

The Effects of Health, Mobility, and Socio-Economic Status Factors

on the Race Gap in Achievement

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Abstract

Previous research has shown that Black and Hispanic students tend to achieve at significantly lower levels than Asian and White students on standardized tests. The purpose of this study was to examine the influence of health, mobility, and socio-economic status on this racial/ ethnic achievement gap. Through information from parent and student surveys, as well as student grades from transcripts, scores from state-administered achievement tests, and district-gathered information on whether or not the student was eligible for free/ reduced-price lunch, I was able to analyze influences on the achievement gap in a suburban school district. I found significant effects of race/ ethnicity on achievement, socio-economic status, mobility, and one health factor, as well as significant effects of socio-economic status, mobility, and some health measures on achievement.

The US is the most economically stratified industrial country in the world (Lykes, Banuazizi, Liem, & Morris, 1996). The effect of these socio-economic class differences is clear in everything from the jobs people strive for, to the neighborhoods they live in (Hanson, McLanahan, & Thomson, 1996 as cited in Duncan & Brooks-Gunn, 1997). No one wants higher taxes, yet the current social services are not adequate to help the American poor (Duncan & Brooks-Gunn, 1997; Rothstein, 2004). As time progresses, researchers are realizing more and more that these socio-economic discrepancies begin in the home and are perpetuated in the schools (Rothstein, 2004). With approximately 47.6 million children around the country, parents depend on the government to provide quality schooling (McDowell & Johnson, 2002). Yet the education children get is not equal (Barton, 2003; Rothstein, 2004). Often time this socio-economic segregation is connected to location where the affluent suburbs have more resources to invest in youth education (Duncan & Brooks-Gunn, 1997). Socio-economic status is heavily correlated with race/ ethnicity (Orr, 2003), and accordingly this geographic segregation is racial/ ethnic as well.

As capital to the richest state, Hartford is the second poorest small-to-medium sized city in the US after Brownsville, Texas (Jacobs, 2003; Kuzyk, 2003) and is 73 percent minority (Jacobs, 2003). Within the public schools, approximately 95 percent of Hartford students are minority (Jacobs, 2003). The affluent neighboring suburbs are predominantly White, with the exception of Bloomfield (Jacobs, 2003). The schools, unequally separated by race/ ethnicity and socio-economic, are detrimental to everyone involved. Neither suburban nor urban students are getting alternative perspectives within the classroom.

Milo Sheff was a 4th grade student in the Hartford public school system when his mother and other concerned public school students and parents from urban and suburban schools in the

Greater Hartford school district teamed up with local civil rights action groups to sue the State of Connecticut (Horton-Sheff, 2004; Sheff v. O'Neill, 1999). They alleged that the schools in Connecticut are racially and ethnically isolated, and this segregation is illegal under Connecticut state law (Green, 2001a; Kuzyk, 2003). The lead defendant was then Governor William O'Neill. Sheff vs. O'Neill turned into a string of cases still going on today about de facto residential segregation and the effects thereof on the Connecticut public school systems (Horton-Sheff, 2004; Kaminski, 2002).

The Sheff plaintiffs sued the state of Connecticut for not giving Connecticut students equal education opportunities (Green, 2001b). Economic and racial/ ethnic diversity are often found to be associated with educational achievements (Jacobs, 2003; Rothstein, 2004). Accordingly the de facto segregation is denying equal education to all (Horton-Sheff, 2004). Racial/ ethnic integration is important to both the urban schools as well as those in the suburbs (Wells & Crain, 1997). Thus, the court ruled that the state had to remedy the problem by integrating city and suburb (Green, 2001a). This ruling began the long road to policy changes and government sponsored desegregation efforts.

One of the first remedies the state government suggested was the Open Choice Program. The concept was that busses could take suburban students to city schools and urban students to suburban schools (Jacobs, 2003). Unfortunately the suburban parents did not enroll nearly as many of their students compared to the urban parents (Jacobs, 2003). Consequently, the program became a one-way bussing of urban students to the suburbs. It is not a strong program because the suburban school systems of greater Hartford cannot hold all of Hartford's students (Jacobs, 2003). Thus, Open Choice only affects a small percent of urban students (Jacobs, 2003; Delaney, 1994).

The State's second attempt to resolve segregation was with Magnet schools (Delaney, 1994). These magnet schools have state-of-the-art technology and the same level (or more) resources available that suburban schools provide their students (Kaminski, 2002; Wells & Crain, 1997). While this appeased the suburban parents' argument that the schools they send their kids to should be of equal caliber to the neighborhood suburban school, magnets schools alone are an inadequate remedy (Smrekar & Goldring, 1999; Orfield & Eaton, 1996). The state set a guideline that the magnet school ratio was 75 percent Hartford students and 25 percent students from the 19 surrounding suburbs, until 2004 when it became a 70 percent/ 30 percent urban/ suburban mix (Sheff v. O'Neill, 2003; Strategic School Profile, 2005). With this rule implemented, the magnet schools are helping less than 5 percent of the urban public school student population (Kaminski, 2002; Hartford Public Schools, 2002). Moreover, though the magnet schools are assisting in district socio-economic desegregation, racial/ ethnic segregation continues. There is a phenomenon some current studies are finding where while the suburb is majority White, suburban students attending magnet schools are predominantly minority (not White) (Estevez, 2006). Thus action towards the value of desegregation in education has yet to be resolved.

Section 8 housing vouchers can be viewed as another desegregation attempt (Donovan, 1994). The premise behind the vouchers was that individuals who would ordinarily be living in federally funded affordable housing can take that money and apply it towards housing anywhere in a suburb or city (Donovan, 1994). The vouchers encourage socio-economic integration geographically. Connecticut's minority residents are more likely than any other group to live in socio-economically stressed communities due to factors such as housing discrimination (Orfield & Luce, 2003). The majority of socio-economically poor individuals in Connecticut are not

White (Kuzyk, 2003); ergo the Section 8 program becomes a tool to desegregate the suburbs racially as well. Thus far, Section 8 has stimulated some movement of minority families to the suburbs. As the general population diversifies, the effects are seen in the schools as well.

In terms of intellectual and financial capital, the suburbs of Hartford are much more affluent in comparison to Hartford (Jacobs, 2003). The focus must shift to what the Section 8 mobility means to suburban students. Even with physical desegregation of the classrooms, all students are not at the same comfort level, afforded the same resources, and starting at the same point. Students who are minority or socio-economically poor are disadvantaged and often start further behind other students at the beginning of the school year (Entwisle, Alexander, & Olson, 1997). This occurs in part because of all the factors associated with achievement (Rothstein, 2004).

The Race/ Ethnicity Gap in Achievement

The race/ ethnicity gap in achievement is the visible difference in student scores between Asian, Black, Hispanic, and White students (Barton, 2003; Rothstein, 2004). Asian and White students tend to score above average on standardized test scores while Blacks and Hispanics score significantly below average (Barton, 2003; Rothstein, 2004). The race/ ethnicity gap is a misnomer because it is not actually race or ethnicity per se that causes this gap but rather all the factors associated with race/ ethnicity (Rothstein, 2004). In America, race/ ethnicity is so highly correlated with socio-economic status, that though the gap in achievement may look like scores differ by race/ethnicity, they may actually differ by the student's socio-economic background (McLoyd, 1998).

The socio-economic and race/ ethnicity gap in achievement is affected by both home and school factors. Home factors consist of everything from the student's birthweight and other

health factors, to social factors such as home language and parental education (Barton, 2003; Rothstein, 2004). In school, student achievement is affected by how the student interacts with peers and teachers (Green, Adams, & Turner, 1988), whether or not the student feels a sense of belongingness to the school (Goodenow, 1993), as well as other factors. There is some overlap; for instance, pre-school experience could be seen as a school factor or a consequence of family initiative. Technically the student is not yet under the jurisdiction of the public school system, and thus it is a family factor, though at the same time, daycare is a type of school and thus a school factor.

With so many variables affecting the racial/ ethnic achievement gap, family background has the single largest effect on test scores and overall achievement (Jacobs, 2003; Coleman, Campbell, & Hobson, 1966). There is a great deal of research connecting the achievement gap directly to socio-economic status (McLoyd, 1998). Socio-economic status in turn overlaps with student health, as well as mobility and housing conditions (Rothstein, 2004).

Socio-economic Status

The United States is the most economically stratified society of all industrial nations in terms of both income and wealth (Lykes et al., 1996). This translates into forty percent of US wealth located in the hands of the top one percent of the wealthiest individuals (Lykes et al., 1996). This also means, families in poverty are seriously disadvantaged. Logistically, the lower income parent often works long hours and expects the adolescent child to contribute to the collective good either with money from an outside job or by work in the house. This work includes care for younger siblings, chores around the house, cooking, and shopping (Gennetian et al., 2004). Socio-economic status also plays into how much of a role model the parent is for the student, and more affluent parents define success at higher levels for the child to strive towards

(McLoyd, 1998). This discrepancy in wealth also means that students from lower socio-economic status backgrounds have greater health concerns, they move more often, and the neighborhood to which they move is often clustered low-income housing (Rothstein, 2004).

Health and Socio-economic Status

Brooks-Gunn and Duncan (1997) explain that while health is an endpoint, it is also a path, influenced by poverty, towards school achievement. Health problems are somewhat indicative of which students will perform at higher levels because those afflicted with illnesses are less likely to be attentive in the classroom when they attend school at all. Some health factors studied include lead poisoning, vision problems, hearing problems and earaches/infections (otitis media), asthma, hunger and general nutrition levels, oral health, and general medical care (Barton, 2003; Egbuonu & Starfield, 1982; Rothstein, 2004). Though many students from all economic levels are afflicted with these problems, lower socio-economic background students are more likely to have the afflictions more severely. Students of lower socio-economic classes are also more likely to be hospitalized and hospitalized for a longer period of time (Egbuonu & Starfield, 1982). On the financial spectrum, if students from low socio-economic background received a \$10,000 increase in family income between birth and kindergarten, the student would achieve at the level of an entire academic year difference (Brooks-Gunn & Duncan, 1997).

Health

Asthma. Asthma is a breathing affliction that affects over 15 million people in the US alone (Schwab, Cullen, & Schwartz, 2000). Inflammation of the airways can be caused by environmental pollutants, such as industrial air pollution and cockroach remnants, as well as genetic factors (Rothstein, 2004; Schwab, Cullen, & Schwartz, 2000). Asthma is the most

common chronic health concern among students, and children with asthma are three times more likely to miss school than asthma-free students. Students with asthma are more likely to be kept awake at night from coughing, this in turn leads to less attentive behavior while in class the following day- if the student attends class at all (Rothstein, 2004). The number of reported asthma cases in the US rose 160 percent in children under five in the last 10 years (Schwab, Cullen, & Schwartz, 2000).

The higher the socio-economic status of the school district, the fewer the cases of asthma within the district (Schwab, Cullen, & Schwartz, 2000). Hartford county has the third highest asthma rate in the state of Connecticut (Orfield & Luce, 2003). This number is not all inclusive because asthma tends to be underreported, and asthma levels vary by season. Thus data collected in the spring will not be indicative of how many students had asthma in the fall. Yet asthma is caused by sometimes temporary or changeable factors (Schwab, Cullen, & Schwartz, 2000). For instance, cockroaches are highly associated with increased asthma levels. If one can rid the residence of cockroaches, the number of residents with asthma should decrease. Asthma is another chronic affliction to the lower class. Though Egbuonu and Starfield (1982) found that internationally children from higher classes were more likely to report having had asthma, they counter argued that families from lower social classes are less likely to have access to medical care and accordingly may not recognize when the child has asthma and will underreport the affliction. Asthma was also reported to be more severe among lower socio-economic status students (Egbuonu & Starfield, 1982).

Plumbism (lead poisoning). According to the Centers for Disease Control (CDC), lead poisoning (also known as plumbism) is recognized to be a problem in children (regardless of socio-economic status) (Egbuonu & Starfield, 1982). In order to be considered to have a high

lead blood level, the individual must have 30 μ g of lead per 100ml of blood (Egbuonu & Starfield, 1982). Children of lower socio-economic classes had a median of 29.3 μ g/ 100ml while higher socio-economic class children had a median of 22.4 μ g/100ml (Egbuonu & Starfield, 1982). More simply put, blood lead levels are higher among socio-economically disadvantaged students, and blood lead levels decrease as affluence increases (Brooks-Gunn & Duncan, 1997). If the student is exposed to lead at a young age, s/he is more likely to have stunted growth, hearing loss, metabolism damage, impaired blood production, toxic effects on the kidneys, not to mention lower IQ levels, decreased attention span, reading and learning disabilities, and overall cognitive functioning (CDC, as cited in Barton, 2003; Brooks-Gunn & Duncan, 1997). Children are often exposed to lead through lead paint chips and dust in their residence (Barton, 2003; Rothstein, 2004). In 1978 the US Housing Department passed a law abolishing lead based paint from use residentially (Rothstein, 2004).

Two important years with respect to lead-based house paint are 1946, when legislation came out that lead adversely affects health and 1978, when lead-based paint was banned from use in the US (Barton, 2003; Brooks-Gunn & Duncan, 1997; Kreiger et al., 2003). Thus housing built prior to 1978 could potentially have lead-based paint. Financially disadvantaged and minority students are more likely to live in these older dwellings and less likely to have coats of paint covering the layers of lead-based paint (Barton, 2003). Accordingly, the paint dust is more likely to be in the air and leads to higher levels of lead in the blood of the residents.

Vision. Another health concern is from vision problems. Though myopia (near-sightedness) is more common among middle-class than poverty-stricken students, middle-class students are also more likely to wear glasses and correct the problem. Poor students are also more likely to have vision problems which are more challenging to overcome (Egbuonu &

Starfield, 1982). Rothstein (2004) argues that schools often only test for myopia rather than hyperopia (farsightedness). Students who depend on the school for eye care because they are less likely to have medical health insurance (Rothstein, 2004), are less likely to have farsightedness diagnosed or treated. To a lower income bracket student, this means reading a book in class is likely to be more challenging (Rothstein, 2004).

Hearing. As if lower cognition levels and not being able to see clearly weren't enough, lower socio-economic status students are also more likely to have otitis media (ear infections/aches) and hearing loss. If the otitis media is a chronic affliction to the student, the student may lose up to 15 decibels or more of hearing (Egbonu & Starfield, 1982). Higher socio-economic class students are less likely to have such hearing impairments or the side effects. A student with otitis media is less able to concentrate in class, when s/he is in school. Poor students are reported to have greater hearing difficulties, running ears, and ear aches (Egbonu & Starfield, 1982). If the student is afflicted with an ear infection, the lower SES parent is not likely to be able to leave his/her paid-by-the-hour job early to take the child to the doctor. Thus the child is afflicted for a greater period of time (thereby increasing hearing impairment and distraction in class). If the student lacks health care coverage or insurance, s/he is not likely to receive the necessary medications for curing the ear ache.

Nutrition. Lack of quality nutrition is another factor affecting school success with many derivatives such as iron deficiency and anemia, lower birthweight of the child, stunted growth, and decreased cognitive abilities. Some school systems offer high-caloric breakfast and lunches to ensure students have enough energy for the school day; studies have shown these students' standardized test scores do increase (Rothstein, 2004). This also assists the student's concentration level where in class the student might otherwise concentrate on his/her hunger

(Barton, 2003). While only 14 percent of all households with children under the age of 18 report having food issues or concerns, this problem is much more prevalent among Hispanic and Black families than White families (Barton, 2003). Lower nutrition levels also lead to greater susceptibility to any lead the child is exposed to. Iron deficiency also leads to conduct disorders among teens and overall decreased attentiveness. Again, this health concern occurs much more often among poor than non poor students (Egbuonu & Starfield, 1982).

Dental hygiene. Similar to earaches and asthma, toothaches can also be a distraction in the classroom (Rothstein, 2004). Students who do not have proper dental health care coverage are less likely to see a dentist and thus more likely to have toothaches or untreated cavities (Rothstein, 2004). Lower socio-economic status students are almost three times more likely to have untreated cavities than their middle-class counterparts (Rothstein, 2004).

Medical care. Along the same lines, students without proper medical care are more likely to have illnesses which keep them out of school. Egbuonu and Starfield (1982) argue that lower socio-economic status families often have illnesses of greater severity than middle class families due to the length of time the ailment remains untreated before the individual gets help. Improper medical care is also linked to health insurance. Poor families are less likely to have health insurance, even when Medicaid is available. If the family does have health insurance, they will often not know what resources are available to them or how to access the resources (Rothstein, 2004). Furthermore, there is a time commitment involved because parents paid on salary can take an afternoon off to take the sick child to the doctor with relative ease, lower-income jobs paid by the hour mean that the parent will take a pay cut when s/he takes the sick child to the doctor. Medical facilities for low-income families are often overburdened and thus the child is more likely to go to the emergency room for routine care than to see a primary care

physician. This divide is also clear by race/ ethnicity in which Black and Hispanic children are more likely to go to the emergency room for routine care. Rothstein (2004) suggests that students who do not regularly see a primary care physician are not as likely to get all their vaccinations, and this may in turn explain why poor children miss school approximately 30 percent more often than middle-class children.

Mobility

Socio-economic status also affects student mobility. Students from a more affluent background were less likely to move as often as their less advantaged counterparts. Moves are disruptive to the student who must adjust to a new classroom, teacher, classmates, curriculum, and available resources (Rothstein, 2004). Thirty percent of the poorest children had attended three different schools by third grade (this statistic was only true for ten percent of middle class students). This difference in stability is also divided across racial/ ethnic lines. Of the frequent school changers, Black and Hispanic students are more than twice as likely to change schools as White students (Barton, 2003). Rothstein (2004) argues that this difference alone accounts for 14 percent of the achievement gap in standardized test scores.

Housing. When considering mobility it is important to consider housing as well. Firstly, housing can be considered another factor associated with social inequality, specifically health (Dunn, 2002). Initially, one must consider into what neighborhood the family moves. Often times affluent neighborhoods are not integrated with those that are less affluent, and the resources available to a community are not evenly distributed. These residential inequalities are detrimental to the student (Donovan, 1994). Lower income neighborhoods are often less socially organized and have fewer resources for child development (Brooks-Gunn & Duncan, 1997), not to mention fewer parks, community and childcare centers, and schools (McLoyd, 1998). These

less affluent neighborhoods also often have clusters of older dwellings with internally- exposed lead paint (Barton, 2003). Once in the house, lower income students are further disadvantaged because they are less likely to have their own room in which to do homework. Due to overcrowding, these students are generally less able to avoid hearing the television, siblings, or other distractions of the house (Rothstein, 2004).

The Connecticut Background

With the race/ ethnicity and socio-economic gap in achievement found nationwide, Connecticut is no exception. The small state of 3.4 million residents (US Census, 2000), divided into 169 districts (Connecticut State Department of Education, 2003), has the significantly highest per capita income, 37 percent higher than the rest of the US (Orfield & Luce, 2003). Approximately 55 percent of Connecticut residents' property taxes go to schools (Orfield & Luce, 2003). Yet almost 60 percent of the state's public school students are in school districts encountering fiscal and social stress (Orfield & Luce, 2003). One way to assess whether students across the state are achieving at the same level (regardless of district concerns) is with standardized tests. Connecticut public school students all take the Connecticut Mastery Test (CMT) in grades 4, 6, and 8 as well as the Connecticut Aptitude and Performance Test (CAPT) in grade 10. Post 2007, students will take the CMTs every year from 3rd grade through 8th grade as a reaction to the federally mandated No Child Left Behind Act (Connecticut State Department of Education, 2005). On the 2001 CMTs for grade 4 reading, 70 percent of the White students met the state goal while only 26 percent of the Black students met the same goal (Education Trust, 2003). Following the same trend, 44 percent of Black students scored at the "intervention level" on the 4th grade CMT reading test, while only 10 percent of their White counterparts received the same classification (Education Trust). This discrepancy in test scores is also clear

in the math CMTs for 8th graders; 67 percent of White students met the state goal and 5 percent were at the intervention level, whereas 19 percent of Black students met the state goal and 30 percent scored at the intervention level (Education Trust). Connecticut's Black-White achievement gap (that all states measure for the No Child Left Behind Act) is the 6th largest in the nation for 4th grade reading scores (Education Trust), though at the same time, Blacks in Connecticut perform at higher levels on the 4th grade reading CMT than anywhere else in the country (Education Trust). Performance on the 8th grade math CMTs differ greatly in that Connecticut has the largest Black-White gap in the country and Black students' overall performance is in the middle level when assessed within the US (Education Trust).

Predictions

If one was to look at all these family and school factors and how they correlate with the achievement gap, I hypothesize that most of the above factors will account for some part of the gap. Many of the current studies of the gap compare a wealthy region to a poor one, or focus on the poverty-stricken region. This study however, will look solely at the relatively affluent suburb, "Twainville", a racially and ethnically integrated suburban public school system in Connecticut¹.

Twainville has already found a race/ ethnicity gap in achievement (Ward, 2005). I predict that there is also a socio-economic gap in achievement. Students who are eligible for free and reduced- price lunches (signifying that their households are below poverty level) will achieve at lower levels than all other students. I predict that students with low SES, depleted health, and high mobility will perform the worst academically. Minority students will be more likely to have moved, have depleted health, and therefore perform at lower levels. As always,

¹ "Twainville" is a pseudonym. The investigators agreed not to reveal the name of the school district in any public reports of this research in order to preserve confidentiality.

this is not because of race or ethnicity per se but rather the high correlation of other factors associated with race/ ethnicity.

Furthermore, socio-economic status and race/ ethnicity will heavily correlate with health. Students who are socio-economically disadvantaged in Twainville will achieve at lower levels in part because of various health problems. Health afflictions in general will significantly affect achievement levels primarily due to student absences. While I predict that asthma will affect all socio-economic classes, the effects of asthma will be more slightly more severe in poor students because they will not have gone to the doctor as often as the wealthy students. The more extensive effect of asthma in poverty-stricken students will manifest itself in a greater number of absences and more nights kept awake (leading to drowsiness in class and lower achievement). Dental hygiene variation will be minimal across socio-economic groups. I do not predict a difference in the risk of plumbism between any ethnicity or socio-economic class. I also do not predict that hearing and vision problems will correlate significantly with race/ ethnicity and socio-economic status.

Additionally wealthy White students will be less likely to have moved during their school career than Asian, Black, or Hispanic students of any socio-economic status. Mobility will have a direct negative correlation with achievement. The more the student has moved, the less well the student will perform. Higher socio-economically classified parents are more likely to have college degrees and jobs that require critical thinking. This in turn will lead to these parents providing a more intellectually stimulating environment for their children, and thus these students will achieve at higher levels than their classmates.

Methods

In the town of Twainville, Connecticut, the public school student population is 68 percent White, 13 percent Hispanic, 10 percent Black, 9 percent Asian (Strategic School Profile, 2005). Approximately one fifth of the Black and Hispanic student populations within the suburb moved there from Hartford within the last 12 years, and another fifth moved from elsewhere in Connecticut. This contrasts heavily with the 75 percent of White students who have lived in Twainville for their entire schooling career. Within Twainville, the populations are also spatially segregated with more Black and Hispanic students living in the southeast corner and more White and Asian students residing in the northwest corner of the suburb. The suburb is a typical mix of cultures and strives for unity, yet as with almost every other school district in the country, there is a race/ ethnicity gap in achievement between these groups of students.

In terms of socio-economic status, approximately 12 percent of the public school students in Twainville receive free or reduced price lunches. This means the students are from families living at or below the poverty line (Strategic School Profile, 2005). Asthma is 50 percent higher in urban school students than rural students in Connecticut (Mitchell, 2005). Twainville's proximity to Hartford suggests that the students are at greater risk for asthma. Thus with an economically stratified population where health afflictions are probable and mobility is a concern, the achievement gap has already been identified in standardized test scores.

Sampling and Recruitment

I chose to study Twainville primarily because the school system was very willing to assist us. The population is racially/ ethnically, socio-economically, and occupationally diverse: residents range from recent immigrants to those who have lived in Twainville for multiple generations. Residents run the gamut from those who live below the poverty line to those who

are wealthy, and they do all different types of jobs from manual labor to office work. This in turn makes the student population diverse as well and provides a generalizable sample. While researchers have looked at the Black-White gap, or the Black, Hispanic- White gap, it seems that few have taken the four prominent racial/ethnic groups— Asian, Black, Hispanic, and White— into account. The opportunity further presented itself when the school district offered to work with us and even went so far as to give us data on the entire student population (approximately 10,000 students).

In this cooperative light, I chose to take a racially/ ethnically stratified random sampling of the public school student population. I chose to specifically sample seventh and eleventh graders because they would have recent test scores available for Connecticut's standardized tests (CMT and CAPT respectively). These age groups also represent students who are well acclimated to their middle or high schools. The school district allowed us to send out a recruitment letter (see Appendix A) and consent form (see Appendix B) to 7th and 11th grade households. Out of the 547 recruitment letters sent out, I received 49 affirmative responses, a 9 percent response rate.

Sample Characteristics

The students in our sample were predominantly White (see Table 1), upper middle class, low mobility, and healthy. This is in some ways a representative sample because Twainville is also mostly White (68.4 percent compared to our sample, 65.3 percent), with a low poverty level (12.1 percent of the population are eligible for free or reduced-price lunch compared to our sample, 10.2 percent). Furthermore, consistent with Twainville, the sample had a high level of parental education. In Twainville approximately 9.9 percent of all adults had less than a high school diploma. In our sample, of the 29 parent respondents (see Table 2), 93 percent had at

least a high school diploma, and 84 percent of their spouses had at least a high school diploma as well.

The participants in this sample reported high socio-economic status. Also unique to the sample, the students had a high overall health levels. There was some variability in whether or not the student needed glasses (22 had perfect vision, 18 wore glasses, and 3 needed glasses but didn't have them), and between individuals with and without asthma, and cigarette use in the household (most did not have smokers). There was minimal variability in hearing abilities, dental health (ranged from good to excellent), and dental visits (virtually all students in the sample had visited the dentist within the past year). Overall health was mostly between excellent and very good though three participants responded that their health was good. Within the parent sample, 97 percent reported that their house was built before 1978, and the remaining individual did not know. Also in the sample, 15 of the 27 parents wrote that they moved once or twice since their child entered kindergarten. Only one parent in our sample did not send his/her child to pre-school.

Measures

To test for the race/ ethnicity gap in achievement within our sample, I used a demographic question to gather race/ ethnicity information, and achievement data provided by standardized test scores; CMT 6 Math, Reading, and Writing, as well as both the student's cumulative and current- year GPA within the school.

Socio-economic status is a complex variable. Often studies look at short and long term poverty of the family, but given the length of this study, that was not feasible. I chose to adapt the MacArthur Scale of Subjective Social Status (Goodman et al., 2001) and measure where the student perceived his/her family to be financially (see Appendix C). The Twainville district also

gave me information about students in my sample who were eligible for free or reduced price lunch.

In terms of mobility, I created my own questions factually asking the student when s/he began attending Twainville public schools and if the student had moved, from where. I gave the parents more in-depth questions about how long they had lived in Twainville, and how many times they had moved since their children started kindergarten (see Appendix D).

In prior research of health and achievement, scientists have found that bad eye sight, poor hearing, inadequate dental hygiene and overall healthcare factor significantly in a student's attention and therefore achievement levels. Asthma, and other chronic diseases, are also found to have huge effects on standardized test scores. I adapted questions from the National Health and Nutrition Examination Survey (NHANES III), and from the National Survey of Children's Health (2003) (see Appendix E).

Procedures

I chose to draw a stratified- random sample by race/ ethnicity of 7th and 11th graders in the Twainville public school system. Trinity's Internal Review Board approved this study. After administrators identified possible students, I mailed consent forms to parents requesting that they be in the study and allow their children to be in it. Once those were returned, I mailed out the surveys to the consenting parents. The student data was collected during school hours over the course of four days. Twainville sent an electronic copy of data on achievement, race/ ethnicity, and whether the student was eligible for free or reduced price lunch for all students in my sample.

Results

Effects of Race/ Ethnicity on Student Achievement

There was a marginally significant effect of race/ ethnicity on cumulative GPA, where Black students achieved at lower levels than White and Hispanic students, $F(3, 45) = 2.5, p = .07$ (see Figure 1 and Table 3). There was a significant effect of race/ ethnicity on CMT Math score, $F(3, 34) = 3.96, p = .02$. Black students performed at significantly lower levels than the White students ($p = .02$) and marginally significantly lower than Hispanic students ($p = .08$). Overall, Hispanics had a higher mean than any other group ($M = 317.5$ compared to 299.7, 265.0, and 235.5 for White, Asian, and Black students, respectively). There was not a significant effect of race/ ethnicity on current GPA, $F(3, 45) = 1.54, p = .22$, or the other two CMT scores: CMT Reading score, $F(3, 33) = 1.21, p = .32$ or CMT Writing score, $F(3, 33) = .29, p = .83$.

Race/ Ethnicity and SES

From the student- reported placement on the socio-economic status ladder, there was a significant effect of race/ ethnicity on SES, $F(3, 38) = 5.18, p = .004$ (see Figure 2). Black students reported lower SES than other groups. There was also a significant effect of race/ ethnicity on whether or not the student shared a room at home (an SES indicator), $\chi^2(df = 6, n = 43) = 18.67, p = .01$. The majority of Asian, Black, and White students did not share a room with anyone else, whereas Hispanic students were equally likely to have their own room as to share the room with one other person.

In terms of parent responses, there was a significant effect of race/ ethnicity on parent-reported SES, $F(1, 27) = 4.08, p = .05$ (see Figure 3). White parents had a significantly higher self-reported SES than non-White parents ($M = 7.61$ and 6.0, respectively). There was not a significant effect of race/ ethnicity on parental education, $F(1, 26) = 1.09, p = .31$. There was

also no significant effect of race/ ethnicity on the other parent's education, $F(1, 23) = .77, p = .39$.

Race/ Ethnicity and Health

White students reported significantly less cigarette use in their households than any other race/ ethnicity, $F(3, 39) = 4.11, p = .01$ (see Figure 4). All other student measures did not show a significant effect of race/ ethnicity on health.

In terms of parent- reported health measures, there were no significant effects of race/ ethnicity on any of the health factors. There was no significant effect of race/ ethnicity on the parent-report of the child's overall health, $F(1, 27) = 1.34, p = .26$. In both White and non-White families, parents reported their children's overall health near excellent. There was a significant effect of race/ ethnicity on whether or not a child wore glasses, $\chi^2(df = 1, n = 29) = 6.62, p = .01$. White students were less likely to wear glasses than non-White students, $M = 1.52$ and 2.67 , respectively. This makes sense because any vision problems are already corrected. There was not a significant effect of race/ ethnicity on parent-report of the child's overall dental health, $F(1, 27) = 1.38, p = .25$. Most of both White and non-White parents reported their children's dental health as excellent or very good, $M = 1.22$ and 1.5 , respectively. There was no significant difference in the effect of race/ ethnicity on parent report of child's asthma, $\chi^2(df = 1, n = 29) = 1.58, p = .21$. Though not significant, the five parents who reported that their children had asthma were White. There was not a significant effect of race/ ethnicity on parent- reported cigarette use in the household, $F(1, 27) = .25, p = .62$. Most of both White and non-White parents reported never smoking cigarettes. Here, there is an interesting difference in results between student and parent responses. This may be due to which parents completed the survey.

Except for one, all parents reported living in houses built before 1978, thus any effects of lead poisoning from paint chips and dust would be indistinguishable across the sample.

Race/ Ethnicity and Mobility

According to student- reported data, White students lived in Twainville for significantly longer than any other race/ ethnicity, $F(3, 39) = 3.84, p = .02$ (see Figure 5). From the parent questionnaire, there was no significant difference between races/ ethnicities in the number of times the child moved since kindergarten, $F(1, 25) = 2.54, p = .12$, or between races/ ethnicities in when the child entered Twainville public schools, $F(1, 27) = 2.30, p = .14$. Though the parent analyses showed no significant differences, the differences were in the same direction as evidenced by the student- reported data.

SES and Achievement

There were significant correlations, ranging from .37 to .59, between the student-reported SES ladder and all five achievement measures (see Table 4). The sample was too small to measure the significance of a shared room on the five achievement measures and thus, nothing significant was found.

From the parent measures, there were highly significant positive correlations between CMT 6 Math scores and the SES ladder, as well as with other parent (typically, father's) education (see Table 5). The CMT 6 Reading scores correlated significantly with parent and other parent education. These positive correlations indicate that the higher the parent's education, the higher the student's performance scores on the CMT 6 Reading test.

Health and Achievement

There were three significant negative correlations between health measures and achievement levels. Students' ratings of their overall dental health correlated highly with CMT 6

Math scores and CMT 6 Writing scores (see Table 4). The correlation is negative because dental health scale was coded <1> “excellent” to <5> “poor.” Thus the lower the rating, the better the dental health. Overall health was highly negatively correlated with CMT 6 Writing scores.

Similar to dental health, overall health was coded on a scale from <1> “excellent” to <5> “poor.”

Parent responses showed there was no significant effect of student vision (glasses) on cumulative GPA, $F(1, 27) = .219, p = .64$. There was no significant effect of student vision (glasses) on current GPA, $F(1, 27) = .197, p = .66$. There was no significant effect of student vision (glasses) on CMT 6 Math, $F(1, 22) = 2.31, p = .14$. There was no significant effect of student vision (glasses) on CMT 6 Reading, $F(1, 21) = 1.317, p = .26$. There was no significant effect of student vision (glasses) on CMT 6 Writing, $F(1, 21) = .293, p = .59$. There were also no significant effects of student asthma on achievement measures. According to Table 5, there were three significant correlations (out of 15) between parent-reported health measures and student achievement. Overall dental health correlated significantly with CMT 6 Math and reading, and household cigarette use correlated significantly with current GPA.

Mobility and Achievement

There were highly significant negative correlations between student-reported mobility and both cumulative GPA and CMT 6 Math scores: the less recently the student started in Twainville public schools, the better s/he achieved academically (see Table 4). The parent measures also showed a significant negative correlation between when the child started in Twainville schools and CMT 6 Math scores: the earlier the child started school in the district, the better s/he did on the CMT Math test (see Table 5).

Parent-Student Report Correlations

The student sample was larger and more diverse in terms of mobility and health. Yet for the most part, there were strong correlations between the way the students and parents answered. For instance, although the SES ladder is somewhat subjective, both students and parents responded with similar answers, $r = .49$, $p = .009$. The parents' and students' mean reported SES were 7.28 and 7.19, respectively.

There was also a significant correlation between parent and student reported overall health, $r = .40$, $p = .04$, with $M = 1.56$ and 1.17 for students and parents, respectively. Health was coded <1> "excellent" to <5> "poor." Similarly, parent and student reports of whether or not the child wears glasses, had close means, $M = 1.91$ and 1.76 for students and parents respectively, where possible responses were <1> "No, my vision is perfect," <2> "No, my vision is not perfect but I don't have any glasses/ contacts," <3> "Yes, I wear glasses/ contacts." There was also a significant correlation between parent and student reports of the child's overall dental health, $r = .53$, $p = .005$, $M = 1.91$ and 1.28 for students and parents, respectively with dental health coded <1> "excellent" to <5> "poor."

There was not a significant correlation between parent and student reports of cigarette use in the household, $r = -.04$. The 43 students had a mean of 1.23, while the 29 parents' mean was 1.03 (on a scale ranging from <1> "never smokes" to <4> "smokes daily."

In terms of mobility, there was a highly significant correlation between parent and student reports of when the student started school in the district, $r = .99$, $p = .001$, $M = 4.16$ and 3.79 for students and parents, respectively, ranging from <0> pre-kindergarten to <13> 11th grade.

Discussion

Findings

Socio-economic status. There was a significant effect of race/ ethnicity on parent-reported socio-economic status. This finding is consistent with my hypothesis that Black students will be of lower socio-economic status, yet I also thought that Hispanic students would report themselves at low levels. There are several possible explanations for this. This analysis compared White and non-White parents with respect to their perceived socio-economic status level. White parents reported significantly higher levels than non-White parents. There was a significant effect of race/ ethnicity on student-reported socio-economic status as well. Black students' self reports in my sample were at a lower average score than Asian, Hispanic, and White students'. In this sample, the Hispanic students' mean self-reported SES was higher than any other group. Yet, these same Hispanic students were more likely than any other group to share a room with at least one other person in their household. Room sharing is another indicator of socio-economic status. The discrepancy in SES measures could be caused by either the small sample, or the language barrier. Of the Hispanic students, all reported themselves between six and eight. Two were eligible for free or reduced- price lunch. For one of these two, English was not her first language. The difference in findings for different SES measures might reflect the socio-economic diversity within the Hispanic sample.

Room sharing has also been associated with achievement because students who have their own rooms are more likely to be able to concentrate on their work (Rothstein, 2004). Within our sample, 86 percent of students had their own room; this suggests the sample is skewed towards economically wealthy individuals. The data supports this, students in my sample who did not share a room achieved at higher levels on the CMT 6 Math test. The

insignificance of other achievement measures correlated with whether or not the student shared a room suggests that the other factors assisting or inhibiting student achievement may have stronger effects, there may not be enough variation between students who shared or did not share their rooms. For instance, while three of the Hispanic students shared their rooms, there was only achievement data on two of the six students- neither of whom shared a room. Or again, it could be the small sample size. Parental education is also a sign of socio-economic status, consistent with the rest of the sample data, most of the parents in the sample had a college degree or better.

Socio-economic status is a complex variable and combines background wealth, income level and overall economic status of the short and long term. Students and parents may only look at one piece of the puzzle, or not realize where they actually fall on the ladder. Furthermore, the ladder acts as a comparison- one is the wealthiest, ten is the poorest. The field of comparison may vary by family- for instance, a relatively wealthy parent might rate him/herself moderately on the scale in comparison to Bill Gates or some other multi-billionaire. A parent with the same resources might look at the other end and realize that s/he is much wealthier than someone poverty stricken, and accordingly rate him/herself as a ten. Despite the subjectivity of the ladder measure, it was a good predictor of student achievement. This data suggests that socio-economic status is directly related to both race/ ethnicity and achievement and may act as a mediating factor between the two.

Health. The health variables did not confirm or disconfirm my hypotheses. There was a significant effect of race/ ethnicity on the student-report of whether or not someone in the household smokes and how often. Almost all White students check the “never” box, while almost all Asian students varied their response from “never” to “occasionally.” Only two of the

49 students reported someone smoking in their household daily. Race/ ethnicity did not have any significant effects on the other health measures in the student questionnaire.

From the parent questionnaire, when comparing White to non-White families, there was a significant effect of race/ ethnicity on whether or not the student wore glasses. White parents were more likely to report that their children had perfect vision. Within the sample, the three students who did not have glasses and needed them were all White. If Twainville does not already, I would recommend that the district test for both near and farsightedness. Except for one parent who didn't know, everyone reported living in a house built before 1978. This makes it hard to discriminate between students who were exposed to lead from paint chips and those who were not exposed. Otherwise, there were no other significant findings with health and race/ ethnicity. This is not to say that health is not related to both race/ ethnicity and achievement but rather that our sample was not indicative of a relation.

Mobility. White students were significantly less mobile than non-White students, according to the student survey. The parent survey showed a difference in the mean amount of time White and non-White families had lived in Twainville, but it was not a significant difference. One reason for the discrepancy in reports is that the non-White parents who responded to the survey are not a representative sample of all non-White families in Twainville. There were also significant correlations between mobility and achievement levels. This suggests that mobility is a significant factor in the "race gap," and one way to begin closing the gap is identify the more mobile students. Perhaps students new to Twainville could complete a short academically rigorous integration program. This program could connect the parent(s) to the school to open lines of communication and teach the parent how to better assist the student.

Limitations

Timing. I only had a short data collection period, due to several factors. Because of this, I was unable to send out a second round of recruitment letters to obtain a larger student sample. Nor was I able to call and remind parents who agreed to be in the study to return the survey. Any student who was absent on the day I administered surveys did not have a second opportunity to take the survey.

The recruitment procedure. In a study where participation is optional, the recruitment letter is a crucial piece of the procedure. Though I had contact over the full school year with the Twainville district, the letter was the first official contact with parents. I requested that the parent consent to either be in the study with the child, allow just the child, or refuse to be in the study and reply by April 8th, 2006. With timing as it was, the parent most likely did not receive the letter until April 5th and may in turn have thought that it was too late to bother. This “opt-in” strategy also unintentionally selects out the parents who are not as involved in their children’s lives, or too busy to communicate with the school district. Additionally, one member of our investigating team live in Twainville. I may have lost some participants because they knew this member and did not feel comfortable being in the study.

The final limitation of the recruitment procedure stems from the actual mailing process. Eleven recruitment letters were returned, marked “addressee unknown.” Some students had different surnames than their parents, and it is possible that the postal worker chose to not deliver the mail because of the discrepancy. The more likely alternative is that these students moved. The implications of this mobility factor are two fold. First, it means that if the mailing address is incorrect, the district is unable to contact them as well. Secondly, it affects the validity of my mobility measures: students who recently moved into or out of Twainville were not included in

the study. The fact that eight out of the 11 names were Hispanic students, two were Asian, and one was Black is also interesting, yet unfortunately not something I could investigate further given the time constraints.

The survey. The number of questions on the parent survey may have acted as a deterrent to a parent with limited time availability. The nature of the questions also varied from factual to personal. Accordingly, some parents who agreed to be in the study may have opted out once they received the questionnaire. Also, there was some variability in which parent completed the survey. Each parent may have had different perceptions of his/her child's health depending on if s/he was the more involved of the two parents.

Given that the survey was administered in a group setting for students, any student filling it out may have been concerned with the confidentiality of the study and whether or not his/her peers could see what responses s/he was writing. Furthermore, the measures themselves may not have been valid. In terms of socio-economic status, there were two main measures: students' self-reported status and the school district's data on the students' eligibility for free or reduced-price lunch. The students who were eligible for free or reduced-price lunch did not all report themselves at low levels on the socio-economic ladder. This may have occurred because students did not want to admit it. More likely, the student was not aware of his/her family's finances. Previous studies look at poverty in terms of short and long term (Duncan & Brooks-Gunn, 1997). This study was limited to short term poverty. Families who are temporarily poverty-stricken still have many available resources financially from relatives, and intangible resources such as background education (Orr, 2003). The child is less likely to know s/he is in poverty unless it is long-term (Duncan & Brooks-Gunn, 1997). Depending on the reason for poverty, the child may not be as hindered by factors associated with poverty. For instance, with

Trinity College and other institutions in close proximity, it is possible that some parents are graduate students or finishing their medical degrees at Hartford Hospital. Though these parents would be viewed as poor, given the parents' education, the children would still be stimulated intellectually at home (Rothstein, 2004).

Twainville is a relatively small suburb and any environmentally associated health problems would be prevalent among all children in the district. Without variation it is challenging to define health problems by race/ ethnicity or socio-economic status. The health measures also depend on the student and/or parent having an accurate memory. If the parent who filled out the questionnaire took the child to the doctor once that year, but the other parent took the child five times, the reporting parent might only remember three of the six visits. The data could lose accuracy and no longer represent the true number of visits to the doctor.

Data analysis. The three prominent problems in data analysis were due to the sample size, the self-selection by the participants to partake in the study, and the disproportionate numbers of students by grade level and school. The small sample size hindered data analysis because there was little variation among the participants in terms of parent education and health. It was challenging to create multi-variable tests with student race/ethnicity because the number of non- White students was very small.

The parents who consented to be in the study may have been the parents who are more involved in their childrens' lives. This could have skewed the data especially in terms of the health measures. Parents who have the time to fill out surveys and be involved probably also have more time to take their children to the doctor or dentist. These students are less likely to have health problems go untreated and can thus be more attentive in class.

The students were not geographically spread out across Twainville and thus any incident in one particular school may have been exacerbated by the amount of data coming from that single school. Although specific events occurred recently at one school and not others, the numbers of students at any one school were too small to make inferences about school-specific effects.

Future Studies

This report provides a lot of suggestions for future studies at every phase of data collection and analysis. To begin with, I would recommend doing a long- term study so as to collect short and long- term poverty data. If not as a replacement, I would recommend interviews supplement the surveys. Though the interview format has its own confounding factors, the mailed surveys were impersonal and had a low response rate. Interviews would also control for any possibility that parents need clarification about specific questions- the interviewer could elaborate.

The initial problem with the study was in recruitment, in future studies I would recommend strategizing how to attract students and parents that will provide a representative sample. Perhaps if future investigators use an “opt-out” rather than an “opt-in” procedure to obtain informed consent then the researcher would not lose students to inert parents. Another suggestion is to use tangible incentives for students and parents to participate, such as free movie passes, gift coupons for bookstores, or \$10 to \$15 stipends. Allow more time for every step of the process, from recruiting the sample so that two or three rounds of recruitment letters could be sent, and phone call follow-ups might be made, to allowing all postal mail an extra week. The longer duration of recruitment and testing will also increase the likelihood that more mobile students are included. Finally, if future researchers shorten the parent questionnaires so that they

only required 5 to 10 minutes to complete, rather than the 20 to 40 minutes this study took, the parents might be more willing to participate.

References

- Barton, P. E. (2003). *Parsing the Achievement Gap: Baselines for Tracking Progress*. Princeton, NJ: Policy Information Report for Educational Testing Service.
- Brooks-Gunn, J., & Duncan, G. J., (1997). The effects of poverty on children. *The Future of Children, 7*, 55-71.
- Coleman, J. S., Campbell, E. Q., & Hobson, C. J. (1966). *Equality of Educational Opportunity*. Washington, DC: National Center for Educational Statistics, US Department of Health, Education, and Welfare.
- Connecticut State Department of Education. (2003). *Connecticut Education Directory*. Hartford, CT: State Department of Education.
- Connecticut State Department of Education (2005). *Cost of implementing the federal No Child Left Behind Act in Connecticut*. Retrieved March 29, 2005 from www.state.ct.us/sde/nclb_study_2_28_05.pdf
- Delaney, S. B. (1994). The battle for school desegregation in Connecticut. *Equity & Excellence in Education, 27*, 10-18.
- Donovan, S. (1994). Moving to the suburbs: Section 8 mobility and portability in Hartford. *Working paper*: Joint center for Housing Studies, Harvard University.
- Duncan, G. J., & Brooks-Gunn, J. (1997). *Consequences of Growing Up Poor*. New York: Russell Sage Foundation.
- Dunn, J. R. (2002). Housing and inequalities in health: A study of socioeconomic dimensions of housing and self reported health from a survey of Vancouver residents. *Journal of Epidemiol Community Health, 56*, 671-681.

Education Trust, Inc. (2003). Education watch: The nation. US Department of Education.

Retrieved June 17, 2005 from www.edtrust.org

Egbonu, L., & Starfield, B. (1982). Child health and social status. *Pediatrics*, 69, 550-557.

Entwisle, D. R., Alexander, K. L., & Olson, L. S. (1997). *Children, Schools, and Inequality*.

Boulder, CO: Westview Press.

Estevez, N. (2006). Are magnet schools attracting all families equally? A GIS mapping analysis.

Working Thesis. Hartford, CT: Trinity College.

Gennetian, L. A., Duncan, G., Knox, V., Vargas, W., Clark-Kauffman, E., & London, A. S.

(2004). How welfare policies affect adolescents' school outcomes: A synthesis of evidence from experimental studies. *Journal of Research on Adolescence*, 14, 399-423.

Goodman, E., Adler, N. E., Kawachi, I., Frazier, A. L., Huang, B., & Colditz, G. A. (2001).

Adolescents' perceptions of social status: Development and evaluation of a new indicator.

Pediatrics 108:2. Retrieved on November 17, 2005 from

<http://www.pediatrics.org/cgi/content/full/108/2/e31>

Goodenow, C. (1993). The psychological sense of school membership among adolescents: Scale

development and educational correlates. *Psychology in the Schools*, 30, 79-90.

Green, C. W., Adams, A. M., & Turner, C. W. (1988). Development and validation of the

School Interracial Climate Scale. *American Journal of Community Psychology*, 16, 241-259.

Green, R. (2001a, February 27). State focuses on magnet schools Sergi differs with Sheff

plaintiffs on Open Choice. *The Hartford Courant*, p. A3.

Green, R. (2001b, July 24). Budget hurts Sheff efforts no new school plans funded by

legislature. *The Hartford Courant*, p. A1.

Hartford Public Schools (2002). Hartford, CT: Magnet School Plan Revised March 2002, 1-12.

Horton-Sheff, E. (2004, April 19). Personal interview. Hartford, CT.

Jacobs, E. (2003). Educating inner-city children in suburban schools. *Unpublished Thesis: Cornell University*.

Kaminski, S. (2002). Magnet schools: An effective solution to Sheff v. O'Neill? *Trinity Papers, 21*, 63-71.

Kreiger, N., Chen, J. T., Waterman, P. D., Soobader, M-J., Subramanian, S. V., Carson, R. (2003). Choosing area based socioeconomic measures to monitor social inequalities in low birth weight and childhood lead poisoning: The public health disparities geocoding project (US). *Journal of Epidemial Community Health, 57*, 186-199.

Kuzyk, I. (2003). A Hartford primer & field guide. *Trinity College*: Hartford, CT

Lykes, M. B., Banuazizi, A., Liem, R., & Morris, M. (1996). *Myths About the Powerless*. Philadelphia: Temple University Press.

Mitchell, M. (2005, October 25). Liberty and environmental justice for all: Environmental health experts discuss creating a clean environment for Connecticut residents. Hartford, CT: Panel Discussion at Trinity College.

McDowell, L. M., & Johnson, F. (2002, June). Early estimates of public elementary and secondary education statistics: School year 2001-02. *Education Statistics Quarterly*. Institute for Education Sciences 4. Retrieved on May 13, 2006 from http://nces.ed.gov/programs/quarterly/vol_4/4_2/3-4.asp.

McLoyd, V. (1998). Socioeconomic disadvantage and child development. *American Psychologist, 53*, 185-204.

- National Survey of Children's Health (2003). *Centers for Disease Control and Prevention National Center for Health Statistics*. Atlanta, GA: Health Resources and Services Administration Maternal and Child Health Bureau, 1-65.
- Orfield, G., & Eaton, S. E. (1996). *Dismantling desegregation; The quiet reversal of Brown v. Board of Education*. New York: The New Press.
- Orfield, M., & Luce, T. (2003). Connecticut Metropatterns. Minneapolis, MN: *Ameregis*, 1-25.
- Orr, A. J. (2003). Black-White differences in achievement: The importance of wealth. *Sociology of Education*, 76, 281-304.
- Rothstein, R. (2004). *Class and Schools: Using Social, Economic, and Educational Reform to Close the Black- White Achievement Gap*. Washington, D. C.: Economic Policy Institute.
- Salas, K. D. (2003). Teaching about toxins. *Rethinking Schools* Winter: 22-25.
- Sheff v. O'Neill (1999). X03 CV89 0492119S (Superior Ct. 1999) Retrieved 5/10/06 from <http://www.state.ct.us/sde/sheff.htm>.
- Schwab, N. C., Cullen, M. R., & Schwartz, J. E. (2000). A survey of the prevalence of asthma among school age children in Connecticut. North Haven, CT: *Environment and Human Health, Inc.* 1-32.
- Smrekar, C., & Goldring, E. (1999). *School choice in urban America: Magnet schools and the pursuit of equity*. New York: Teachers College Press.
- Strategic School Profile (2005). District and School level profile information. Retrieved 4/ 7/06 from <http://www.csde.state.ct.us/public/cedar/profiles/index.htm>
- Third National Health and Nutrition Examination Survey (1988-1994) *National Center for Health Statistics*, Hyattsville, MD: Centers for Disease Control and Prevention.
- US Census. (2000). Retrieved April 7, 2006 from www.factfinder.census.gov.

Ward, C. (2005, February 15) "Achievement Gap Data Study, Class of 2003 through 2009"

Presentation given to Twainville² School Board.

Wells, A. S., & Crain, R. (1997). *Stepping Over the Color Line: African-American Students in White Suburban Schools*. New Haven, CT: Yale University Press.

² Twainville is a pseudonym to protect confidentiality within the school district.

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Table 1. *Characteristics of students who agreed to participate*

<u>Grade</u>	<u>Race / Ethnicity</u>				<u>Overall</u>
	<u>Asian</u>	<u>Black</u>	<u>Hispanic</u>	<u>White</u>	
7	3	2	6	22	33
11	1	3	2	10	16
<u>Gender</u>					
Female	2	3	6	19	30
Male	2	2	2	13	19
<u>Eligible for F/RP</u>	1	1	3	0	5
<u>Overall</u>	4	5	8	32	49

Note. Eligible for F/RP= If the student is eligible for free or reduced- price lunch at school.

Table 2. *Characteristics of parents who completed surveys*

<u>Grade of Child</u>	<u>Race / Ethnicity of Child</u>				<u>Overall</u>
	<u>Asian</u>	<u>Black</u>	<u>Hispanic</u>	<u>White</u>	
7	2	1	2	15	20
11	0	1	0	8	9
<u>Gender of Parent</u>					
Mother	1	2	2	21	26
Father	1	0	0	2	3
<u>Overall</u>	2	2	2	23	29

Table 3. *Effects of race/ ethnicity on student achievement measures.*

<u>Achievement Measure</u>		<u>Race/ Ethnicity</u>			
		<u>Asian</u>	<u>Black</u>	<u>Hispanic</u>	<u>White</u>
Cumulative GPA	n	4	5	8	32
	M	3.36	3.08	3.63	3.64
	SE	.23	.20	.16	.08
Current GPA	n	4	5	8	32
	M	3.18	3.47	3.76	3.68
	SE	.25	.22	.18	.09
CMT6 Math	n	2	4	2	30
	M	265	235.5	317.5	299.7
	SE	26.99	19.08	26.99	6.97
CMT6 Reading	n	2	3	2	30
	M	249	279.67	300	294.33
	SE	24.6	20.09	24.6	6.35
CMT6 Writing	n	2	3	2	30
	M	276	277.67	296.5	296.17
	SE	30.14	24.61	30.14	7.78

Note. Cumulative GPA is the cumulative GPA since the student entered his/her current school; Current GPA is the GPA for the current school year; CMT6 Math is a scale score on the mathematics portion of the 6th grade Connecticut Mastery Test; CMT6 Reading is a scale score on the reading portion; CMT6 Writing is the writing scale score.

Table 4. Correlation Between Measures of Achievement and Student-Reported SES, Mobility, and Health.

	Achievement			SES			Mobility			Health		
	1	2	3	4	5	6	7	8	9	10	11	12
1. Cumulative GPA	1.00											
2. Current GPA	.76**	1.00										
3. CMT6 Math	.59**	.48**	1.00									
4. CMT6 Reading	.51**	.41*	.69**	1.00								
5. CMT6 Writing	.57**	.48**	.46**	.57**	1.00							
6. SES	.44**	.42**	.59**	.45**	.37*	1.00						
7. Mobility	-.42**	-.15	-.45**	-.16	-.24	-.29	1.00					
Health												
8. Teeth	-.27	-.29	-.42*	-.22	-.43*	-.29	-.05	1.00				
9. Cigarette Use	-.24	-.24	-.29	-.17	-.05	-.09	.30*	.22	1.00			
10. Proactive Care	-.14	.02	-.33	-.2	.04	-.05	.02	.02	.07	1.00		
11. Reactive Care	.12	.21	.17	-.01	-.06	.00	-.11	.06	.17	.35*	1.00	
12. Overall Health	-.19	-.02	-.20	-.15	-.45**	-.37*	.06	.32*	-.08	-.01	.28	1.00

*p<.05, **p<.01

Table 5. Correlation Between Measures of Achievement and Parent- Reported SES, Mobility, and Health.

	Achievement					SES					Mobility			Health		
	1	2	3	4	5	6	7	8	9	10	11	12	13			
Achievement																
1. Cumulative GPA	1.00															
2. Current GPA	.76**	1.00														
3. CMT6 Math	.59**	.48**	1.00													
4. CMT6 Reading	.51**	.41*	.69**	1.00												
5. CMT6 Writing	.57**	.48**	.46**	.57**	1.00											
SES																
6. SES ladder	.35	.25	.60**	-.05	.16	1.00										
7. Parent Education	.25	.23	.38	.51*	.02	.27	1.00									
8. Other Parent Education	.28	.39	.58**	.44*	.34	.37	.69**	1.00								
Mobility																
9. When child started in Twainville	-.33	-.07	-.50*	-.16	-.16	-.28	.05	.14	1.00							
10. Times moved since K	-.25	-.20	.19	.30	-.06	-.18	-.06	.19	.33	1.00						
Health																
8. Teeth	.02	-.07	-.63**	-.44**	-.34	-.23	-.25	-.39	-.01	-.18	1.00					
9. Cigarette Use	-.40*	-.49**	-.06	-.17	-.11	-.13	-.42*	-.10	.26	.33	-.10	1.00				
10. Child's Overall Health	-.18	-.00	-.00	.06	.06	-.12	.08	-.1	.27	.01	-.07	-.09	1.00			

*p<.05, **p<.01

Figure Caption

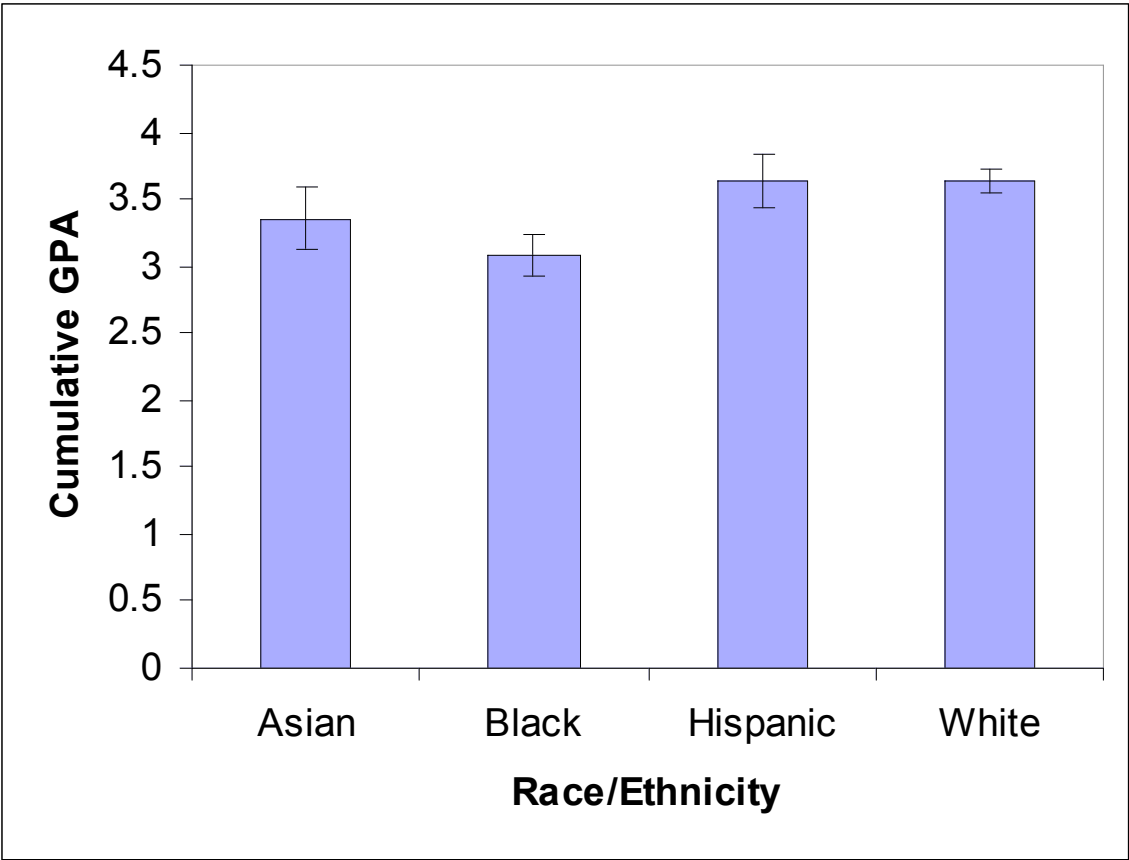
Figure 1. Relation of race/ ethnicity with students' cumulative GPA

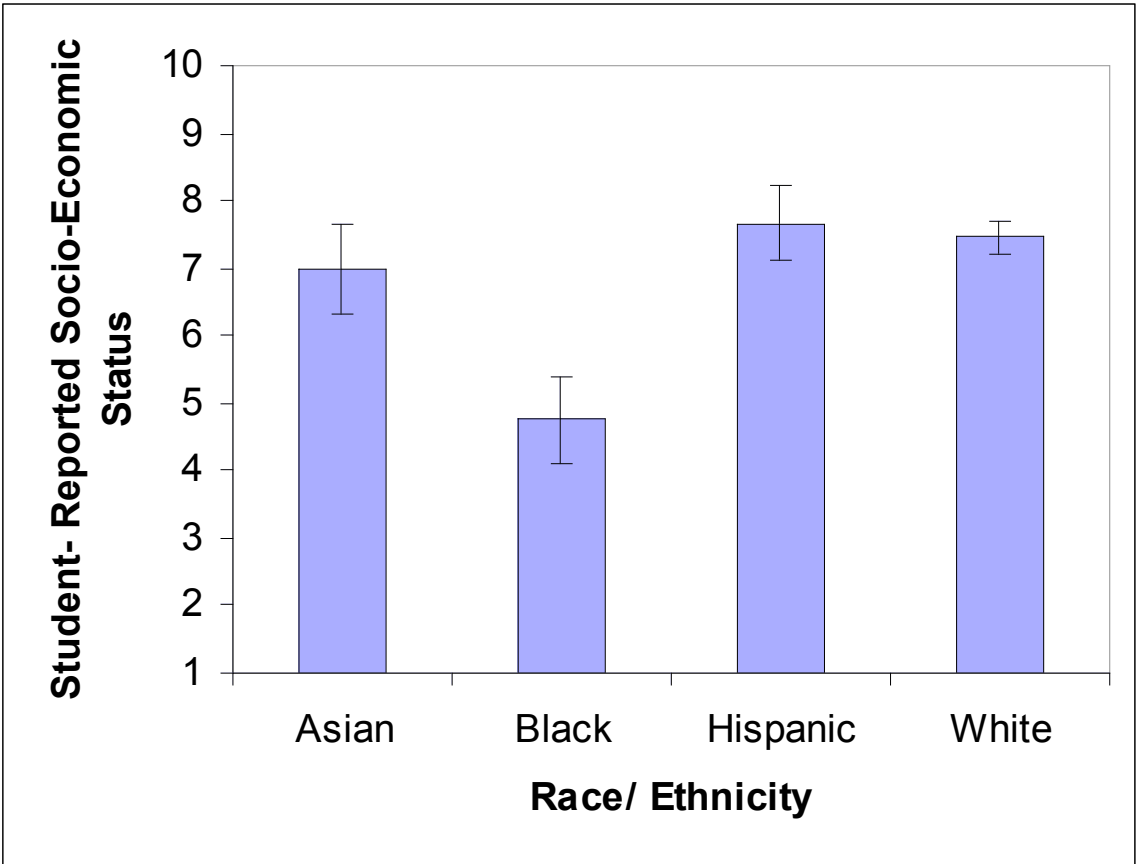
Figure 2. Relation between race/ ethnicity and student- reported socio-economic status

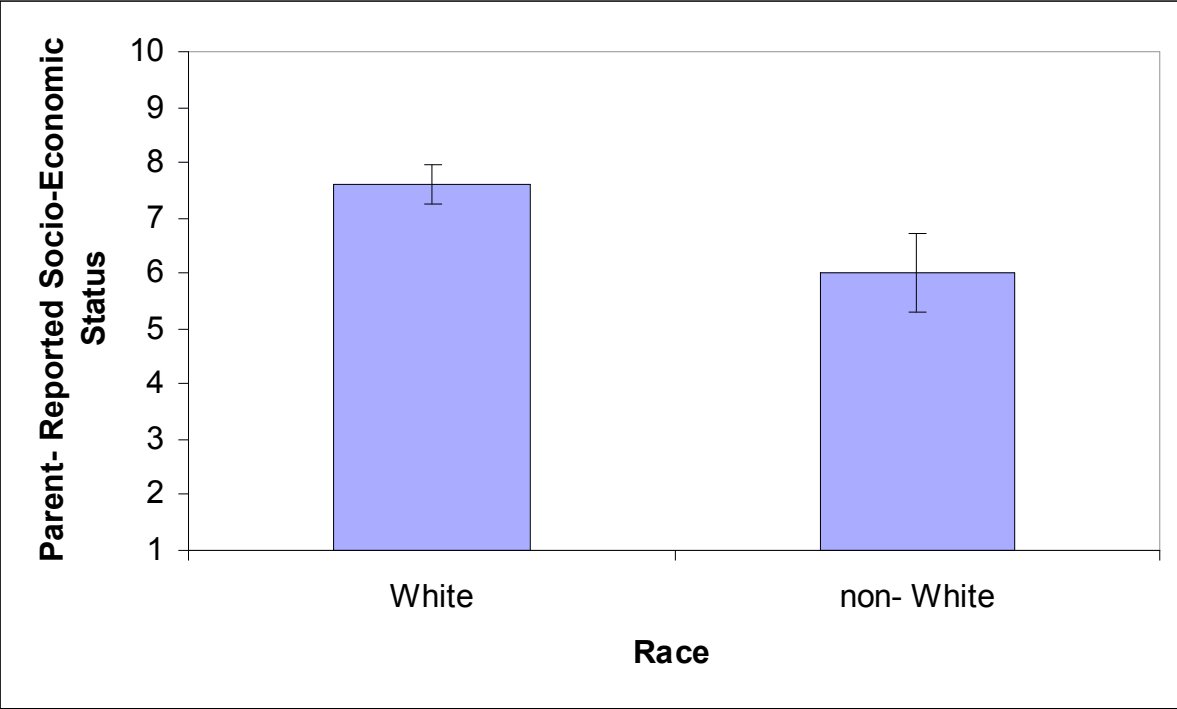
Figure 3. Relation between race/ ethnicity and parent- reported socio-economic status

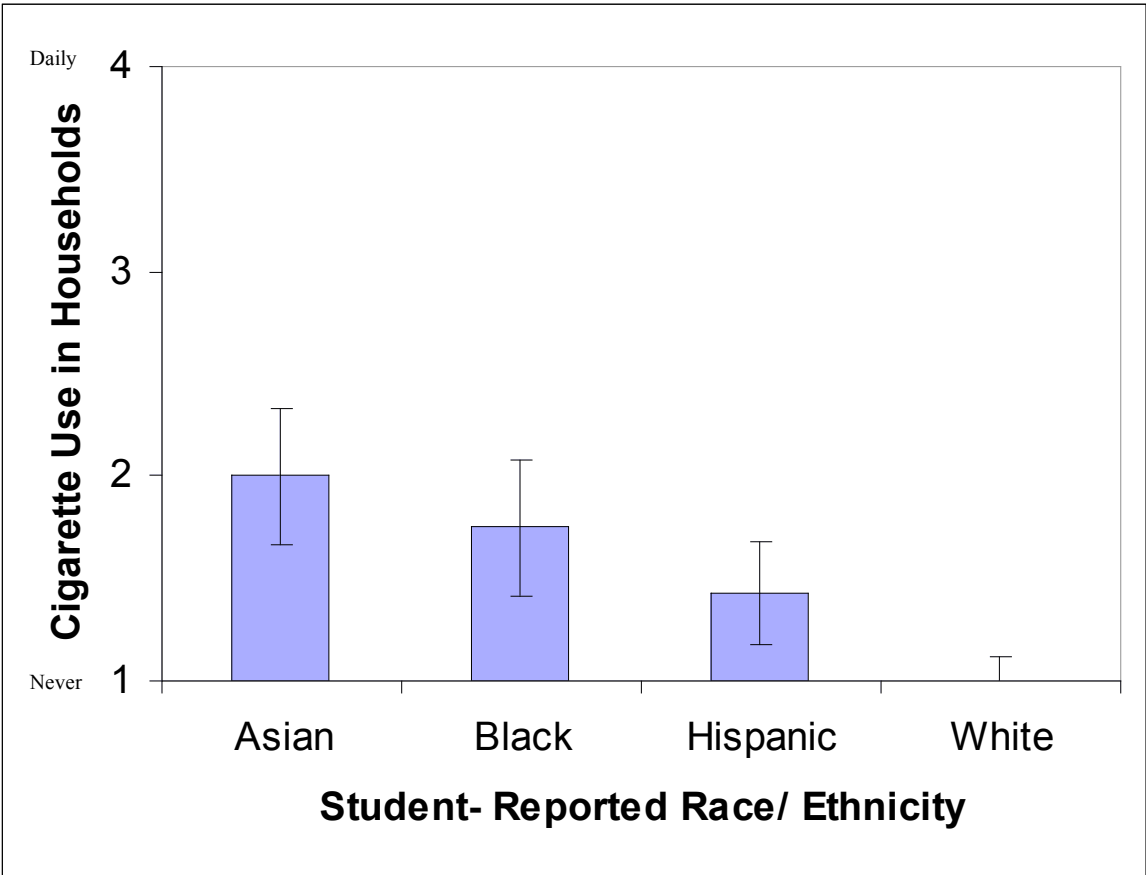
Figure 4. Relation between race/ ethnicity and household cigarette use

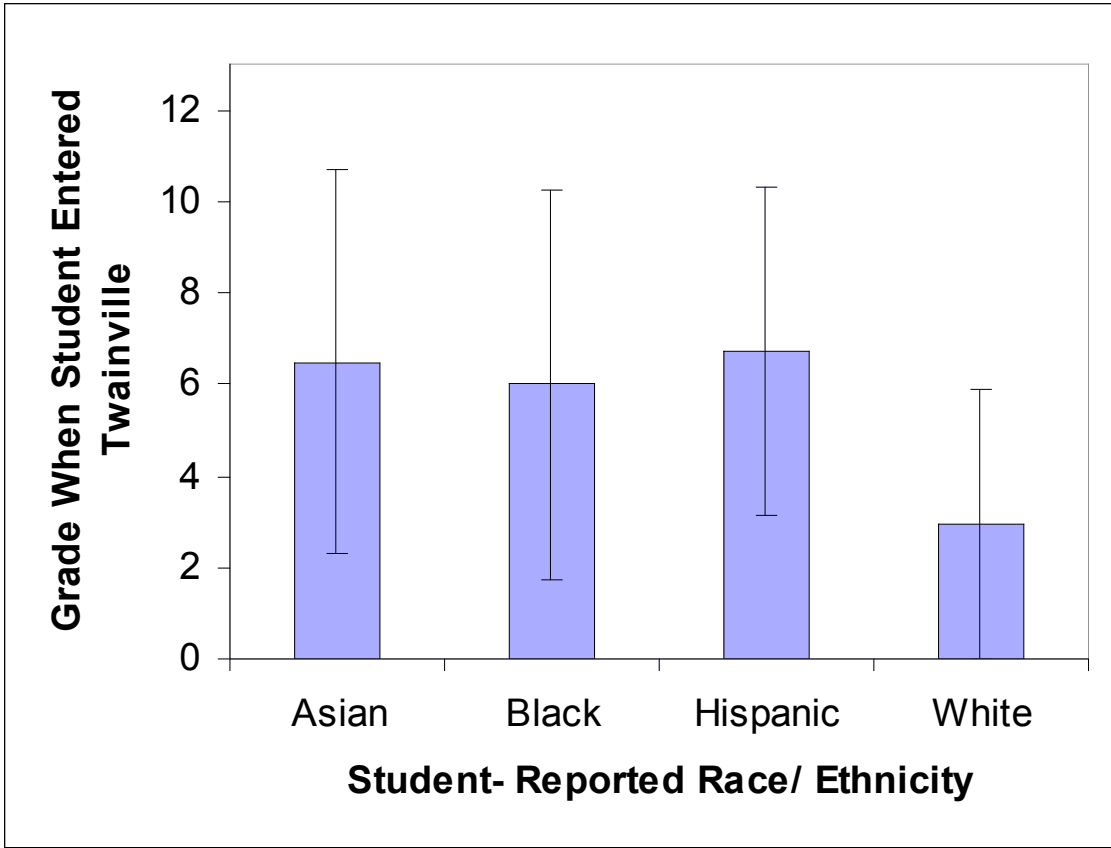
Figure 5. Relation between race/ ethnicity and mobility



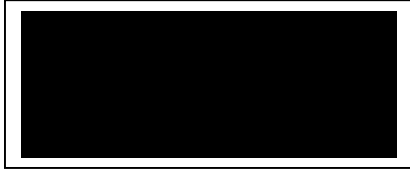








Appendix A:



March 29, 2006

Dear Parent / Guardian,

We are writing to ask you and your 11th-grade son or daughter to participate in an important research project on *Families and Education in* [REDACTED]. The research is being conducted collaboratively by the [REDACTED] Public Schools district and by researchers at Trinity College. The purpose of the research is to identify effects of school and family factors on student achievement in [REDACTED]. The research is not an evaluation of individual students, but rather an assessment of overall trends within the district.

Students who participate in the research will complete a survey questionnaire at school; parents who participate will complete a survey at home. The survey will take about 20 to 40 minutes to complete. The surveys differ for students and parents, but both will include a few demographic questions, as well as questions about students' health, language spoken at home, educational aspirations, and parental involvement in their child's schooling. Student surveys will also ask about students' experiences at and attitudes toward school. Once the survey data has been returned, the [REDACTED] Central Office staff will link that data to academic data and then remove any student names from the database before the combined dataset is provided to Trinity College researchers. The data provided to Trinity will be completely anonymous so that all participants' confidentiality will be protected.

Participation in this study is voluntary. We hope that you will participate along with your child, but you may grant permission for your 11th-grade son / daughter to participate without participating yourself. You or your child may withdraw from the study at any time without penalty. We do strongly urge you to participate so that our sample accurately represents all students.

Please be assured that students' and parents' answers to survey questions will be kept completely confidential. Only the Trinity College researchers will have direct access to participants' survey responses. No participants will be identified by name in public presentations of the findings.

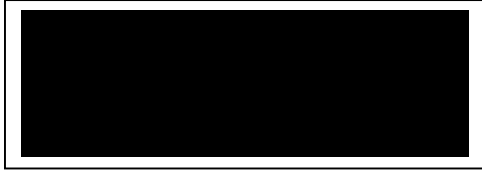
If you agree to participate in this study, or only grant permission for your 11th-grade son / daughter to participate, please sign and return the attached consent form in the pre-addressed envelope by Thursday, April 6th. Feel free to contact either of us directly with any questions or concerns you might have.

Sincerely,

[REDACTED]
Public Schools

David Reuman, Ph.D.
Associate Professor of Psychology,
Trinity College
(860) 297-2341
David.Reuman@mail.trincoll.edu

Appendix B:



CONSENT FORM

Title of Project: Families and Education in [REDACTED]

Principal Investigator: David Reuman, Ph.D.
 (860) 297-2341 or David.Reuman@mail.trincoll.edu
 Department of Psychology, Trinity College, Hartford, CT 06106

District representative: [REDACTED]

I acknowledge that I have received and read a letter explaining purposes and procedures in the study of *Families and Education in [REDACTED]*. I understand that there are no known risks to participants in the study, that my child and I are free to withdraw from participation at any time, and that any questions that I may have about the study will be answered fully by the principal investigator.

Please indicate your willingness to participate by checking one of the following options:

- I agree to participate together with my 11th grade son / daughter. He / she will complete a survey at school. I will complete a survey at my home and return it to the investigators in a pre-paid envelope.
- I grant permission for my 11th grade son / daughter to participate. He / she will complete a survey at school.
- My 11th grade son / daughter and I decline to participate. Please do not send us any further reminders about this study.

Please return this consent form to [REDACTED] in the pre-addressed envelope by Thursday, April 6th.

Print Your 11th grade Son's / Daughter's Name

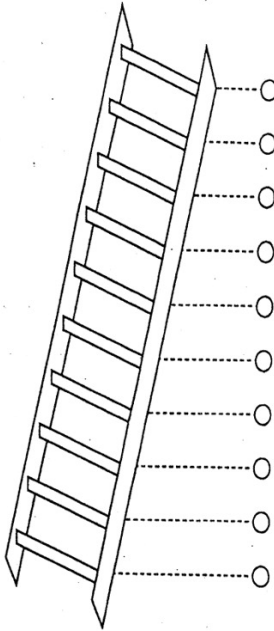
Print Your Name

Your Son's / Daughter's Signature

Your Signature

Date

Appendix C. Socio-economic status ladder scale

Student version

Imagine that this ladder pictures how American society is set up.

- At the top of the ladder are the people who are the best off—they have the most money, the highest amount of schooling, and the jobs that bring the most respect.
- At the bottom are people who are the worst off—they have the least money, little or no education, no job, or jobs that no one wants or respects.

Now think about your family. Please tell us where you think your family would be on this ladder. Fill in the circle that best represents where your family would be on this ladder.

Appendix D. Questions regarding family mobility

Student Questions

1. **At what grade level did you start attending [redacted] Public Schools?**

(Check one)

- | | | |
|-----------------------|-----------------------|------------------------|
| Pre-kindergarten | 4 th grade | 9 th grade |
| Kindergarten | 5 th grade | 10 th grade |
| 1 st grade | 6 th grade | 11 th grade |
| 2 nd grade | 7 th grade | |
| 3 rd grade | 8 th grade | |

2. **If you lived somewhere else before moving to [redacted], in what town and state did you live?**

3. **Do you have your own room?**

- Yes
- No, I share it with one other person
- No, I share it with more than one other person

Parent Questions

1. **At what grade level did your child start attending [redacted] Public Schools?**

(Check one)

- | | | |
|-----------------------|-----------------------|------------------------|
| Pre-kindergarten | 4 th grade | 9 th grade |
| Kindergarten | 5 th grade | 10 th grade |
| 1 st grade | 6 th grade | 11 th grade |
| 2 nd grade | 7 th grade | |
| 3 rd grade | 8 th grade | |

2. **If you lived somewhere else before moving to [redacted], in what town and state (or country, if applicable) did you live?**

3. **In what year did you begin living in [redacted]?**

4. **How many times have you moved since your child was in kindergarten?**

5. **Have you moved within [REDACTED] since your child started attending [REDACTED] Public Schools?**

_____ Yes _____ No

6. **Was your current home / apartment built before 1978?**

_____ Yes _____ No _____ I don't know

7. **How long have you lived in this home / apartment?**

Appendix E. Questions about student health

Students

1. Do you wear glasses or contacts?
No, my vision is perfect.
No, my vision is not perfect but I don't have any glasses/contacts.
Yes, I wear glasses/contacts.
2. Do you use a hearing aid or other device?
No my hearing is perfect.
No, my hearing is not perfect but I don't have a hearing device/aid.
Yes, I use a hearing aid or other device.
3. How would you describe the condition of your teeth?
Excellent
Very good
Good
Fair
Poor
4. About how long has it been since you last saw a dentist? (Include all types of dentists, such as orthodontists, oral surgeons, and all other dental specialists.)
I have never been to a dentist.
I visited a dentist within the last 6 months.
I visited a dentist more than 6 months ago, but not more than 1 year ago.
I visited a dentist more than 1 year ago, but not more than 2 years ago.
I visited a dentist more than 2 years ago.
5. Has a doctor or health professional ever told you that you have asthma?
No
Yes
Don't know
6. How often does someone in your house smoke cigarettes?
Never
Occasionally
Weekly
Daily
7. During the past 12 months, how many times did you see a doctor, nurse, or other health care professional for preventative medical care, such as a physical exam or well-child check-up?

_____ times don't know
8. During the past 12 months, how many times did you see a doctor, nurse, or healthcare professional for treatment of illness or injury?

Zero times 1-2 times 3-4 times 5-6 times more than 6 times
9. In general, how would you describe your child's health?
Excellent
Very good
Good
Fair
Poor

Parents

Please answer the questions on the following pages about your child's health by checking one box for each question.

1. **Does your child wear glasses or contacts?**
 No, her/his vision is perfect.
 No, her/his vision is not perfect but s/he doesn't have any glasses/contacts.
 Yes, s/he wears glasses/contacts.

2. **Does your child use a hearing aid or other device?**
 No her/his hearing is perfect.
 No, her/his hearing is not perfect but s/he doesn't have a hearing device/aid.
 Yes, s/he uses a hearing aid or other device.

3. **How would you describe the condition of your child's teeth?**
 Excellent
 Very good
 Good
 Fair
 Poor

4. **About how long has it been since your child last saw a dentist?** (Include all types of dentists, such as orthodontists, oral surgeons, and all other dental specialists.)
 S/he has never been to a dentist.
 S/he visited a dentist within the last 6 months.
 S/he visited a dentist more than 6 months ago, but not more than 1 year ago.
 S/he visited a dentist more than 1 year ago, but not more than 2 years ago.
 S/he visited a dentist more than 2 years ago.

5. **During the past 12 months, did your child receive all the routine preventative dental care s/he needed?**
 No
 Yes
 Don't know

If you answered "No" to Question 5, please respond to Question 5a. Otherwise, skip ahead to Question 6.

- 5a. **Why did your child not get all the dental care that s/he needed?**
 (Check all that apply.)

Cost too much
 No insurance
 Health plan problem
 Can't find dentist who accepts child's insurance
 Not available in area/transport problems
 Not convenient times/could not get appointment
 Dentist did not know how to treat or provide care
 Dissatisfaction with dentist
 Did not know where to go for treatment
 Child refused to go
 Treatment is ongoing
 No referral
 Lack of resources at school
 Other (please describe) _____

6. **Has a doctor or health professional ever told you that your child has asthma?**
 No
 Yes
 Don't know

If you answered “Yes” to Question 6, please respond to Questions 6a – 6c, otherwise skip ahead to Question 7.

6a. **Overall, how much of a burden has your child’s asthma placed on your family?**

- A great deal
- A medium amount
- A little
- Not at all

6b. **How often does your child awaken from sleep with asthma or wheezing?**

- Every night
- A few times a week
- A few times a month
- A few times a year
- Never

6c. **How often is your child’s activity limited because of asthma?**

- Every day
- A few times a week
- A few times a month
- A few times a year
- Never

7. **How often does someone in your house smoke cigarettes?**

- Never
- Occasionally
- Weekly
- Daily

8. **During the past 12 months, how many times did your child see a doctor, nurse, or other health care professional for preventative medical care, such as a physical exam or well-child check-up?**

_____ times don’t know

9. **During the past 12 months, how many times did your child see a doctor, nurse, or healthcare professional for treatment of illness or injury?**

Zero times 1-2 times 3-4 times 5-6 times more than 6 times

10. **Does your child have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicaid?**

- No
- Yes
- Don’t know

11. **During the past 12 months, did your child receive all the medical care s/he needed?**

- No
- Yes
- Don’t know

If you answered “No” to Question 11, then answer Question 11a. Otherwise skip to question 12.

11a. **Why did your child not get all the medical care that s/he needed?**

(Check all that apply.)

Cost too much

No insurance

Health plan problem

Can't find doctor who accepts child's insurance

Not available in area/transport problems

Not convenient times/could not get appointment

Doctor did not know how to treat or provide care

Dissatisfaction with doctor

Did not know where to go for treatment

Child refused to go

Treatment is ongoing

No referral

Lack of resources at school

Other (please describe) _____

12. **In general, how would you describe your child's health?**

Excellent

Very good

Good

Fair

Poor