by age 19. But, using group average homeownership rates as an instrument, the coefficients on homeownership mostly become insignificant.

He argues that the instrumental variable models indicate selection effects account for the bulk of the homeownership effect, writing of Green & White's work that "while the authors claim that their results are robust to parametric self-selection corrections, these techniques require assumptions about the selection equation that are difficult to defend" (p. 357).

Controlling for the fraction of years in which one moved accounts for almost one-half of the homeownership effect. Though much of the effect seems to be due to "latent family stability factors," as the reasons cited for moving (e.g. job or neighborhood) accounts for at least

one-fifth, and perhaps as much as two-fifths of the effect. Moving within and across zip codes are negatively correlated with attainment, but moving across states has a significant positive effect. Mobility has the same negative effect on children of both homeowners and renters. The homeownership effect disappears in highly mobile communities when controlling for residential duration, but persists in low mobility neighborhoods.

Aaronson also examines the differential impact of homeownership on higher- and lower-income neighborhoods (top quartile versus bottom quartile of income). He argues that "the results tentatively suggest that part of the homeownership effect is due to higher levels of home equity. That is, homeownership has a larger impact on children's outcomes for those with equity at the top of the distribution" (p. 362).

Without controlling for mobility, the effect is three times larger in low-income (12%) versus high-income (4.2%) communities. Controlling for mobility eliminates the effect in high-income communities and cuts the effect almost in half (6.7%) in low-income communities. After controlling for mobility, homeownership is statistically insignificant in all of the instrumental variables equations except for the low mobility neighborhood sample.

Without controlling for mobility, the coefficient on homeownership is statistically significant for the whole sample and the raw coefficients are higher for low-income and low-mobility neighborhoods relative to high-income and high-mobility neighborhoods. This is seemingly contradictory as one might expect low-income neighborhoods to have higher mobility.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 0

Total: 3 (Weak Evidence)

Though most of his IV results fail to reach conventional levels of statistical significance, Aaronson argues that "given the strong impact of residential mobility, even after attempts to correct for endogeneity, homeownership as a means of reducing community turnover may still be important to children's educational outcomes" (p. 368).

Haurin, Parcel, & Haurin (2002)

Using panel data, Haurin, Parcel, & Haurin find (2002) a positive relationship between owning a home and children's cognitive ability – including 9% higher scores on math achievement tests and 7% higher scores on reading achievement tests and argue that two mechanisms for account for the homeownership effects: increased "investment incentive" and increased "geographic stability".

Like many other researchers, they are highly critical of the Green & White article. Among other things, they criticize the piece for failing to control for parental wealth or neighborhood attributes and while Green & White found no evidence of bias from unobserved factors, in this sample tests for selection bias find that unobserved variables explain both homeownership and outcome variables.

To account for this selection bias, they instrument on the likelihood of a family owning a home (including the relative price of housing in an area – which they argue varies widely and often exogenously throughout the country) to run two-stage regressions on panel data. They find that that both homeownership and length of homeownership are associated with higher reading and math scores and better home environments. Reading and math scores were improved by 9% and 7%, respectively, while homeownership was associated with a 23% higher cognitive/physical home environment and 13% higher emotional support in the home

environment, net of a wide array of demographic, family, health, and neighborhood characteristics. The estimate of the effect of homeownership on child behavioral problems yields a negative coefficient equal to a 3% reduction, but is not quite statistically significant.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 3

Evidence of a Causal Mechanism: 3

Evidence of Time-Order Effects: 1

Total: 7 (Strong Evidence)

The Haurin, Parcel, and Haurin paper remains the only one using instrumental variables to consistently find statistically significant effects on academic performance. Questions remain about whether some of their claims about their instrument are true, though – notably that home prices vary exogenously.

Harkness & Newman (2003)

Harkness & Newman (2003b) break down the analysis between low- and high-income homeowners and renters living in neighborhoods with high and low rates of poverty, residential stability and homeownership. They find that homeownership (measured as always living in an owned home from age 11-15) increases the probability of high school graduation by 13 percentage points, college enrollment by 6 percentage points, and years of schooling by four-tenths of a year for low-income (150% of poverty or below) homeowners while it has far smaller effects on higher-income homeowners. The estimates are larger for low-income homeowners in lower-poverty and more stable neighborhoods.

Interestingly, Harkness & Newman find moderately stronger effects of neighborhood poverty and stability on children of homeowners than on children of renters. They hypothesize

that renters both form fewer ties with the people and institutions in their neighborhood and reside in a given neighborhood for a shorter period of time, on average. Given these results, they argue that policy designed to keep low-income residents in their current neighborhoods will have a larger effect than policy designed to move renters to higher-income neighborhoods (e.g. MTO). Similarly, they argue that buying a house in an unstable, high-poverty neighborhood may yield *worse* results for children than renting a house in that same neighborhood.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 2

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 0

Total: 4 (Moderately Strong Evidence)

This is the first piece that really looks at the issue from a policy perspective – focusing more on who might benefit from owning a home in the future rather than whether people have benefitted, on average, from owning a home in the past.

Zhan & Sherraden (2003)

Zhan & Sherraden (2003) take a different tack, examining homeownership as a financial asset. Using a sample of female-headed households, they control for other assets (though, notably, only 17% of the sample has other assets totaling $3,000 or more) and find homeownership to be positively associated with both reported grades in school and mother's expectations (which itself is positively associated with higher grades and a higher likelihood of graduation), though not statistically significantly associated with high school graduation (the coefficient is positive, but only the coefficient on having other assets totaling $3,000 or more is

significant – students with mothers who have saved $3,000 or more are 1.3 times as likely to graduate from high school net of multiple demographic characteristics).

They also find that income is only significant in their models when assets are left out (i.e. wealth is more important than income). The policy question, then, becomes whether owning a home increases familial wealth. If so, the returns to homeowning may be understated by this piece (i.e. if owning a home leads to more saving and asset accumulation net of home equity, this paper would be controlling for mediators that would downward bias their estimates).

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 2

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 0

Total: 4 (Moderately Strong Evidence)

At this point, six major studies had been completed – and five in a four-year period, largely in response to the Green & White piece – and all had found at least some evidence of a homeownership effect on academic performance. But after a few years' hiatus, a new era of econometric modeling ushered in a new wave of attacks on these findings.

Galster et. al. (2007)

The first of these papers (Galster, et al., 2007) uses both a proxy for unobserved characteristics and instrumental variables to try and isolate the exogenous influences of homeownership on children.

They use PSID data to examine the effects of homeownership on 755 children born between 1968 and 1974 in 1999 (i.e. when they are aged 25-31). Given the focus of this paper, it is worth noting that their sample includes few very low income families – children in their

sample spent 72% of their childhood in homes owned by the head of their household and only 6% never lived in such housing.

To address selection bias, they first create a measure designed to simulate the unobserved characteristics of children by regressing later homeownership status on the observable characteristics of the individual, home, parents, and metropolitan area and then using the residuals as a proxy these unobserved characteristics with the theory that the unobserved factors that predicted whether or not a child owned a home later in life (which might include future orientation, credit score, and others) likely also will influence their educational attainment.

Second, they create an instrumental variable designed to simulate the exogenous likelihood of a family purchasing a home by using a number of measures of the cost of purchasing a house versus renting and financial changes that would increase a family's ability to purchase a house. The model is moderately predictive of a family's actual homeownership decision (R^2 = .29).

Among control variables that significantly influence educational attainment in their models are parent education and the number of neighbors parents knew by name along with a number that the authors could not explain (e.g. parent membership in a union increased attainment, but parent veteran status reduced it). This raises questions as to whether the relationships they find are just random and why variables with no supporting theory are included in the regressions.

They estimate 8 equations that predict both receipt of a high school diploma and receipt of a bachelor's degree – 4 each with and without controlling for residential stability. The two basic logistic regressions controlling for demographics and parent characteristics find a statistically positive impact of homeownership (measured as proportion of childhood years lived

in a home owned by their parent(s)) on both measures of attainment. When they add in the proxy measure of unobserved individual characteristics as a control variable, the coefficients remain significant and virtually unchanged. When they use their instrumental variable, though, the point estimates are no longer significant. When controlling for residential stability, none of the estimates are statistically significant when predicting high school diploma and neither the instrumental variable or proxy measure estimates are significant when predicting college attainment (though the two models using only demographics and parent characteristic do produce positive and significant coefficients). Overall, 8 of the 16 models they run find a statistically significant contribution of homeownership; but only 2 of the 8 models using more advanced methods find statistically significant effects.

The authors note, however, that (a) controlling for stability only very slightly reduces the magnitude of the coefficients (bringing them just slightly below conventional levels of statistical significance for the four non-instrumental variable estimates that are insignificant) and (b) the instrumental variable actually increases the magnitude of the point estimate in the two models predicting receipt of a high school diploma, but the imprecision of the instrument raises the standard errors more – resulting in the statistical insignificance. Due to this imprecision, the authors argue that their instrumental variable models are unable to detect "even the sizable effects" and that, therefore, their "IV results should be treated as suggestive only" (p. 811). The authors also note the size of the point estimates in the college attainment models translate into a student who lives in owner-occupied housing his/her entire childhood being 19 percentage points more likely to earn a 4-year degree than a similar child who never lives in owner-occupied housing (which is particularly noteworthy given that only 14% of the population had earned a 4-year degree).

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 0

Total: 3 (Weak Evidence)

Overall, the study finds fairly mixed results, but the more rigorous models find no statistically significant impact of homeownership independent of a slew of control variables and multiple ways of modeling selection effects. It is worth noting, though, that the authors are skeptical of some of their more complex models.

Barker & Miller (2009)

The most comprehensive of the new wave of articles is written by Barker & Miller (2009), who use a wide array of data and methods and consistently find mostly null results. They first attempt to replicate Green & White's results using PSID data, but only find positive and statistically significant coefficients on homeownership when they omit dwelling type, urbanicity, mobility, vehicle ownership, and wealth. Mobility in particular (measured as both whether the family had moved in the past 2 and 10 years) reduced the homeownership effect by 60% and made it insignificant. When they separate out those living in single-family and compare them with those living in multi-family structures, though, they find positive and significant results for the former.

They also fail to replicate Green & White's results when determining whether there is selection bias associated with homeownership, concluding that "the results of our selection bias test indicate a potentially serious problem with research that has found evidence of benefits of homeownership" (p. 289).

They then continue on to examine PUMS data, finding positive results when using a logistic regression model similar to Green & White and find larger coefficients for detached houses than attached houses/apartments. Living space and owned vehicles are both negatively associated with dropout rates in this model. When the sample is limited to only those living in their houses for 5 or more years, the homeownership effect is cut in half for those living in detached houses and rendered insignificant for those living in attached houses/apartments. When the sample is restricted to those who have lived in their homes for 10 or more years, they find no significant effect on any group. This is consistent with the theory that homeownership increases performance by increasing residential stability – in which case, stable homes would not benefit as much from owning a home.

They then conduct a differences-in-differences analysis using NLSY data to examine families that changed from renters to owners during a four-year interval versus families who did not change ownership status, and find positive but non-significant results. Other than families who moved to "worse" housing (defined as moving out their own dwelling and into a parent's or other dwelling), they find little effect of any type of change of status, but caution that this result may not be particularly meaningful given both the small number who switched status (roughly 3% of the sample) and the short duration of the window at which they look. They also find large negative results on reading comprehension scores for students who moved to better housing (this is not defined in the article), one indicator that moving alone may negatively impact students (though there are small positive effects of such a move on math scores and statistically insignificant results on reading recognition scores). This is one reason to believe the authors may have chosen the wrong comparison group.

The model they construct is potentially the best measure of a true homeownership effect. It is the only one in these papers in which the act of purchasing a home is evaluated

rather than just having owned a home in the past. But in a differences-in-differences analysis designed to ascertain whether buying a home improved scores, what one arguably *should* model is the differences in scores of new homeowners (scores after home purchase minus scores before home purchase) minus similar scores (scores at the end of the time period minus scores at the beginning) for *renters* during the same time period. Barker and Miller instead appear to use *all* families who made no move as the reference group, which includes those who lived in homes throughout (which, if the sample is nationally representative, would be roughly 60% of the sample). Meaning that rather than comparing renters who bought homes to renters who did not buy homes, they are comparing renters who bought homes to both homeowners and renters who did not buy or sell a home – and the majority of the comparison group is likely homeowners. Additionally, the authors also caution that the four year time period they examine may be too short to see the full effect of homeownership emerge. Given that a number of articles find detrimental effects of moving for at least the first year afterward and that half the sample had probably owned their house for under two years, it plausible if not probable that any homeownership effect is being washed out by the negative moving effect.

Lastly, they examine ECLS data and look at the progress of kids from 1st to 3rd to 5th grade. For reading scores, the group that lived in owned housing throughout scored the highest, followed by those that switched from rented to owned, then those who lived in rented housing the whole time, and then those who switched from owning to renting were last. The pattern was similar for math scores except that those who switched from owned to rented outscored those who lived in rented housing throughout. In short, those who purchased homes during the study outscored renters who did not and owners who became renters – though the home purchases could be the result of factors that raise achievement. It should also be noted that very few families purchased homes during this four-year period: 79.1% of the kids in the sample

lived in owned housing in first grade versus 81.8% in third grade (i.e. 2.7% of the sample). Data on homeownership were not available for fifth graders, so the authors only included students who lived in owned homes and said they had not moved in the past two years in the sample.

They find a negative coefficient on homeownership for first graders and positive but insignificant coefficients on the third and fifth grade results (the the coefficients are larger with each passing year). They then regress homeownership on the change in scores between 1st and fifth grade and find no significant results (a positive coefficient on reading and a larger negative coefficient on math score growth). The R-squareds for these models, however, are exceptionally low (.05 and .04), so an abundance of caution is necessary when interpreting the results.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 1

Evidence of Time-Order Effects: 1

Total: 3 (Weak Evidence)

Mohanty & Raut (2009)

Mohanty & Raut (2009) also find no direct effects of homeownership, instead finding that home environment, neighborhood quality, and residential stability are positively associated with reading and math performance. They divide their sample into 3-5 year-olds, 6-9 year-olds, and 10-12 year-olds to see if moving at different ages affects children differently.

As in earlier studies, when using OLS estimates they find homeownership positively and statistically significantly associated with achievement in a pooled sample of all age groups (without controls, children of homeowners score 10% higher in math and reading), but only for

the 10-12 year-olds as an individual age group in the disaggregated data. Using instrumental variables, they find mostly no effects (with a smattering of positive and negative effects). They do find a positive association, however, between homeownership and home environment.

One questionable decision in this piece is controlling for the percentage of homeowners and minorities in a neighborhood (both as reported by the residents) in addition to parents' assessment of the neighborhood as being a good place to raise children. Given that homeowners both live in neighborhoods for longer and become more involved in their neighborhoods, however, it seems likely that the two groups would perceive the same neighborhood differently. For example, homeowners and renters in Germany viewed their neighborhoods differently, with the former feeling more empowered to make changes and also perceiving less disorder and more social capital (Friedrichs & Blasius, 2009). If renters perceive the same neighborhood as worse than homeowners, the models would erroneously indicate that renters' children perform worse in school because they live in worse neighborhoods rather than because they rent when, in reality, renters perceive their neighborhoods as worse *because* they rent.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 1

Evidence of Time-Order Effects: 0

Total: 2 (Weak Evidence)

Elliot, Kim, Jung, & Zhan (2010)

Given the substantial questions about mediating effects of homeownership, a path analysis model is appropriate. Elliott et al (2010) examine the effects of parental wealth on

children's reading and math scores using such a model . They design their model to test the "assets theory" hypothesis that savings help children in two ways: 1.) increased purchasing power; and 2.) raised educational expectations. They measure children's school savings (whether children had savings set aside for college) in addition to other assets to test this hypothesis. Interestingly, the correlation between wealth and income is almost three times higher for Blacks than Whites (.430 vs. .173).

They find no direct effects of parental wealth regardless of race on math scores, but for Whites there is an indirect effect – the effects of homeownership on math scores of Whites were fully mediated by school savings (which increases college expectations). They found no relationship, however, between homeownership and college expectations. They also find no direct effects of wealth or homeownership on reading scores for either race.

In sum, the article offers tepid support for the idea that there may be a homeownership effect on academic performance, though there are more null results than positive ones. One limitation is that they test only the effects of homeownership as an asset and not as a way to improve living conditions or residential stability – factors that draw more scrutiny in other articles.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 1

Total: 4 (Moderately Strong Evidence)

Kim & Sherraden (2011)

In the only recent article to find a positive result, Kim and Sherraden (2011) examine the influence of assets on high school completion, college attendance, and college degree attainment. Controlling for financial assets and standardized test scores, they find a statistically significant relationship between homeownership and college attendance, but only a positive and insignificant coefficient on homeownership when predicting high school completion and college degree attainment – when other assets are stronger predictors (and stronger predictors than income for the first two).

They test the mediation roles of child's educational expectations, child's self-esteem, and parental involvement and find that only the first mediates the relationship between asset-holding and high school completion.

The results are plausible – homeownership may have a larger effect on college enrollment than other measures if increased assets make college enrollment more likely, but the methods are less rigorous than other recent papers.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 2

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 1

Total: 5 (Moderately Strong Evidence)

Holupka & Newman (2012)

In the most recent article, Holupka & Newman (2012) use two different datasets (PSID and NLSY) to conduct separate sub-group analyses on low-income White, Black, and Hispanic

children. They use propensity score matching and instrumental variables regression to account for selection effects. Before accounting for selection effects, they find positive effects of homeownership on multiple measures of children's achievement for the White and Hispanic subsamples, but no positive effects in either of the Black subsamples. After addressing selection effects, they find no effects of homeownership for almost all models (the four exceptions are in the matching models: a negative effect on the health of White children and positive effect on the word recognition of Black children in the PSID data and a negative effect on the reading recognition of White children and positive effect on the reading comprehension of Hispanic children in NLSY).

They use two different instrumental variables: housing price index and the average homeownership rates for different races and income levels by state. The first may be problematic if higher home prices are affecting not only whether or not families buy houses but also the well-being of their children, while the second may be problematic if different metropolitan areas in a state have vastly different home prices and homeownership rates.

They also test to see whether the effects of homeownership are mediated by increased residential stability, improved home/parent factors, or improved neighborhood quality. They find little evidence of mediation for most of the variables they test, but do find positive effects of homeownership on residential stability in the White subsamples, as well as an increased percentage of homeowners in the family's census tract, but a lower home environment score in the Hispanic subsample. They then test whether including these mediators reduces the impact of homeownership on achievement when added to a regression model, and found that for most it did not (the exception being the rate of homeownership in the resident's census tract on White children's word recognition scores).

To assess selection problems with homeownership, the authors compare families that do not own homes in the first year of data but eventually buy a home with families who never buy a home. In the White subsample of the PSID data, families who eventually purchased a home scored higher on achievement tests and reported fewer behavior problems. In the Black subsample, however, this pattern is not seen. The authors report similar results from the NLSY data: Whites self-selected into housing while Blacks and Hispanics did not (based on the measures they have available). Perhaps most surprising is that none of the variables they use to measure parents' resourcefulness, cognitive ability, or parenting ability were significant predictors of homeownership for any of the racial subsamples. This offers reasons to both believe and doubt the hypothesis that selection effects are driving the homeownership effect.

The authors report that the strongest predictor of achievement across the subgroups was mother's cognitive ability, but that single-parent families, more siblings, and more time spent on welfare negatively affect results for Black children while breastfeeding improved results for White children and always receiving welfare and living more than half their life in a non-metropolitan area reduced achievement.

One weakness of the study is the fairly small sample sizes (ranging from 150-547), which at times are not large enough to detect small or medium effect sizes. This problem in addition to potentially problematic instrumental variables and the inability to explain the selection effects of homeowning provide some reasons to be skeptical of the results, but overall this study and the Baker & Miller study are probably the most complete analyses of homeownership and both find little support for an independent effect of homeownership on achievement.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 1

Evidence of Time-Order Effects: 0

Total: 2 (Weak Evidence)

Overall Results

Overall, the evidence is incredibly mixed. More recent and more rigorous studies find overwhelmingly null results, but almost all the studies of attainment (rather than achievement) find positive results. There is also a gaping hole in the research when it comes to policy. All twelve of these studies use secondary data to retrospectively examine the effects of homeownership on various aspects of academic performance, but none assess the effect of policy designed to move low-income families into owned homes. Indeed, only one of these studies (Barker & Miller, 2009) examines the results of families who transitioned from renting into homeowning over a number of years and that analysis is extremely limited. Only two studies examine longer-run effects (Boehm & Schlottmann, 1999; Galster, et al., 2007); the former examines students 10 years after graduation, and finds positive results – but with less rigorous methods – while the latter examines former students aged 25-31 and finds mixed results overall, but null results with more rigorous methods.

Collectively, they offer convincing evidence that there is no large and immediate effect of homeownership on achievement – a conclusion in line with another recent review of some of these studies (Ma'rof & Redzuan, 2012). But different studies indicate that there may be stronger impacts on attainment, for lower-income families, for families moving to lower-poverty neighborhoods, and for children in the long-run.

Instrumental variables. There is also reason to be skeptical of the instrumental variables used by researchers to isolate homeownership effects. Almost all of the models

discussed above that use instrumental variables used some version of average housing price as an instrument and found no results on homeownership. But higher or lower local housing prices might not be exogenous. Area home prices may influence not just whether people buy a house but how they behave in other ways. One study in Canada, for example, found that higher home prices predicted lower savings ceterus parabus – potential homeowners seemed to be discouraged and saved $300 less for each additional $1000 in average housing prices, ostensibly because they were not optimistic about their ability to purchase a home any time in the near future (Engelhardt, 1994). Another study finds that housing affordability affects children's well-being – though the best outcomes are found in the highest and lowest-priced areas, which the authors interpret to mean that the highest-priced areas are superior in some unobserved way and that the lowest-priced areas allow children to consume more basic necessities when young (Harkness & Newman, 2005). And a recent study finds that higher cost of living hurts only poor children academically (Chien & Mistry, 2013) An instrumental variable is designed to isolate the variance in the outcome variable that derives solely from an exogenous factor and exploit that to estimate the difference between people to whom the condition randomly applied. If local area home prices are not exogenous, most of the instrumental variables used in these studies are not valid. This merits further scrutiny.

Differential effects. These papers also examine differential effects of homeownership on wealthier versus poorer neighborhoods (Aaronson, 2000), Blacks versus Whites versus Hispanics (Elliott, et al., 2010; Holupka & Newman, 2012), by different ages of students (Mohanty & Raut, 2009), of single-parent families (Zhan & Sherraden, 2003), and of neighborhood effects on homeowners versus renters (Harkness & Newman, 2003b), but

collectively fail to really answer the question "for whom would homeownership prove beneficial?"

Context likely influences the success or failure of homeownership in many other ways. For example, one study using propensity score matching found positive homeownership effects only in more densely populated areas (Grinstein-Weiss et al., 2012) while another found that only homeowners with incomes below 150% of the federal poverty line accrued significant benefits (Harkness & Newman, 2003a). Families and children also likely experience homeownership differently when their children are different ages at the time of purchase and depending on the way in which the home was acquired (e.g. gift or cash purchase vs. taking on a large mortgage) among other factors. For those designing and implementing policy and/or managing homeownership or other social programs, the question of who will benefit and when is more important than the degree to which the average citizen has benefitted from homeownership in the past.

International evidence. It is also worth noting that researchers in other countries have found positive homeownership effects on multiple occasions. Using an instrumental variables approach, Chen (in press) finds that homeownership has a positive effect on high school graduate rates in Sweden, net of individual, family, and community variables. Using census data from Taiwan, Lien, Wu, & Lin (2008)find a positive association between homeownership and high school enrollment for teens and college enrollment for young adults. And a review of the literature on homeownership in England and Scotland finds evidence that homeownership has an effect on school attainment above and beyond that of poverty and related variables (Bramley & Karley, 2007).

Neighborhood-level effects. Lastly, one new paper finds evidence that increasing homeownership in a neighborhood improves local schools. An evaluation of New York City's "Ten Year Plan for Housing," in which affordable housing units were both built and refurbished for rent and for purchase, finds that elementary school zones in which more owner-occupied units were placed experienced increases in enrollment of White students and decreases in enrollment of low-income students in local schools. Even after controlling for neighborhood demographics, owner-occupied housing was associated with higher standardized test scores in local schools while they found no such relationship with construction or refurbishment of rental units. Effects were strongest for units that were in place for at least five years and were refurbished (rather than newly constructed) – an additional 100 units of such housing was associated with a 3.3 point increase in the percentage of students passing reading exams (Chellman, et al., 2011).

Along with other studies finding that neighborhood-level homeownership raises home prices (Coulson, Seok-Joon, & Imai, 2003) and other measures of neighborhood quality (Haurin, Dietz, & Weinberg, 2002), this raises the distinct possibility that increasing homeownership rates may be collectively good for a neighborhood – which could then boomerang back to help the individual new homeowner.

Summary. In short, the empirical evidence on homeownership offers little support for the hypothesis that homeownership dramatically or immediately increases the average student's achievement – but *does* offer reason to believe that homeownership may impact attainment, students in particular contexts or sub-groups, and/or longer-run outcomes.

Theory

With mixed empirical evidence, the theory of action becomes even more important. Why the relationship? What is the causal mechanism? One overarching explanation is that homeownership produces a plethora of positive externalities; other empirical studies find that homeowners subsequently experience higher incomes later in life (Di, 2007), invest more in social capital (DiPasquale & Glaeser, 1999), and have higher rates of political engagement (Engelhardt, et al., 2010). In this sense, if homeowners experience more success in various areas of life, one might expect their children to follow suit in school. But that explanation leaves a lot to the imagination. Below, I review nine different causal mechanisms advanced by the literature and supported by empirical research.

Residential Stability

The most widely cited explanation is increase in residential stability (for better or for worse) of homeowners – homeowners both have stronger incentives to become involved in their neighborhood and find it tougher to move. Aaronson (2000) and others argue that part of the explanation may be family characteristics that are associated with homeownership, but even after controlling for these he still finds a unique and significant contribution of homeownership on predicting achievement due to increased residential stability. Many other articles have reached similar conclusions regarding stability (See, for example: Galster, et al., 2007; Holupka & Newman, 2012).

We know from other research that moving negatively impacts high school graduation rates (Haveman, et al., 1991) and that moving to a new school not only harms the child who moves, but other children in the school (Hanushek, et al., 2004). The reasons for this are fairly straightforward: moving creates stress, uncertainty, turmoil, and disorder as a family searches

for a new residence, packs up everything, moves what they can, and adapts to an array of new and unfamiliar surroundings. Avoiding this process not only avoids the stress, uncertainty, turmoil, and disorder, but allows residents to form deeper connections with their neighbors and their community. Increased residential stability is probably the strongest reason to believe that homeownership positively impacts many families and their children's performance in school.

Asset-Building

The second strongest body of evidence relates to asset-building. Homeownership may help build assets in three ways: first, through accrual of net worth as a homeowner pays down a mortgage and the home increases in value; second, through a change in orientation toward thinking about the future; and, third, from possible income increases.

Even low- and moderate-income homeowners who purchased their homes in the middle of the US housing crisis saw faster growth in assets and net worth than a matched set of renters (Grinstein-Weiss, et al., 2011), this is partly due to the forced savings aspect of owning a home, and partly because owner-occupied homes appreciate faster than renter-occupied housing (Shilling, Sirmans, & Dombrow, 1991).

The future orientation literature is discussed below, but may also explain the finding that homeownership increases future income – with one study estimating a gain of an additional 2% in income above and beyond renters for each additional year of homeownership (Di, 2007).

Evidence abounds that these additional assets benefit families and students. Aaronson (2000) argues "The results tentatively suggest that part of the homeownership effect is due to higher levels of home equity. That is, homeownership has a larger impact on children's outcomes for those with equity at the top of the distribution." (p. 362). A path analysis (Elliott,

et al., 2010) finds homeownership leads to increased school savings, which raises expectations for college, which raises math scores. Separate studies estimate that saving over $3,000 is associated with a 30% higher chance of high school graduation (Zhan & Sherraden, 2003) and that each additional $10,000 increase in home equity is associated with a 5.7 percentage point increase in college enrollment (Lovenheim, 2011). Indeed, a long line of research has tied assets and wealth with college enrollment since the area gained attention at the turn of the century (Conley, 2001). This makes sense given the expense of college: enrollment seems far less daunting when one has the resources to pay for it.

And assets may help beyond the college enrollment process as well. One recent study found that college students who had accumulated savings during high school were more likely to be on track to graduate – likely because they accumulate less debt and are more focused on finishing than finding financing (Elliott & Nam, 2012).

But the effects may be even deeper than financial wherewithal : a path analysis finds that assets positively impact expectations for and confidence about the future, increase planning, and lead to more social connections (Yadama & Sherraden, 1996). More money for college would certainly explain higher enrollment and completion rates, but a shift in thinking may be even more powerful.

Future Orientation

Sherraden (1991) proposes an "assets theory," arguing that the opportunity to accrue assets changes orientation toward the future and results in more saving, more long-run planning, and greater financial stability. Homeowning may also affect the future orientation of children: the Elliot et al (2010) study reviewed above found that heightened expectations mediated the relationship between homeownership and achievement. And, looking further into

the future, multiple studies have found that living in an owned home as a child increases the odds that child owning a home as an adult (Boehm & Schlottmann, 1999; Galster, et al., 2007; Henretta, 1984).

One explanation for these effects is that this shift in orientation increases self-control (Bernheim, Ray, & Yeltekin, 2013), a crucial non-cognitive factor impaired by living in poverty (Duckworth, et al., 2013), and strongly predictive of academic performance (See, for example: Duckworth & Seligman, 2005; Shoda, Mischel, & Peake, 1990). Another is that homeownership and asset accrual simply gives one more hope, more confidence, and higher expectations for what lies ahead.

Personal Status

A longitudinal analysis of those who bought homes versus those who continued to rent found an increase in life satisfaction (though not self-esteem or a sense of control) (Rohe & Stegman, 1994). Another study found that the opportunity to own a home can raise an individual's societal status and, concurrently, self-esteem and personal security (Balfour & Smith, 1996). And a third found weak evidence that homeowners had higher self-esteem and life satisfaction (Rossi & Weber, 1996). The evidence on this is somewhat tenuous, but if homeownership increases well-being in general, that could affect academic performance by improving parenting, increasing confidence, or simply raising expectations.

Expectations and Aspirations

Indeed, the theory that homeownership increases expectations and aspirations has been explored multiple times. Kim & Sherraden's results (2011) indicated that aspirations were mediating the relationship between homeownership and educational attainment. The path

analysis by Elliot et al (2010), however, indicates that homeownership may impact aspirations only indirectly – that owning a home allows families to save money for college, which then raises expectations of attendance. It seems likely, instead, that heightened aspirations partly cause the increase in savings, which increase expectations. And, as discussed above, Zhan & Sherraden (2003) found that a Mother's expectations mediates the relationship between homeownership and grades. The logic behind this is pretty simple: the increased status and assets of homeownership raise expectations and aspirations, which lead to more demanding parenting, more planning for the future (e.g. college saving), and ultimately higher achievement and attainment.

Home Environment

Another explanation is that homeownership positively impacts life inside the home. This was discussed in some of the reviews above. In addition to higher achievement, Haurin et al (2002) found that families experience better home environments and fewer child behavior problems. Mohanty & Raut (2009) also find that homeownership improves home environment, which improves achievement.

One way that an improved home environment can act on academic performance is through improved parenting (R. H. Bradley, 2002). One study found, controlling for selection effects, that homeowning parents are more likely to organize structure activities and that their children spend less time watching TV and playing video games (Grinstein-Weiss et al., 2010).

And a large body of literature links home environment with child behavior (See, for example: Coldwell, et al., 2006; Price, et al., 2013), which would explain why one study found positive effects of homeownership on children's behavior in densely populated areas (Grinstein-

Weiss, et al., 2012) and another large study in Canada found that homeownership was associated with improved teacher and parent ratings of child behavior (Boyle, 2002).

A large body of literature also links home environment with parenting (See, for example: R. H. Bradley, et al., 1988; Deater-Deckard, et al., 2009) and with academic performance (See, for example: Dornbusch, et al., 1987; Lareau, 2003), and the link between child behavior and academic performance is self-evident.

Neighborhood Improvement

Another explanation is that owner-occupied homes are usually located in neighborhoods with more educated residents, lower crime, more stability, and other positive attributes. In other words, residents likely benefit from neighborhood effects when purchasing a home because that home is located in a better neighborhood. In all of the mediation tests run by Holupka & Newman (2012), the one variable that mediated the effect of homeownership on achievement was the percentage of homeowners in the neighborhood.

Low-income residents who purchased homes through the Home Ownership Program operated by the Denver Housing authority overwhelmingly ended up in better neighborhoods than the ones in which they previously lived (though worse neighborhoods than the average Denver homeowner) on a wide variety of measures ranging from environment to perceived safety (A. M. Santiago, et al., 2010), indicating that those who purchase homes may, indeed, end up in better neighborhoods.

Neighborhoods with higher rates of homeownership have more political capital and are more likely to avoid environmental hazards (e.g. dumps or factories) being placed nearby, and neighborhoods with such environmental toxins are also less desirable and therefore lower priced (Currie, Davis, et al., 2013). A growing body of literature finds large deleterious effects of

these environmental toxins on overall health and well-being (Evans & Kantrowitz, 2002) – effects that can be avoided if a potential homeowner is able to move to a higher-priced neighborhood.

Moving to a safer, calmer neighborhood may also reduce stress levels for children and their families. Research has consistently found negative correlations between stress levels and various types of brain development (National Scientific Council on the Developing Child, 2005), with one recent study finding that children who spent less time in poverty had both experienced less stress and exhibited a better working memory (Evans & Schamberg, 2009).

While we could certainly pursue other policies designed to move families to better neighborhoods, purchasing a home may offer buyers a chance to live in neighborhoods that have little or no rental housing.

At the same time, papers comparing the magnitude of neighborhood effects on homeowners versus renters (e.g. Chellman, et al., 2011; Harkness & Newman, 2003b) find that neighborhoods affect homeowners more, which may mean we should be cautious about encouraging homeownership in troubled neighborhoods.

Community Engagement

Similarly, researchers frequently hypothesize that homeownership will increase community attachment and social capital. Even when using instrumental variables, German homeowners moved less frequently and were therefore more likely to engage with their neighborhoods (DiPasquale & Glaeser, 1999). Another study found that even though homeowners and renters had similar social views, homeowners were involved in more community improvement groups (Rossi & Weber, 1996). A longitudinal analysis finds that low-income home buyers increased participation in neighborhood and block association meetings

more so than did a similar sample of continuing renters (Rohe & Basolo, 1997). And a recent analysis found that homeowners are more likely to vote in local elections and join local/neighborhood groups, which the author argues is due to residential stability and homeowners being financially dependent on the health of their community (McCabe, 2013).

A new study in New Zealand, however, controlling for selection effects, finds that homeownership both fosters social capital in neighborhoods and increases demands on local government – which actually leads to reduced satisfaction with the performance of said local government (Roskruge, Grimes, McCann, & Poot, 2013). As discussed in Chapter 2, social capital can foster both positive and negative outcomes.

Increased participation in neighborhoods, "neighboring" activity, political participation, and other forms of engaging with the community all build social ties and social capital, which fosters higher academic performance (See, for example: Coleman, 1988; Portes, 1998).

Physical Environment

Lastly, the physical condition of the house in which one lives may matter. Since homeowners spend more on maintenance (Galster, 1987; Gatzlaff, Green, & Ling, 1998; Spivack, 1991), it stands to reason that their homes will be in better repair overall.

One study found that physical condition (e.g. whether there is structural damage) and type (e.g. single family vs. multiple family) of housing influences the mental health of occupants (Evans, et al., 2003), similar to the results of a forthcoming paper that finds poor housing quality significantly harms multiple aspects of child development (Coley, et al., in press). A new systematic review of the literature found a distinct pathway through which home improvement influences health: improving insulation and other aspects of a home can increase "thermal comfort" by making a house more affordable to heat, reduces respiratory issues and may

increase attendance at work and school (Thomson, Petticrew, Thomas, & Sellstrom, 2013). And a particularly rigorous study finds housing condition -- regardless of ownership – influenced self-esteem and life satisfaction (Rohe & Stegman, 1994).

The findings that physical environment can impair emotional and behavioral functioning, cognitive skills, mental health, and self-esteem offer multiple pathways through which it could directly affect academic performance.

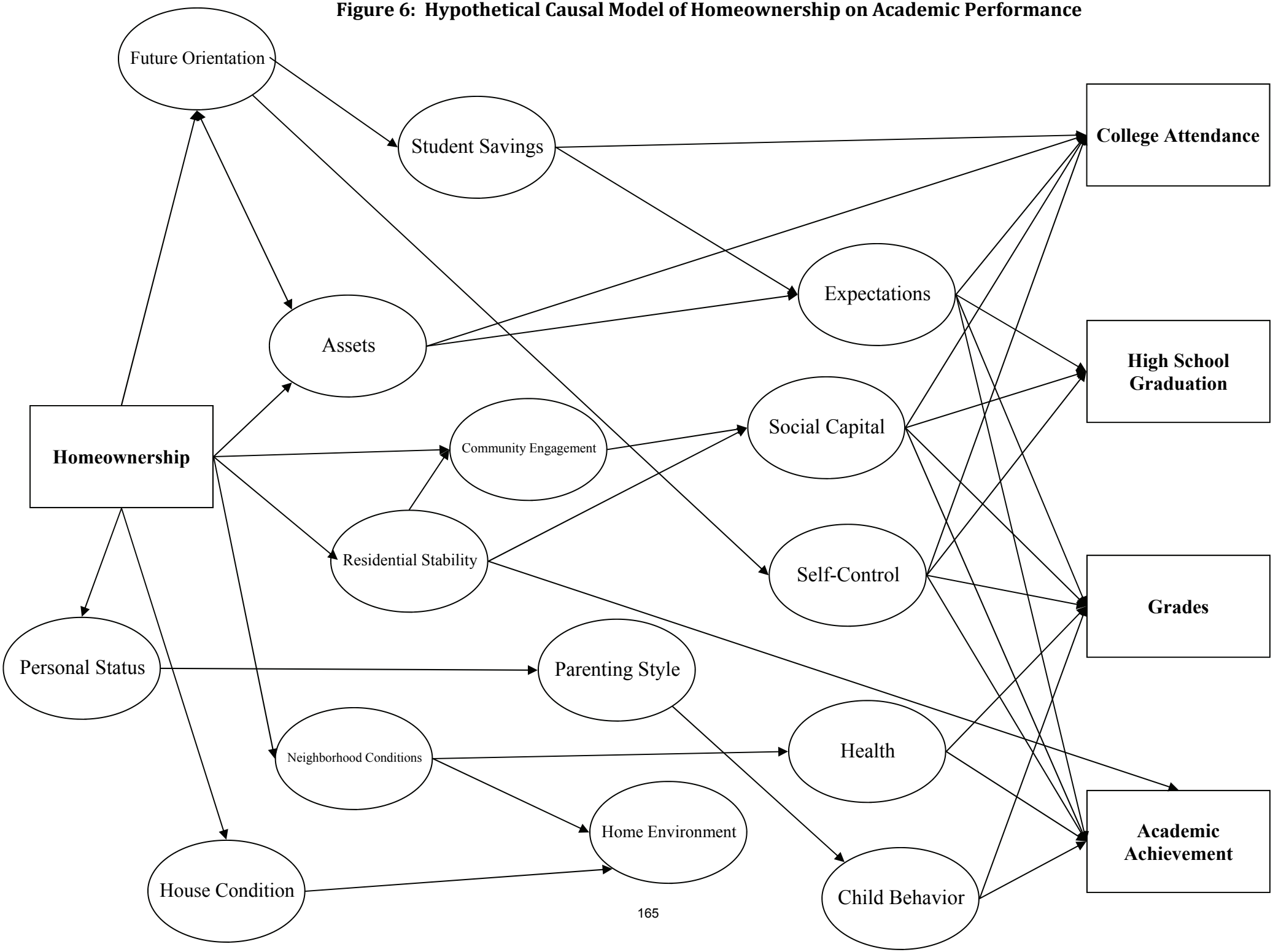
Summary

Overall, the theory behind why homeownership might matter is strong. Evidence supports, to varying degrees, theories that homeownership increases residential stability, asset accumulation, future orientation, personal status, expectations/aspirations, home environment, community engagement, and house condition. These interact with each other to improve self-control, parenting, child behavior, health, and increase social capital – all strongly linked with academic performance. These relationships are displayed in Figure 6.

In addition to improving individual outcomes, increased homeownership rates likely benefit neighborhoods as well. Given the vast empirical evidence that homeowners move less frequently in addition to other findings that they invest more in their communities (DiPasquale & Glaeser, 1999) and that more owner-occupied housing leads to higher-performing schools (Chellman, et al., 2011), one need not make any great leap in logic to assume entire neighborhoods may benefit from increased homeownership. Indeed, a study of neighborhoods in Germany (Friedrichs & Blasius, 2009) finds that homeowners in deprived neighborhoods experience higher rates of social control and social capital while perceiving less disorder.

This aligns with a seminal work finding that length of residence in a community is a main driver of friendship, associational networks, and community attachment (Kasarda & Janowitz,

Figure 6: Hypothetical Causal Model of Homeownership on Academic Performance



1974) and another seminar work on the "collective efficacy" of a neighborhood, which finds that higher rates of homeownership are a strong positive predictor while higher rates of mobility were a strong negative predictor (Sampson, et al., 1997).

An analysis of census data finds that higher rates of homeownership at the neighborhood and city level lead to improved maintenance, longer lengths of residence, and greater property appreciation (Rohe & Stewart, 1996) and increasing homeownership was seen to raise property values in Cleveland (Ding & Knaap, 2002).

And, for better or for worse, local communities with higher rates of homeownership can practice more redistributionist policies since there is less threat of out-migration from the community (Epple & Romer, 1991)

So, even if homeownership has limited effects on academic performance of an individual child, increasing homeownership in a neighborhood may help many children.

Make no mistake, though; a growing number of researchers are expressing skepticism about the effects of homeownership based on the last decade of research using quasi-experimental methods. As just one example, a recent experiment where people were eligible for subsidized Individual Development Accounts (IDAs) yielded positive results regarding political engagement when using basic probit models, but those results disappeared when using instrumental variables (Engelhardt, et al., 2010) – a finding seen in many of the recent studies above.

As such, multiple reviews of this literature express skepticism about such results, with one simply calling it "deficient" (Dietz & Haurin, 2003). Another finds no link between homeownership and child development, but argues that the strongest factors are environmental toxins/hazards, crowding, and residential mobility (Leventhal & Newman, 2010).

As Newman (2008) puts it in a recent policy retrospective on the research:

> *After years of accumulating evidence on the benefits of homeownership for children, the suggestive evidence that homeownership may not be the causal agent after all will come as a shock to many. This possibility aggravates the policy problem, because promoting homeownership is a straightforward policy lever, whereas impacting the characteristics of parents is not (p. 918).*

Despite this recent surge in skepticism about the impact of homeownership, a vast body of literature offers strong theoretical support for at least indirect effects on many areas of life – including academic performance of children.

From a policy standpoint, one could argue that the fact that other factors mediate the impact of homeownership on academic outcomes does not really mean that homeownership effects are small or non-existent. Most notably, some of the mediators through which homeownership acts – for which researchers usually control when modeling homeownership effects – may be most easily changed by encouraging homeownership. In this sense, it does not really matter whether or not it is homeownership itself that directly impacts performance or whether homeownership is simply the lead domino in a chain reaction.

For example, multiple papers find that a large portion of the effects of homeownership are actually due to increased residential stability. One could conclude that we should therefore pursue policies designed to increase residential stability rather than homeownership, but in reality getting a family to buy a home may be the best way to get them to commit to their home and neighborhood, avoid evictions and other landlord problems, and put down roots. Similar arguments could be made regarding many of the other mediators.

Conclusion

Disentangling the effects of homeownership on homeowners and neighborhoods has vexed researchers for decades because of the endogeneity of homeownership. In the current literature, a considerable amount of uncertainty remains regarding whether – and exactly how –

homeownership affects a child's academic performance. This uncertainty spills over into research on other aspects of homeownership. There is rock solid evidence that homeownership increases residential stability and asset-holding, compelling evidence that it increases community engagement and social capital, and somewhat weaker evidence that – partly as a result of these three – it may improve a number of other areas of a family's life.

Evaluation Rubric

On the evaluation rubric, I rate the overall empirical and theoretical evidence as moderately convincing. Table 7 displays the results of the evaluations of the individual articles.

Evidence of a non-spurious relationship. The evidence of a non-spurious relationship rates a 1 on the 0-3 scale: multiple studies offer evidence that homeownership increases academic performance while controlling – to varying degrees – for possible mediating and moderating variables, but almost as many find no evidence with equally rigorous designs. Of the 12 studies reviewed, 6 find mostly positive results while 6 find mostly null results. This is slightly lower than the average of the individual article evaluations because so many found correlations when not controlling for other variables that disappeared after building more sophisticated models.

Evidence of a causal mechanism. The evidence of a casual mechanism rates a 3: the empirical evidence supporting the existence of multiple causal mechanisms is vast. The theory of action here is quite strong. This is slightly higher than the average of the individual article evaluations because, examined holistically, the theoretical evidence from both the empirical

Table 7: Results of Evaluations of Articles on Homeownership

Author(s)	Year	non-spurious relationship	causal mechanism	time-order effects	total
Green & White	1997	2	2	1	5
Boehm & Schlottman	1999	2	2	1	5
Aaronson	2000	1	2	0	3
Haurin, Parcel, & Haurin	2002	3	3	1	7
Harkness & Newman	2003	2	2	0	4
Zhan & Sherraden	2003	2	2	0	4
Galster et. al.	2007	1	2	0	3
Barker & Miller	2009	1	1	1	3
Mohanty & Raut	2009	1	1	0	2
Elliot et. al.	2010	1	2	1	4
Kim & Sherraden	2011	2	2	1	5
Holupka & Newman	2012	1	1	0	2
Average		*1.58*	*1.83*	*0.50*	*3.92*

articles examined and the rest of the literature on homeownership make a compelling argument not made in many of the individual articles.

Evidence of time-order effects. The evidence of time-order effects also rates a 1: few studies examine families before and after home purchases and those that do find mixed results. The vast majority of the studies on homeownership – and 11 of the 12 studies reviewed – exclusively examine homeownership effects at a point in time or over a number of years rather than a before-and-after. This is in line with the average of the individual articles evaluations.

Summary. In total, homeownership rates a 5 on the 0-9 scale; there is moderate support for the idea that we should attempt to increase homeownership among the urban poor in order to decrease the achievement gap. These results are displayed in Table 8.

Implications

Overall, sufficient empirical and theoretical evidence exists to justify considering policies aimed at increasing homeownership in order to increase the academic performance of low-income students. Given the current political environment (many remain skeptical about increasing homeownership among lower-income families after the recent sub-prime mortgage crisis), and the uncertainty over which families should buy which homes in which manner, policymakers should proceed with caution.

Past Interventions

A wide range of past interventions have aimed to increase homeownership. These include: (a) incentivizing saving with Individual Development Accounts (Grinstein-Weiss, Chowa,

Table 8: Rubric for Evaluation of Homeownership Literature Base

score	*Criteria*		
	non-spurious relationship	**causal mechanism**	**time-order effects**
0 (None)	no evidence of a correlation between factor and academic performance	no evidence of a causal relationship between the factor and academic performance	no evidence of a longitudinal relationship between factor and academic performance
1 (Weak)	evidence of correlation between factor and academic performance in multiple studies	A causal mechanism is proposed, but only weakly supported by other literature	weak evidence of a longitudinal relationship based on cross-sectional data
2 (Moderate)	evidence of correlation between factor and academic performance in multiple studies that also control for possible mediating and moderating variables	multiple studies theorize the same causal mechanism and support their theory with empirical literature	multiple studies observe a change in academic performance over time that is correlated with a change in a particular factor
3 (Strong)	evidence of strong association between factor and academic performance in at least five studies of various methodologies that also control for possible mediating and moderating variables	multiple studies, using both quantitative and qualitative methodologies, provide both empirical evidence of a causal mechanism and reference a wide range of supporting literature	multiple empirical studies, using both quantitative and qualitative methodologies, observe a change in academic achievement both before and after a particular factor changes in students' lives

et al., 2010) – the American Dream Policy Demonstration used IDAs and saw increased saving among participants (Grinstein-Weiss, et al., 2009); (b) building more affordable owner-occupied homes – which could follow various models, including New York City's (Chellman, et al., 2011), Montgomery County, Maryland(H. L. Schwartz, 2010), Habitat for Humanity, or HOPE VI (Turner, 2009); (c) offering homeownership and financial management classes – one study found that pre-purchase homeownership counseling reduced the rate of mortgage delinquency at day 90 by 19% overall and by up to 34% in the most effective programs (Hirad & Zorn, 2001); and (d) offering mortgage assistance. All should increase homeownership among low-income families to some degree, but some doubtless do so more effectively than others.

It may be possible to design programs to build assets in conjunction with or instead of programs designed to increase homeownership. A review of the quantitative literature finds potential positive results of Child Development Accounts (CDAs) used to help kids save for college (Elliott, Destin, & Friedline, 2011) as does a review of the recent qualitative literature (Margaret Sherraden, Peters, Wagner, Guo, & Clancy, 2013). Indeed, increased financial literacy in and of itself may benefit families in a variety of ways (Lusardi & Mitchell, 2013). Programs designed to reinforce some of the hoped-for benefits of homeownership (in this case, asset-building and future orientation) may also magnify results and help narrow achievement gaps.

Lessons for Research

In order to inform policy, researchers should explore both more nuanced research on the effects of homeownership in various contexts and just plain more research on the effects of the myriad policies designed to increase homeownership among low-income families. We should strive to better define the effects of programs such as those discussed above.

Program evaluations of the wide variety of policies designed to increase homeownership among low-income families in addition to research on the contexts that make homeownership most successful would immensely aid legislators and practitioners.

Lessons for Practice and Policy

In the meantime, legislators and practitioners should cautiously proceed with programs designed to encourage homeownership, but with a number of caveats. Obviously, we cannot repeat the mistakes of the 90's and 00's when financing was too easy to acquire and predatory loans widespread – putting people into a house they will not be able to afford to remain almost certainly does more harm than good. Second, leaders should monitor the areas in which people purchase or construct homes as part of these programs – multiple studies indicate that purchasing a home in a lower-poverty neighborhood may multiply the benefits of homeownership. Third, leaders should monitor the lives of residents after moving – if residents are not meeting other neighbors, building a nest egg, maintaining their home, and generally happy in their environment, then moving into a new home will likely yield disappointing results.

Despite recent the skepticism expressed in recent research, homeownership is still a potentially valuable tool that we can use to narrow the achievement gap as long as we do it the right way.

Chapter IV

Stress and the Achievement Gap

Shonkoff & Phillips (2000) include stress theory as a fourth group of neighborhood effects theories, but it is more often cited by health researchers. In overly simplistic terms, stress theory posits that stressors more common in poorer neighborhoods (which might range from crime to lead paint) have deleterious effects on children. These negative effects add up to create stress, harm health, and inhibit development. Stress theory would predict that children exposed to more negative experiences would be more distracted, less focused, more stressed, and lower achieving in school.

An important distinction must be drawn, however, between different types of stress. Most Americans doubtless feel like they are subjected to a great deal of stress between personal, family, and work needs and demands. A major research report on the issue (National Scientific Council on the Developing Child, 2005), though, differentiates between three different types of stress: positive, tolerable, and toxic. Positive stresses are moderate, temporary, and can be harnessed (e.g. exercise or excitement). Tolerable stresses are also temporary but could prove harmful without supportive relationships (e.g. divorce or illness). Toxic stresses are those that frequently elicit strong and prolonged reactions from the body and/or potentially tolerable stresses experiences without supportive relationships that help the child manage the stress. These eat away at multiple body systems over time and affect the physical and mental health, cognitive development, and other aspects of a child's life. All of which should add up to worse performance in school.

Poverty and Stress

Decades of research have explored the ways in which living in poverty increases stress (see, for example: Aneshensel, 2010; D. C. Glass & Singer, 1972) and evidence has emerged that stress-inducing conditions harm child development in low-SES families (R. H. Bradley & Corwyn, 2002). Why would living in poverty increase exposure to toxic stress?

Among other factors, lower-income children experience more stress because they: experience more negative life events (McLoyd, 1990); are exposed to more violence (Foster & Brooks-Gunn, 2009), crime (Goldmann, et al., 2011) and disorder (Hill, et al., 2009); have less residential stability and are more likely to be homeless or have high mobility (Banyard & Graham-Bermann, 1998); live amidst more physical deterioration and in lower quality housing (Evans, et al., 2001); reside in noisier (Evans & Kantrowitz, 2002), more crowded (Evans & English, 2002), and more polluted (Evans & Kantrowitz, 2002) areas; experience more family disruption (McLanahan, 1985); and possess fewer resources with which to combat problems (Banerjee & Mullainathan, 2008).

All of which explains why recent studies have found that children who spent less time in poverty had both experienced less stress (Evans & Kim, 2007).

Allostatic Load

The body's system of managing stress, or allostasis, is effective in the short-run but eats away at the body over time if it is overworked; the degree and frequency to which the body's stress management system has to act is referred to as "allostatic load" and negatively affects a wide range of physical and mental health outcomes in animals and humans (McEwen, 2004).

Tough (2012) provides a useful metaphor of the stress-response response system as a firehouse. In this sense, firefighters are excellent at putting out fires in the short-run – just as

the human body's fight-or-flight response system is excellent at responding to a single emergency. But if firefighters had to rush to put out a fire at the same house over and over again – each time breaking windows, hacking into the roof, and dousing everything with water – eventually the house would be but a shell of its former self. The allostatic load measures the extent to which the body has been chopped away at and soaked with stress hormones over time.

If families living in poverty experience more stressors on a daily basis, then they should also accumulate a larger allostatic load over time. Indeed, a large, national study found that income and education levels were significantly and negatively associated with higher allostatic loads (which they term "cumulative biological risks") net of individual factors (Seeman et al., 2008) and in a second, adults who had experienced more SES-related adversity throughout their lives (ranging from welfare receipt in childhood to difficulty paying bills as an adult) had higher allostatic loads in a national study (Gruenewald et al., 2012). Another study of adults in Chicago also found that those in poorer neighborhoods displayed more cumulative biological risk than those in more affluent areas net of individual demographics (King, et al., 2011). Though financial difficulties alone certainly stress people, the theory focuses more on the environmental toxins and stresses to which those living in the poorest neighborhoods are exposed.

Large, national studies also find compelling evidence that living in poorer neighborhoods impacts allostatic load: one found that those who lived in lower SES neighborhoods experienced higher alllostatic loads net of race, gender, age, and income (Bird et al., 2010) and a second found that neighborhood SES most strongly predicted allostatic load among the Black population (Merkin et al., 2009). And another study in Detroit found strong evidence of an impact of neighborhood poverty on allostatic load among Detroit residents using multilevel

models (Schulz et al., 2012). All of which adds up to compelling evidence that living in poverty does, in fact, raise levels of chronic and toxic stress.

ACE

A recent advance in the study of stress was the creation of the Adverse Childhood Experiences (ACE) survey (Felitti, 2002; Felitti et al., 1998), which measures accumulated stress through exposure to various stressors in childhood and strongly predicts a wide variety of health problems later in life. The original ACE survey asked 1-3 yes/no questions (which were counted collectively as one stressor) about 7 different dimensions of stressors; the current version (Acestudy.org, 2013) now contains 10.

One important reason for the use of ACE and other similar checklist measures is that stress can be subjective; for example, a study of neighborhoods in Detroit found that White and Black residents living in the exact same neighborhoods reported very different levels of social and physical environmental stress (Schulz, et al., 2008). Studies asking how bad conditions were will get widely varying responses from different people about the same aspect of a home or neighborhood. On the other hand, the same factor will impact different people to differing degrees.

The results of the first ACE studies touched off a wave of studies measuring other impacts of stress and greatly expanded the research base on the subject.

Evidence

It makes sense, on face, that stress would reduce the achievement – and disproportionately reduce the achievement of low-income students – of students. And, indeed, a review of the evidence points to stress as an important mediator between poverty and

academic performance (McLoyd, 1998). The increased stress impacts academic performance in numerous ways. Below, I review studies linking stress with academic performance. I limit the reviews to studies that include environmental stressors related to poverty and exclude those that only measure familial stress inside a household. Summaries of the studies are displayed in Table 9 below.

Articles are reviewed individually based on the rubric presented in Chapter 1 (Table 2). Articles are rated 0-3 (no evidence, weak evidence, moderately strong evidence, or strong evidence) in each of three categories: the degree to which the results show a non-spurious relationship between stressors and academic performance, demonstrate a causal mechanism to explain such a relationship, and display time-order effects to link changes in academic performance to a change in stressors. Articles that score under 3 are considered weak evidence, those that score between 4 and 6 are considered moderately strong evidence, and those that score 7 or above are considered strong evidence that stressors will affect academic performance.

Alva & de los Reyes (1999)

Alva and de los Reyes (1999) argue that the acculturation process uniquely stresses Hispanic families and children. They survey 171 ninth grade students at a predominantly Hispanic public high school in Los Angeles: only 33% of the students sampled reported that they had been born in the United States and the median GPA in the sample was 2.3.

They measure psychosocial stress by using the Hispanic Children's Stress inventory, which has 30 items asking about culturally specific stressors, and find that score on the inventory is positively correlated with mental health issues and negatively correlated with perceived self-competence. Using hierarchical regression, they find that adding psychosocial

Table 9: Summary of Main Findings of Articles on Stress

Author(s)	Year	Main Outcome	Longitudinal	Methodology	Data	Direction
Alva & de los Reyes	1999	GPA	No	Hierarchical Regression	Primary	-
Thompson & Masset	2005	Iowa Test of Basic Skills	No	Correlation	Primary	-
Morales & Guerra	2006	Iowa Test of Basic Skills	Yes (2)	Sructural Equation Model	Primary	-
Wadsworth et al.	2008	Grades/Effort/Importance	No	Sructural Equation Model	Primary	0

stress statistically significantly increases the prediction power of the model when predicting GPA, but the prediction power is fairly low overall (R^2=.14 for a model with demographic variables and stressful life events and .21 when cognitive self-competence is added). The model has more power when predicting internalized symptoms (a composite of anxiety and depression).

The small sample size and simplistic methods provide only limited evidence that stress negatively impacts children's performance in school, but the examination of stress among mostly recent immigrants is one important dimension to examine.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 2

Evidence of Time-Order Effects: 0

Total: 3 (Weak Evidence)

Thompson & Massat (2005)

Thompson & Massey (2005) survey 110 6th graders in four different inner-city Chicago public schools to measure their exposure to violence, PTSD symptoms, behavioral problems, and academic achievement (based on the Iowa Test of Basic Skills).

They find high rates of both exposure to community violence (70% report knowing someone who was shot or stabbed in the past year) and PTSD symptoms (the median score indicates mild PTSD). They then run correlations between the variables of interest and find community violence (r=-18, p<.10) and witnessing violence (r=-.20, p<.05) mildly negatively correlated with achievement, strongly positively correlated with PTSD symptoms, and

moderately positively correlated with behavioral problems. PTSD symptoms are moderately negatively correlated with achievement ($r=-.32$, $p<.01$).

The study's small sample size and correlational methodology leave a lot to desire, though the relationships between violence, stress, behavior, and achievement paint a picture of a negative effect of stress on kids living in urban poverty.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 1

Evidence of a Causal Mechanism: 1

Evidence of Time-Order Effects: 0

Total: 2 (Weak Evidence)

Morales and Guerra (2006)

Given the multiple pathways through which stress affects kids, path models are particularly appropriate analytical techniques. Morales & Guerra (2006) use structural equation modeling to explore the effects of stressors in the family, home, and school on mental health, behavior, and academic achievement.

They survey over 4,000 1st-6th grade students in 21 urban Midwestern schools from the Metropolitan Area Child Study and then measure achievement in both the first and following year. They find that family/neighborhood stressors predict moderate decreases in achievement in both year 1 and year 2 – and larger decreases than school stress (though not as large as aggressive behavior). Family/Neighborhood Stressors also predict increases in depression and aggression in separate models. The direct and indirect effects of the index of stressors are in line with theory on the subject.

They also test whether stress across different domains might be more deleterious than multiples stresses in one domain and whether cumulative stresses affect students in a linear or quadratic manner. They find no evidence of the former, but when investigating the latter find that the effects of additional stressors decrease after 3 (which differs from other literature on cumulative stress).

This is the most rigorous study of the ones reviewed so far, but the researchers make some interesting decisions regarding the construction of the Family/Neighborhood Stressors measure. They lump together the family transitions and neighborhood violence subscales of the Stressful Urban Events scale plus add "family stress," which they operationalize as 0, 1, or 2 if the child is eligible for no lunch discount, reduced price lunch, or free lunch. Free/Reduced price eligibility is usually used as a measure of socioeconomic status rather than stress.

Given the rigorous design and large, multi-site sample, it provides moderately strong evidence of the effects of stress on academic achievement but would be more compelling if it separated out the effects of different types of stressors and refrained from using SES as a measure of stress exposure.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 3

Evidence of a Causal Mechanism: 1

Evidence of Time-Order Effects: 2

Total: 6 (Moderately Evidence)

Wadsworth et al. (2008)

In another path analysis, Wadsworth et al. (2008) analyze poverty-related stress as a mediator between poverty and academic achievement among 164 low-income students in

Colorado who were recruited for the Colorado Project on Economic Strain (mean income was $19,386 in the sample).

The authors conduct semi-structured interviews with 82 pre-adolescents (aged 7-10), 82 adolescents (aged 11-18), and each child's primary caregiver. They measure stress using five subscales of the Multicultural Events Schedule for Adolescents (economic strain, family conflict, family transitions/changes, discrimination, and victimization/violence exposure) and average student and parent responses. They measure academic achievement by asking students and parents and adolescents about the student's GPA, how much they like school, how much time they spend on homework, and how important school is to the student.

The authors find no statistically significant effects of poverty-related stress as a mediator, but attribute this to the lack of variability in SES (all of the participants are low-income, and they only tested the variance in the stress variable derived that resulted from variance in the income variable). They do, however, find significant effects of stress on a wide range of behavioral and mental health issues (e.g. sleep problems, anxiety, depression, and oppositional defiant disorder). Poverty-related stress explains 7-22% of the variance in psychological syndromes, 5-13% of the variance in psychological disorders, and 11% of the variance in deviancy.

It is also worth noting the high rates of psychological issues in the sample – over 50% of the students demonstrated symptoms of the psychological syndromes the authors tested using the ASEBA (Achenbach System of Empirically Based Assessment) system: aggressive, delinquent, anxious/depressed, and withdrawn behavior in addition to somatic complaints.

Lastly, the authors test for differences by both race and age and find less impact of stress on African-American students but few differences by age group.

The study presents mixed evidence on the effects of stress. The relationships between stress and mental health provide a potential causal mechanism, but the model finds no mediating effects of stress directly on achievement – and we cannot say whether or not this was only due to sample and design limitations.

Overall, I rate the article thusly:

Evidence of a Non-Spurious Relationship: 0

Evidence of a Causal Mechanism: 3

Evidence of Time-Order Effects: 0

Total: 3 (Weak Evidence)

Summary

Overall, shockingly little empirical research connects environmental stress directly to academic performance given the explosion in research on stress, child development, and health over the past 15 years. Collectively, the studies provide moderately convincing reason to believe that stress does, in fact, affect academics, but with myriad limitations.

Three of the studies are small groups of students in one city (only Morales and Guerra sample more than 200 students or students from more than one city). And only Morales and Guerra use rigorous methodology to assess the size of the direct effects of stress on academics net of all other variables.

The studies also fail to establish which stressors are most important. Thompson and Massat use one subscale measuring community violence stressors and a separate one measuring the witnessing of violence, but the other three papers lump together family and community stressors with, in one case each, cultural stressors and socioeconomic status.

Given that the only study not finding a statistically significant effect (Wadsworth et al.) uses stress as a mediator between poverty and achievement in a low-income sample with limited variation, that the same study finds strong effects of stress on behavioral and psychological problems that likely impact achievement, and that the other three find similar relationships, the group collectively provides little reason to believe that stress does *not* affect academic performance.

Nonetheless, the four provide only tepid empirical evidence to back the existence of such a relationship.

Other Evidence

Three other studies measure the effects of stress and academic performance in ways that did not merit full reviews.

A retrospective analysis of 700 children's medical records at a clinic in a distressed section of San Francisco examined the relationship between ACE score and learning/behavior problems (Burke, Hellman, Scott, Weems, & Carrion, 2011). Children had been previously classified as having a learning/behavior problem by a pediatrician on their medical chart if they had low academic achievement or a history of violent behavior. They found that children with a score of 1 or more were over 10 times as likely to display a learning/behavior problem and children with a score of 4 or higher were over 30 times as likely as children with a score of 0. Unfortunately, academic achievement and behavior problems were lumped together into one variable and what constituted "low academic achievement" was not standardized. Nonetheless, the evidence is highly suggestive of a stress effect on academic performance.

Another found that maternal stress (originating in the home) led to less maternal warmth, home learning stimulation, and cultural socialization, which decreased math and

reading achievement of students entering elementary school (Baker & Iruka, 2013). The maternal stress measured is not clearly related to environmental conditions experienced during poverty, but the results nonetheless suggest that maternal stress – perhaps regardless of the source – can impact achievement.

Lastly, in a recent study, Felfe and Hsin (2012) use the PSID to examine maternal workplace environment and child development. They find that lower-income workers were exposed to more hazards, though their measure of workplace stress is positively correlated with income. They find moderate evidence across a variety of models that workplace hazards are associated with both less time spent on education-related activities with their children and lower scores on three different Woodcock-Johnson tests of verbal and math ability.

It remains unclear, however, to what extent either or both of their measures of workplace environment really measure environmental stressors. For example, the workers who reported the highest number of hazards were – who likely replied yes to risk of burns, exposure to high temperatures, use of special safety equipment, and other questions but may have less truly toxic stress than other positions in which dangers are greater but less numerous.

Conclusion

Overall, the empirical evidence supporting the theory that toxic stress harms the academic performance of low-SES students is only moderately convincing. There is more reason to suspect a relationship exists than does not, but we need more research that explores different stressors in-depth, samples larger populations, and uses rigorous methods to disentangle the effects of stress from other SES-related factors and conditions. Next, I review theoretical evidence.

Theory

Unlike the empirical evidence supporting a direct relationship, the theoretical evidence supporting a causal mechanism through which stress could impact achievement is voluminous. And, just as a variety of different factors raise stress levels, raised stress levels impact a variety of aspects of children's lives – many of which may subsequently influence academic performance. Below, I review the evidence supporting the most commonly theorized causal mechanisms.

Cognitive Function

Two major reports by teams of researchers have recently concluded that the evidence linking negative stress with impaired brain development is strong (National Scientific Council on the Developing Child, 2005; Shonkoff et al., 2012). The variety of changes in brain development may be the main pathway through which stress can influence academic performance. A number of articles find relationships between stress and various forms of cognitive function.

One study found that both Vietnam combat veterans and victims of childhood abuse showed increased symptoms of PTSD and had reduced hippocampal volume, which was correlated with verbal memory deficits among the veterans (Bremner, 1999). A forthcoming study (Guenzel, Wolf, & Schwabe, in press) studies "stimulus-response" memory and finds that, when asked to recall the information learned, participants perform significantly worse when first exposed to a stressor with cortisol concentration also negatively related to memory retrieval. Memory deficits certainly would not serve children well in school.

And a large study of World War II soldiers in Finalnd found that early life exposure to stress (in this case, being separated from their parents during the war) predicted intellectual

ability at both age 20 and age 70, though not a more rapid decline between the two time points (Pesonen et al., 2013).

The pathway between cognitive function and academic performance is short and direct: if students struggle to learn new things or remember what they learned, their results will suffer.

Executive Function

Similarly, stress can also affect executive functions – a somewhat slippery term used to describe an umbrella of traits related to the organization, regulation, and management of thoughts and behavior (Lyon, 1996; Miyake & Friedman, 2012; Pennington & Ozonoff, 1996).

As bodies adapt to constant stress, they tend to either constantly produce high levels of cortisol (a hormone released by the body to deal with stress) or stop producing much cortisol (i.e. stress-response systems either stay on constant high-alert or become fatigued and no longer respond); in either case, individuals' cortisone reactivity is dulled. Students in one study who had experienced more stress exhibited lower cortisol reactivity and also performed worse on tests of executive function and self-regulation (Blair, et al., 2005).

In a seminal study, children were tracked from age birth to 17 and given assessments of both poverty and stress levels (allostatic load) at multiple points along the way (Evans & Schamberg, 2009). At age 17, they were given a test of working memory (the ability to recall strings of recently communicated information such as series of numbers or, in this case, the handheld game Simon – which blinks different colored lighted tiles in an increasingly long pattern that then must be repeated). The researchers found that students who had spent more time in poverty both had higher stress levels and performed worse on the working memory test (both of which had already been established in other studies). But in this study that combined

multiple factors, they found that stress levels entirely mediated the effect of poverty on working memory performance.

Two additional studies found that students who had experienced more negative life events displayed less self-control (Duckworth, et al., 2013), and that the stresses of living in poverty can deplete self-control over time (Spears, 2011), which is important since self-control is a particularly strong predictor of academic performance (Duckworth & Seligman, 2005). This is in line with previous studies have established psychological effects of poverty (Mullainathan, 2011), in part because the constant need to focus on immediate survival tasks reduces attention to more long-run activities (Banerjee & Mullainathan, 2008).

Overall, these studies provide strong reason to believe that stress over time disrupts brain functioning, exhausts self-control, and reduces executive functioning in students. Not surprisingly, previous research has established as an important part of academic performance, since students who cannot organize, control, or plan their thoughts and actions stand little chance of working through the steps of a math proof or composing an essay (Masten, et al., 2012).

Parenting

Stress impacts the whole family, not just the child. Of particular import may be the effect of stress on parents and how that changes parenting practices. If parents are exhausted and frustrated from stress, they may be angrier and less patient with their children.

One study on parental support in high-stress situations used a path model to examine the links between economic hardship and adolescent distress and found that economic hardship increased parental depression and decreased supportive parenting – which increased internalizing and externalizing symptoms displayed by the adolescents (Barrera et al., 2002).

This supports the theory that stressed-out parents are sometimes too angry, impatient, and/or exhausted to be supportive of their children.

In a similar vein, researchers have explored the effects of stress on the responsivity of parents to child needs. A study of families living in small towns and rural areas found that low-income children experienced decreased maternal responsiveness due to heightened maternal stress and reduced social networks (Evans, Boxhill, & Pinkava, 2008). And a recent study measured the parenting traits used on a sample of healthy, low-SES, African-American children and then the stress reactivity of the same children 11-14 years later and found those who had had higher parent responsivity earlier in life performed better on the stress test and displayed higher levels of cortisol reactivity (Hackman et al., 2013).

If parents are less supportive and less responsive to child needs, it likely deteriorates the parent-child relationship. Indeed, using structural equation modeling one study found significant paths from financial strain and neighborhood stress to parent psychological distress and then to less positive parent-adolescent relations, which predicted worse adolescent adjustment (Morrison Gutman, McLoyd, & Tokoyawa, 2005), which is consistent with another study using structural equation models that found that recent negative life events increased parental depression and disrupted discipline practices, which reduced the adaptability of boys (Conger, et al., 1995).

And the deterioration in relationships can have multiple effects. In one longitudinal study, stress and negative life events were associated with harsher discipline and less maternal warmth and then with child aggression and externalizing problems (Dodge, et al., 1994), which is consistent with another study that found economic pressure increased hostility by parents and the frequency of adolescent behavioral and emotional problems (Conger, et al., 1994).

Parenting practices also affect home environment – a number of these studies find changes in home environment as a result of the changed parenting behaviors. This is consistent with the path analysis discussed in the evidence section that found stress reduced both home learning stimulation and cultural socialization through reduced maternal warmth (Baker & Iruka, 2013).

Overall, the literature strongly supports the theory that parents experiencing high amounts of stress struggle to support, respond, and relate to their children and, as a result, children display more psychological and behavioral issues and worse stress-management. The relationships here are unsurprising given the well-established literature linking parenting with academic performance (see, for example: Dornbusch, et al., 1987; Klebanov, et al., 1994; Petrill, et al., 2005).

Physical Health

The most-studied impact of stress has been physical health. The initial ACE study (Felitti, et al., 1998) found that half of the population reported at least one type of negative experience while a quarter reported 2 or more (out of 7) and that those exposed to four or more categories of stressors were between 40% and 1200% more likely to display risky health traits and behaviors ranging from obesity to smoking to suicide. This set off an avalanche of similar research using ACE scores to predict health outcomes; a review of the first decade of that research (Felitti & Anda, 2010) found strong evidence that ACE not only influenced health but that the number of factors related to ACE was continuing to grow. I discuss some of the most notable of these papers below.

A large study of over 17,000 HMO members found that those with higher ACE scores were at far greater risk for 18 different outcomes related to impaired brain structure and

function (e.g. substance abuse, memory, and aggression) with the mean number of outcomes three times as high at the top of the scale as the bottom (Anda et al., 2006).

A retrospective survey of adults found that 9 out of 10 categories of ACEs significantly raised the odds of ischemic heart disease – those with an ACE score of 7 or higher were 3.7 times more likely to contract IHD. Equally important, they found that psychological factors more strongly mediated the relationship between ACEs and heart disease than traditional physical risk factors – indicating that ACEs were likely influencing disease risk due to changes in psychology rather than physical traits (Dong, Giles, Felitti, & Dube, 2004). And a forthcoming study examines long-term cortisol elevation in hair samples and finds a positive association with cardiovascular disease (Manenschijn et al., In Press).

Lastly, people with an ACE score of 6 or higher died nearly 20 years earlier than those with a score of 0. After controlling for demographic variables, they were still 1.7 times as likely to die before age 75 and 2.4 times as likely to die before age 65 (Brown et al., 2009).

The evidence that childhood stress impacts a wide range of physical health issues – up to and including death – is rock solid. And the relationship between health and learning is both pretty clear – students who are ill cannot come to school, pay attention while they are there, or function well enough to learn efficiently – and well supported (see, for example: Basch, 2010; B. J. Bradley & Greene, in press; Currie, 2005).

Mental Health

After physical health, the most frequently studied outcome of childhood stress is mental health. The relationship has become so widely accepted that a different measure of neighborhood disorder and violence – the City Stress Inventory – was deemed valid in part

because it correlated a variety of mental health problems including depression, self-esteem, and mood changes (Ewart & Suchday, 2002).

In one interesting study, researchers interviewed children in juvenile detention in Cook County, Illinois and found that the median inmate had experienced 6 childhood traumas and also were able to diagnose 11% with PTSD – both far more than in the non-incarcerated population (Abram et al., 2004). One could argue that the results indicate that the real cause of crime – at least in this sample – is exposure to stress.

While most studies of mental health study symptoms, another way to measure its prevalence is to examine the number of study participants who were prescribed drugs to combat diagnosed problems. Indeed, a 9-year study found that those who had higher ACE scores at the start of the study were significantly more likely to receive a prescription for a psychotropic medication in the years that followed – net of demographic controls, those with a score of 5 were five times more likely to receive such a prescription than those with a score of 0 (Anda et al., 2007). The result was replicated in a large study in Sweden (over 360,000 participants) which found both that lower SES children had higher ACE scores and that those with higher ACE scores were more likely to be prescribed psychotropic medication – an ACE score of 3+ was associated with a 2.4 higher odds of prescription for women and 3.1 for men (Björkenstam et al., 2013).

In another study, adults at a clinic in San Diego were more likely to report depressive symptoms the higher ACE score they reported (Chapman et al., 2004). While a longitudinal study of low-income families in Denver used hierarchical linear modeling to control for different levels of influences, but found that poverty-related stress significantly predicted all 8 psychological syndromes for which they tested in the adolescents in the sample (C. D. Santiago, Wadsworth, & Stump, 2011).

Two narrower studies found that parental incarceration is associated with higher rates of mental health problems among children (Foster & Hagan, 2013) and prenatal stressors may make children more prone to ADHD (K. J. Anand & Scalzo, 2000). And, at the extreme, a forthcoming study finds that depressed adults who had experienced more stress during childhood both experienced more stress later in life and were more likely to attempt suicide (S.-W. Kim et al., In Press).

As with physical health, the evidence strongly supports an effect of stress on mental health. Which makes sense: if chronic and toxic stress flood the body with hormones that eventually impair its ability to properly function, then psychological functioning would suffer as well. The relationship between mental health and academic performance is similarly clear – students who are upset, distracted, unable to focus, or not processing things well will also struggle to learn – and supported by research (see, for example: Frick et al., 1991; Hinshaw, 1992; McGee & Share, 1988).

Behavior

Behavioral problems often go hand-in-hand with mental health issues, and a wide range of studies have examined the effects of stress on behaviors.

A study of African-American and Hispanic children living in urban neighborhoods found that those living in more disadvantaged neighborhoods had experienced more stressful life events and that those who had experienced more of each of stressful life events, life transitions, and exposure to violence exhibited more aggression (Attar & Guerra, 1994). More aggression can be helpful in many domains of life, but usually not in school.

Conversely, stress can also make students less aggressive. A review of the effects of environmental stressors on motivation finds evidence that uncontrollable stimuli (e.g. noise,

crowding, pollution) result in learned helplessness because the inability to control these stressors turns into a belief that they cannot control other environmental factors; persistence in the face of challenge; and increases depressed affect (Evans & Stecker, 2004). At one end of the spectrum, an angry and overzealous child probably will not focus in school but, at the other, a child who believes he/she cannot accomplish anything will never succeed.

A number of studies also indicate that stress exposure increases the willingness of children to take risks. A laboratory study tested adolescents on two separate days: on one which they reported high stress and one on which they reported low stress (Galván & McGlennen, 2012). In a decision-making task, the participants showed significantly more risky decision-making in high-stress conditions, which the authors argue indicates that individuals may be more vulnerable to contextual influences when experiencing high rates of stress. If this is the case, stress could amplify the effects of negative conditions across the spectrum from neighborhood to home. Other studies have found those exposed to more stress had increased odds of using illicit drugs (Dube et al., 2003) and were more likely to give birth out-of-wedlock as a teenager (An, et al., 1993). While we certainly do not want students to be averse to all risks, constantly seeking out the most risk possible usually only lands students in hot water.

We also have some evidence that these problems continue to plague students later in life. A study of almost 10,000 adults in San Diego found that higher ACE scores were associated with worse work performance (serious job problems, financial problems, and absenteeism) due to increased interpersonal relationship problems, emotional distress, somatic symptoms, and substance abuse (Anda et al., 2004).

Overall, the evidence that stress increases behavioral problems is very strong. And the relationship is, again, straightforward between behavior and achievement: students who do not cooperate in class, are constantly in trouble, and unfocused will not maximize their classroom

time. And behavior may be particularly important for low income students: a recent study tracked achievement trajectories of at-risk children and found that while most continued to fall further behind academically throughout school, those with better interpersonal skills and fewer internalizing problem behaviors fared better (Judge, 2013). Additionally, behavior can affect other students (G. Chen, 2007)

Sleep

Another factor people frequently associate with stress is sleep – people often blame an inability to sleep on anxiety and other manifestations of stress. A number of studies have explored this relationship.

A sleep study of people with insomnia found that those with high ACE scores awoke and moved around more often during the night and showed more signs of sleep disturbance, but found no differences in sleep patterns after reading negative biographical information (designed to induce stress) between high- and low-scorers (Bader, Schafer, Schenkel, Nissen, & Schwander, 2007). This offers evidence that stress impairs sleep, but counteracts other studies that find that those subjected to chronic and toxic stress are less able to cope with additional stressors later.

A study in Finland also found a significant relationship: Those who experienced 3-6 childhood adversities were 3.64 times as likely to report poor quality sleep (Koskenvuo, Hublin, Partinen, Paunio, & Koskenvuo, 2010).

And a recent study of adults across 5 states found that ACEs during childhood was a statistically significant predictor of frequent insufficient sleep (lack of sufficient sleep in at least 14 of the past 30 days) in adults and that those with 5 or more reported ACEs were 2.5 as likely as those with 0 to report frequent insufficient sleep (Chapman et al., 2013).

The relationship between stress and sleep make sense and has a fair amount of evidence behind it. The degree to which sleep matters for academic performance is a little less clear, but sleep does have significant negative effects on a wide range of physical health problems (Shankar, Syamala, & Kalidindi, 2010), quality of life (Strine & Chapman, 2005), and general attitude and persistence – which seem to influence achievement (Perkinson-Gloor, Lemola, & Grob, 2013).

Summary

If stress negatively impacts brain development, cognitive performance, executive functioning, parenting and home environment, health, mental health, sleep, and behavior – all of which are related to academic performance – it stands to reason that it also impacts children's performance in school as a result.

Overall, the theoretical evidence that stress impacts achievement is extremely strong and the empirical evidence to support the theory is rapidly accumulating. Unfortunately, just as the causes of stress are complex and numerous, the solutions may be as well. Possibilities include (a) altering environments, (b) increasing support, and (c) providing children with counseling. A full conceptual map is displayed in Figure 7.

Conclusion

Evaluation Rubric

On the evaluation rubric, I rate the empirical and theoretical evidence as very convincing all together – 7 points out of 9. The results of the evaluations of the individual articles are displayed in Table 10.

Figure 7: Hypothetical Causal Model of Stress on Academic Performance

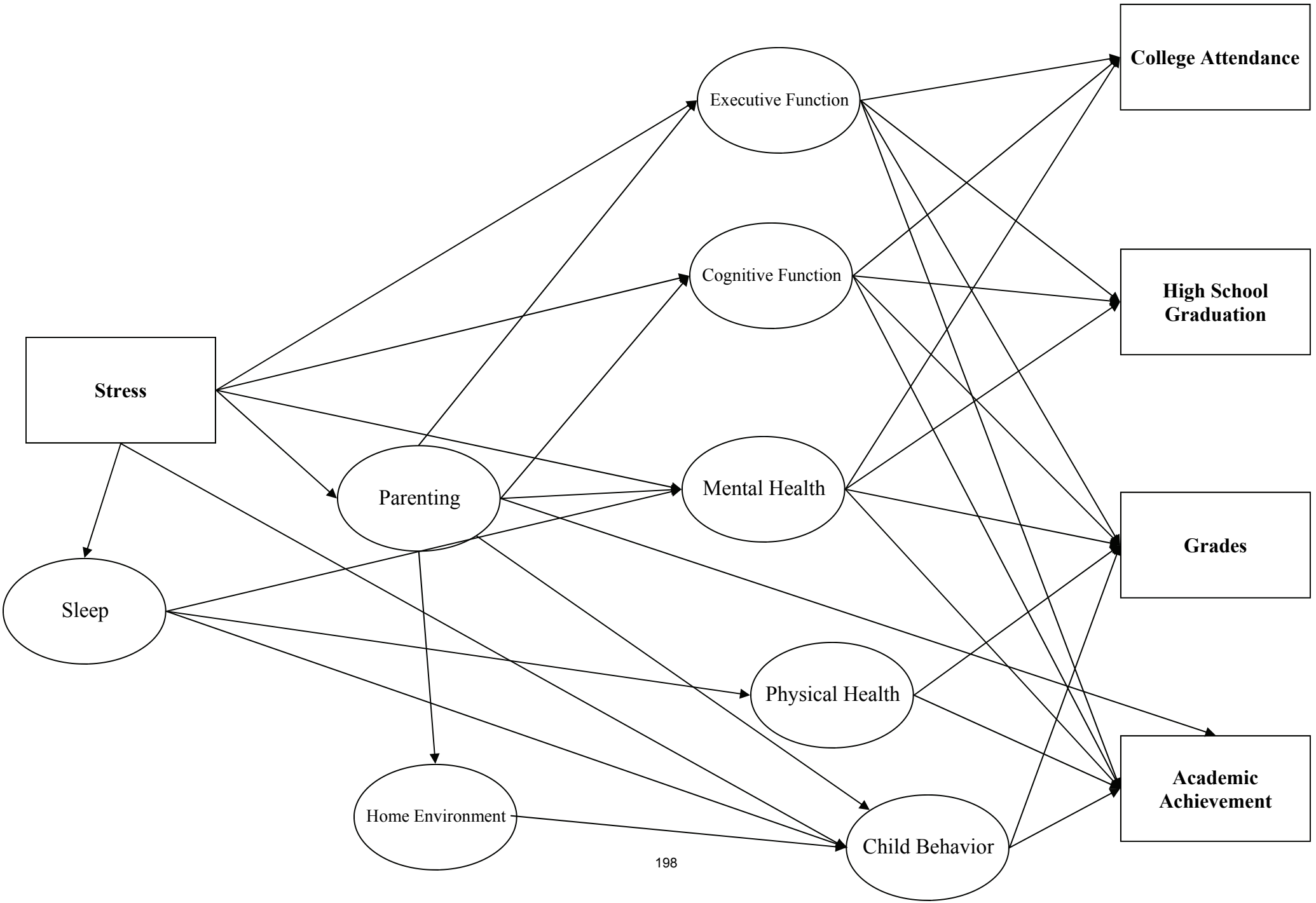


Table 10: Results of Evaluations of Articles on Stress

Author(s)	Year	non-spurious relationship	causal mechanism	time-order effects	total
Alva & de los Reyes	1999	1	2	0	3
Thompson & Masset	2005	1	1	0	2
Morales & Guerra	2006	3	1	2	6
Wadsworth et al.	2008	0	3	0	3
Average		*1.25*	*1.75*	*0.50*	*3.50*

Evidence of a non-spurious relationship. The evidence of a non-spurious relationship rates a 2 on the 0-3 scale: multiple studies find correlations between stress and different measures of academic performance using different samples and methods – some of which control for other covariates, but more large-scale and rigorous studies are needed. This is slightly higher than the average of the individual article evaluations because I placed more weight on the best-executed article, which found compelling evidence of a relationship.

Evidence of a causal mechanism. The evidence of a casual mechanism rates a 3: A plethora of research finds that stress harms physical and mental health, cognitive function, and executive functioning – all of which are tightly intertwined with academic performance. Solid evidence also exists that stress likely alters student behavior, parenting, and sleep. This is slightly higher than the average of the individual article evaluations because a holistic examination of both the empirical articles (which offer moderate support for a causal mechanism) and the broader literature base (which offers very strong support) offers compelling evidence.

Evidence of time-order effects. The evidence of time-order effects also rates a 2: The evidence that changing stress over time is moderately strong. On the one hand, many studies track results of stress long after the negative experiences occurred. On the other, few studies explicitly study the effects of a change in stress on a change in academic performance or a closely related factor. Once again, this is higher than the average of the evaluations of the individual empirical articles because the rest of the literature base offers strong evidence that changes in stressors yield changes in myriad behaviors associated with academic performance.

Summary. In total, stress rates a 7 on the 0-9 scale: the evidence and theory are quite strong. These results are displayed in Table 11.

Implications

Given the strength of the evidence and theory linking poverty with stress and stress with academic performance, the issue certainly deserves attention from researchers, legislators, and practitioners who are interested in narrowing achievement gaps. The lessons they should draw and next steps, however, are not as clear as the evidence.

Previous Interventions

Since stress is not strictly tangible – one can either own a home or not, but not really be stressed or not – figuring out how to mitigate the effects of stress on students is trickier. And, to date, interventions have actually focused on building resilience to stress (Rutter, 1987) rather than reducing the amount of stress to which students are exposed.

A natural experiment occurred when an American Indian casino opened, and a large number of mostly poor families began earning income supplements; children's behavior and oppositional defiant disorder symptoms subsequently improved, but anxiety and depression did not (Costello, et al., 2003). This underscores the difficulty of reducing some of the more deeply rooted responses to stress – years of damage cannot be undone quickly.

One possibility is getting people outdoors more. A study of after-school and weekend activities found that students who spent more time in green or natural settings experienced less ADHD (Kuo & Faber Taylor, 2004) and a forthcoming study tracked adults while walking in outdoor, green environments versus other settings and found that those in green environments

Table 11: Rubric for Evaluation of Stress Literature Base

score	*Criteria*		
	non-spurious relationship	**causal mechanism**	**time-order effects**
0 (None)	no evidence of a correlation between factor and academic performance	no evidence of a causal relationship between the factor and academic performance	no evidence of a longitudinal relationship between factor and academic performance
1 (Weak)	evidence of correlation between factor and academic performance in multiple studies	A causal mechanism is proposed, but only weakly supported by other literature	weak evidence of a longitudinal relationship based on cross-sectional data
2 (Moderate)	evidence of correlation between factor and academic performance in multiple studies that also control for possible mediating and moderating variables	multiple studies theorize the same causal mechanism and support their theory with empirical literature	multiple studies observe a change in academic performance over time that is correlated with a change in a particular factor
3 (Strong)	evidence of strong association between factor and academic performance in at least five studies of various methodologies that also control for possible mediating and moderating variables	multiple studies, using both quantitative and qualitative methodologies, provide both empirical evidence of a causal mechanism and reference a wide range of supporting literature	multiple empirical studies, using both quantitative and qualitative methodologies, observe a change in academic achievement both before and after a particular factor changes in students' lives

displayed more mood-enhancing and restorative traits (Aspinall, et al., in press). Of course, if one lives in a concrete desert then reaching greenspace will be harder. Urban gardens, parks, and so forth may be effective interventions in these cases.

Green space is not the only solution, though. A review of the research on exercise and anxiety finds limited evidence that multiple exercise programs have improved anxiety disorders (Asmundson et al., in press). Getting out and moving, regardless of whether or not one is surrounded by plants and trees, may help. Though, of course, convincing people to exercise more is not exactly easy for policymakers to accomplish.

Psychological interventions offer another possible path. A meta-analysis of studies of Mindfulness Based Stress Reduction found that they tend to reduce sleep problems and improve mental health (De Vibe, et al., 2012). A more recent intervention in two high-poverty, urban schools used meditation, yoga, breathing exercises, and appreciative inquiry exercises found significant reductions in hyperactivity and inattentiveness in students two months later (Klatt, Harpster, Browne, White, & Case-Smith, 2013). And mindfulness training in a randomized trial also increased GRE reading scores and working memory capacity after a two-week intervention (Mrazek, Franklin, Phillips, Baird, & Schooler, 2013). These may have the best combination of ease of implementation and evidence of effectiveness, but not all psychological interventions work.

A study of depressed individuals reporting sleep disturbance measured both depression and sleep disturbance before and after receiving therapy and found that patients reported remitted depression but 92% still continued to report sleep disturbance (Carney, Harris, Friedman, & Segal, 2011). Again, some of the symptoms of stress are more easily remedied than others.

Other research indicates that more social support can help, but at least one study finds that that may not be enough since the urban, low-income youth in the sample did not have the effects of stress offset by caring adults and emotional support (Gillock & Reyes, 1999).

These studies provide some food for thought, but also demonstrate the difficulty of the task. And none investigate the possibility of trying to reduce stressors upfront rather than help people respond better to past experiences.

Lessons for Research

In the end, no one intervention seems likely to dramatically reduce stress – but interventions aimed at altering stress levels may also alter other factors/conditions associated with academics (e.g. health, physical fitness, neighborhood conditions, etc.) and, as such, deserve our attention. Researchers should focus on determining exactly which types of stress affect academics, how these stressors may be eliminated or overcome, and the degree to which student performance will increase if stressors are reduced and/or resilience is improved. Given the myriad causes and consequences of stress, though, it is unlikely that any one intervention will have more than modest effects on either stress accumulation or reduction. As such, researchers should avoid the race to dismiss all interventions with small effects in search of one with slightly larger effects and instead focus on integrating studies to find the best combination of interventions.

Lessons for Policy and Practice

The lessons are both clear and confusing for those designing policy and implementing interventions. On the one hand, the evidence is overwhelming that stress both disproportionately affects low-income students and likely reduces their academic performance

through myriad paths. On the other hand, the number of causes of stress and the number of ways that stress can affect kids are overwhelming. And a number of interventions have shown small effects, but none have had massive breakthroughs. All of which makes it tough to know where to start.

Shonkoff (2010) lays out a new framework for childhood policy in which he argues that scientific breakthroughs on stress and other developmental issues now make it clear we need to leverage that information into new policy intervening in early childhood processes and then lays out some ideas to inspire fresh thinking and new innovation.

Legislators and practitioners should make stress reduction and coping major goals of interventions designed to narrow the achievement gap, but should be careful when designing the exact interventions. Mindfulness therapy seems the most promising, but it is also worth pursuing neighborhood and household changes (e.g. less crime or physical deterioration) that will reduce stress. Given the difficulty of changing homes and neighborhoods, though, interventions should be designed to address factors and conditions that affect academics directly rather than only through stress.

And, as with researchers, those involved with policy and practice should approach stress with a multi-pronged approach: no one intervention will dramatically reduce stress across the population or dramatically reduce the effects of stress across the population. The trick is finding the right combination of changes to pursue.

Chapter V

Policy Implications for Narrowing the Achievement Gap

The four previous chapters discuss causes of, and potential solutions to, the achievement gap; psychosocial mediators between poverty and academic performance; and the impacts of homeownership and stress on the academic performance of low-income students. Together, they paint a portrait of the problem we currently confront and hint at some potential solutions.

In this chapter, I first briefly review the findings of the previous three chapters and discuss the gaps in theory and evidence. Second, I discuss the case for proceeding with social reforms designed to address mediators between poverty and academic performance. I then explore a number of social programs that merit attention based on their potential to impact academic performance. I conclude by discussing the implications for researchers and the implications for practitioners and legislators.

Review of Findings

Chapter 2 reviews 21 different environmental conditions and social factors that mediate the relationship between poverty and academic performance, and I argue that the evidence and theory support pursuing 19 of those 21 as possible levers through which to narrow the achievement gap and strongly support pursuing 12 of these.

Chapter 3 reviews the evidence and theory linking homeownership and academic performance, and concludes that empirical evidence supporting direct effects is decidedly mixed

but that the theory is well-grounded and well-supported. I argue that the evidence on indirect effects is strong enough to proceed with caution and that encouraging homeownership will likely benefit low-income families as long as the family can afford the home, the home location does not harm the family, and residents change after moving.

Chapter 4 reviews the evidence and theory linking stress and academic performance, and concludes that empirical evidence of direct effects is limited but consistently positively while the theory is well-grounded and evidence supporting causal pathways is extremely strong. I argue that reducing stressors should be a primary concern going forward but that addressing other factors/conditions related to achievement simultaneously probably offers the best chance of success.

Gaps in Evidence

While the research is voluminous, most questions remain unanswered. As I discuss throughout the dissertation, research on social factors and environmental conditions focuses heavily on non-academic outcomes – which poses the largest barrier to figuring out what matters and how we should try to effect change. But two other major gaps exist.

Policy effects. The primary question left unanswered by the research is the degree to which policy can elicit changes in these factors/conditions that will then yield changes in academic performance. The research primarily investigates contemporaneous relationships between factors/conditions and outcomes, but rarely investigates whether changing a factor/condition will subsequently change outcomes – yet alone whether policy can actually alter that factor/condition.

Interaction between factors/conditions. Many of the factors and conditions discussed in this dissertation influence each other in addition to child outcomes. For example, disorder, crime, and social organization of neighborhoods all interact with each other and are probably influenced by homeownership and subsequently influence stress levels. To really understand which mediators need to be addressed, we need to understand the interaction effects of different mediators.

Currently, research mostly examines whether one factor/condition affects child outcomes independent of the influence of other factors and conditions. This is helpful when envisioning which might have the largest effects, but out of line with the way the real world operates. If somebody wants to be healthy, for example, they cannot accomplish their goal only by brushing their teeth or eating apples. Rather, we need to know how oral hygiene, fruit consumption, and other factors interact and accumulate to affect one's health.

Gaps in Theory

The theory supporting social intervention is stronger than the evidence. Given what we know about how and when the achievement gap is formed, what influences academic outcomes, and how environmental conditions and social factors influence a wide array of child outcomes, one can make a strong case for the merits of social intervention. When examining empirical evidence, though, two gaps in theory stand out.

Understanding family preferences. We need to better understand the preferences of the families affected by policies and keep in mind that the people we aim to help do not always share the same goals for themselves as we do for them. For example, even though moving to a higher-income neighborhood seems like a good idea from afar, many people moved away from

their new lower-poverty neighborhood after confronting issues with isolation, landlords, and other issues in Gautreaux (Boyd, Edin, Clampet-Lundquist, & Duncan, 2010) and sacrificed neighborhood quality for housing quality when making subsequent moves in the Moving to Opportunity experiment (Rosenblatt & DeLuca, 2012).

Similarly, when the gang-infested, crime-riddled, dilapidated public housing towers were demolished in Chicago, it was largely seen as a win for both the city and the residents of these towers. But the reality is that many of the residents had deep ties in the developments – regardless of how they might appear to outsiders (Venkatesh, 2008), which then affected whether or not they returned post-demolition (Joseph & Chaskin, 2012).

A study of randomly assigned housing vouchers in Yonkers found that residents who moved to low-poverty neighborhood were less likely to socialize informally with their neighbors (Fauth, Leventhal, & Brooks-Gunn, 2004), which could partly explain both dissatisfaction with low-income neighborhoods and some tepid empirical results. Another study hints at one potential solution: finding that people who moved into HOPE VI neighborhoods had the highest levels of social capital when neighborhood resources were plentiful (Curley, 2010b).

Whether and to what extent people are willing and able to buy into a program will certainly affect the program's success. Understanding what makes people willing and able to engage can help design better policy – this may be particularly important in mixed-income developments, which often count on social interaction between neighbors to provide a higher quality of life (Joseph, 2006).

Educational researchers should be familiar with this problem since "implementation fidelity" is a major problem in school research – teachers and principal routinely ignore, misunderstand, or disagree with new curricula, pedagogies, etc. – which limits the impact of many interventions. Similarly, if families have different goals, desires, or perceptions than those

designing interventions and creating policy, they will almost certainly react in unexpected ways – preventing policies from achieving their goals. This is often cited when diagnosing the failure of an intervention, but not fully incorporated into theory regarding the effects of poverty or the ability of policy to mitigate these effects.

Institutions. Though institutions have been widely studied for centuries, virtually none of the studies cited in this dissertation discuss the influence of institutions on either children's academic performance or the factor/condition being studied.

The institutions present in a neighborhood almost certainly affect both the objective conditions of the neighborhood – for example, more bars and fewer recreation centers are associated with increased crime in high-poverty neighborhoods in Columbus, Ohio (Peterson, Krivo, & Harris, 2000) – in addition to the way that families and children experience these conditions.

The presence and utilization of churches, schools, community centers, police stations, health clinics, social service agencies, social clubs, recreational facilities, athletic teams, and other institutions should be more prominently considered by researchers both when examining the observable traits of neighborhoods, homes, health, and family interactions and when examining the ways in which these observable traits influence children.

Limitations

The combination of the broad topic and the myriad gaps in evidence and theory limit the degree of certainty of most of the conclusions reached by this dissertation. Indeed, the main conclusion I draw in the pages that follow is that we need more research on and policy experimentation with most of the topics I discussed in previous chapters.

Despite my attempt to be comprehensive, I certainly missed *something* and likely many papers that could have shaped my understanding of these issues. Similarly, I doubtless made coding decisions with which others would disagree – one of the hazards of working alone. Were others to examine the same body of evidence as I, they would certainly not reach the exact same conclusions. I have done my best, however, to be systematic throughout, mitigate bias whenever possible and make my methods and sources as transparent as possible in order to let the reader draw their own conclusions.

Lastly, a larger base of more consistent studies would allow for meta-analysis on the factors and conditions discussed in this dissertation. Over the decades to come, I expect meta-analyses will be conducted on these topics as more evidence emerges and may reach different conclusions than did I. I look at this as the natural progression of research rather than a refutation of my findings: I hope further research clarifies or even contradicts my findings so that we may better understand the issues at hand.

Overall, I am sure of little other than this topic is important. I hope that others agree so that we may become more certain of how to proceed in other regards over time.

Evidence for Proceeding

The studies I review in chapter 1 on Gautreaux, Moving to Opportunity, New Hope and the demolitions of high-rise public housing in Chicago in addition to recent research on the Harlem Children's Zone provide decidedly mixed evidence regarding the effectiveness of past non-school social policy interventions in improving academic performance.

This led the former Institute of Education Sciences director to question the strategy, remarking that "Improving neighborhoods and communities is a desirable goal in its own right,

but let's not confuse it with education reform" (Whitehurst & Croft, 2010, p. 9). And to a pair of Harvard economists concluding that

> *The evidence suggests that investments in school quality are more effective in decreasing persistent economic and educational inequalities and for reducing risky behaviors. Neighborhood improvements, however, do more to reduce mental and physical health inequalities. With sufficient budgetary resources, policy-makers would try to improve both neighborhood and school quality for low-income children (R. Fryer & Katz, 2013).*

At the same time, we may lack the necessary political will or popular support to enact large-scale social interventions. Multiple studies have found that dialogue in Congress (Guetzkow, 2010) and the media (M. Rose & Baumgartner, 2013) has increasingly shifted toward highlighting the misdeeds of the poor and away from alleviating poverty. We have two reasons, though, to believe this could change: (a) a recent study found that those who had experienced economic hardship – and many have done so in the past five years due to the recession – were more likely to support welfare policies (Margalit, 2013); and (b) politicians and leaders from both side of the aisle have increasingly branded educational inequality as the "civil rights issue of our time". Solutions so far have focused on in-school reforms, but if the racial achievement gap continues to plateau while the income achievement gap grows, more of those engaged in the education reform process could being view social reforms linked with education as a natural extension.

At the same time, the evidence and theory linking environmental factors and social conditions with academic outcomes offer a compelling case that interventions *should* be able to help. Which is why, in a recent Presidential address to the main academic society for the study of public policy, Ladd (2012) called on her colleagues to eliminate No Child Left Behind and focus instead on addressing the problems confronted by low-SES students.

Education policy this century has focused mainly on reforming and replacing ineffective schools and teachers through accountability, choice, and competition. But as No Child Left Behind declares more and more schools "in need of improvement" while benchmarks rise toward an unreachable goal, it seems that attitudes may be shifting. Indeed, the past decade has seen more calls to address poverty itself, kick-started by the seminal work of Rothstein (2004), spurred by the formation of the "Broader, Bolder Coalition," and now culminating in the creation of dozens of Promise Neighborhoods around the country.

Overall, based on the research presented in this dissertation, a fair conclusion is that we have strong reason to believe that non-school social policy *can* work but little evidence that it actually *has* or necessarily *will*. But if we wait for strong evidence before proceeding with new ideas, those ideas will never be tested. Given the breadth and depth of the research, the failure of recent policy, and the significance of the problem, it seems the only responsible course of action is to focus significant efforts on learning whether, how, and when non-school social policy can work to narrow the achievement gap.

Programs Meriting Further Attention

Given the lack of research on the academic results of policies, interventions, and experiments designed to change social factors and environmental conditions, we need to conduct more program evaluations. Below, I discuss three programs that merit particular attention due to their impact on multiple dimensions of factors/conditions and make note of a number of others that might merit attention as well.

Promise Neighborhoods

Currently the main federal initiative designed to improve the academic outcomes of low income students, Promise Neighborhoods seek to replicate (and, ultimately, improve on) the model of the Harlem Children's Zone (HCZ) in New York City. HCZ started when Geoffrey Canada, a local Karate instructor, grew frustrated with the regression he saw from kids once they left his program (which he believed to be highly effective) and decided to form a network of programs that eventually became a "cradle-to-college pipeline" and serve over 100 blocks and over 10,000 kids with services ranging from parenting classes to exercise programs to charter schools (P Tough, 2008).

While the main goal of the program is to get kids to college, it remains too early in the process to assess its success. Only one analysis of educational outcomes has been published, and it found that differences in test scores stemmed from enrollment in the neighborhood charter school rather than residence inside the zone itself (Curto, et al., 2011; Dobbie & Fryer, 2011). As discussed in chapter I, we do not know whether students living in the neighborhood but not enrolled in the charter schools actually engaged in more or fewer HCZ programs than those living outside the area but attending the charter schools (which host a large number of the programs). Additionally, a short-term gain in achievement scores is a good sign, but may or may not precipitate more important outcomes later (e.g. college attendance, employment, etc.). Indeed, a number of programs have seen test-score effects "fade out" in a few years but more important effects emerge a decade or more later.

The federal program has now handed out 46 half-million dollar planning grants and 12 multi-million dollar implementation grants over three rounds of funding starting in September, 2010 (U.S. Department of Education, 2013). The programs vary widely in size, scope, location, urbanicity, and management structure. This presents a golden opportunity for researchers to

examine both the overall efficacy of a bundle of social reforms and of the comparative effectiveness of different reforms delivered in different ways. And it presents practitioners a golden opportunity to collectively throw everything including the proverbial kitchen sink at the problem and see what sticks.

HOPE VI Housing

HOPE VI (Homeownership and Opportunity for People Everywhere) housing also merits attention from educational researchers. In 1989, Congress sponsored the National Commission on Severely Distressed Public Housing – "severely distressed" public housing was defined as places with: "Residents living in despair and generally needing high levels of social and supportive services; physically deteriorated buildings; and economically and socially distressed surrounding communities" (National Commission on Severely Distressed Public Housing, 1992, p. 5).

The commission recommended that said housing be demolished and replaced. In 1992, Congress passed HOPE VI to do just that. The main goals of HOPE VI were: to help develop self-sufficiency of residents; improve the living environment; improve surrounding neighborhoods; decrease the concentration of poverty; and to build communities that will thrive in the long-run (Popkin et al., 2004). In practice, HOPE VI has usually involved razing blighted public housing projects and replacing them with mixed-income developments that include both subsidized housing and social supports (e.g. financial counseling and homeownership classes) for low-income residents and market-rate rentals and homes for sale for middle-income residents (Cisneros & Endgahl, 2009).

HOPE VI provides a unique opportunity to assess the potential impact of non-school social policy on academic performance because residents undergo both radical and replicable

change. Since education is an enormously complex process involving numerous moving parts, small changes do not often yield large results. A move to a HOPE VI neighborhood, however, involves a large number of substantial changes in a child's surroundings and lifestyle – changes that may be significant enough to produce measurable effects. Additionally, HOPE VI is replicable on a larger scale than experiments involving moving low-income families to different neighborhoods. We cannot simply move every low-income family to a new neighborhood, but we *can* redevelop every public housing project as a HOPE VI-type development.

HOPE VI provides an excellent test of the power of changing non-school social policy. Although HOPE VI neighborhoods do not explicitly aim to change the health care of residents, a move to such a neighborhood certainly changes the housing and neighborhood context of a family, and may also alter both economic well-being and family dynamics. Research on the educational outcomes of children who move from low-income neighborhoods is decidedly mixed, but the manner in which HOPE VI has been implemented may allow for better research design and result in stronger impacts.

In order to ensure that people will be interested in paying market rates, care is taken to construct and maintain neighborhoods that are neat and orderly. The latter is accomplished through both screening applicants (e.g. rejecting those who have a criminal record or are unemployed) and, in many places, the enactment and enforcement of strict rules not unlike those in a planned development with a homeownership association (Bower, 2009a). Accordingly, many HOPE VI residents report that their surroundings are quieter, safer, and more orderly than their former neighborhoods (Cisneros & Endgahl, 2009). The market bears out these findings: multiple studies (Bower, 2009b; Castells 2010; Voith & Zielenbach, 2008) have found home prices in neighborhoods surrounding HOPE VI developments rose faster over the past decade than other, similar, neighborhoods.

In short, we have reason to believe that HOPE VI neighborhoods are, in many ways, better places to live than were residents' former neighborhoods. And the concerted efforts to change many aspects of residents' lives (including, but not limited to, the quality of their housing, the quality of their neighborhood, their job-seeking habits, their homeownership aspirations, their level of responsibility for their homes, and their social circles), makes the program an excellent test of the notion that non-school social policy can influence educational performance. How might HOPE VI influence Educational Outcomes? Given the findings of the literature and characteristics of HOPE VI housing discussed above, residency may act upon at least four levers.

Stress levels. HOPE VI residents report that their surroundings are quieter, safer, and more orderly than their former neighborhoods (Turner, 2009). Moving to a safer, calmer neighborhood may reduce stress levels for children and their families. As I discuss in Chapter 4, a good deal of research has found stress to be negatively associated various types of brain development (National Scientific Council on the Developing Child, 2005), with one recent study finding that children who spent less time in poverty had both experienced less stress and exhibited a better working memory as a result (Evans & Schamberg, 2009).

Normative Behaviors. Residents of HOPE VI developments often undergo criminal background checks before moving in and must hold a job to maintain residency; meaning that HOPE VI residents see more employed neighbors and fewer who engage in illicit activities than residents in many impoverished neighborhoods. Since seeing rules broken can encourage people to break other rules (Keizer, et al., 2008), it stands to reason that seeing fewer rules

broken may lead residents to comply with other rules (e.g. paying attention in class or completing homework).

Aspirations. Exposure to more socially responsible behavior may positively influence the aspirations of child residents. In an extreme case, it may mean that a child who previously idolized a drug dealer now idolizes a nurse or police officer. It may mean that graduating from high school and attending college is seen as something that most people tend to do and to which a child should aspire. Five years after the conclusion of the New Hope project, treatment group children were still significantly more optimistic about their future, and boys had significantly higher expectations for their academic performance (Huston, et al., 2008). HOPE VI may affect students similarly.

Home Environment. Living in higher-quality housing in a calmer, quieter neighborhood may also impact the environment inside the home. Eventually, less chaos outside the house may lead to less chaos inside the house. This could manifest in various ways that have been positively associated with a child's performance in school, including: a warmer parental-child relationship (Yeung & Conley, 2008), a more orderly home (Coldwell, et al., 2006), or parents being more willing to help with homework.

In these four ways and others, it is conceivable that moving to a HOPE VI neighborhood positively impacts a child's performance in school. The evidence surrounding changes in neighborhood characteristics, and social changes in general, is decidedly mixed. HOPE VI offers a unique opportunity to assess the potential impact of non-school social policy on educational performance because residents undergo both radical and sustainable change.

Nurse-Family Partnership

Another program that attacks mediators between poverty and academic performance is the Nurse-Family partnership, which sends nurses into the homes of new mothers from pregnancy through the child's second birthday to counsel and assist them with parenting techniques. The program has spread to multiple locations in recent decades and aims to change the prenatal and post-natal health of the baby, parenting techniques, and home environment – all of which are tightly intertwined with academic performance.

A rigorous randomized controlled trial in New York tracked children for 15 years and found that adolescents whose mother had taken part in the program were significantly less likely to run away, less likely to be arrested or convicted, were less sexually active, and smoked and drank less frequently (Olds et al., 1998). A follow-up trial in with primarily African-American women in Memphis found reduced hypertension during pregnancy, fewer health problems for the young children, and fewer health complications with second pregnancies that followed (Kitzman et al., 1997).

Though not as multi-faceted as Promise Neighborhoods or HOPE VI housing, the nurse-family partnership still offers a model that alters multiple aspects of a young child's life that may subsequently affect academic performance.

Other Programs

Hundreds – if not thousands – of other programs and policies merit attention from researchers, legislators, and practitioners, but space and time constraints preclude a full discussion of all of these. Below, I briefly overview a smattering of programs mentioned in peer-reviewed journal articles.

Individual Development Accounts. IDAs are often used in conjunction with homeownership programs and consist of savings account to which an individual contributes – every contribution is then matched, usually ranging from a 1:1 basis to a 3:1 basis. Restrictions are often placed on what can be done with this money (e.g. being applied to a down payment on a house). Research has found that IDAs help build savings (Grinstein-Weiss, Chowa, et al., 2010) and increase college enrollment (Grinstein-Weiss et al., In Press) among other outcomes.

Child Development Accounts. CDAs are similar to IDAs, but are in the child's name and are usually used to save for college. Research suggests that they help children accumulate assets, raise expectations of college attendance, and shift kids to a more long-term orientation in thinking (Margaret Sherraden, et al., 2013).

Baby bonds. Baby bonds are essentially CDAs that are endowed at birth. Some argue that if low-SES children received larger endowments at birth it could go a long way toward closing socioeconomic gaps in wealth and college attendance (Hamilton & Darity, 2010).

Habitat for Humanity. The Habitat for Humanity program uses volunteers to build affordable homes for low-income families. In order to qualify for a house, a parent must go through a rigorous application process, take homeownership and financial management classes, and provide sweat equity (i.e. help build the house). As the program has grown, it has begun building entire neighborhoods of homes in some areas instead of just individual ones.

Despite the size, notoriety, and history of the program, virtually no research exists beyond one study that finds an increase in social capital (Hays, 2002).

The Yonkers Project. Court-ordered desegregation in 1985 resulted in low-income families being randomly selected to move to publicly funded townhomes in middle-class neighborhoods. Studies have found that the move improved parenting techniques, family economic resources, and neighborhood conditions (Fauth, Leventhal, & Brooks-Gunn, 2007). Such a combination of changes likely yielded academic benefits as well.

Implications for Research

Despite the large volume of studies discussed in this dissertation, research still has a *long* way to go before figuring out this important, complex, and massive topic. Throughout the dissertation, I discuss narrow questions researchers should explore in order to answer the larger questions of whether and how non-school social policy can significantly narrow the achievement gap.

As I discuss at the start of this chapter, we need more program evaluations, investigations of the interaction between different factors/conditions, a better understanding of the interplay between family preferences and policy efficacy, and a better accounting of the role that institutions play in the whole process. Researchers can take three specific steps (among others) in order to facilitate these goals.

Differential effects. The vast majority of policy research strives to find the average effect of a variable or intervention on a population of people. While this can help point us in the right direction, these studies are usually of little practical use for legislators and practitioners. More important than whether a policy works for the average person is *for whom* a policy works.

The wide range of factors/conditions discussed in this dissertation often impact a few people dramatically and many people either only mildly or not at all – which means that only a few people will likely dramatically benefit from an intervention. Imagine, for example, giving every child a pair of eyeglasses and then concluding that the average child showed no gain in achievement. This would be silly since most kids either have reasonably good vision or already own eyeglasses – we would only expect those with poor vision and no glasses to benefit appreciably. The situation is almost certainly similar with any number of factors discussed in this dissertation: homeownership will only benefit those who do not own a home and can purchase a certain type of home in a certain manner; fitness will only dramatically benefit students who are significantly out of shape and different types of fitness programs will help different students; and noise likely only dramatically reduces achievement for children near a limited number of high-noise features (e.g. highways or airports).

Researchers need to better elucidate how and when different factors/conditions matter and for whom and when different interventions will likely work.

Mechanism experiments. Randomized trials are the gold standard of research but usually impractical for social scientists due to both ethical and legal concerns. One idea (Ludwig, Kling, & Mullainathan, 2011) is to conduct small-scale experiments on specific mechanisms – the authors suggest parking battered cars and similar shiny cars in randomly selected neighborhoods and watching to see if crime increases. This is similar to the social disorganization experiments conducted in the Netherlands (Keizer, et al., 2008) which involved spraying an alley with graffiti among other changes.

IRB concerns will prevent researchers from taking these too far, but could be overcome if the changes are positive instead of negative (e.g. washing graffiti off a wall or cleaning up a vacant lot).

We cannot learn the answer to large and multi-part questions from a small-scale experiment, but large numbers of these can certainly point us in the right direction. Such experimentation is common in companies who want to learn, for example, which type of letter will yield the most responses and can randomly send out envelopes with and without pictures and infinite other differences to learn the effects of each small change (Ayres, 2008).

Holistic analysis. At the same time researchers investigate the effects of micro-changes in the environment, we should also keep in mind both that all these factors/conditions are interrelated and that they almost certainly matter collectively more than individually.

The large number of factors/conditions alone precludes any one from being crucially important to a large number of students. None of the factors/conditions are sufficient and it is highly unlikely that any of them are even necessary for a child to be high achieving. In essence, nothing matters precisely because everything matters.

Traditional studies of the average effect sizes of one variable on a group of children will miss this. And disregarding every study that finds small effect sizes in a race to find the one variable that trumps all others may be the least productive thing researchers could do in order to figure out how social policy and interventions should be designed and implemented and which factors/conditions (plural) should be addressed. Until we better understand how different factors/conditions affect different students separately and collectively affect students as a whole, we cannot answer these questions.

Implications for Policy and Practice

Given the evidence presented in this dissertation, legislators and practitioners should absolutely look for ways to change the environmental conditions and social factors that harm low-income children. Unfortunately, the best conclusion based on current evidence is that a whole lot of things matter a little bit each and, as such, the best advice for practitioners and legislators is probably to examine the list of the factors/conditions with the strongest evidence bases and seek to address as many of the ones that matter most in a particular context as their resources will allow. When designing and implementing these changes, a few guidelines should be kept mind.

School-Based Policies

First, there is no war between school reform and social reform. Indeed, schools are often uniquely situated to incorporate social reforms and or serve as a base from which social programs may be operated. Functionally, it is unlikely to matter much whether a student eats healthy food or exercises at home versus at school versus or at a community center.

For example, extracurricular activities at schools may benefit students in many of the same ways that social programs could. Studies of sports participation found an increase in social ties and achievement (Broh, 2002) and evidence that these effects may be stronger in low-SES schools (Guest & Schneider, 2003).

A review of coordinated school health programs finds evidence that they improve nutrition, health services, and mental health (N. G. Murray, et al., 2007). And a book on "full-service schools" (Dryfoos, 1998) argues that school reform cannot succeed unless schools incorporate a range of community services. The Harlem Children's Zone and Promise Neighborhoods follow in this tradition, forming multiple school-community partnerships.

Combining services

Perhaps the defining trend of the Promise Neighborhoods movement is the combining of multiple services. Just as Geoffrey Canada was disappointed in the long-term results of his karate program amidst a sea of negative influences, the operating theory here is that we need to address multiple problems from multiple angles at multiple times – which makes a lot of sense given the research evidence that a lot of things matter a little bit each.

Promise Neighborhoods, though, are hardly the first policy to do this. Indeed, they may really just be the latest new idea along a history of new ideas that include offering coordinated children's services as part of community-connections experimentation (Crowson & Boyd, 1993); service integration in the human services system (Kagan, 1993); and cross-sector collaboration in health care (Erickson & Andrews, 2011) among others.

Practitioners and legislators should bear in mind that combining, coordinating, and integrating different services has the potential to foster better outcomes but should not make aggregation the sole goal.

Scope of Change

We should also not pin our hopes on interventions and policies that yield small changes in living conditions. Given the small impact of a wide variety of factors/conditions across the population the two logical strategies are to try and alter many aspects of a child's life or to design programs that dramatically alter the aspect they aim to improve.

One explanation of the vastly different effects of MTO and Gautreaux, for example, is that MTO produced shorter-distance moves that were to higher-poverty census tracts with more minorities, worse schools, and lower employment rates (J. E. Rosenbaum & Zuberi, 2010).

In this sense, the program may simply have failed to truly dramatically alter residents' lives. Moving to a slightly different neighborhood nearby where the family still maintains the same social network, attends the same church, and sends their kids to the same school probably should not be expected to yield remarkable results.

Programs have experienced more success when they expose individuals to completely different environments (see, for example: Corey & Bower, 2005) than when tiny changes are made but subjects mostly go about their daily lives as usual.

Motivation

New developments in behavioral economics may help understand the motivations of people and how to change their behaviors (P. Anand & Lea, 2011). Just as I discussed the need to understand the preferences of families, we should also understand what will prompt them to change.

Change is hard. And often may not seem logical. Simply demanding that one change, offering a reward to change, or punishing those who do not change will often yield disappointing results. New research points toward motivating people based on autonomy, mastery, purpose, and social relationships rather than using sticks, carrots, and mandates – which can result in resistance, reactance, and even demotivation (Ariely, 2009; Pink, 2010). In one experiment, for example, students were either told that they should eat more fruit, told that that their friends eat lots of fruit, or told nothing; those who were told to eat more fruit actually reported eating less fruit than the control group (though, in reality, consumed similar amounts), while the students who were told that their peers eat lots of fruit consumed significantly more (Stok, et al., 2013).

By being smarter about how goals are communicated and people are encouraged to change, policies and interventions can better tailor their strategies and offerings to the local context and improve outcomes.

Conclusion

This dissertation asks more questions than it answers. We know far less about the ability of social policy to mitigate the influence of poverty on academic performance than we need to know in order to significantly narrow the achievement gap. Nevertheless, we know enough to both design better policy and ask better questions in the future.

Overall, we have plenty of reason to believe that non-school social policy can be effective but little evidence proving that is *has* or necessarily *will* – largely because academic outcomes simply have not been part of most studies of non-school social policy. The mixed evidence and strong theory combined with the lack of success of current policies, though, dictate that we follow our intuition and explore how and whether non-school social policy can significantly narrow the achievement gap.

We have evidence that children living in poverty experience a wide range of environmental conditions and social factors negatively impact their academic performance. This provides us a clearer picture of one major way in which poverty impacts performance that nudges us toward an understanding of the causal effects of poverty on academics.

It also provides enough information to facilitate a broad research agenda that explores how these different factors/conditions collectively affect children, which children they affect, and how policy can change them.

Lastly, it provides practitioners and legislators with a framework with which to work when designing policy and implementing interventions. A crucial question for Promise

Neighborhoods and other interventions is what they should seek to change, and I provide a list of 19 factors/conditions with varying degrees of empirical and theoretical support in addition to a thorough review and discussion of the ways in which homeownership and stress both interact with the other 17 and directly affect students alone.

Overall, this dissertation provides a comprehensive overview of what we know about whether and how non-school social policy can narrow the achievement gap but, unfortunately, concludes that we do not know far more than we know. Researchers, policymakers, and practitioners should work to change this in order to prevent further widening in the achievement gap.

Appendix I: Detailed Results of all Homeownership Studies

Author(s)	Year	Sample	Factor	How Measured	Outcome	How Measured	method	dir	Att/ Ach
Green & White	1997	2237 youths aged 17-18 in PSID dataset from 1980-87	homeownership	whether the youth's household lives in owner-occupied housing	school enrollment	dummy variable = 1 if youths are still in school or have already graduated HS	probit regression	+	Att
Green & White	1997	All households with a 17 year-old in PUMS in the 1980 census	homeownership	whether the youth's household lives in owner-occupied housing	school enrollment	dummy variable = 1 if youths are still in school or have already graduated HS	probit regression	+	Att
Green & White	1997	10,981 youths in HSB 1980 cohort (sophomores) followed-up in 1982	homeownership	whether the youth's household lives in owner-occupied housing	school enrollment	dummy variable = 1 if youths are still in school or have already graduated HS	probit regression	+	Att
Green & White	1997	874 youths aged 17 in PSID dataset from 1980-87 with previous data	homeownership	whether the youth's household lives in owner-occupied housing	school enrollment	dummy variable = 1 if youths are still in school or have already graduated HS	bivariate probit "endogenous switching model"	+	Att
Boehm & Schlottman	1999	911 children who left their parents' households between 1975 and 1982 in PSID observed 10 years later	homeownership	whether the youth's household lived in owner-occupied housing	educational attainment	odds of being a HS graduate/getting post-secondary education/being a college graduate	multinomial logit	+	Att
Aaronson	2000	5143 children observed for at least 6 years between ages 7 and 16 in PSID between 1975 and 1993	homeownership	percentage of years child lived in owner-occupied housing between ages 7 and 16	high school graduation	discrete variable = 1 if child graduates from HS by age 19	probit regression	+	Att
Aaronson	2000	5143 children observed for at least 6 years between ages 7 and 16 in PSID between 1975 and 1993	homeownership	percentage of years child lived in owner-occupied housing between ages 7 and 16	high school graduation	discrete variable = 1 if child graduates from HS by age 19	instrument on group avg homeownership	0	Att
Harkness & Newman	2003	adults born from 1957-1973, in PSID samples from 1963-1993, limited to adults under 150% of poverty rate	homeownership	whether child lived in owned home from ages 11-15	idleness	not working, attending school, or caring for children	probit regression	-	Att
Harkness & Newman	2003	adults born from 1957-1973, in PSID samples from 1963-1993, limited to adults under 150% of poverty rate	homeownership	whether child lived in owned home from ages 11-15	idleness	not working, attending school, or caring for children	probit regression	0	Att
Harkness & Newman	2003	adults born from 1957-1973, in PSID samples from 1963-1993, limited to adults under 150% of poverty rate	homeownership	whether child lived in owned home from ages 11-15	education	years of education at age 20	OLS	+	Att
Harkness & Newman	2003	adults born from 1957-1973, in PSID samples from 1963-1993, limited to adults under 150% of poverty rate	homeownership	whether child lived in owned home from ages 11-15	high school	HS completion at age 20	probit regression	+	Att
Harkness & Newman	2003	adults born from 1957-1973, in PSID samples from 1963-1993, limited to adults under 150% of poverty rate	homeownership	whether child lived in owned home from ages 11-15	post-secondary education	acquisition of post-secondary educ at age 20	probit regression	+	Att
Zhan & Sherraden	2003	591 children of single mothers aged 12-18 in NSFH	homeownership	mother's response to "Do you own your own home?" (1=yes)	high school graduation	whether 18 to 26 year-old reported graduating from high school	Logistic Regression	0	Att

Zhan & Sherraden	2003	591 children of single mothers aged 12-18 in NSFH	homeownership	mother's response to "Do you own your own home?" (1=yes)	mother's academic expectations	mothers' reports 1-7 ("less than a high school degree" to "a master's or doctorate degree")	OLS Regression	+	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	High School Diploma	Whether the adult had earned a high school diploma (1=yes)	Logistic Regression controlling for parental attitudes/behaviors	+	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	High School Diploma	Whether the adult had earned a high school diploma (1=yes)	Logistic Regression controlling for unobserved indiv. chars.	+	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	High School Diploma	Whether the adult had earned a high school diploma (1=yes)	Logistic Regression instrumenting on likelihood of homeownership	0	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	college degree	Whether the adult had earned a Bachelor's Degree (1=yes)	Logistic Regression controlling for parental attitudes/behaviors	+	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	college degree	Whether the adult had earned a Bachelor's Degree (1=yes)	Logistic Regression controlling for unobserved indiv. chars.	+	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	college degree	Whether the adult had earned a Bachelor's Degree (1=yes)	Logistic Regression instrumenting on likelihood of homeownership	0	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	High School Diploma	Whether the adult had earned a high school diploma (1=yes)	Logistic Regression controlling for stability and parental attitudes/behaviors	0	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	High School Diploma	Whether the adult had earned a high school diploma (1=yes)	Logistic Regression controlling for stability and unobserved indiv. chars.	0	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	High School Diploma	Whether the adult had earned a high school diploma (1=yes)	Logistic Regression controlling for stability and instrumenting on likelihood of homeownership	0	Att

Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	college degree	Whether the adult had earned a Bachelor's Degree (1=yes)	Logistic Regression controlling for stability and parental attitudes/behaviors	+	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	college degree	Whether the adult had earned a Bachelor's Degree (1=yes)	Logistic Regression controlling for stability and unobserved indiv. chars.	0	Att
Galster et. al.	2007	755 children born from 1968-1974 in PSID in 1999 when they're aged 25-31	homeownership	proportion of childhood years that parents owned the dwelling they occupied	college degree	Whether the adult had earned a Bachelor's Degree (1=yes)	Logistic Regression controlling for stability and instrumenting on likelihood of homeownership	0	Att
Barker & Miller	2009	205,690 families with 17 year-olds from 2000 Census in PUMS	homeownership	not specified	School Dropout	Whether 17 year-old was enrolled in school or not	Logistic Regression	+	Att
Kim & Sherraden	2011	632 9th/10th graders in 1996/1998 whose mothers were in NLSY79 sample	homeownership	dichotomous (1 = home owner; 0 = otherwise)	high school completion	Whether student had completed high school or earned a GED 8 years later	Logistic Regression	0	Att
Kim & Sherraden	2011	632 9th/10th graders in 1996/1998 whose mothers were in NLSY79 sample	homeownership	dichotomous (1 = home owner; 0 = otherwise)	college attendance	Whether student had ever enrolled in college 8 years later	Logistic Regression	+	Att
Kim & Sherraden	2011	632 9th/10th graders in 1996/1998 whose mothers were in NLSY79 sample	homeownership	dichotomous (1 = home owner; 0 = otherwise)	college degree	Whether student had obtained any kind of post-secondary academic degree 8 years later	Logistic Regression	0	Att
Haurin, Parcel, & Haurin	2002	>1,000 children aged 5-8 in 1988 in NLSY who were surveyed again in '90, '92, and '94	homeownership	duration of homeownership, observed each year between 1979 and 1994	child cognition	reading recognition from Peabody Individual Achievement Test (PIAT-Reading)	instrument on estimated likelihood of homeownership	+	Ach
Haurin, Parcel, & Haurin	2002	>1,000 children aged 5-8 in 1988 in NLSY who were surveyed again in '90, '92, and '94	homeownership	duration of homeownership, observed each year between 1979 and 1994	child cognition	math achievement from PIAT-Math	instrument on estimated likelihood of homeownership	+	Ach
Zhan & Sherraden	2003	591 children of single mothers aged 12-18 in NSFH	homeownership	mother's response to "Do you own your own home?" (1=yes)	academic performance	mothers' reports of child's grades, 1-9 ("mostly A's" to "mostly F's")	OLS Regression	+	Ach
Barker & Miller	2009	including 313 who changed from renters to homeowners or vice-versa over a four-year interval	homeownership	family changed from renter to homeowner	Math	not specified	Differences-in-Differences	0	Ach

Barker & Miller	2009	6,448 children in NLSY from 1986-2004, including 301 who changed from renters to homeowners or vice-versa over a four-year interval	homeownership	family changed from renter to homeowner	Reading Recognition	not specified	Differences-in-Differences	0	Ach
Barker & Miller	2009	6,396 children in NLSY from 1986-2004, including 299 who changed from renters to homeowners or vice-versa over a four-year interval	homeownership	family changed from renter to homeowner	Reading Comprehension	not specified	Differences-in-Differences	0	Ach
Barker & Miller	2009	3,281 first graders in ECLS	homeownership	dummy variable indicating homeownership	Reading	not specified	OLS	-	Ach
Barker & Miller	2009	3,281 first graders in ECLS	homeownership	dummy variable indicating homeownership	Math	not specified	OLS	0	Ach
Barker & Miller	2009	3,151 third graders in ECLS	homeownership	dummy variable indicating homeownership	Reading	not specified	OLS	0	Ach
Barker & Miller	2009	3,144 third graders in ECLS	homeownership	dummy variable indicating homeownership	Math	not specified	OLS	0	Ach
Barker & Miller	2009	3,023 fifth graders in ECLS who hadn't moved in the past two years	homeownership	dummy variable indicating homeownership	Reading	not specified	OLS	0	Ach
Barker & Miller	2009	3,023 fifth graders in ECLS who hadn't moved in the past two years	homeownership	dummy variable indicating homeownership	Math	not specified	OLS	0	Ach
Barker & Miller	2009	3,140 students who progressed from 1st to 3rd grade in ECLS	homeownership	dummy variable indicating homeownership	Reading	improvement in reading test scores from 1st to 3rd grade	OLS	0	Ach
Barker & Miller	2009	3,147 students who progressed from 1st to 3rd grade in ECLS	homeownership	dummy variable indicating homeownership	Math	improvement in math test scores from 1st to 3rd grade	OLS	0	Ach
Mohanty & Raut	2009	1,930 0-12 year old children in CDS subsample of PSID	homeownership	dummy variable (1 = head of household owns the housing unit)	Reading achievement	Broad Reading Woodcock-Johnson score	2-stage OLS Regression instrumenting on predicted value of homeownership	0	Ach
Mohanty & Raut	2009	1,930 0-12 year old children in CDS subsample of PSID	homeownership	dummy variable (1 = head of household owns the housing unit)	Math achievement	Broad Math Woodcock-Johnson score	2-stage OLS Regression instrumenting on predicted value of homeownership	0	Ach
Elliot et. al.	2010	1,063 black/white children aged 12-18 from the 1997 sample in the 2002 PSID/CDS	homeownership	head of parent asked whether they own the house they live in or not	math score	Math score from the Woodcock Johnson	SEM	0	Ach
Elliot et. al.	2010	1,063 black/white children aged 12-18 from the 1997 sample in the 2002 PSID/CDS	homeownership	head of parent asked whether they own the house they live in or not	math score	Math score from the Woodcock Johnson	SEM	+	Ach
Elliot et. al.	2010	1,063 black/white children aged 12-18 from the 1997 sample in the 2002 PSID/CDS	homeownership	head of parent asked whether they own the house they live in or not	reading score	Reading score from the Woodcock Johnson	SEM	0	Ach

Elliot et. al.	2010	1,063 black/white children aged 12-18 from the 1997 sample in the 2002 PSID/CDS	homeownership	head of parent asked whether they own the house they live in or not	reading score	Reading score from the Woodcock Johnson	SEM	+	Ach
Holupka & Newman	2012	783 Black children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Skills	Woodcock-Johnson Letter-Word Identification Test	Statistical Matching	0	Ach
Holupka & Newman	2012	783 Black children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	Woodcock-Johnson Passage Comprehension Test	Statistical Matching	0	Ach
Holupka & Newman	2012	783 Black children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Math Skills	Woodcock-Johnson Applied Math Problems Test	Statistical Matching	0	Ach
Holupka & Newman	2012	299 White children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Skills	Woodcock-Johnson Letter-Word Identification Test	Statistical Matching	+	Ach
Holupka & Newman	2012	299 White children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	Woodcock-Johnson Passage Comprehension Test	Statistical Matching	0	Ach
Holupka & Newman	2012	299 White children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Math Skills	Woodcock-Johnson Applied Math Problems Test	Statistical Matching	0	Ach
Holupka & Newman	2012	391 White children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Skills	PIAT Reading Recognition Test	Statistical Matching	-	Ach
Holupka & Newman	2012	391 White children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	PIAT Reading Comprehension Test	Statistical Matching	0	Ach
Holupka & Newman	2012	391 White children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Math Skills	PIAT Math Test	Statistical Matching	0	Ach
Holupka & Newman	2012	571 Black children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Skills	PIAT Reading Recognition Test	Statistical Matching	0	Ach
Holupka & Newman	2012	571 Black children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	PIAT Reading Comprehension Test	Statistical Matching	0	Ach
Holupka & Newman	2012	571 Black children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Math Skills	PIAT Math Test	Statistical Matching	0	Ach
Holupka & Newman	2012	333 Hispanic children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Skills	PIAT Reading Recognition Test	Statistical Matching	0	Ach
Holupka & Newman	2012	333 Hispanic children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	PIAT Reading Comprehension Test	Statistical Matching	+	Ach
Holupka & Newman	2012	333 Hispanic children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Math Skills	PIAT Math Test	Statistical Matching	0	Ach
Holupka & Newman	2012	783 Black children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Skills	Woodcock-Johnson Letter-Word Identification Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach

Holupka & Newman	2012	783 Black children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	Woodcock-Johnson Passage Comprehension Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	783 Black children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Math Skills	Woodcock-Johnson Applied Math Problems Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	299 White children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Skills	Woodcock-Johnson Letter-Word Identification Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	299 White children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	Woodcock-Johnson Passage Comprehension Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	299 White children aged 5-17 from PSID 2002 CDS sample with income 200% of poverty or less	homeownership	fraction of the child's life spent in an owned home	Math Skills	Woodcock-Johnson Applied Math Problems Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	391 White children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Skills	PIAT Reading Recognition Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	391 White children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	PIAT Reading Comprehension Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	391 White children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Math Skills	PIAT Math Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach

Holupka & Newman	2012	571 Black children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Skills	PIAT Reading Recognition Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	571 Black children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	PIAT Reading Comprehension Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	571 Black children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Math Skills	PIAT Math Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	333 Hispanic children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Skills	PIAT Reading Recognition Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	333 Hispanic children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Reading Comprehension	PIAT Reading Comprehension Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach
Holupka & Newman	2012	333 Hispanic children aged 4-14 in 2002 from 1996 NLSY79	homeownership	fraction of the child's life spent in an owned home	Math Skills	PIAT Math Test	Instrument on housing price index and local avg. hmrshp rates of race/income	0	Ach

Appendix II: Detailed Results of all Stress Studies

Author(s)	Year	Sample	Factor	How Measured	Outcome	How Measured	method	dir
Alva & de los Reyes	1999	171 Freshmen at a predominantly Hispanic High School in LA	stress	Hispanic Children's Stress Inventory (30 items on culturally specific stressors)	Grades	GPA during first semester of HS	Hierarchical Regression	-
Thompson & Masset	2005	110 African-American children aged 11-13 from four inner-city Chicago public schools	stress	The Extended Childhood Post-Traumatic Stress Disorder Reaction Index	Academic Achievement	Iowa Test of Basic Skills	Correlation	-
Thompson & Masset	2005	110 African-American children aged 11-13 from four inner-city Chicago public schools	violence	Community Violence Scale (section of Conflict Tactics Scales)	Academic Achievement	Iowa Test of Basic Skills	Correlation	-
Morales & Guerra	2006	4,458 1st-6th grade students in 21 urban Midwestern schools observed twice over 2 years	stress	Stressful Urban Events Scale (family transitions/nghbd violence exposure subscales + FRPL status)	Academic Achievement	Iowa Test of Basic Skills	Sructural Equation Model	-
Wadsworth et al.	2008	164 low-income students (82 aged 7-10 and 82 aged 11-18) from Colorado Project on Economic Strain	stress	parent and student responses to five subscales of the Multicultural Events Schedule for Adolescents	Academics	Parent and Student interviews regarding GPA, how much student likes school, time spent on HW, and importance of school to stu	Sructural Equation Model	0

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