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A Meta-Analysis of School Belonging and Academic Success and Persistence

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A META-ANALYSIS OF SCHOOL BELONGING AND ACADEMIC SUCCESS

AND PERSISTENCE

A DISSERTATION SUBMITTED TO

THE FACULTY OF THE GRADUATE SCHOOL

IN CANDIDACY FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

PROGRAM IN COUNSELING PSYCHOLOGY

BY

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CHAPTER I

INTRODUCTION TO THE ISSUE OF ACADEMIC ACHIEVEMENT AND

PERSISTENCE

Of the statistical data compiled by the U.S. Department of Education,

status dropout rates receive arguably the most attention. The status dropout rate

represents the percentage of an age group that is not enrolled in school and has

not earned a high school credential [i.e., diploma or General Educational

Development (GED) certificate]. According to this measure, 7.4 percent of 16- to

24-year-olds in this country were out of school without a GED in 2010 (U.S.

Department of Education, 2012).

Although status dropout rates for White, Black, and Latino young adults

have declined since 1972, disparities among the three groups exist. Dropout

rates remain lowest for White students and highest for Black and Latino students

(U.S. Department of Education, 2012). Black students accounted for 8 percent of

all high school dropouts in 2010 and made up 15.3 percent of the total student

population in pre-kindergarten through 12th grade (U.S. Department of Education,

2012). Among youth ages 16 to 24, Latinos accounted for 41.5 percent of all high

school dropouts in 2010. However, they only made up 23.3 percent of the total

student population in pre-kindergarten through 12th grade (U.S. Department of

Education, 2012). In 2012, 5.1 percent of White students ages 16 to 24 were not

enrolled in school and had not completed high school, compared with 8.0 percent of Black students and 15.1 percent of Latino students. These statistics are alarming, given the negative consequences of suspending one's education. The implications of dropping out of high school are numerous and related to negative financial, health, and legal consequences. In 2010, the median income of high school dropouts was $21,000 whereas the median income of individuals with a high school credential was $29,900 (U.S. Department of Education, 2012). Students who dropout are also less likely to be in the labor force than those with a high school credential or higher, and are more likely to be unemployed if they are in the labor force (U.S. Census Bureau, 2004). In regards to health, dropouts over the age of 24 tend to report being in worse health than adults who completed their high school education, regardless of income (U.S. Department of Education, 2003). Finally, dropouts comprise disproportionately higher percentages of the nation's prison and death row inmates (Laird, 2006). It is imperative to understand why students, particularly ethnic minority students, are dropping out of high school, and how we can promote academic persistence.

Existing literature contains a wide variety of theories and models that attempt to explain dropout and academic achievement. Strain theory, social control theory, and primary socialization theory (Aloise-Young & Chavez, 2002), empowerment theory (Hunt et al., 2002), systems theory (Stevenson, Maton, & Teti, 1998), human capital theory, the working mother model, role model theory (Haveman, Wolfe, & Spalding, 1991), a transactional model (Jimerson,

Anderson, & Whipple, 2002), social competence theory (Walters & Bowen, 1997), and Farmer et al.'s (2003) deviant peer group model all identify variables that are proposed predictors of dropout. The aforementioned variables include stress and coping (Hess & Copeland, 2001), peer relationships (Ellenbogen & Chamberland, 1997), grade retention (Jimerson et al., 2002), intergenerational systems (Havemen et al., 1991), extracurricular activities (Mahoney & Cairns, 1997), and interpersonal relationships (Marcus & Sanders-Reio, 2001). In addition it has been suggested that environmental and social problems such as poverty, violence, and racism may cause disruptions in the child's family and community life, which in turn has a negative impact on the child's emotional, social, and academic development (Bauer, Sapp, & Johnson, 2000). Many of the above-mentioned variables have been synthesized into the construct of school belonging.

School belonging is operationalized in different ways across the literature but is generally viewed as the extent to which students feel personally accepted, respected, included, and encouraged by others in the school social environment (Goodenow, 1993). School belonging has also been described as students' "social bond between themselves, the adults in the school, and the norms governing the institution" (Wehlage, 1989), and as students' perception of the social context of schooling and their place in it (Anderman, 2003). Wehlage, et al.'s (1989) used school membership as the term to describe school belonging and suggested that it is comprised of four characteristics: attachment (personal

investment in meeting the expectations of others, caring what others think, and positive reciprocal teacher and student relations); commitment (complying with a school's rules and demands); involvement (active participation in school activities and school tasks); belief (valuing and trusting the institution). Others use the term "school connectedness" to refer primarily to the affective components of school belonging (Jimerson, Campos, & Greif, 2003 as cited in McMahon, Parnes, Keys & Viola, 2008), while still others propose a tripartite model named school engagement that includes cognitive, affective, and behavioral dimensions across a variety of contexts (Jimerson et al, 2003 as cited in McMahon, Parnes, Keys & Viola, 2008).

Previous research has linked perceived feelings of belonging to the following five categories of academic-based outcomes (Osterman, 2000): (a) the development of basic psychological processes key to student success, (b) academic attitudes and motives, (c) social and personal attitudes, (d) engagement and participation, and (e) academic achievement. School membership has been correlated with self-reported school motivation, academic achievement and academic effort (Goodenow, 1993), self-efficacy (Roeser et al., 1996), educational expectations (Smerdon, 2002), and has been shown to result in positive student behaviors such as respect for other students and adults (Wehlage, et al., 1989). Students are hypothesized to be at risk for dropping out of school if they do not "fit in" at school and are socially isolated from other students and school adults (Wehlage, 1989). Similarly, Finn (1989)'s

Participation-Identification model posited that those students who participate in school activities grow to value and identify with the school's culture, mission, and objectives. This model presents dropout as a "process of disengagement" over time; a process that contains a behavioral antecedent (participation) and a psychological condition (identification with the school) (Finn, 1989). Identification "denotes perceptions of congruence of the self with an external object (e.g. parents, social group, or institution) in the form of shared values or sense of belonging" (Finn, 1989). Finn (1989) stated that students who identify with school view themselves as a part of the school and value achievement of school-related goals; they have an "internalized conception of belongingness", a lack of which could increase the chances of dropout (Finn, 1989).

It is clear that much has been written in the area of a student's perceived level of school belonging and its relationship with academic persistence and achievement. However, the variety of terms and conceptualizations used makes it difficult to interpret the findings in a meaningful way. Furthermore, for adolescents and ethnically diverse students, mixed results are found in the literature for a direct relationship between belonging and achievement (Booker, 2006). Methodological issues have been named as a primary reason for these mixed results; namely, a variety of conceptualizations of school belonging and differences in the manner in which academic achievement has been measured (Booker, 2006). Even the term *school belonging* is problematic because it is not the only term that refers to this specific concept—other terms such as *school*

attachment, *school bond*, *connectedness*, and *school engagement* attempt to capture a variety of dimensions about belongingness and connection to one's school—dimensions that overlap from study to study. Furthermore, the literature reflects a call for increased investigation and attention to the terms used in this area of research (Finn, 1989).

To date, only narrative reviews of the belonging literature have been conducted. Although narrative reviews provide useful compilations of findings from past research in the area, they are vulnerable to reviewers' subjective biases. Furthermore, narrative reviews usually do not account for the magnitude of the effects observed (Bushman & Wells, 2001) nor are they able to estimate the degree to which sampling error and other forms of bias may account for the variability among individual study outcomes. Therefore, to organize a sample of the belonging literature in a meaningful way and to make empirically-based inferences about this sample, a meta-analysis is warranted. The aim of this study is to meta-analytically estimate the magnitude of the relationship between school belonging and academic performance (e.g., school grades) and academic persistence (e.g. school dropout) and, if necessary, to explore moderators of these relationships.

It is hypothesized that there is a statistically reliable positive relationship between school belonging and academic performance and persistence. It is also hypothesized that the variance among effect sizes will be greater than what can

be accounted for by sampling error. Thus, four a priori moderator hypotheses are also proposed.

First, the author hypothesizes that the manner in which school belonging is operationalized will influence the relationship between the predictor (i.e. school belonging) and the criterion (i.e. academic achievement and persistence). The second and third moderators, gender and race/ethnicity are drawn from previous research findings that suggest that the strength of the relationship between belonging and academic performance vary based on demographic and personal characteristics of the students (Goodenow, 1991; Osterman, 2000). Finally, the author hypothesizes that the manner in which academic achievement and persistence are operationalized and measured will act as a moderator.

The results of this study will not only add to the literature examining the factors that influence students' academic performance, but will also provide a statistical summary of the existing research. Key stakeholders in children's education (e.g., parents, teachers, school administrators) can use the results of this study to inform their efforts to support and increase the academic persistence and performance of students in grade school and secondary school.

CHAPTER II

LITERATURE REVIEW

School Belonging

The concept of school belonging is ubiquitous in the research area

examining students' experiences in school. Goodenow (1993) conceptualized

school belonging as the extent to which students feel personally accepted,

respected, included, and encouraged by others in the school social environment.

Other researchers have proposed similar conceptualizations of the concept of

school belonging, often using different terms to label their definitions. Wehlage,

et al. (1989) uses the term "school membership" to describe school belonging.

"School connectedness", referring to the affective components of school

belonging, has been proposed by Jimerson, Campos, & Greif (2003). Many

studies refer to, and make use of, a tripartite model named school engagement

that includes cognitive, affective, and behavioral dimensions of engagement

across a variety of contexts (Jimerson et al, 2003 as cited in McMahon, Parnes,

Keys & Viola, 2008).

School engagement has been described as a "meta" construct (Fredricks,

Blumenfeld, & Paris, 2004); a multidimensional construct that encompasses

different dimensions. Some argue that school engagement is comprised of three

dimensions: emotional, behavioral, and cognitive (Finn, 1989). A brief discussion of each dimension follows.

Emotional engagement refers to students' emotional affective reactions in the classroom (Connell & Wellborn, 1991). Some researchers conceptualize this type of engagement as students' emotional reactions to the school and the teacher (Lee & Smith, 1995), while others view emotional engagement as identification with school (Finn, 1989). The identification portion of Finn's (1989) participation-identification model refers to a student's sense of belonging, which is conceptualized as a student's "internalized conception of belongingness". The concept of identification also contains a student's valuing of achievement and success in school-related goals. A student who identifies with his/her school feels that he/she is important to the school and believes that success in school as important and valuable (Finn, 1989).

Behavioral engagement has been described as being comprised of three components: behavior related to learning (e.g., effort, persistence, asking the teacher questions in class, contributing to class discussions); compliance with school norms and rules and absence of disruptive behaviors; and participation in extracurricular activities (Fredricks, Blumenfeld, & Paris, 2004). Finn's (1989) conceptualization of behavioral engagement divides participation into four levels; levels that follow children's development and increasing maturity. Level-one participation includes attending class and responding to the teacher's questions. Level-two participation is characterized by students taking the initiative within the

classroom by asking questions and interacting with the teacher and by completing more work than is required of them (Finn, 1989). Level-three participation characterizes students' increased autonomy and participation in extracurricular activities.

The research literature reflects two main conceptualizations of cognitive engagement. One conceptualization involves the psychological investment in learning. The second conceptualization includes cognition and highlights strategic learning. Connell and Wellborn's (1991) proposition is aligned with the former conceptualization: that cognitive engagement involves psychological investment in learning, a willingness to work beyond the stated requirements of a task, and a desire for a challenge. Others note that cognitive engagement involves the "student's psychological investment in and effort direction toward learning, understanding, mastering the knowledge, skills or crafts that the academic work is intended to promote" (Newmann et al., 1992), and "the psychological investment required to comprehend and master knowledge and skills explicitly taught in schools" (Wehlage, et al., 1989).

The studies reviewed in this analysis make use of some of the above-mentioned conceptualizations of school belonging. Goodenow (1993a), McMahon, Wernsman, & Rose (2009), Nelson & DeBacker (2008), Singh & Chang (2010), and Liu & Lu (2010) use Goodenow's (1993) original conceptualization of school belong and state that this construct is a student's sense of being accepted, valued, included, and encouraged by teachers and

peers in school settings. Benner, Graham, and Mistry (2008) also make use of Goodenow's (1993) conceptualization of school belonging; however, they include an additional aspect, "fairness", which they note is the extent to which students feel that the school rules were equitable and all students were treated equally. School membership, as described by Adelabu (2007), refers to a student's feelings of acceptance and belonging within the school.

Other studies use terms that hint at different aspects of Goodenow's (1993) conceptualization of school belonging. Van Ryzin's (2011) conceptualization of belonging refers to students' perceptions of support from their teachers and peers (i.e., support for learning and doing their best schoolwork as well as personal care and support). Buhs, Ladd, & Herald's (2006) peer group acceptance/rejection refers to the extent to which students were seen as a desirable playmate by their classmates.

A number of studies in this analysis make use of the engagement construct; some use the full model while others use only a portion of the model. Lam et al. (2012) and Wang & Eccles (2011) use the full tripartite model of school engagement, which is comprised of affective, behavioral, and cognitive dimensions.

Other studies isolate a dimension of engagement, rather than using the full tripartite model. Sirin & Rogers-Sirin (2005), Wang & Holcombe (2010), and Perry, Liu, & Pabian (2009) use the term "school identification", which they operationalize as the affective aspects of school engagement. These aspects

include feelings of belonging in the school setting and identifying with others in school. Ladd & Dinella (2009) use the term school liking and avoidance to refer to the emotional or psychological form of school engagement. They note that this dimension of school engagement is the degree to which children exhibit receptiveness toward school (Ladd & Dinella, 2009). Sciarra & Seirup (2008) make use of the emotional engagement portion of the full engagement model. They conceptualize emotional engagement as the quality of student-teacher relationships, school safety, relationships with peers, and harmony among different racial groups (Sciarra & Seirup, 2008). Li & Lerner's (2011) "emotional engagement" is defined as a student's emotional reactions to the school, the teacher, and schoolmates. Sirin & Rogers-Sirin's (2004) school engagement is comprised of affective identification with school along with students' behavioral identification with school. Dotterer & Lowe (2011) use the term "psychological engagement" to refer to affective and cognitive components of engagement. They explain that these components are comprised of students' feelings, behaviors, and thoughts about their school experiences and the emotional link to school (Dotterer & Lowe, 2011). Chen (2005) uses the construct of academic engagement, which is conceptualized as a student's behavior and feeling toward schooling, classroom conduct, seriousness about school, time expenditure, self-expectations, and self-evaluations.

Others' conceptualization of school belonging appears to be aligned with the behavioral dimension of the school engagement construct. Student

engagement, as described by Singh, Granville, & Dika (2002), is a student doing homework, coming prepared for classes, regularly attending school, and not skipping classes. Finn & Rock (1997) use the term "engagement" to refer to a student's basic compliance or noncompliance with the requirements of school and the classroom and were based on teachers' and students' responses, respectively, and students' self-reports of in-school and out-of-school initiative taking. Ladd, Birch, & Buhs' (1999) classroom participation refers to student behaviors such as the willingness to adhere to the social rules and role expectations, conduct self in a cooperative and responsible manner, and displaying autonomous, self-reliant behavior.

Furrer & Skinner (2003) use the term "relatedness" to refer to generalized expectations about the nature of the self in relationships. Roeser, Midgley, & Urdan (1996) use a different conceptualization of "relatedness", stating that the construct refers to feelings of belonging.

Finally, Sanchez, Colon, & Esparza (2005) use the term sense of community to refer to membership, influence, integration and fulfillment of needs, and shared emotional connection.

Assessment

The studies reviewed reflect a variety of methods and assessments used to measure the independent variable: school belonging. To assess a student's level of school belonging, many studies used Goodenow's (1993) Psychological Sense of School Membership scale (PSSM) (Sanchez, Colon, & Esparza, 2005;

Adelabu, 2007; Nelson & DeBacker, 2008) or a variation of the PSSM scale

adapted for use for the particular study (Liu & Lu, 2010; Anderman, 2003;

McMahon, Wernsman, & Rose, 2009). To assess a student's level of school

engagement, the studies used measures for each dimension (emotional,

cognitive, and behavioral) of the construct (Sciarra & Seirup, 2008; Ream &

Rumberger, 2008; Archambault, et al., 2009; Li & Lerner, 2011).

The articles reviewed in this study use different methods and assessments

to measure the dependent variable: academic performance or academic

persistence (i.e., dropout). The majority of the studies use a student's grades or

grade point average (GPA) to assess a student's academic performance

(Herman & Tucker, 2000; Singh, Chang, & Dika, 2010; Sirin & Rogers-Sirin,

2004). Other studies obtained student scores on standardized tests (e.g.,

Woodcock Johnson III Tests of Achievement, Wide Range Achievement Tests)

to assess students' academic performance (Luo, et al., 2009; Ladd & Dinella,

2009; Ryzin, 2011; Sciarra & Seirup, 2008). A small number of studies obtained

information about a student's academic performance by asking teachers to

answer questions regarding the student's performance and how well each

student performed on class assignments and tests (Lam, et al., 2012; Sanchez,

Colon, & Esparza, 2005). Two articles included in this meta-analysis examined

dropout as the dependent variable. One study obtained school records to

determine students' registration status (Archambault, et al., 2009) while the other

study asked students to indicate their graduation status (Ream & Rumberger,

2008). The studies reviewed obtained a student's academic information through student self-report, via student records, or as reported by the student's teacher.

It has been stated that the correlation between engagement and achievement depends on the manner in which achievement is assessed (Fredricks, Blumenfeld, & Paris, 2004). In the following section, the author discusses this relationship.

School Belonging and Academic Success and Persistence

Previous research has linked perceived feelings of belonging to academic-based outcomes (Osterman, 2000). Finn (1989)'s Participation-Identification model presents dropout as a "process of disengagement" over time (Finn, 1989). Identification "denotes perceptions of congruence of the self with an external object (e.g. parents, social group, or institution) in the form of shared values or sense of belonging" (Finn, 1989). Finn (1989) stated that students who identify with school view themselves as a part of the school and value achievement of school-related goals; they have an "internalized conception of belongingness", a lack of which could increase the chances of dropout (Finn, 1989).

Research supports a positive correlation between the behavioral dimension of school engagement and a student's academic achievement (Connell & Wellborn, 1991). Positive behaviors such as attending class, participating in class, and engaging with classmates and instructor have been associated with increased school performance. This relationship between behaviors and performance is also present when one considers negative

behaviors, such as disruptive, inattentive, withdrawn behavior. Studies have shown an association between negative behaviors and a student's academic performance and achievement (Finn, 1989). Fewer studies examine the relationship between emotional engagement and student achievement. Cognitive engagement, another dimension of school engagement, has also been found to be associated with academic achievement (Fredricks, Blumenfeld, & Paris, 2004).

All of the studies examined in this analysis used survey design. The studies administered questionnaires to students assessing their level of school belonging. The researchers then obtain information about students' academic performance either through self-report or through school records (e.g., GPA, standardized test data). The research statistic used is often correlational or predictive via structural equation modeling.

CHAPTER III

METHODS

Estimation of Power

The power in a meta-analytic study is reflective of the number of studies

aggregated to test the hypotheses—if there is an insufficient number of studies to

include then the statistical power of the analysis will be low resulting in effect-size

estimates with a large amount of error variance. This creates a wide confidence

interval that makes it difficult to reject the null hypothesis and reduces the

advantages of performing a meta-analysis (Quintana & Minami, 2006). To

estimate the power of this meta-analysis, this researcher followed Hedges and

Pigott's (2001) recommendation and estimated the expected observed effect size

between the conditions within the studies, the average sample sizes in each

condition per study, and the number of studies to aggregate by examining

articles found by conducting a pilot review. The pilot review revealed correlations

that ranged from 0.10 to 0.40—the author conservatively estimated a small effect

size of 0.10. The sample sizes range from 69 to 11,388 students—the author

conservatively estimated an average sample size of 100 and estimated that 25

studies would be included in the subsequent meta-analyses.

The results of the power analysis are summarized in Table 1 and reveal a

power of 0.99851 to detect a small effect size of 0.01. If the estimated effect size

was a bit larger (e.g., 0.20), then the estimated power would increase to 1.000.

Thus, the probability of making a Type II error in the subsequent analyses

(concluding incorrectly that a null meta-analytic relationship exists) is quite

small—0.01 for a small effect size of 0.10. With the larger effect size (0.20),

these analyses suggest a 100% chance of being able to detect an effect size of

this magnitude.

Table 1. Estimations

Dimension	Estimate
Estimated overall effect size =	0.10
Estimated average sample sizes in each condition per study (N) =	100
Estimated variance of the weighted mean for Fisher's z (v_i) =	0.0103
Estimated variance of the weighted mean effect size (v) =	0.000412
Estimated number of studies to aggregate (k) =	25
Critical value for statistical significance ($C_{\alpha/2}$) =	1.96
Estimated power (p) =	0.9985

Literature Search

The author identified studies that examined the relationship between

school belonging and academic achievement and persistence over a 42-year

period (from January 1, 1970 to March 17, 2012). The author selected a time

period of approximately 40 years, beginning her search date with January 1,

1970, to capture recently published studies because a cursory search of the

databases revealed that the literature in the area covered the past 4 decades. To

capture the broadest possible sample of relevant articles, the author used

multiple search terms and strategies (see Table 2 for Search Terms and

Strategies). The author conducted searches for published studies using the

PsycINFO and Education Resources Information Center (ERIC) databases. She

also reviewed the reference lists of the included studies and narrative reviews,

and conducted hand searches of the Table of Contents sections of recently

published journals devoted to studies investigating school-related issues (e.g.,

factors affecting students' academic performance).

Table 2. Search Terms and Strategies

Database	Key Search Terms
ERIC	TX All Text (school belonging OR school attachment OR school engagement OR belongingness OR relatedness OR sense of community OR school membership OR classroom membership OR psychological membership OR school support OR teacher support OR peer acceptance OR school acceptance OR school connectedness OR school connection OR school bond OR school involvement OR academic engagement) AND (school success OR academic achievement OR dropout OR academic persistence OR graduation) Limiters: Full Text, Peer Reviewed, Date Published from 19700101-20120331, Journal Articles (EJ), English language
PsycINFO	(school belonging or school attachment or school engagement or belongingness or relatedness or sense of community or school membership or classroom membership or psychological membership or school support or teacher support or peer acceptance or school acceptance or school connectedness or school connection or school bond or school involvement or academic engagement).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] AND (school success or academic achievement or dropout or academic persistence or graduation).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] LIMIT (peer reviewed journal and all journals and human and English language and yr="1970 - Current")
REFERENCE LISTS	(1) Articles included in this study (2) Narrative reviews
JOURNAL TABLE OF CONTENTS	American Educational Research Journal Applied Developmental Science Child Development Developmental psychology Journal of Adolescence Journal of Early Adolescence Journal of Educational Psychology Journal of Educational Research Journal of Experimental Education Journal of Research on Adolescence Journal of School Psychology Journal of Youth and adolescence Psychology in the Schools Sociology of Education The Counseling Psychologist The Elementary School Journal Urban Review Youth and Society

The inclusion criteria for this meta-analysis were that studies (a) be written in English, (b) provide quantitative data, (c) report effect size or provide the data needed to calculate effect size, (d) measure the identified independent and dependent variables, and (e) be published in a journal.

The literature search (after removal of 41 duplicates) yielded 2,148 abstracts, which were examined by this author. A total of 2,128 articles were from the online database searched (PsycINFO and ERIC), 19 articles were from reference lists of included articles and narrative reviews, and 1 article was from hand searches of journal Table of Contents. The review of abstracts identified 231 articles which were subsequently obtained and evaluated. A primary reason for article exclusion was that the study did not examine the identified independent and/or dependent variables (see Figure 01). Thirty-seven articles were included in this meta-analysis; however not all of these articles were analyzed because 10 articles reported beta coefficients. Thus, a final set of 27 articles met all inclusion criteria and were included in the data analysis.

Although many meta-analysts recommend including unpublished as well as published literature, doing so can result in a complete (or at least representative) sample from the published literature and a sample of unknown representativeness from the population of unpublished studies. Thus, only published articles were included in this study. The issue of possible sampling bias if a researcher does not include unpublished studies that report non-significant results is termed the "file-drawer" problem (i.e., the problem that significant results are published while non-significant results are relegated to file drawers). This problem can be addressed via Rosenthal's (1979) "Fail-safe N" test, which is presented later in the Results section. The Fail-safe N test provides the researcher with the number of nil/null studies that would need to be added to

the analysis in order to reduce the significant results to non-significance (i.e.,

"nullify" the results) (Rosenthal, 1979).

Figure 1: Counts and Details of Articles Included and Excluded From Study


```
┌─────────────────────────┐
│   2189 articles found   │
└─────────────────────────┘
           │
           ├──────────────────────►┌──────────────────────────┐
           │                       │  41 duplicates removed   │
           ▼                       └──────────────────────────┘
┌─────────────────────────┐
│  2148 articles reviewed │
└─────────────────────────┘
           │
           ├──────────────────────►┌──────────────────────────────────┐
           │                       │ 1917 articles excluded           │
           │                       │   • 1755 – did not examine the   │
           │                       │     independent and/or           │
           │                       │     dependent variable           │
           │                       │     identified in this study     │
           │                       │   • 99 – review or commentary    │
           │                       │   • 58 – participants were       │
           │                       │     university-aged students     │
           │                       │   • 4 – not experimental         │
           │                       │     design                       │
           ▼                       │   • 1 – not written in English   │
┌─────────────────────────────┐   └──────────────────────────────────┘
│ 231 articles obtained and   │
│          reviewed           │   ┌──────────────────────────────────┐
└─────────────────────────────┘   │ 194 articles excluded            │
           │                       │   • 178 – did not examine the    │
           ├──────────────────────►│     independent and/or           │
           │                       │     dependent variable           │
           │                       │     identified in this study     │
           │                       │   • 15 – review or commentary    │
           │                       │   • 1 – not experimental         │
           │                       │     design                       │
           ▼                       └──────────────────────────────────┘
┌─────────────────────────────┐
│ 37 articles reviewed and    │   ┌──────────────────────────────────┐
│          coded              │   │ 10 reported beta coefficients    │
└─────────────────────────────┘   │   • 2 – dependent variable:      │
           │                       │     dropout                      │
           ├──────────────────────►└──────────────────────────────────┘
           ▼
┌─────────────────────────────┐
│ 27 articles included in     │
│          analysis           │
└─────────────────────────────┘
```

Data Coding

The research studies included were coded by the researcher using a code

book she developed. The code book extracted several objectively verifiable

characteristics of the studies, including: (a) the publication author(s), title, date

and journal of publication, (b) the number of participants and their demographic

information (i.e. race/ethnicity, gender, age), (c) grade in school, (d) location

(e.g., urban, suburban, rural), (e) school SES (as reported by the researchers—

based on social class and/or income information of the parents of students in the

school or school district), (f) ethnic/racial composition of the school, (g) the

research design used, (h) the test statistic, (i) the manner in which school

belonging was operationalized and (j) measured, (k) the manner in which

academic achievement was operationalized and (l) measured, (m) the means,

standard deviations, and ranges of the scores obtained from the measures, (n)

relevant reliability estimates of the measures, (o) bivariate correlations

(Pearson's r) reported in the individual studies. The summary table of information

coded from the individual studies can be found in Appendix A.

Data Analytic Strategies

Computation of Effect Sizes

This meta-analysis examined the relation between school belonging and

academic achievement using the software by Biostat, Inc. called "Comprehensive

Meta-Analysis 2.0". In the analysis, bivariate correlations (r) were the effect sizes

employed and were, in all possible cases, extracted directly from each study. If a

study reports more than one effect size, then the researcher has three options:

the effect sizes can be averaged to give one effect size to be included in the

analysis, one effect size can be selected to be included in the analysis, or more

than one effect size can be recorded from a single study if the N of the

subsample from which the effect size was obtained is reported by the study

authors (Lipsey & Wilson, 2001). This third option, extracting multiple effect sizes from one study, assumes that the reported relationships are mostly independent of the other subsamples in the study. However, it has been suggested that dependencies exist between effect sizes that come from the same study. These dependencies, however, are assumed to be small (Lipsey & Wilson, 2001). The researcher can confidently define independence at the sample or study level, as is the standard practice in meta-analysis (Lipsey & Wilson, 2001). After obtaining the effect sizes from the included studies, all the correlations (*r*s) then underwent a series of adjustments and corrections.

Since the sample *r* is a negatively biased estimate of the population *p*, the researcher converted each *r* to Fisher's *z* using the "Comprehensive Meta-Analysis 2.0" software. The use of this software to calculate Fisher's *z* is comparable to using transformation tables available in the literature (e.g. Pearson & Hartley, 1976). The Fisher *z*s were corrected for sampling error by weighting each study's *z* by the inverse of its variance (*N*-3). The distribution of the weighted effect sizes among the studies was examined, by generating a histogram, to identify possible outliers. Outliers were removed only if it could be justified using theory or methodology (Quintana & Minami, 2006).

If all the studies include in this analysis report reliability estimates on the measures of both the independent and dependent variables, then the researcher could correct for measurement error on the school belonging and academic success/persistence measures using the method outlined by Hunter & Schmidt

(2004). If a study did not report reliability estimates, then that statistic was imputed from another study that used a demographically similar student sample (Hunter & Schmidt, 2004).

Computation of the Overall Effect Size Estimate

The unbiased effect size estimate ($r+$) served as the overall effect size estimate in the analysis. The corrected and weighted z values (see above) were aggregated, and averaged (i.e, divided by the sum of the weightings of the individual studies) using the "Comprehensive Meta-Analysis 2.0" software program to obtain the unbiased z (i.e., $z+$) and 95% confidence intervals were put around the $z+$ statistic. A test of statistical significance was conducted by determining if 0 is included within this 95% confidence interval (Quintana & Minami, 2006). Finally, the $z+$ statistic was converted back to a correlation statistic (r) using the "Comprehensive Meta-Analysis 2.0" software program.

The overall effect size ($r+$) was estimated using a random-effects model. A random-effects model assumes the existence of variability beyond subject-level sampling error (Lipsey & Wilson, 2001). Moreover, a random-effects model assumes that there is a *distribution* of true effect sizes versus a fixed-effects model that assumes there is a true effect size common to all studies (Borenstein et al., 2010). Given that previous research has identified the possibility of moderator effects that operate on the relationship between school belonging and academic achievement (Booker, 2006), a random-effects model will be used. The

moderators are expected to account for most, if not all, of the variability above and beyond sampling error.

Homogeneity of Effect Sizes

The author used the homogeneity test statistic Q to determine if effect sizes are homogenous or reasonably similar to one another. A homogeneous distribution means that any variability is no greater than what would be expected from sampling error (Lipsey & Wilson, 2001). If the Q statistic is found to be <u>non-significant</u>, this suggests that the effect sizes are homogenous and any variability is most likely due to sampling error alone. On the other hand, if the Q statistic is found to be <u>significant</u>, this suggests heterogeneity among effect sizes; the effect size differences among the studies are greater than would be expected by chance (Lipsey & Wilson, 2001). Furthermore, a Q statistic rejects the assumption of a fixed effect model (i.e., that effect sizes are homogeneous and any variability is due to sampling error alone), indicating the suitability of a random-effects model. If significant heterogeneity exists, then the four moderator hypotheses will be tested.

Moderator Analysis

Moderator analysis within a meta-analysis requires a test for a linear association between the effects size and the moderator variable. Two factors must be considered when determining the appropriate statistical method to test moderator effects. First, it must be determined whether the moderator is categorical or continuous. In this study, three moderators are categorical

(gender, race/ethnicity, and operationalization of school belonging) and, in some cases, the fourth can be considered continuous (operationalization of academic achievement via grade point average). The dependent variable (academic achievement) was coded one of five ways: (1) standardized test, (2) GPA, (3) achievement test administered by teacher, (4) teacher ratings of effort, (5) teacher-reported prospective grades and effort rating. Given these categories, it is more appropriate to treat the moderator, academic achievement, as categorical. Categorical moderators will require use of a statistical procedure analogous to a weighted ANOVA (Hedges & Pigott, 2004).

The second factor, whether the aggregated effects sizes were tested under the fixed-effects or the random-effects model, is easily answered—the study will be tested under a random-effects model.

In sum, to test moderator effects in both meta-analyses, the omnibus test that uses the Q statistic was divided into two statistics: Q_B for between-group homogeneity and Q_W for within-group homogeneity (Quintana & Minami, 2006). It is expected that a significant Q_B statistic will be found, indicating that the mean effect sizes between the groups are significantly different from each other, suggesting the influence of a moderator (Quintana & Minami, 2006). The researcher then determined if there is any remaining variance not accounted for by the hypothesized moderator (Q_W). A significant Q_W indicates partial moderation, meaning that variability beyond subject-level sampling error remains

across effect sizes (Lipsey & Wilson, 2001). On the other hand, a non-significant Q_W suggests that the moderator accounts for all the variability within the group.

External Validity

Use of meta-analytic strategies allows the researcher to generalize effects across a variety of settings and participants sampled in the studies included in the study (Quintana & Minami, 2006). A fixed-effects model allows the researcher to make *conditional* inferences about the results (i.e., generalize the results to the sample of studies reviewed) (Hedges & Vevea, 1998). On the other hand, use of a random-effects model allows the researcher to generalize the results to the entire population of studies (i.e., *unconditional* inference) (Hedges & Vevea, 1998). A random-effects model is appropriate for this study because use of this type of model assumes the existence of variability beyond subject-level sampling error (Lipsey & Wilson, 2001). As mentioned earlier, this study assumes that the variability beyond subject-level sampling error is possibly due to systematic differences that can be identified (i.e., moderators) because previous research has identified the possibility of moderator effects that operate on the relationship between school belonging and academic achievement (e.g., Booker, 2006). Therefore a random-effects, as opposed to fixed-effects, model was used in this study.

CHAPTER IV

RESULTS

Computation of Effect Sizes

In the analysis, bivariate correlations (r) were the effect sizes employed and were extracted directly from 27 studies. Since some studies reported more than one independent effect size, a total of 41 effect sizes were obtained. It is noted that 10 studies were excluded from the data analysis because they only reported beta coefficients. Two of these 10 studies examined academic persistence (i.e., dropout) as the dependent variable. The beta coefficients reported by the remaining 8 studies ranged from 0.20 to 0.93 (see Figure 2). Since only 2 studies were found that examined the independent variable and used dropout as the dependent variable, the scope of this analysis was narrowed to examine the relationship between school belonging and academic achievement. In sum, the results of the school belonging-academic achievement meta-analysis were based on 27 studies with 41 individual effect sizes.

Figure 2: Frequency of Beta Coefficients of Individual Studies
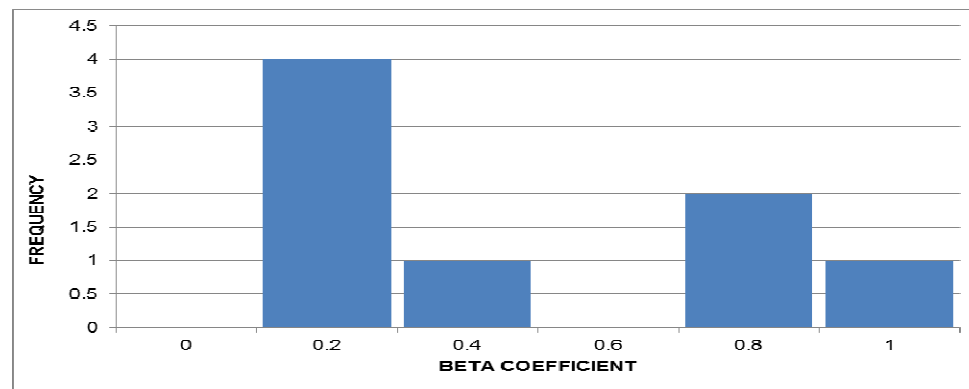
The author attempted to correct the measurement error on the predictor (school belonging) or criterion (academic achievement) variables, or both. Ten studies reported reliability estimates for both variables. Seventeen studies were missing reliability estimates on either the predictor or criterion. Reliability estimates were imputed for 8 studies. This resulted in a total of 18 studies with reliability estimates for both x and y, and 9 studies that were still missing reliability estimates. As a result of the missing reliability estimates, measurement error corrections were not conducted for this analysis.

The r's were converted to Fisher's *z* and then corrected for sample error by weighting each study's *z* by the inverse of its variance (N-3). The distribution of the weighted effect sizes among the studies was examined by creating a histogram to identify possible outliers (Figure 3).

Figure 3: Frequency of Correlations Found in Individual Studies
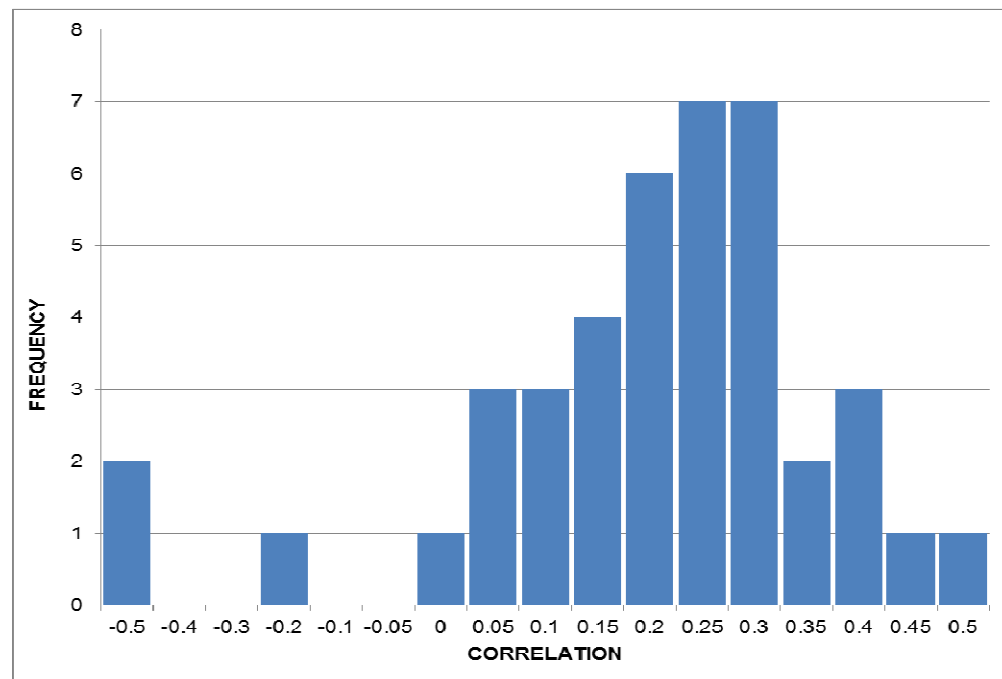
From the histogram (Figure 3), one can see that most of the relationships reported are positive; however, 3 relationships are negative. Further investigation reveals that 3 of these relationships come from subsamples within the same study (Flook, Repetti, & Ullman, 2005). Flook, Repetti, & Ullman (2005) examined social acceptance in the classroom and academic performance. They found a negative relationship between a student's lack of peer acceptance (independent variable) and reading and math grades obtained from the student's report card (dependent variable). The manner in which the independent variable was conceptualized ("lack" of peer acceptance) helps to explain the negative relationship found by Flook, Repetti & Ullman (2005). In other words, the more that a student lacks peer acceptance (i.e., student is not accepted by his/her

peers), the lower his/her academic performance (i.e., grades). Since the commonly reported direction of the relationship between school belonging and academic achievement is positive, the correlations reported by the Flook, Repetti & Ullman (2005) study were reverse coded. Examination of a histogram that includes the reverse coded effect sizes (Figure 4) does not reveal any additional outliers.

Figure 4*: Frequency of Correlations Found in Individual Studies, After Removal of Outliers
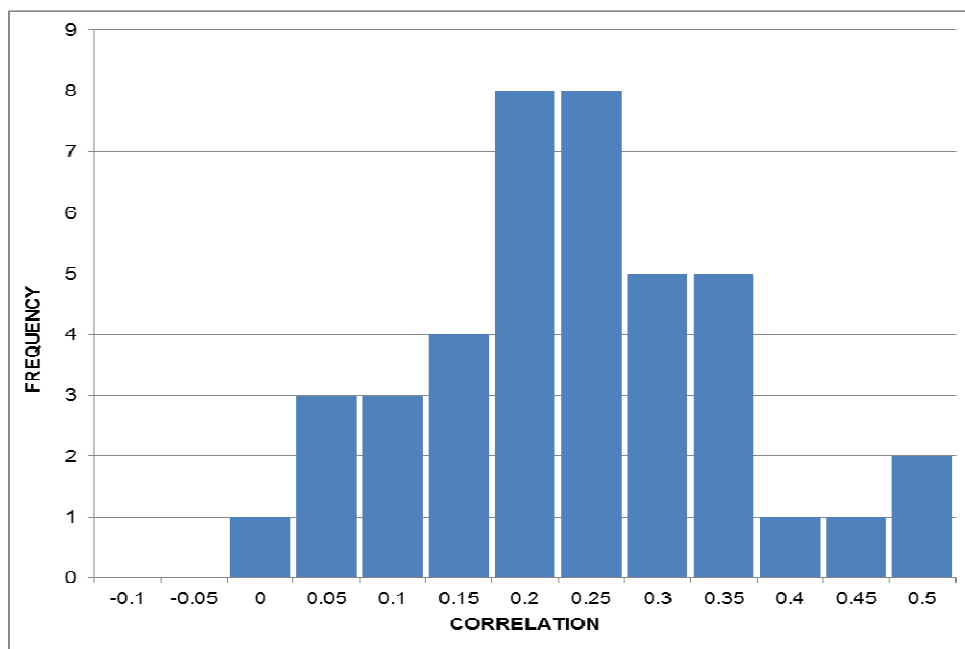

Computation of the Overall Effect Size Estimate

Using a random-effects model, the results indicate a Fisher's z of 0.224. This statistic was then converted to a bivariate correlation (*r*=0.220). A test of statistical significance revealed that 0 is not included within the 95% confidence interval (95% confidence interval: 0.188–0.252); therefore, the overall effect size

estimate appears to be significant. Furthermore, according to Cohen's (1988, 1990) "rule of thumb", a correlation of 0.220 is considered a small-to-medium effect size. See Figure 5 for a forest plot of the effect sizes and their 95% confidence intervals for school belonging and academic achievement.

Figure 5: Forest Plot of the Effect Sizes and Their 95% Confidence Intervals for School Belonging and Academic

Achievement (*k*=41).
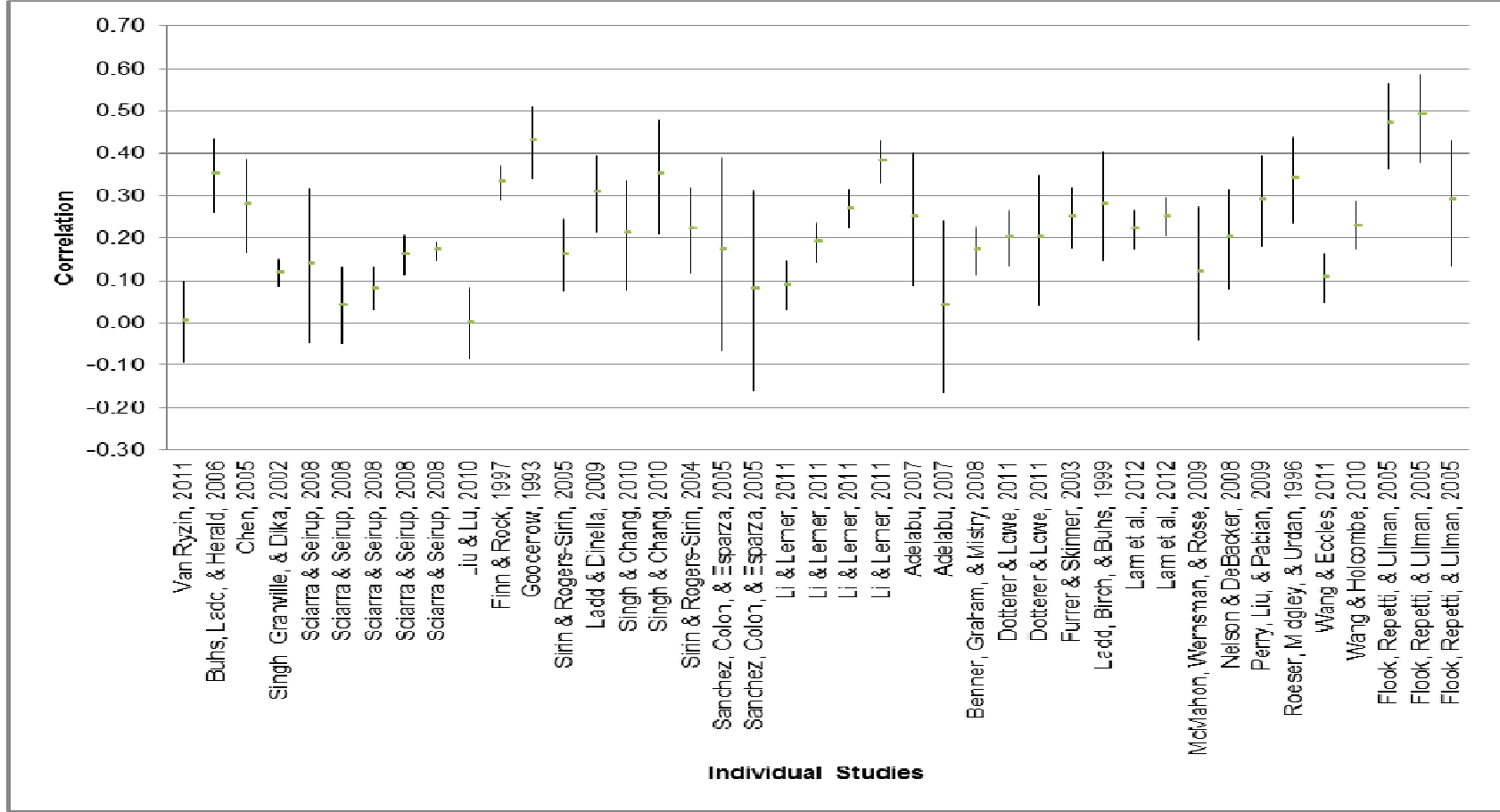
To address the "file-drawer problem" that is characteristic of meta-analytic efforts, the author conducted Rosenthal's (1979) Fail-safe N test. Using the "Comprehensive Meta-Analysis" software, the author found that Fail-safe N=2,680, z=34.52, p<0.0001. This statistic indicates that 2,680 studies would need to be added to the analysis to yield a statistically non-significant result. This appears to be a large Fail-safe N, given the relatively small effect size. Therefore, the author completed a hand calculation of the Fail-safe N using Rosenthal's equation, where k=the number of studies, and mean Z_k=mean Z for the k studies (Rosenthal, 1979). Since some of the individual studies included in this analysis provided more than one effect size, the k for Rosenthal's equation refers to the number of independent effect sizes (k=41) (Rosenthal, 1979).

$$\text{Fail-safe N} = k/2.706 \, [k(Z_k)^2 - 2.706]$$

$$= 41/2.706 \, [(41*0.200)^2 - 2.706]$$

$$= 15.15 \, [8.2^2 - 2.706]$$

$$= 15.15 \, [67.24 - 2.706]$$

$$= 977.69$$

The hand-calculated Fail-safe N appears to be a more realistic number, considering the overall effect size found in this study. Therefore, the author will use a Fail-safe N of 977.

Use of Rosenthal's equation to calculate the Fail-safe N yielded different results than use of the "Comprehensive Meta-Analysis 2.0" program. One possible explanation for this difference is the manner in which the Fail-safe N

statistic was calculated. The software program computes an effect size for each study, combines the effect sizes, and then calculates the p-value for the combined effect. On the other hand, Rosenthal's approach computes a p-value for each study and then combines these *p*-values. The creators of "Comprehensive Meta-Analysis 2.0" explain in the program's "Classic fail-safe N notes" section that these two approaches are not identical and therefore, do not yield identical results.

Although Rosenthal (1979) reports a lack of a "cut-off" point for what can be considered an unlikely number of unretrieved or unpublished studies, it is recommended that researchers use $5k + 10$ as an adequately conservative Fail-safe N level. For this study, 5(41) + 10=215 is considered the tolerance level for unlikely number of unretrieved or unpublished studies. Whether the author uses the Fail-safe N reported by the software, or the hand-calculated Fail-safe N, the statistic exceeds the tolerance level; therefore, we can have confidence that the calculated effect size would not likely become null in the presence of unpublished studies.

Homogeneity of Effect Sizes

Results of the test for homogeneity of the effect sizes across the sampled studies indicate a significant *Q* statistic (Q=338.082, *df(Q)*=40, *p*<0.0001), suggesting heterogeneity among effect sizes and variability above and beyond sample error (Lipsey & Wilson, 2001). Due to the significant heterogeneity, the four moderator hypotheses were tested.

Moderator Analysis

In this study, the four moderators are categorical (gender, race/ethnicity, operationalization of school belonging, and operationalization of academic achievement). The omnibus test using the Q statistic was divided into two statistics: Q_B for between-group homogeneity for each moderator and Q_W for within-group homogeneity (Quintana & Minami, 2006).

For gender as a moderator, a non-significant Q_B statistic was found (Q_B=1.247, *df(Q)*=2, *p*<0.536) suggesting homogeneity between the groups and lack of a moderator effect. Furthermore, the relationship between school belonging and academic achievement is found to be non-significant for boys. However, it is noted that that 35 of the 41 effect sizes in this analysis came from studies that failed to provide data categorized by gender grouping. Removing the studies that did not indicate gender groupings (i.e., "Not Indicated") results in a significant correlation for boys. Removing the studies also results in a non-significant Q_B statistic (Q_B=1.318, *df(Q)*=1, p<0.251) suggesting homogeneity between the groups and lack of a moderator effect (Table 4).

As shown in Table 4, school belonging and academic achievement was significantly correlated for girls but not for boys. In addition, the correlation was slightly larger for girls (*r*=0.245) as compared to boys (*r*=0.194), but not to a statistically significant degree.

Table 3. Gender as a Moderator

GENDER	CORRELATION	LOWER LIMIT	UPPER LIMIT	Z-VALUE	P-VALUE
Not Indicated	0.224*	0.189	0.259	12.160	0.0001
Female	0.234*	0.097	0.361	3.320	0.001
Male	0.144	0.000	0.282	1.958	0.050
Overall	**0.218***	**0.173**	**0.262**	**9.277**	**0.0001**

Significant at 95% confidence interval

Table 4. Gender as a Moderator, "Not Indicated" Removed

GENDER	CORRELATION	LOWER LIMIT	UPPER LIMIT	Z-VALUE	P-VALUE
Female	0.245*	0.184	0.303	7.718	0.0001
Male	0.194*	0.130	0.256	5.900	0.0001
Overall	**0.220***	**0.170**	**0.269**	**8.395**	**0.0001**

Significant at 95% confidence interval

For race/ethnicity, a non-significant Q_B statistic was found (Q_B=4.058, $df(Q)$=5, p<0.541), suggesting lack of a moderator effect. As revealed in Table 5, school belonging was significantly correlated with academic achievement for all racial/ethnic groups except Native Americans, Asian Americans, and Latino. The effect size was particularly small in the Asian American sample (r=.04).

Table 5. Race/Ethnicity as a Moderator

RACE/ETHNICITY	CORRELATION	LOWER LIMIT	UPPER LIMIT	Z-VALUE	P-VALUE
Native American	0.140	-0.137	0.396	0.992	0.321
Asian	0.040	-0.182	0.258	0.350	0.726
Black	0.193*	0.032	0.344	2.340	0.019
Latino	0.160	-0.050	0.356	1.499	0.134
White	0.187*	0.030	0.334	2.335	0.020
Not Indicated	0.234	0.196	0.271	11.734	0.0001
Overall	**0.188***	**0.112**	**0.262**	**4.781**	**0.0001**

* Significant at 95% confidence interval

For operationalization of school belonging, a significant Q_B statistic was found (Q_B=30.829, $df(Q)$=18, p<0.030) suggesting the presence of moderator effects (Table 5). Complete moderation is not supported because continued analysis reveals a significant Q_W statistic (Q_W=158.347, $df(Q)$=22, p<0.0001). However, as shown in Table 6, correlations ranged from small to moderate (r=0.119 to 0.404) for all conceptualizations of school belonging except for school belonging and fairness, school membership, sense of community, student engagement, and student perceptions of support from teachers and peers.

Table 6. School Belonging as a Moderator

OPERATIONALIZATION of SCHOOL BELONGING	CORRELATION	LOWER LIMIT	UPPER LIMIT	Z-VALUE	P-VALUE
Academic engagement (behavior and feeling toward schooling, classroom conduct, seriousness about school, time expenditure, self-expectations, and self-evaluations).	0.280*	0.072	0.465	2.615	0.009
Classroom participation (willingness to adhere to the social rules and role expectations, conduct self in a cooperative and responsible manner, autonomous, self-reliant behavior)	0.280*	0.060	0.474	2.482	0.013
Emotional engagement I (quality of student-teacher relationships, school safety, relationships with peers, and harmony among different racial groups)	0.119*	0.031	0.205	2.657	0.008
Emotional engagement II (student's emotional reactions to the school, teacher, and schoolmates)	0.235*	0.145	0.322	5.023	0.0001
Engagement (student's basic compliance or noncompliance with the requirements of school and the classroom and were based on teachers' and students' responses, respectively. And students' self-reports of in-school and out-of-school initiative taking.)	0.332*	0.159	0.485	3.655	0.0001
Peer group acceptance/rejection	0.404*	0.307	0.493	7.553	0.0001
Psychological engagement (affective and cognitive components: students' feelings, behaviors, and thoughts about their school experiences and emotional link to school)	0.200*	0.053	0.339	2.653	0.008
Relatedness I (feelings of belonging)	0.340*	0.141	0.513	3.264	0.001
Relatedness II (generalized expectations about the nature of the self in relationships)	0.250*	0.060	0.422	2.564	0.010
School belonging and fairness	0.170	-0.017	0.345	1.785	0.074
School engagement	0.220*	0.015	0.407	2.101	0.036
School identification (affective aspects of school engagement: feelings of belonging in the school setting and identifying with others in school)	0.225*	0.113	0.331	3.878	0.0001
School liking/avoidance (emotional or psychological form of school engagement: degree to which children exhibit a receptiveness toward school)	0.307*	0.111	0.480	3.026	0.002
School membership (feelings of acceptance and belonging within school)	0.158	-0.024	0.329	1.708	0.088
Sense of community (membership, influence, integration and fulfillment of needs, and shared emotional connection)	0.126	-0.085	0.326	1.171	0.242
Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	0.219*	0.132	0.302	4.872	0.0001
Student engagement I (affective, behavioral, and cognitive dimensions)	0.194*	0.089	0.295	3.578	0.0001
Student engagement II (doing homework, coming prepared for classes, regular attendance, not skipping classes)	0.117	-0.065	0.291	1.263	0.0207
Student perceptions of support from teachers and peers	0.005	-0.196	0.205	0.048	0.962
Overall	**0.222***	**0.168**	**0.275**	**7.844**	**0.0001**

Significant at 95% confidence interval

For operationalization of academic achievement, a significant Q_B statistic was found (Q_B=17.355, $df(Q)$=8, p<0.027), indicating a moderator effect (Table 7). Complete moderation is not supported because continued analysis indicates a significant Q_W statistic (Q_W=234.671, $df(Q)$=32, p<0.0001).   Significant correlations ranged from small to moderate-to-large (r=0.175 to 0.43) for all operationalizations of academic achievement except for academic self-efficacy, achievement goals, GPA and standardized test (combined), and school tests, which were found to be non-significant. The effect size was nil for school tests (r=0.000).

Table 7. Academic Achievement as a Moderator

OPERATIONALIZATION of ACADEMIC ACHIEVEMENT	CORRELATION	LOWER LIMIT	UPPER LIMIT	Z-VALUE	P-VALUE
Academic self-efficacy	0.120	-0.122	0.348	0.972	0.331
Achievement goals	0.201	-0.016	0.400	1.820	0.069
Achievement test	0.350*	0.157	0.517	3.455	0.001
GPA	0.247*	0.204	0.290	10.818	0.0001
GPA and Standardized test	0.117	-0.067	0.293	1.250	0.211
School tests	0.000	-0.196	0.196	0.000	1.0000
Standardized test	0.175*	0.115	0.234	5.645	0.0001
Teacher ratings	0.235*	0.107	0.356	3.547	0.0001
Teacher-reported prospective grade and effort ratings	0.430*	0.246	0.584	4.309	0.0001
Overall	**0.213***	**0.139**	**0.283**	**5.602**	**0.0001**

Significant at 95% confidence interval

CHAPTER V

DISCUSSION

The goal of this study was to use meta-analytic methods to clarify the relationship between school belonging and academic achievement and persistence and to explore any moderators of these relationships. A total of 2,148 articles were found; 27 of which met inclusion criteria and were analyzed. Results supported the author's hypothesis that there is a statistically reliable, small-to-moderate positive relationship between school belonging and academic performance.

Data also supported the hypothesis that the variance among effect sizes will be greater than what can be accounted for by sampling error, suggesting moderator effects. The operationalization of school belonging and the operationalization of academic achievement were found to be moderators; however, a complete moderation effect was not supported by the data. In other words, unexplained variability remained among the effect sizes within each group.

Within the race/ethnicity grouping, the correlations for Native American, Latino, and Asian subgroupings were not significant. The non-significant finding for the Native American subgrouping could be reflective of inadequate power to detect the relationship. For the Latino and Asian subgroups, the non-significant

correlation between school belonging and academic performance might be the result of the broad ethnic/racial categories used in the studies. Use of the broad racial/ethnic category results in loss of the features of the distinct ethnic groups included under the umbrella term of "Asian" (Lee, 1994) or "Latino".

There is an additional explanation; namely that a lack of school belonging might not affect Asian-American or Latino students' academic performance as much as other groups since, for example, they tend to be more motivated by family than by other possible sources of influence. This collectivistic orientation is also characterized by a strong desire to avoid bringing shame to one's family. Thus, it may be that family is a stronger influence on Asian American's or Latino's school performance than is feelings of belonging or connectedness in school.

For the Asian-American subgroup, another explanation of the non-significant finding might come from the Model Minority Myth (MMM) of Achievement Orientation (Wexler & Pyle, 2012). The MMM of Achievement Orientation is conceptualized as a belief that Asian Americans outperform other racial minority groups in areas such as academics (Wong & Halgin, 2006 as cited in Wexler & Pyle, 2012). Stereotypes can then arise and as a result, the needs of individual Asian students might be overlooked (Wing, 2007; Yu, 2006, as cited in Wexler & Pyle, 2012). It is possible that the MMM of Achievement Orientation influenced how teachers perceived, and rated, Asian students, thereby affecting the results of the studies included in this analysis.

The correlations for Black and White subgroups were found to be significant. This clarifies the mixed findings for African American students in the literature; results from this study suggest that there is indeed a small relationship between these two constructs for African American students and that the mixed results from individual studies is likely due to sampling error associated with individual studies. However, race/ethnicity does not fully account for the relationship. There appears to be other factor(s) that influence this relationship. Further research is necessary to identify the factor(s) as well as explore the relationship between these two constructs for other racial/ethnic groups.

Our findings suggest that the manner in which both school belonging and academic achievement are operationalized matters and affects the correlation between these two constructs. Depending on which conceptualization of school belonging was used in the primary study, the strength of the relationship ranged from small to moderate (rs ranged from 0.119 to 0.404). Conceptualizing school belonging as peer group acceptance/rejection yielded larger effects; conceptualizing school belonging as emotional engagement (e.g., quality of teacher-student relationships, school safety, relationship with peers, and harmony among the different racial groups) yielded smaller effects.

Moreover, our findings support other researchers findings that the correlation between engagement and achievement depends on the manner in which achievement is assessed (Fredricks, Blumenfeld, & Paris, 2004). This study found that the relationship between school belonging and academic self-

efficacy was non-significant; the relationship was nil for school tests. It is possible that academic self-efficacy was not significantly related to school belonging because a student's self-efficacy is largely a cognitive construct. Academic self-efficacy is defined as a student's beliefs that he/she has control over his/her performance in a specific subject (McMahon & Wernsman, 2009). School belonging, on the other hand, is often conceptualized as a more psychological/emotional construct. So it is plausible that a largely cognitive construct such as self-efficacy would not be strongly related to the construct of school belonging. A reasonable explanation for the nil finding for school tests is that these tests are developed independently by individual schools and are therefore, not standardized, and have questionable reliability and validity.

It is possible that only a partial, and not full, moderator effect was found for school belonging and academic achievement because of inadequate reliability estimates for the measures used in the studies. Since some studies did not report reliability estimates for all the measures they used, and the reliability estimates could not be imputed for all the studies, correction on the measures could not be completed. Further research in this area is needed.

Examination of the relationship between school belonging and academic persistence (i.e., dropout) was not performed because the two relevant studies that were found reported beta coefficients and therefore, were not included in the data analysis. The beta weights from these studies suggested that engagement behaviors were a significant predictor of school dropout (Archambault et al.,

2009; Ream & Rumberger, 2008). More specifically, Ream and Rumberger's (2008) explored engagement behaviors such as homework activities, school preparation, athletic participation, and arts participation among Mexican American and non-Latino White students. They found that school preparation and athletic participation were significant predictors of dropout for both ethnic groups. Furthermore, homework activities were not a significant predictor of dropout; however, school preparation, organized sports, and arts participation appeared to reduce the likelihood of dropout (Ream & Rumberger, 2008). Archambault et al. (2009) used the tripartite model of engagement (i.e., behavioral, cognitive, and affective dimensions) in their study and found that only the behavioral component of engagement was a significant predictor of school dropout. Further research, in the form of primary studies, is needed to learn more about the relationship between school belonging and academic persistence.

Beta coefficients were reported by eight studies examining school belonging and academic achievement; therefore, these studies were not included in the data analysis. It is noted that the results of these 8 studies are consistent with the findings of this meta-analysis: that a significant positive relationship exists between school belonging and academic achievement.

The findings of this study have practical implications for educators, counselors, and other professionals who work with children in a school setting. It is clear that a relationship between school belonging and academic achievement exists for some students. Individuals who work with children in a school setting

can take steps to encourage students' feelings of belonging. Research recommends that teachers create norms and rules regarding social interactions within the classroom and encourage the importance of respecting others and working together in order to facilitate students' sense of belonging in the school (Fredricks, 2011). The conceptualizations of school belonging that exhibited moderate-to-large relationships with academic outcomes in this meta-analysis included students' acceptance/rejection by their peer group, classroom participation (students' willingness to adhere to the social rules and role expectations and behaving in a cooperative and responsible manner), school liking/avoidance (degree to which children exhibit a receptiveness toward school), and students' basic compliance or noncompliance with the requirements of school and the classroom. Teachers set the tone within the classroom; therefore, it is suggested that teachers take steps to ensure that the classroom culture fosters the aforementioned experiences for students. Furthermore, the data suggests that depending on the race/ethnicity of the student, there might be other factors that influence the relationship between school belonging and academic achievement. For example, counselors and teachers should be aware that a sense of school belonging might not be as important to Asian-American students' academic performance than family influences and it might be the latter (family influences) that exert a stronger influence on school performance than school belonging (or, at least, that school belonging might not contribute to the academic performance of Asian American students as it does other students).

Moderate-to-large effects were found when academic performance was conceptualized either as a student's GPA or as teacher ratings of the student's current and future performance. In light of these findings, it is suggested that teachers should make efforts to provide feedback to students about their current, and future, performance. It is reasonable to expect that this feedback would not only inform students about their academic progress, but also serve as an interaction that might strengthen the teacher-student relationship. This might then positively contribute to a student's sense of belonging. Results of this study have implications for researchers as well.

Researchers who attempt to study school belonging and academic performance should be aware that the operationalization of school belonging and academic achievement they select will influence their data and findings. Results of this meta-analysis show that the manner in which school belonging and academic achievement are operationalized impacts the relationship between these two constructs. While this is a partial effect, it is recommended that researchers be mindful of how they conceptualize these constructs as it could affect their results. There is a dearth of research that examines how to adequately assess, and then meet, the educational needs of ethnic minority students. It is recommended that further investigation be undertaken to better understand the relationship between school belonging and academic performance for ethnic minority students. It is also recommended that

researchers use precise demographic categories instead of broad racial/ethnic

groupings that "lump" together cultures that are in fact, quite distinct.

There are several issues that pose limitations and warrant consideration

when evaluating the results of this study. First, it is noted that the process of

taking the average of correlations reported in a single study may underestimate

(or in some cases overestimate) the effect size. If a subsample within a study

demonstrates a negative correlation, while another subsample in the same study

suggests a positive correlation—taking the average of these two relationships

could result in a zero (i.e., no relationship). The "zero" is simply a mathematically

average, but does not correctly reflect the average of the two effects. For

example, in this study the bivariate correlations reported by Liu & Lu (2010) were

averaged, resulting in a single correlation of zero. This does not accurately reflect

the study findings because the negative and positive correlations cancel each

other out mathematically. In other words, inclusion of the Liu & Lu (2010) effect

size could have resulted in an underestimate of the overall effect size estimate.

This methodological issue is important to consider when evaluating the results.

Another methodological issue that poses a potential limitation is the

process used for coding. The author was the sole coder for the study; no other

researchers were involved in the coding of the primary studies. This poses

potential biases, such as confirmatory inferential bias (Quintana & Minami, 2006).

Confirmatory inferential bias refers to the unintentional bias during the coding

process when the coder is privy to the hypothesis/goals of the study (Quintana &

Minami, 2006). Furthermore, the researcher did not code the effect sizes independently of all the variables of interest in this study. It has been recommended that coders remain blind to the effect sizes of the primary studies and the hypothesis of the meta-analysis (Quintana & Minami, 2006).

Removing the barriers to academic achievement and facilitating the academic and personal growth of grade school and high school students is the focus of a myriad of research studies. This systematic review of the literature provides information that can be applied to real-world settings: the school and classroom. Continued examination of the factors that influence the relationship between school belonging and academic achievement will illuminate the obstacles that hinder student performance as well as identify the variables that facilitate student academic growth. It then becomes the responsibility of school administrators and teachers, as well as policy makers, to use these research findings to inform their work in an effort to increase academic achievement for all students.

APPENDIX A

STUDY, SAMPLE, AND OPERATIONALIZATION OF SCHOOL BELONGING

AND ACADEMIC ACHIEVEMENT OF THE STUDIES INCLUDED IN THE

META-ANALYSIS

Study Author(s)	Subgroup within study	Correlation	N	Fisher's Z	Gender	Race/ Ethnicity	Operationalization of School Belonging	Operationalization of Academic Achievement
Adelabu, 2007	Females: r between acad achiev and school belonging (r = .25, p < .01)	0.25	139	0.2554	female	Not Indicated	School membership (feelings of acceptance and belonging within school)	GPA
	Males: r between acad achiev and school belonging not significant (r=.04)	0.04	93	0.0400	male	Not Indicated	School membership (feelings of acceptance and belonging within school)	GPA
Benner, Graham, & Mistry, 2008	school belonging and GPA (r=.17, p<.001)	0.17	1120	0.1717	Not Indicated	Not Indicated	School belonging and fairness	GPA
Buhs, Ladd, & Herald, 2006	peer acceptance/rejection (standardized scores) and achievement (residual scores) (r=.35, p<.01)	0.35	380	0.3654	Not Indicated	Not Indicated	Peer group acceptance/rejection	Achievement test
Chen, 2005	acad engagement and english/chinese grade	0.28	270	0.2877	Not Indicated	Not Indicated	Academic engagement (behavior and feeling toward schooling, classroom conduct, seriousness about school, time expenditure, self-expectations, and self-evaluations).	GPA
Dotterer & Lowe, 2011	psychological engagement and acad achievement, non-struggling students (r=.20, p<.01)	0.2	863	0.2027	Not Indicated	Not Indicated	Psychological engagement (affective and cognitive components: students' feelings, behaviors, and thoughts about their school experiences and emotional link to school)	Standardized test
	psychological engagement and acad achievement, struggling students (r=.20, p<.05)	0.2	151	0.2027	Not Indicated	Not Indicated	Psychological engagement (affective and cognitive components: students' feelings, behaviors, and thoughts about their school experiences and emotional link to school)	Standardized test

Study Author(s)	Subgroup within study	Correlation	N	Fisher's Z	Gender	Race/ Ethnicity	Operationalization of School Belonging	Operationalization of Academic Achievement
Finn & Rock, 1997	effect sizes for engagement measures: male-female, teacher reported bx, ALL, -.56, p<.001, student reported bx, ALL, .62, p<.001. Hispanic-black, teacher reported bx, ALL, .30, p<.001, student reported bx, ALL, .19, p<.001. Completers-dropouts, teacher reported bx, ALL, .76, p<.001, student reported bx, ALL, .68, p<.001.	0.332	1803	0.3447	Not Indicated	Not Indicated	Engagement (student's basic compliance or noncompliance with the requirements of school and the classroom and were based on teachers' and students' responses, respectively. And students' self-reports of ,in-school and out-of-school initiative taking.)	Standardized test
Flook, Repetti, & Ullman, 2005	4th grade, lack of peer acceptance and acad performance (r= -.47, p<.01, n=230)	0.47	230	0.5101	Not Indicated	Not Indicated	Peer group acceptance/rejection	GPA
	5th grade, lack of peer acceptance and acad performance (r= -.49, p<.01, n=203)	0.49	203	0.5361	Not Indicated	Not Indicated	Peer group acceptance/rejection	GPA
	6th grade, lack of peer acceptance and acad performance (r= -.29, p<.01, n=150)	0.29	150	0.2986	Not Indicated	Not Indicated	Peer group acceptance/rejection	GPA
Furrer & Skinner, 2003	relatedness aggregated and acad performance (r=.25, p<.01)	0.25	641	0.2554	Not Indicated	Not Indicated	Relatedness (generalized expectations about the nature of the self in relationships)	GPA
Goodenow, 1993	class belonging and support scale (CBSS) and english grade (r=.430, p<.001)	0.43	353	0.4599	Not Indicated	Not Indicated	Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	Teacher-reported prospective grade and effort ratings

Study Author(s)	Subgroup within study	Correlation	N	Fisher's Z	Gender	Race/ Ethnicity	Operationalization of School Belonging	Operationalization of Academic Achievement
Ladd & Dinella, 2009	liking-avoidance and achievement first/second/third grade	0.307	383	0.3169	Not Indicated	Not Indicated	School liking/avoidance (emotional or psychological form of school engagement: degree to which children exhibit a receptiveness toward school)	Standardized test
Ladd, Birch, & Buhs, 1999	classroom participation and achievement (cumulative r-squared=.45, p<.001), (r-squared=.08, p<.001); path model coefficient=.43 "substantial and positive". Sqrt of .08=.28	0.28	200	0.2877	Not Indicated	Not Indicated	Classroom participation (willingness to adhere to the social rules and role expectations, conduct self in a cooperative and responsible manner, autonomous, self-reliant behavior)	Standardized test
Lam et al., 2012	student engagement and acad performance: boys, r=.22, p<.01.	0.22	1666	0.2237	male	Not Indicated	Student engagement (affective, behavioral, and cognitive dimensions)	Teacher ratings
	student engagement and acad performance: girls, r=.25, p<.01	0.25	1725	0.2554	female	Not Indicated	Student engagement (affective, behavioral, and cognitive dimensions)	Teacher ratings
Li & Lerner, 2011	grade 5 emotional engagement and grade 8 grades: r=.09, not significant	0.09	1115	0.0902	Not Indicated	Not Indicated	Emotional engagement (student's emotional reactions to the school, the teacher, and schoolmates)	GPA
	grade 6 emotional engagement and grade 8 grades: r=.19, p<.01 significant	0.19	1598	0.1923	Not Indicated	Not Indicated	Emotional engagement (student's emotional reactions to the school, the teacher, and schoolmates)	GPA
	grade 7 emotional engagement and grade 8 grades: r=.27, p<.01 significant	0.27	1545	0.2769	Not Indicated	Not Indicated	Emotional engagement (student's emotional reactions to the school, the teacher, and schoolmates)	GPA
	grade 8 emotional engagement and grade 8 grades: r=.38, p<.01 significant	0.38	1136	0.4001	Not Indicated	Not Indicated	Emotional engagement (student's emotional reactions to the school, the teacher, and schoolmates)	GPA

Study Author(s)	Subgroup within study	Correlation	N	Fisher's Z	Gender	Race/ Ethnicity	Operationalization of School Belonging	Operationalization of Academic Achievement
Liu & Lu, 2010	sense of school belonging and acad achievement, time 1 (r=.01), time 2 (r=.03), time 3 (r= -.04)	0	567	0.0000	Not Indicated	Not Indicated	Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	School tests
McMahon, Wernsman, & Rose, 2009	Corr btwn school belonging and math and science self-efficacy (r=.02) and language self-efficacy (r=.22, p<.05)	0.12	149	0.1206	Not Indicated	Not Indicated	Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	Academic self-efficacy
Nelson & DeBacker, 2008	belongingness and mastery/performance-approach/perf-avoidance	0.201	253	0.2034	Not Indicated	Not Indicated	Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	Achievement goals
Perry, Liu, & Pabian, 2009	correlations: identification w/school and grades (r=0.29, p<.01)	0.29	285	0.2986	Not Indicated	Not Indicated	School identification (affective aspects of school engagement: feelings of belonging in the school setting and identifying with others in school)	GPA
Roeser, Midgley, & Urdan, 1996	school belonging and gpa	0.34	296	0.3541	Not Indicated	Not Indicated	Relatedness (feelings of belonging)	GPA
Sanchez, Colon, & Esparza, 2005	correlations, females: belonging and gpa (.17), not significant	0.17	71	0.1717	female	Not Indicated	Sense of community (membership, influence, integration and fulfillment of needs, and shared emotional connection)	GPA
	correlations, males: belonging and gpa (.08), not significant	0.08	69	0.0802	male	Not Indicated	Sense of community (membership, influence, integration and fulfillment of needs, and shared emotional connection)	GPA

Study Author(s)	Subgroup within study	Correlation	N	Fisher's Z	Gender	Race/ Ethnicity	Operationalization of School Belonging	Operationalization of Academic Achievement
Sciarra & Seirup, 2008	corr emotional engagement and math achievement (Native Amer, .14)	0.14	112	0.1409	Not Indicated	Native American	Emotional engagement (quality of student-teacher relationships, school safety, relationships with peers, and harmony among different racial groups)	Standardized test
	corr emotional engagement and math achievement Asian (.04)	0.04	483	0.0400	Not Indicated	Asian	Emotional engagement (quality of student-teacher relationships, school safety, relationships with peers, and harmony among different racial groups)	Standardized test
	corr emotional engagement and math achievement Black (.08, p<=.01)	0.08	1548	0.0802	Not Indicated	Black	Emotional engagement (quality of student-teacher relationships, school safety, relationships with peers, and harmony among different racial groups)	Standardized test
	corr emotional engagement and math achievement Latino (.16, p<.01)	0.16	1679	0.1614	Not Indicated	Latino	Emotional engagement (quality of student-teacher relationships, school safety, relationships with peers, and harmony among different racial groups)	Standardized test
	corr emotional engagement and math achievement White (.17, p<=.01)	0.17	7551	0.1717	Not Indicated	White	Emotional engagement (quality of student-teacher relationships, school safety, relationships with peers, and harmony among different racial groups)	Standardized test
	Corr 0.35, p<0.01 for African-American sample. In African-American sample, only significant variable was school belonging (b = 0.392). The model explained about 14% variance in the grades.	0.35	163	0.3654	Not Indicated	Black	Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	GPA

Study Author(s)	Subgroup within study	Correlation	N	Fisher's Z	Gender	Race/ Ethnicity	Operationalization of School Belonging	Operationalization of Academic Achievement
Singh & Chang, 2010	Corr 0.21, p<0.01 for Caucasian-American sample	0.21	210	0.2132	Not Indicated	White	Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	GPA
	Corr 0.35, p<0.01 for African-American sample. In African-American sample, only significant variable was school belonging (b = 0.392). The model explained about 14% variance in the grades.	0.35	163	0.3654	Not Indicated	Black	Sense of school belonging (sense of being accepted, valued, included, and encouraged by teachers and peers in school settings)	GPA
Singh, Granville, & Dika, 2002	grade and time spent on hmwk	0.117	3227	0.1179	Not Indicated	Not Indicated	Student engagement (doing homework, coming prepared for classes, regular attendance, not skipping classes)	GPA and Standardized test
Sirin & Rogers-Sirin, 2004	acad performance and school engagement (r=.22, p<.001). Regression model predicting acad performance, school engagement beta=.136, p<.05.	0.22	339	0.2237	Not Indicated	Not Indicated	School engagement	GPA
Sirin & Rogers-Sirin, 2005	acad performance and school identification (r=.16, p<.001). Predicting acad performacy by school identification (beta=.04)	0.16	499	0.1614	Not Indicated	Not Indicated	School identification (affective aspects of school engagement: feelings of belonging in the school setting and identifying with others in school)	GPA
Van Ryzin, 2011	teacher support and reading/math	0.005	423	0.0050	Not Indicated	Not Indicated	Student perceptions of support from teachers and peers	Standardized test
Wang & Eccles, 2011	School belonging and GPA: grade 7=.08, grade 9=.12, grade 11=.12, all coefficients were p<.01	0.107	1148	0.1071	Not Indicated	Not Indicated	Student engagement (affective, behavioral, and cognitive dimensions)	GPA
Wang & Holcombe, 2010	school identification and gpa (beta=.32, p<.01) (r=.23, p<.01)	0.23	1046	0.2342	Not Indicated	Not Indicated	School identification (affective aspects of school engagement: feelings of belonging in the school setting and identifying with others in school)	GPA

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VITA

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While at Loyola, Moallem worked as a graduate assistant on the Chicagoland Partnerships for English Language Learners (CPELL) team. She was also a member of Dr. Elizabeth Vera's research team, investigating subjective well-being among urban youth.

Currently, Moallem is an Adjunct Assistant Professor of Psychology at the College of Staten Island in Staten Island, New York. She lives in New York City.