ABSTRACT

Title of Thesis: NEIGHBORHOOD STRUCTURE AND ACADEMIC SELF CONCEPT: A MULTILEVEL MODEL

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There is a robust correlation between a student's academic achievement and his/her academic self concept. Various contextual variables, such as the school population's average academic ability, have been shown to have an effect on academic self-concept and on the relationship between self-concept and measured achievement. Community variables can have an effect on a student's academic achievement, though the relationship with academic self-concept is not well established. Urbanicity of the environment is a variable of interest, as there are various ways to describe and measure a neighborhood, though there is still a question about what makes a neighborhood urban. This study seeks to measure urbanicity and uses this urbanicity variable in a multilevel model, estimating the direct effects of the context on academic self-concept and explores the possibility that urbanicity modifies the relationship between self-concept and other student variables. Analysis revealed that neighborhood variables had no significant relationship with self-concept

NEIGHBORHOOD STRUCTURE AND ACADEMIC SELF CONCEPT: A

MULTILEVEL MODEL

By

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Chapter 1: Introduction

Public schools in the United States of America have the primary goal of enabling academic competence in students. In the pursuit of this end, it is important to understand the different variables that help determine student academic performance. It is clear that cognitive ability plays a significant and meaningful role in determining academic outcomes. Though student outcomes have typically been associated with cognitive factors, there are other factors that can play a significant role in the achievement of students. Various socio-emotional and behavioral factors have been linked to student achievement, including self-regulation (Evans & Rosenbaum, 2008), school adjustment (Teo, Carlson, Mattieu, Egeland, et al., 1996), student-teacher relationships (O'Connor & McCartney, 2007), and students self-views (Swann, Chang-Schneider & McClarty, 2007). The latter category, self-views, is a variable that is of particular interest, which encompasses self-concept and self-esteem. Self-concept and self-esteem are related in that they are both self-views, though self-esteem is typically conceptualized as having an evaluative nature, while self-concept is a more general statements about self and ability. It has been argued that these two should be united into a single category, as these terms are often used interchangeably and some have taken self-esteem to refer to a global measure of self-concept (Swann, Chang-Schneider & McClarty, 2007; Marsh & O'Mara, 2008).

Academic Self-Concept

Academic self-concept is one variable that can have a meaningful impact on educational outcomes of students. Academic self-concept can be defined as a student's

self-perceptions of his or her academic abilities (Shavelson, Hubner, & Stanton 1976). Academic self-concept can be conceptualized as a specific domain of general self-concept. Shavelson, Hubner, and Stanton (1976) proposed a hierarchical organization of self-concept, consisting of academic and various nonacademic self-concepts. Academic self-concept can further decompose into subject specific self-concepts, such as math self-concept, reading self-concept, and science self-concept. Understanding the relationships between these various self-concept domains and their respective achievement areas can be an important tool in improving academic outcomes for struggling students.

Academic self-concept is significantly related to academic achievement. A meta-analysis revealed that there is an average correlation of .21 between measures of self-concept and academic achievement (Hansford & Hattie, 1982). A more recent study confirms that, across grades, there is an average correlation between self-concept and achievement of about .20 (Pullmann & Allik, 2008). This correlation between general self-concept and academic achievement is positive but considered to be weak. Academic self-concept, compared to general self-concept, has a larger relationship with academic achievement. General academic self-concept has a mean correlation of .53 with academic achievement. This correlation is consistent across grade levels, while the correlation between general self-concept and achievement becomes non-significant after 10th grade (Pullmann & Allik, 2008). Further research has shown that there are larger correlations between specific domains of self-concept and the corresponding academic area, with a mean correlation of .57, across subjects (Marsh, 1992). These academic self-concept domains are not simply a proxy for measuring achievement, since, compared to achievement domains, self-concept domains have smaller correlations among each other

and can be completely uncorrelated (Marsh, 1990, 1992). Furthermore, while there are positive correlations between different self-concepts and their corresponding academic domains, correlations between non-corresponding achievement and self-concept domains are often weak or negative (Marsh, 1990; Valentine, Dubois, & Cooper, 2004).

Though there is evidence for the relationship between self-concept and achievement, the causal ordering of those variables is not entirely clear. Given that academic self-concept is a measure of student perceptions of their academic competence, it is logical to consider that beliefs about ability will result from past achievement. Self-perceptions are typically shaped through observing past performance and receiving feedback from others (Shavelson et al., 1976). This perspective, referred to as the "skill development model", posits that that there is a clear temporal precedence of achievement, which explains self-concept (Helmke & van Aken, 1995). It appears that, early in a student's academic career, academic self-concept is relatively high and poorly related to actual performance (Chapman & Tunmer, 1995). By grade five, however, self-perceptions become more accurate, as students have had an opportunity to get feedback on academic performance. Early research on self-concept development seems to indicate that negative self-concepts can develop even sooner, within months of beginning school (Chapman, Tunmer & Prochnow, 2000). Studies involving older student populations indicate that self-concept can be affected by social comparison and ability grouping (Chiu, et al., 2008; Ireson & Hallam, 2009).

The countering perspective claims that achievement can be explained, in part, by academic self-concept. The causal ordering may be reversed as the educational career continues. Marsh (1990b) found that by the end of high school previous academic self-

concept affected achievement, but previous achievement had no effect on self-concept. Other research seems to confirm the perspective that self-concept has a direct effect on academic performance (Steinmayr & Spinath, 2009; Thomas & Gadbois, 2007, Waxman & Huang, 1996). Waxman and Huang (1996) found that the academically resilient students had significantly higher achievement motivation, academic self-concept and social self-concept. The reversal of the causal ordering may be explained by the stability of self-concept as age increases, though Thomas and Gadbois (2007) refer to self-concept uncertainty, which can affect academic behaviors in college aged students. In practice, it is difficult to make the claim that achievement and self-concept operate in a single causal direction. A reciprocal relationship, in which both variables are simultaneously influencing each other, has received strong support (Marsh & Yeung, 1997; Guay, Marsh & Boivin, 2003).

School Effects on Self-Concept Variables

Given that self-concept is a personal attribute that can be altered, it is important to ask what other factors can have an effect on academic self-concept. This is an important question to ask because of the effect that self-concept can have on later achievement. The reciprocal models imply that improving achievement can be aided by improving self-concept, so if self-concept is increased, even without directly affecting achievement, later achievement will improve. One major consideration when studying academic self-concept is the potential for school effects. Students are grouped into schools, which raises the possibility that the school context can have an effect on the students that are attending. For example, there may be certain school wide variables that affect self-concept, after controlling for individual student variables, or that affect the relationship

between student achievement and self-concept. Rumberger (1995), for example, found that school level variables, such as school-wide SES, affected the variables that predicted students dropping out. The predictive variables are different, depending on the school context. Because of the fact that school context can have an effect on individual student variables, precise modeling of the student variables requires attention on the ecological environment (Raudenbush & Bryk, 2004).

Multilevel Data

When conducting large scale studies of students, one should analyze data using a multilevel approach. Students can be grouped, or "nested" into classrooms, which can be grouped into schools, and schools are grouped into districts, and so on. Each of these groupings can have a unique ecological effect on individual student outcomes. One way to deal with nested data is the use of multilevel modeling. Multilevel modeling approaches, such as Hierarchical Linear Modeling (HLM), allow for the analysis of multiple levels of data (Lee, 2000). The use of models like HLM helps eliminate problems associated with using single level models with multilevel data. Lee (2000) identified three major problems that are addressed with HLM. Single level models do not control for aggregation bias. A variable might have different meanings depending on the level of analysis. For example, individual student ethnicity is not the same as school average ethnic composition and these two variables may have completely different effects on the outcome of interest in the analysis. The second issue is caused by a failure to identify cases within a school as related. By treating all of the students as independent cases, standard errors are underestimated and significance calculations are incorrect. The third problem that occurs with single level models is the incorrect assumption that

relationships between student characteristics are the same between higher level groups, like schools. Hierarchical linear modeling helps eliminate those problems in the analysis of nested data.

Effects of School Context

The learning context can have a significant influence on academic self-concept. Baker (1998) found that student ratings of classroom climate had an indirect influence on academic self-concept, mediated by psychological distress. Teacher practices, such as previewing material with the student, can have a positive influence on self-concept for students that have low math achievement (Lalley & Miller, 2006). The classroom climate can have a larger direct effect on student achievement than the home environment. Gill and Reynolds (1999) found that teacher expectations for student performance had a larger direct effect on achievement than parent expectations in both math and reading. In each of those content areas, however, teacher expectations were not correlated with the child's perceptions of teacher expectations, indicating that the student may be misinterpreting the teacher's expectations. While actual teacher expectations had a positive effect, in the case of reading, student perceptions of teacher expectations had a negative effect on achievement.

The learning context can have an influence of the structure of the relationship between self-concept and achievement. Trautwein, Lüdtke, Köller, and Baumert, (2006) found that meritocratic learning environments had a qualitatively different model of self-concept development, compared to a non-meritocratic environment. The rigor of the academic environment can also have influences on self-perceptions. Class difficulty level and ethnicity can interact to affect self-concept (Singer, Beasley, & Bauer, 1997).

Specifically, this study showed that, in a sample of 100 secondary school students, African Americans in remedial math courses and White students in typical courses were both likely to attribute their math performance to ability, rather than effort. African Americans in non-compensatory classes and White students in compensatory classes were far less likely to indicate that their performance was due to ability.

Big Fish Little Pond Effect

Social comparisons are thought to have a significant influence on academic self-concept development. Social comparisons are common in schools, though they seem to take on more of an evaluative nature as the student gets older. In kindergarten, social interactions are based on nonacademic interests, whereas after kindergarten, students interact in order to compare academic behavior (Frey & Ruble, 1985) Students will more often compare themselves to classmates who have higher achievement than themselves, since this stimulates self improvement efforts and leads to greater long term outcomes (Chiu, et al, 2008; Huguet, Dumas, Monteil & Genestoux, 2001). When studying academic self-concept, it may be more useful to examine a student's academic ability relative to classmates, rather than their achievement in isolation (Rogers, Smith & Coleman, 1978). One influential model of school effects on self-concept is the phenomenon referred to as the Big-Fish-Little-Pond Effect (BFLPE; Marsh & Parker, 1984). This theory states that students who have equal academic ability will have differing academic self-concepts, specifically that students in higher achieving schools have lower academic self-concept. After controlling for all other variables, students should have higher self-concepts in schools that are low achieving. The BFLPE has been replicated in various cultures, consistently supporting the conclusion that school-wide

achievement has a negative effect on individual academic self-concept (Marsh & Hau, 2003). It has been extended to explain differences in grades between schools and ethnic differences in self-concept (Marsh, 1991; Marsh, 1987). The BFLPE may be relevant in studying the effect of selective high schools and placement of female students in gifted programs (Marsh, 1991; Preckel, Zeidner, et al., 2008).

The BFLPE has not received universal support, however. An alternative model proposes a "reflected glory" effect, which states that student perceptions of school status may have a positive effect on academic self-concept (Marsh, Kong & Hau, 2000). This effect can run in contrast to the BFLPE, so students will experience an increase in self-concept if they believe that they are a member of a prestigious institution. The BFLPE ignores the potential motivating effect of a highly achieving school, implying that good students will be better served going to low achieving schools (Dai, 2004). Further problems with the paradigm have been examined, including specificity regarding when, where and for whom will the BFLPE effect occur (Dai & Rinn, 2008).

Urbanicity

Effect of Urban Environments

Given that student self-concept can be partially explained by school-wide variables, it is important to examine other important context variables that can affect self-concept. The type of neighborhood that the school is placed in can have an effect on the school environment. Community variables, including population size and neighborhood poverty can help explain school disorder (Gottfredson & Gottfredson, 1985). Urbanicity can be conceptualized as a community-wide variable. In public schools particularly, where students are assigned to their particular school based on the area that they live in,

community variables can affect school-wide variables. Factors that are related to urbanicity can affect self-concept and other academic outcomes. Leventhal and Brooks-Gunn (2000) suggested that neighborhood context can explain about 5% of the variance in child educational and social outcomes, with small to moderate effect sizes. Boyle, Georgiades, Racine and Mustard (2007) found similar effects of neighborhood effects on educational attainment. Leventhal and Brooks-Gunn cite neighborhood affluence, residential mobility and ethnic diversity as the variables that are most relevant to child outcomes. All of these variables should be included in the characterization of neighborhood factors.

Poverty and educational disadvantage are problems that many urban students face (Gottfredson & Gottfredson, 1985). On the individual student level, high poverty is associated with lower levels of reading achievement (Chatterji, 2006). Increasing risk factors, such as homelessness and high mobility, negatively impacts the academic progress of those students (Obradovic, Long, et al., 2009). A recent meta-analysis by Sirin (2005) revealed that there is a meaningful correlation (.30) between individual family SES and student achievement. Looking at the neighborhood context, neighborhood affluence can have a significant impact on several developmental outcomes. Though they had a small sample of studies, Sirin's meta-analysis found a correlation of .60 between aggregated school SES and academic achievement. Brooks-Gunn and colleagues (1993) found that having a larger proportion of affluent neighbors positively influenced childhood IQ and likelihood of remaining in school. This study separated proportion of affluent neighbors and proportion of low income neighbors into two separate variables, allowing for better statistical control. Controlling for proportion

of affluent neighbors, having more low income neighbors had no significant effect on student developmental outcomes. However, holding all else constant, having greater proportions of affluent neighbors significantly improved student outcomes. This observation can be linked to school ecological variables. High neighborhood affluence can indicate high school-wide SES, which can help to explain the impact of affluence on educational variables. Interestingly, an interaction has been found between neighborhood affluence and race. The positive impact of having affluent neighbors seems to apply more to White students than to Black students. Black students do not receive the same benefits from the neighborhood variable (Brooks-Gunn, Duncan, Klebenov & Sealand 2003).

Urban environments are generally associated with several other factors, including greater amounts of life stress and social dysfunction (Gottfredson & Gottfredson, 1985). Neighborhood disorder has a negative effect on psychological functioning, leading to increased rates of depression, (Ross, 2000). Negative life events and socioeconomic disadvantage can also lead to increased psychological distress in adolescence (Duboise, Felner, Meares & Krier, 1994). School related stress and psychological distress have a significant, negative effect on academic self-concept. Additionally, chronic, uncontrollable stress can lead to hopelessness in urban youth (Baker, 1998). Neighborhood social disorganization has a direct, negative effect on individual student academic behavior (Bowen, Bowen, & Ware, 2004). In this study, student perceptions of neighborhood variables were more predictive of student behavior than parenting. This study, chose not to use a hierarchical approach to the investigation, opting instead to use student perceptions of the neighborhood and parent variables, rather than obtaining objective measures of neighborhood poverty and disorganization. This reflects the idea

that neighborhood variables are relevant to student outcomes when they impact students perceptions. Neighborhood social processes may be related to achievement on standardized testing. In low income neighborhoods, neighborhood social factors, such as collective efficacy and neighborhood socialization, are positively related to outcomes on math and reading assessments (Emory, Caughy, Harris & Franzini, 2008). Emory et al found that, after controlling for community social factors, economic disadvantage was not related to academic achievement. Examining community factors can lead to greater insight into the effect that urban environments and urban schools can have on student academic self-concept.

Measurement of Urbanicity

Traditionally, ecological factors that are linked with urban environments have been measured separately from the variable "urbanicity". Urbanicity typically is determined based on factors such as population size and density (Champion & Hugo, 2004). The most familiar operationalization of urbanicity uses a three category community measure (urban-suburban-rural), though different category distinctions have been used. This definition of urbanicity is efficient and allows for between group comparisons. However, as a measure of school ecology, it is imprecise. Although rare in educational research, it may be possible to create a more accurate measure of urbanicity, taking population into account, but also including relevant cultural and ecological factors (Champion & Hugo, 2004). Such a scale could create a continuous measure of urbanicity, which can be used to study community differences more precisely, while maintaining cut scores to build categorical distinctions. One such scale was able to outperform categorical measures of urbanicity for the prediction of health outcomes (Dahly & Adair,

2007). This scale was developed based upon community data, using seven variables that differed between urban and rural villages in the Philippines. These variables included population size and density, as well as availability of health services and educational facilities, indications of urban infrastructure, such as roads and communication services, and number of markets. Each community could receive a score from one to ten in the seven items, yielding a maximum possible urbanicity score of 70. The scale also allowed for finer examinations of relationships, including non-linear relationships. If a similar continuous measure of school urbanicity can be developed, it will allow for a more precise examination of the school context effects on academic self-concept, as well as other relevant student outcomes.

There are some studies which have attempted to measure the neighborhoods in America in a similar fashion. Though they have not tried to quantify the neighborhood context, as in Dahly and Adair, there have been several factor structures that have been proposed. Gottfredson and Gottfredson (1985) proposed a factor structure containing Poverty & Disorganization, Affluence & Education, and Affluent Mobility. Sampson, Raudenbush and Earls (1997) proposed a different three factor structure, containing Concentrated Disadvantage, Immigrant Concentration and Residential Stability, all of which were quantified and placed into a regression model to predict particular individual outcomes. These two structures contained some overlap, but did not agree completely on the relevant variables. Whereas Gottfredson and Gottfredson did not include racial demographics in their factors, the Concentrated Disadvantage and Immigration Concentration factors in Sampson, Raudenbush and Earls's factors both included racial composition among the relevant variables. A recent analysis of New York City

neighborhoods found variables that are similar to Raudenbush and Earls's structure, though the Immigration Concentration variable was changed to a Racial/Ethnic Composition variable, and included "African American percent" as a component of that factor (Beard, Cerdá, Blaney, Ahern, et al, 2009). This differs from Raudenbush and Earls's model, where African American percent was on the economic disadvantage factor. While these models measured variables that are relevant to describing a neighborhood, none are truly a measure of the urbanicity of the neighborhood. An analysis by Simonsen (1998) found a two factor structure, including Concentrated Disadvantage and Urbanicity. Simonsen's Urbanicity variable included traditional urban level, percent living in urban areas and population size. Important to note is that the Urbanicity variable contained no measures of poverty or racial composition, indicating that, though these things often connected with urban environments, they are not necessarily a defining factor in the urban neighborhood.

Current Study

This study examined the effect that high schools have on academic self-concept, after accounting for student factors. The study of context effects on self-concept has typically been limited to the academic context of the school, as evidenced by the Big Fish Little Pond research. Given the evidence that neighborhood context can have a meaningful effect on academic outcomes, it is worth examining how the neighborhood might have an effect on a student's self-perceptions. Specifically, this study measured a neighborhood's urbanicity, or the degree to which a school can be considered to be an "urban" school. After determining neighborhood components, the neighborhood

variables, included urbanicity, were placed in a multilevel model of academic self-concept

Research Questions

If self-concept is a variable relevant to academic outcomes, it is important to examine the different variables that can have an impact on student self-concept. The variable of interest in this study is school urbanicity, or the degree to which a school can be considered to be an "urban" school. The following research questions will be addressed:

1. To what degree does school urbanicity affect the academic self-concept of high school students, after accounting for individual student characteristics, especially student academic achievement?

2. What other school/neighborhood characteristics have an effect on student academic self-concept?

Chapter 2: Method

Sample

The Educational Longitudinal Study of 2002 (ELS: 2002) is a national longitudinal study of 17,591 young adults, following these individuals through the end of their high school career into their post-secondary school experiences. In the base year (2002), 752 public, private and Catholic schools were selected for the study, with 10th grade students randomly selected from within the school. For this study, only the base year (2002) data were used. Only public schools were included in this analysis, since private and Catholic schools typically do not draw their students from a designated geographic region. Because self-concept is the outcome variable of interest, any student that was missing math or English self-concept was removed from the analysis. In order to properly conduct the HLM analysis, all schools that had less than five students sampled were also removed from the analysis. The resulting data set contained 8190 students in 537 schools.

Measures

Academic Self Concept

The academic self-concept variables were created based on questions from the student questionnaire that ask the student to reflect on their own abilities in math and English. A principal components analysis, using varimax rotation, revealed two distinct factors, reflecting two academic self-concept domains. The first factor included questions related to the student's beliefs about his/her math abilities (Math Self Concept) and the second factor included questions about abilities in reading (English Self Concept). Items related to the student's general beliefs about his/her academic ability did not yield a General Academic Self Concept factor, so these items were not included in the analysis.

The results of this principal components analysis are reported in Table 1. Each is composed of five Likert items, each on a four point scale. The scores from the items in each scale were averaged to obtain a composite score for each self-concept domain. The scales each had high reliability (English=.93; Math=.93).

Academic Achievement

Student academic achievement measures, included in the ELS: 2002 data set, are determined through reading and math assessments. Both assessments were two stage assessments, given on two separate days. The first stage was a multiple choice routing assessment, which determined the difficulty level of the second part of the assessment. For this testing stage, the reading assessment was 14 questions long and the math assessment was 15 questions. Depending on their scores in the first part of the assessment, students were either given low, medium or high difficulty assessments for the second stage. The length of this stage varied by difficulty level, with the reading assessment ranging from 15 to 17 questions and the math assessment ranging from 25 to 27 questions. Two schools did not have sufficient time to administer the two-stage assessments, so the students in these schools only took one time limited math assessment, which contained 23 questions. The tests were scored using Item Response Theory, which analyzed response patterns to determine an estimate for the student's raw score if they completed all of the items in the total pool of questions. The results of these assessments are standardized into T scores. The NCES manual reports excellent reliabilities (reading-.86; math- .92) (Ingels, Pratt, Rogers, Siegel, et al, 2004).

Student SES

The Socioeconomic status variable from the ELS: 2002 data set is a composite

score, based on occupational prestige, education history of the parents and family

income. The Components are equally weighted and converted to a Z-score.

Community Variables

A variety of variables were collected from the US Census 2000, linked to the

schools based on each school's zip code. After a principal components analysis of the

variables, using principal components analysis with a varimax rotation, the community

factors were calculated and added to the model. The variables in each factor were

converted to z-scores and summed together to form the neighborhood variable composite

scores.

Data Analysis

Primary data analysis was performed using Hierarchical Linear Modeling (HLM)

to properly assess the school effects on self-concept. The data in the ELS: 2002 was

weighted, both on the individual level (BYSTUWT) and on the school level

(BYSCHWT), using weights included in the data set. The multilevel model assessed

ecological effects, after accounting for the effects of individual student characteristics.

The model is a two level model. The first level was the student level variables

(Achievement; Gender; SES). The second level included "Environmental" variables,

which were the results of the neighborhood principal components analysis and

schoolwide achievement. It is acknowledged that one could conduct a three level model,

with school level variables on the second level and neighborhood variables on the third

level. Schools are nested in particular regions, but neighborhood variables are determined

based upon the zip code of the school. It is unlikely the clustering of schools into zip

codes would have yielded enough zip code clusters, each containing at least five schools, to rationalize a third level.

One complete analysis was completed for each domain of academic self-concept. Each complete analysis was a two level model and was completed with a series of four individual analyses. The first model is the unconditional model, which is a one-way ANOVA model, which will determine how much of the variability in individual self-concepts lies between the groups. This unconditional model is a two level model. The first level will be:

$$Y_{ij} = \beta_{0j} + r_{ij} \tag{1}$$

Where Y_{ij} is the academic self-concept for student i in school j, β_{0j} is the mean self-concept for the jth school and r_{ij} is the level 1 error. The second level of this equation is used to determine the group effect on the school mean, as determined by this equation:

$$\beta_{0j} = \gamma_{00} + u_{0j} \tag{2}$$

where γ_{00} is the grand mean of academic self-concept and u_{0j} is the level 2 error. The unconditional model will be used to determine the intra-class correlation, giving an estimate of the proportion of variance between groups.

The second analysis is the Within Schools model, where the general form of the level 1 (student level) model is:

$$Y_{ij} = \beta_{0j} + \beta_{1j}\text{Achievement} + \beta_{2j}\text{SES} + \beta_{3j}\text{Gender} + r_{ij} \tag{3}$$

where "Achievement" is the grand-mean centered specified achievement for student i, "SES" is the grand-mean centered Socioeconomic Status of student i, and "Gender" represents the student's gender. Using this model, the significance of the regression

coefficients was determined. When it was found that the regression coefficients were significant, they were included in the subsequent models.

The third model is the intercept-as-outcome model, which builds on the within-schools model. This is the second level to the overall model, and it is here that the grand-mean centered environmental level variables are introduced. The intercept-as-outcome model determines the effect of school and community variables on student academic self-concept, while controlling for student variables.

$$\beta_{0j}=\gamma_{00}+\gamma_{01}\text{Urbanicity}+\gamma_{02}\text{School Achievement}+$$
$$\gamma_{03}\text{Neighborhood Variable} + \gamma_{04}\text{Neighborhood Variable} +$$
$$\gamma_{05}\text{Neighborhood Variable} +u_{0j} \tag{4}$$

This model is one of the keys to determining the direct effect of Urbanicity. The significance coefficient for the Urbanicity variable reveals if Urbanicity has a significant effect on individual student academic self-concept, as the relevant student and school variables will all be statistically controlled.

The fourth model is the slopes-as-outcomes model, which modeled the cross level interactions, or the effect that the environmental variables have on the relationship between the student variables. This model is:

$$\beta_{kj}=\gamma_{k0}+\gamma_{k1}\text{urbanicity} +\gamma_{k2}\text{SchoolAchievement}+$$
$$\gamma_{k3}\text{Neighborhood Variable} + \gamma_{k4}\text{Neighborhood Variable} +$$
$$\gamma_{k5}\text{Neighborhood Variable} +\mu_{kj} \tag{5}$$

where β_{kj} is a significant regression coefficient from the level 1 model. It is through cross level interactions that effects, like the Big Fish Little Pond Effect, will be determined. This is an example of a cross level interactions where the correlation between self-concept and achievement strengthens, as school-wide achievement increases and would be represented by a positive γ_{k2} on the School Achievement variable. In the slopes-as-outcomes model, the level one variables were group mean centered

Chapter 3: Results

The first task of this analysis was to establish a factor structure to describe the neighborhood environments of the schools. Data from the 2000 Census was matched to the various schools based on the school zip code. The census variables included information about neighborhood racial and economic demographics, economic descriptors, housing information and educational attainment data, as well as a variety of other descriptive variables that can be included in a principal components analysis. An initial factor model contained several factors, with many cross-loaded variables. Variables with high cross –loadings were eliminated from the analysis. Through this process, a final model was developed (Table 2), which contained three factors. The first factor was Neighborhood Poverty and contained five neighborhood variables (Median Household Income, Percent Below Poverty Level, Percent with Bachelor's Degree or Higher, Single Female-Headed Households with Children, Percent Unemployment). The second factor was Neighborhood Immigration, which contained four variables (Primary Language Not English, Percent of Population that is Latino, Percent Foreign Born , Average Household Size). The third factor was the Urbanicity factor, which contained four factors (Percent of Housing Units that are Rented, Proportion of Housing Units that Contain Non-Relatives, Percent that Lived in the Same House Five Years Ago, Population Density). Further analysis of these three factors reveals that there are moderate correlations between factors, ranging from .40 to .55 (Table 6).   These three neighborhood factors were included in Level 2 of the model, along with school-wide achievement, to determine the effect of the various neighborhood variables on the individual student self-concepts.

An analysis of the unconditional model reveals the proportion of the variance that can be attributed to environmental level effects. In this analysis, only a small proportion of the variance in student self-concept can be attributed to between school differences (Intraclass Correlations: reading= .04; math= .02). These between school differences are smaller than those that have been previously found for school differences in self-perception. Rhodes, Roffman, Reddy and Fredrikson (2004) found that 6 percent of the variance in global self-esteem was between schools. This ICC could reflect the validity of the self-concept variables, the effect of the selection process used to eliminate schools from the analysis, or the actual between school variability of self-concept in public schools. Though the between-school variability is smaller than expected, there still is some between school variability, which may be attributed to neighborhood variables.

At the individual level (Table 3), the results reflect what has been found previously in the literature. As expected, achievement in math and reading is the strongest predictor of the corresponding self-concept dimensions, with correlations of 0.37 and 0.31, respectively. Student SES also had a positive relationship with reading self-concept (β=0.09; p<.001), suggesting that higher SES students have higher average reading self-concept, after accounting for reading ability. Student SES did not have a significant relation with Math Self Concept (*p*>.05). Regarding gender, female students had significantly lower average math self-concept (β=-0.24; *p*<.001), though female students had higher reading self-concept than male students (β=-0.09; *p*=.011). Since SES had a non-significant relationship with Math Self Concept, the variable was removed from that model before the Level 2 analysis was estimated.

School effects (Table 4) on Academic Self-Concept were the major focus of this study, specifically the possibility of a relationship between Urbanicity and individual Academic Self-Concept. Urbanicity, the primary focus of the study, was not significantly related to Math Self-Concept (γ=0.001; p>0.05) or Reading Self-Concept (γ=-0.02; p>0.05). This is contrary to the hypothesis that Urbanicity has a significant impact on academic self-concept, after accounting for individual student variables. No effects were found for Neighborhood Poverty or Immigration for either Math or Reading Self Concept. Schoolwide Achievement was the only Level 2 variable that had a significant relationship with student Self Concept, for both Mathematics (γ=-.12, p<0.001) and Reading (γ=-.13, p<0.001) Self Concept. This finding is consistent with previous findings (Marsh & Hau, 2003) that school-level achievement affects student self-concept, net of student achievement. Specifically, students in higher performing schools have lower self-concept than comparable students in lower performing schools.

Cross Level interactions were examined in a stepwise fashion. Because of the number of potential cross level interactions, variables were added in gradually to the model. For this analysis, schoolwide achievement was modeled first, before the neighborhood variables were added to the model, since achievement was a significant variable in the previous analysis. For Reading Self Concept, the Big Fish Little Pond Effect was found, as Schoolwide Achievement had the predicted impact on the relationship between individual achievement and self-concept (γ=.05, p=.002) , though the previously negative relationship between schoolwide reading achievement and the self-concept intercepts became positive(γ=.07, p<0.001). When the neighborhood variables were added into the model, no additional cross level interactions were found.

Similar to Reading Self Concept, a significant cross-level interaction was found for

Schoolwide Math Achievement, impacting the relationship between student achievement

and self-concept ($\gamma = .10$, $p < .001$), with the previous negative relationship between

schoolwide achievement and self-concept becoming positive ($\gamma = 08$, $p = 0.001$). For both

Reading and Math Self Concepts, in schools with higher average achievement, there is a

significantly greater relationship between self-concept in achievement, although the

effect size is rather small.

Chapter 4: Discussion

There are various implications for the findings of this study. The first major finding of this study was the principal components analysis of the neighborhood characteristics. Based on the census data, I developed three factors that are relatively consistent with previous analyses. The present analysis revealed a factor related to neighborhood disadvantaged conditions, a factor measuring immigration and a factor that was labeled "urbanicity." The urbanicity factor represents an index of crowding and residential instability. Three of the variables (renting housing unit, living with non-relative & recent change in address) suggest a level of mobility in urban environments, and may reflect the presence of people living in apartments with roommates, rather than living with families in permanent houses. The other variable was population density, reflecting the concept that urban neighborhoods will likely have an abundance of housing units closely packed together, fewer open spaces (e.g., backyards) and buildings built with multiple levels.

These factors are similar to those found by Sampson, Raudenbush and Earls (1997). Examining neighborhoods in Chicago, they also found Concentrated Disadvantage and Immigration factors, though they used some slightly different variables to characterize those neighborhoods. The third factor in that study was Residential Stability, containing a measure of how many have not moved in the last five years and a measure of owner occupied housing, which is similar to two of the measures in my Urbanicity factor. The Urbanicity factor also contained measures of living with non-relatives and crowding, which makes it more than simply an index of mobility, but a measure which helps describe the people who reside in the neighborhood. It seems as if

the Urbanicity factor is primarily driven by variables that indicate resident mobility and instability. It is possible that the factor actually measures mobility, but it is also possible that mobility is one of the core features of an urban environment Urban neighborhoods are likely to contain people in temporary, apartment homes, living with roommates and are likely to be living there temporarily, compared to suburban and rural neighborhoods, where it is more likely that a family will find someplace relatively permanent to live.

Another major implication of this neighborhood analysis is that urbanicity and poverty are on two separate factors. A neighborhood that is urban does not necessarily mean that the neighborhood is poor or that the people that live in the neighborhood live in poverty. It would be incorrect to assume that urban schools are in impoverished neighborhoods. It is just as possible that an urban school is located in a neighborhood with upscale high-rise apartment buildings and has no economic disadvantage. Rural neighborhoods can also be just as economically disadvantaged as an urban neighborhood, so it would be incorrect to assume that urbanicity and economic disadvantage were directly related. The immigration concentration variable is another factor which was distinct from the other variables. This is the one factor that describes the demographic characteristics of the neighborhood. Once again, it is meaningful that this factor is distinct from urbanicity and poverty, reflecting that urban neighborhoods can differ in terms of their demographics and large proportions of immigrants can be found in different varieties of neighborhoods.

The neighborhood factors were found, however, through a long decision making process, eliminating variables from the analysis until clear factors were revealed. Because of this process, it cannot be assumed that these factors are entirely inherent in the data.

Additionally, the assumptions of the principal components analysis likely affected the results of that analysis. Orthoganality of the factors was presupposed in this analysis, so analyses involving correlated factors were not tested. Additionally, though many variables with high cross-loadings were eliminated from the analysis, there were still some moderate cross-loadings for some of the remaining factors. The resulting factors were not entirely independent, as evidenced by the correlations between the factors (Table 6).

In the analysis of the academic self-concept, neighborhood did not have any effect, which was unexpected, but results were fairly consistent in terms of the other variables that were associated with self-concept. First, regarding individual variables, as expected, achievement was the variable that was most strongly related to student self-concept. The correlation found in this study, however, is weaker than the correlation in previous studies of academic self-concept, where the correlation ranges from .53 to .57, rather than the correlations of .31 and .37 found in this study (Marsh, 1992; Pullman & Allik, 2008). Being female had a meaningful negative effect on math self-concept and a smaller, but still significant, positive effect on reading self-concept. In this case, it means that female students had lower math self-concept, net of actual achievement in math, and slightly higher reading self-concept, compared to male students. SES had a small positive relationship with reading self-concept, but was unrelated to math self-concept.

The main focus of this study was the effect of neighborhood characteristics on student self-concept. This study, however, found that there were no neighborhood variables that affected individual student self-concept. Additionally, neighborhood variables did not have an effect on the relationship between student characteristic and

self-concept, via cross level interactions. The lack of environmental effects on academic self-concept has several potential explanations. The Neighborhood variables were calculated on the basis of Census data which was linked to the school zip code. Hypothetically, since all schools in the analysis were public schools, the students would be drawn from neighborhoods near the school. It is possible that this was a faulty assumption and that the neighborhood that a school is in is not the best indication of the conditions of the neighborhood. It is also possible that a student's neighborhood does not necessarily impact self-concept as much as that student's individual characteristics. Even a measure of family environment, such as SES did not have a large effect on self-concept, so neighborhood factors may be too far removed from a student's self-concept formation.

The schoolwide achievement was the sole level-two variable that had a significant effect on self-concept and was consistent with previous studies of school effects on academic self-concept. In this analysis, Schoolwide Math and Reading Achievement had a significant negative effect on student self-concept, net of student achievement. This reflects previous findings that students in higher-performing schools will have lower self-concept than similar students in other schools. This is likely due to the effect of social comparison. An average student in a lower performing school would have a much lower ranking in a high performing school and these upward social comparisons result in decreased self-concept. This confirms the Big Fish Little Pond Effect for this analysis, finding that higher performing schools have a negative effect on self-concept. Once the cross level interactions were added into the model, a significant cross level interaction was found in both self-concept models, with schoolwide achievement having a significant positive effect on the correlation between student achievement and student self-concept.

As schoolwide achievement increased, the correlation between student achievement and self-concept increased. This effect was found for both Math and Reading self-concept, though the effect was stronger in the model of Math Self Concept. This may mean that higher achieving schools create an environment where students can more accurately evaluate their abilities, resulting in higher correlations between self-concept and achievement in higher achieving schools. Additionally, while this cross level interaction was significant, the previously found direct effect of school effect on self-concept became significant in the opposite direction, with schoolwide achievement having a small positive relationship with student self-concept. This implies that the Big Fish Little Pond Effect may be accounted for by the inaccurate, inflation of self-concept of students in lower performing schools, rather than that students in higher performing schools underestimate their abilities. The opposite seems to be true, that once cross-level interactions are introduced, student self-concept is consistent with the achievement level of the schools.

The validity of the self-concept variable is something that is not firmly established. Previous studies of academic self-concept (Marsh, Kong & Hau, 2000) used a previously validated measure of academic self-concept from the Self Description Questionnaire. The present study used self-concept variables that were calculated from survey items and, though they reflect a student's beliefs about his/her abilities, they may not be the same measure of self-concept that has been used in past research. The items in this measure of self-concept reflected student beliefs that they can understand, master and perform well math and reading (see Table 1). Items from the Self Description Questionnaire include items about actual past performance, feelings toward the subject

and how much the student seeks out the subject (Marsh & O'Neill, 1984). While the two sets of items are similar, there is still a difference between the validated measure of self-concept and the measure that was created for this study. It can be argued that the items in this study reflect a basic measure of student self-concept, in that they are an evaluative measure of a student's beliefs about his math and reading ability, while the SQD items measure affinity for a subject, since they ask about the student's feelings about the topic and how often they seek out those classes. This difference may explain why the correlation between student self-concept and achievement is not as strong as in previous studies. It can also explain why the between school variance is lower than expected and why neighborhood effects were not found.

Implications

The first important implication for this study is found in the neighborhood principal components analysis. While urban neighborhoods can be stereotyped as being equivalent to poor neighborhoods, this analysis found that communities can be described on several different dimensions. Neighborhood affluence is one part of defining a neighborhood, but urbanicity, a measure of crowding and mobility, is a distinct factor, as is immigration concentration. This means that we may need to change the way that we talk about "urban" schools and become more descriptive in our terminology. If a school is in an urban area, it does not always mean that there will be a high level of financial disadvantage or a large need for ESOL teachers or that the school facilities are inadequate. While that may be an assumption, this analysis found that it is not so easy to classify schools using a single descriptor.

Additionally, the extent to which a neighborhood affects self-concept appears to be minimal. The one aspect of a student's environment that was found to make a difference was the schoolwide achievement. Specifically, students in lower performing schools were less accurate in their evaluation of their abilities, due to overconfidence. Students attending higher performing schools were more accurately able to gauge their ability levels (i.e., there was a higher correlation between achievement and self-concept in higher achieving schools). This finding may have policy implications when considering ability grouping and tracking within schools. Student overconfidence is not ideal, as it would likely lead to students less motivated to work to improve. Iit is possible that the kind of feedback that students are receiving differ between schools, since lower performing schools may have lower standards for student performance. Since achievement was measured using a standardized measure of math and reading ability, it is possible that the difference in school grading was only reflected in how the students felt about their own abilities, resulting in more confidence in schools that had lower performance standards.

Limitations/ Future Directions

The main assumption in the analysis on neighborhood effects was that school zip code is an accurate measure of the environment that the student is experiencing, since public schools typically are in the same general location as the students that attend. It is probably a better assumption that a direct measure of a student's own environment would have more of an effect. It is possible that, in future analysis, neighborhood characteristics from the students' own zip codes would provide a more accurate depiction of the students' environment.

The construction of the self-concept variables via the questionnaire that was present in the data set is another possible limitation. While the self-concept measures in this study may serve as a proxy for true academic self-concept, it is clear that they are different measures than the previously validated standardized measures of Math, Reading and General academic self-concept. While the Math and Reading Self-Concept factors were clear and distinct, the General Self Concept was not a factor in this analysis, so the items reflecting general, non-specific academic ability were taken out of the analysis. A measure such as the SDQ would have factor scores for all three types of self-concept and may result in different conclusions. It is important to not, however, that the items used in this study are indicative of a student's beliefs and evaluation about his own ability. The limitation may be inherent in the unclear definition of self-concept in the SDQ's measure of the construct.

Since this study was an exploratory study, there was no definitive theoretical basis for the variable "Urbanicity", nor was there a hypothesis about how the neighborhood variables would interact with the self-concept variables. Guidance for creating the Urbanicity variable primarily came from previous neighborhood factor analyses, which found factors similar to the three factors found in this analysis (see Simonsen, 1998; Sampson, Raudenbush & Earls,1997). The definition of Urbanicity found in Dahly and Adair (2007) quantified the construct on the basis of infrastructure and education, among other variables. However, that study was conducted in the Philippines, so the definition of Urbanicity would not have a direct translation to American neighborhoods. Traditionally, the designation of "urban" is related to the size of the city, but this study sought to

develop a more precise definition of Urbanicity, so the entire neighborhood factor

structure was derived.

The expectation for neighborhood effects was mainly based on the findings that

neighbodhood variables have an effect on other educationally relevant student variables

(e.g. Emory, Caughy, Harris & Franzini, 2008). Direct links to self-concept had not been

explored in the past. This study found no neighborhood effect on self-concept, which

suggests that student beliefs may not be effected by the neighborhood. Future studies may

explore other variables, such as educational aspirations or beliefs about future vocational

options

Table 1. Self-Concept Principal Components Analysis

	Component Loadings	
Components	**1**	**2**
Math Self Concept		
Can understand difficult math class	0.88	0.17
Can do excellent job on math assignments	0.87	0.20
Can understand difficult math texts	0.87	0.14
Can master math class skills	0.87	0.22
Can do excellent job on math tests	0.87	0.13
Reading Self Concept		
Can do excellent job on English tests	0.18	0.88
Can do excellent job on English assignments	0.16	0.88
Can master skills in English class	0.19	0.88
Can understand difficult English class	0.16	0.87
Can understand difficult English texts	0.16	0.83

Table 2- Neighborhood Principal Components Analysis

Components	Component Loadings		
	1	**2**	**3**
Immigration			
Non-English Spoken at Home	**.93**	.09	.31
Percent Latino	**.88**	.27	.20
Percent Foreign Born	**.88**	.00	.40
Average Household Size	**.77**	.27	-.14
Neighborhood Poverty			
Median Income	.03	**-.86**	-.06
Percent Below Poverty Line	.31	**.82**	.27
Percent with Bachelor's Degree or Higher	-.20	**-.75**	.42
Female Headed Families	.16	**.74**	.30
Percent Unemployed	.26	**.69**	.40
Urbanicity			
Proportion of Rented Housing Units	.25	.42	**.85**
Proportion Living with Nonrelatives	.40	.26	**.59**
Percent Living in Same House as 1995	-.01	.03	**-.52**
Population Density	.36	.16	**.50**

Note: Component Scores were calculated by summing the z-score of each variable.

Table 3- Within-School Effects on Self-Concept (Level 1)

	Reading Self Concept		Math Self Concept	
	Coeff.	S. E.	Coeff.	S.E.
Random Effects (Intercept)	-0.14	0.05	0.36	0.06
Fixed Effects:				
Gender	0.09*	0.04	-0.24***	0.04
Student SES	0.09***	0.03	0.00	0.02
Reading Achievement	0.31***	0.02	---	---
Math Achievement	---	---	0.37***	0.02

* p<0.05   **p<0.01   ***p<0.001

Table 4- Between-School Effects on Self-Concept (Level 2)

Level 2 Predictor	Reading Self Concept		Math Self Concept	
	Coeff.	S. E.	Coeff.	S.E.
Urbanicity	0.001	0.022	-0.017	0.020
Neighborhood Poverty	-0.014	0.020	0.024	0.024
Immigration	0.000	0.022	0.004	0.03
School Average Reading Ach.	-0.13***	0.02	---	---
School Average Math Ach.	---	---	-0.12***	0.02

Note: * p<0.05   **p<0.01   ***p<0.001

Table 5- Summary of Cross-Level Interactions

Predictor	Math Self Concept		Reading Self Concept	
	Coeff.	S. E.	Coeff.	S. E.
Intercept (β_{0j})				
Schoolwide Ach(γ_{01})	0.08**	0.02	0.07***	0.02
Gender(β_{1j})				
Intercept(γ_{10})	-0.26***	0.04	0.08**	0.03
Immigration(γ_{11})	0.05	0.05	0.07	0.04
Urbanicity(γ_{12})	-0.06	0.04	-0.03	0.04
Poverty(γ_{13})	0.005	0.04	0.02	0.04
Achievement(γ_{14})	-0.06	0.03	-0.03	0.03
SES (β_{2j})				
Intercept(γ_{20})	---	---	0.11***	0.02
Immigration(γ_{21})	---	---	-0.01	0.03
Urbanicity(γ_{22})	---	---	0.001	0.03
Poverty(γ_{23})	---	---	0.01	0.02
Achievement(γ_{24})	---	---	0.01	0.02
Math Achievement(β_{3j})				
Intercept(γ_{30})	0.41***	0.02	---	---
Immigration(γ_{31})	-0.03	0.02	---	---
Urbanicity(γ_{32})	0.01	0.02	---	---
Poverty(γ_{33})	-0.01	0.02	---	---
Achievement(γ_{34})	0.10***	0.02		
Reading Achievement(β_{3j})				
Intercept(γ_{30})	---	---	0.34***	0.02
Immigration(γ_{31})	---	---	-0.03	0.02
Urbanicity(γ_{32})	---	---	0.01	0.03
Poverty(γ_{33})	---	---	-0.005	0.03
Achievement(γ_{34})	---	---	0.05**	0.02

Note: * p<0.05   **p<0.01   ***p<0.001

Table 6. Neighborhood Components Correlations

Correlations			
	Immigration	Urbanicity	Poverty
Immigration	1	.550**	.40**
Urbanicity		1	.42**
Poverty			1

Note: * p<0.05   **p<0.01   ***p<0.001

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