e-Kafkas Journal of Educational Research e-KAJER Research Article

The Effect of a Sense of School Belonging on Academic Achievement: A Meta-Analytical Review

Fatma Uslu Gülşen[1]

To cite this article:
Gülşen Uslu, F. (2024). The effect of a sense of school belonging on academic achievement: A meta-analytical review. *e-Kafkas Journal of Educational Research*, *11*, 673-687. doi:10.30900/kafkasegt.1359812

Research article **Received:**13.09.2023 **Accepted:**16.10.2024

Abstract

The concept of a sense of school belonging has gained increasing attention in the educational community due to its numerous developmental and educational advantages. Nevertheless, research on a sense of school belonging has been scattered and has missed certain clarity for the terminology ambiguity. Therefore, it is necessary to conduct a meta-analysis to eliminate the ambiguity regarding the terminology of 'a sense of school belonging' and to determine the relationship between a sense of school belonging and academic achievement. The aim of this study is to determine the effect of a sense of school belonging on academic achievement and to explore the factors that may moderate this relationship. The publication year and the measurement tool are determined as moderator variables for this study. A pool of 6,891 studies was created, including titles containing the terms 'a sense of school belonging' and 'academic achievement'. Twenty-two studies that met the inclusion criteria were selected for the analysis. The findings indicate a statistically significant, albeit small, effect of a sense of school belonging on academic achievement. Notably, the effect of a sense of school belonging varied across publication years and the effect size gradually decreased over time. Furthermore, the analysis found no statistically significant differences among the measurement tools. This finding suggests that the effect of a sense of school belonging on academic achievement remains consistent across different measurement tools. This is significant as it implies researchers can use various measurement tools to study this relationship without worrying about bias or unreliability.

Keywords: academic achievement, a sense of school belonging, meta-analysis.

[1] Corresponding Author, fatmauslu@mersin.edu.tr, mersin university

Introduction

There has been a growing focus on educational research concerning the exploration of social and environmental factors and their impact on student academic performance. As one of the important factors, a sense of school belonging contributes to higher levels of academic achievement and protects students from dropping out (Anderman, 2002). Goodenow (1993) defines a sense of school belonging as the feeling that a student develops that he or she is personally accepted and supported by others in the school. Goodenow (1993) also states that this feeling is gained as a result of mutual social relations between the students and their friends and teachers. On the other hand, Osterman (2000) views a sense of belonging as a crucial aspect in understanding students' behavior and performance, pointing out that students who share common values and have high expectations towards the school will also have high academic expectations. Ma (2003) emphasizes that students who feel a sense of school belonging will have high academic motivation to be successful. Students who are accepted, respected, and supported at school by other students may feel connected to their school and may perform better. In other cases, students' performance and school attendance might decline as a result of exclusion from the classroom and alienation (Osterman, 2000).

A sense of school belonging has been broadly investigated in the current literature, utilizing differing terms. These include such things as school connectedness (Prelow et al., 2016; Frydenberg et al., 2009); sense of community (Sanchez et al., 2015); school bonding (Dotterer & Wehrspann, 2016); school climate (Wilkinson-Lee et al., 2011); student engagement (Perry et al., 2009; Wang & Holcombe, 2010); school relatedness (Deci, 1992); and school identification (Fall & Roberts, 2012). Although it is addressed using different terminology, a sense of school belonging is viewed as one of the significant factors associated with students' positive experiences of school. Within the conceptual limits of this study, it is critically important to note that the terms and definitions used herein are regarded as identical and relate to a single underlying concept, as stated by Goodenow (1993).

Numerous studies have provided evidence demonstrating that a sense of belonging, which refers to an individual's subjective perception of being welcomed and supported by fellow members of the educational environment, plays a vital role in academic achievement. According to Goodenow (1993) and Pittman and Richmond (2008), there is a positive relationship between a sense of school belonging and multiple outcomes for students. A number of these outcomes is listed as follows: commitment to the school; involvement in school activities (Goodenow, 1993; Perry et al., 2009); educational expectations (Smerdon, 2002); a sense of well-being (Jose et al., 2012); and academic performance (Li et al., 2020; Lam et al., 2015).

A sense of belonging can be driven by the need to connect with others and develop a common identity. Ryan and Deci (2000) identify three basic psychological needs; the need for autonomy, relatedness, and competence in the self-determination theory in which a sense of belonging is included under the need for relatedness. In line with the concept of the self-determination theory, Korpershoek (2016) asserts that students have an innate drive to establish and maintain meaningful relationships with their peers and teachers and that they also have a psychological need to establish bonds to the school as an institution. To foster a sense of school belonging, school settings should fulfill students' needs for social bonds and interpersonal relationships to stimulate motivation, participation, and learning (Osterman, 2000). Ryan and Deci (2000) state that a poor school setting including bullying, social exclusion, or peer rejection can undermine a sense of school belonging. Therefore, students' sense of school belonging can be regarded as a vital factor in determining their academic performance and overall well-being. Research has shown that students with a sense of belonging are more engaged in school activities (Perry et al., 2009; Wang & Holcombe, 2010), maintain regular attendance (Cemalcılar, 2010; Warne et al.,2020), and build deep connections with their teachers and peers (Booker, 2021; Booker, 2023). Consequently, this can lead to an increase in academic performance.

Purpose of the Study

A significant number of studies in the literature have examined the correlation between a sense of school belonging and academic achievement (Boston & Warren, 2017; Dotterer & Wehrspann, 2016; Okilwa, 2016; Lam et al., 2015; Li, et al., 2020). The present body of literature provides a wide range of results in regard to the direct correlation between the variables. Fall and Robert (2012) identified a negative

correlation between a sense of school belonging and academic achievement, whereas Okilwa (2016) and Lam et al. (2015) demonstrated a very weak correlation between the two variables. Additionally, certain studies report the weak relationship between the variables (Boston & Warren, 2017; Dotterer & Wehrspann, 2016; Rostosky et al., 2003). The main reason behind the inconsistent findings may be attributed to methodological concerns, such as variations in the definition of a sense of school belonging and disparities in the assessment of academic achievement (Booker, 2004). The different terms used to describe the notion of belonging may result in overlapping dimensions across studies. Therefore, conducting a meta-analysis is crucial in gaining a deeper insight into the effects of school belonging on academic achievement with the hypothesis that a sense of school belonging has a positive effect on students' academic achievement (H1)**.**

When conducting a meta-analysis identifying moderator variables may help explain differences in the results or correlations between studies. The present study employs the publication year and measurement tool as moderator variables. Including these moderator variables aims to produce a more detailed and refined comprehension of the phenomenon and offers guidance for future research in this field.

The publication year is an important moderator variable because it reflects research theories and technological changes over time. Avvisati (2019) asserts that a sense of school belonging was weakened from 2003 to 2015 in the Programme for International Student Assessment (PISA) in the focus report. According to this report the percentage of students who indicated they felt like outsiders at school increased by ten percentage points, from 7% to 17%, over those twelve years. This trend appears to accelerate after 2012, which is consistent with the massive increase in mobile internet services as students find new opportunities in online networks, but this time spent online may also cut into offline interactions with peers (Avvisati, 2019). In order to support the aforementioned pattern, further evidence is required. Therefore, the publication year has been determined as a moderator variable for this study. It analyzes the studies published between 2000 and 2020. Before 2000, there was only a little correlational research on a sense of school belonging. However, there has been a substantial increase in the number of studies since then, and that is why the search for relevant studies began in the year 2000. In the context of these statements, this study has tested whether the year of publication moderates the positive effect of a sense of school belonging on students' academic achievement (H2).

Another important moderator variable is the measurement tool which can significantly impact the study's findings. Different measurement tools might assess distinct parts of a construct, or they may have varying levels of reliability or validity. Meta-analysis allows for the determination of how various assessment procedures can affect the empirical results. This is particularly relevant for a sense of school belonging, as no widely accepted measurement tool accurately reflects its conceptual definition (Booker, 2004). While a number of studies measure a sense of school belonging using an engagement questionnaire (Mo & Singh,2008; Wang & Holcome, 2010) or a classroom climate scale (Benner et al., 2008; Wilkenson-Lee et al., 2011), others measure it using scales aimed at assessing adolescent health (Dotterer & Wehrspann, 2016; Wang & Eccless, 2012). Many studies have used the correlation coefficient *(r),* allowing for a standardized metric for comparing results among various measurement tools. Controlling for measurement tools helps to compare them in terms of the constructs. As a result, the hypothesis that the measurement tool used in the study moderates the positive effect of a sense of school related to students' academic achievement has been tested in this study (H3).

Method

Study Design

The meta-analysis aims to summarize and interpret the data from different independent studies to produce a statistical application. It involves combining the results of other studies on the same topic and reviewing the criticisms (Jak, 2015). It is one of the research syntheses defined by Borenstein et al. (2009) as a combination of the statistical results from quantitative studies. Ethics committee approval is not required as the research data is based on the literature.

Review Strategy and Inclusion/Exclusion Criteria

This study focuses on research published in peer-reviewed publications in English between January 2000 and December 2022. The selection of studies published from January 2000 onwards is determined because the studies conducted after this year are more likely to have employed rigorous methodological standards, enhancing the reliability and validity of the results. Over the past two decades, the constructs of a sense of school belonging and academic achievement have seen more standardized and consistent measurement approaches. This uniformity helps in comparing and synthesizing data across different studies, thereby providing more robust meta-analytic conclusions. ERIC, ScienceDirect, and EBSCO are among the online databases searched. For the literature review process, a combination of terms isused: (school or education) and (belonging or connectedness or identification with school or school membership or relatedness) and (academic achievement or grade point average).

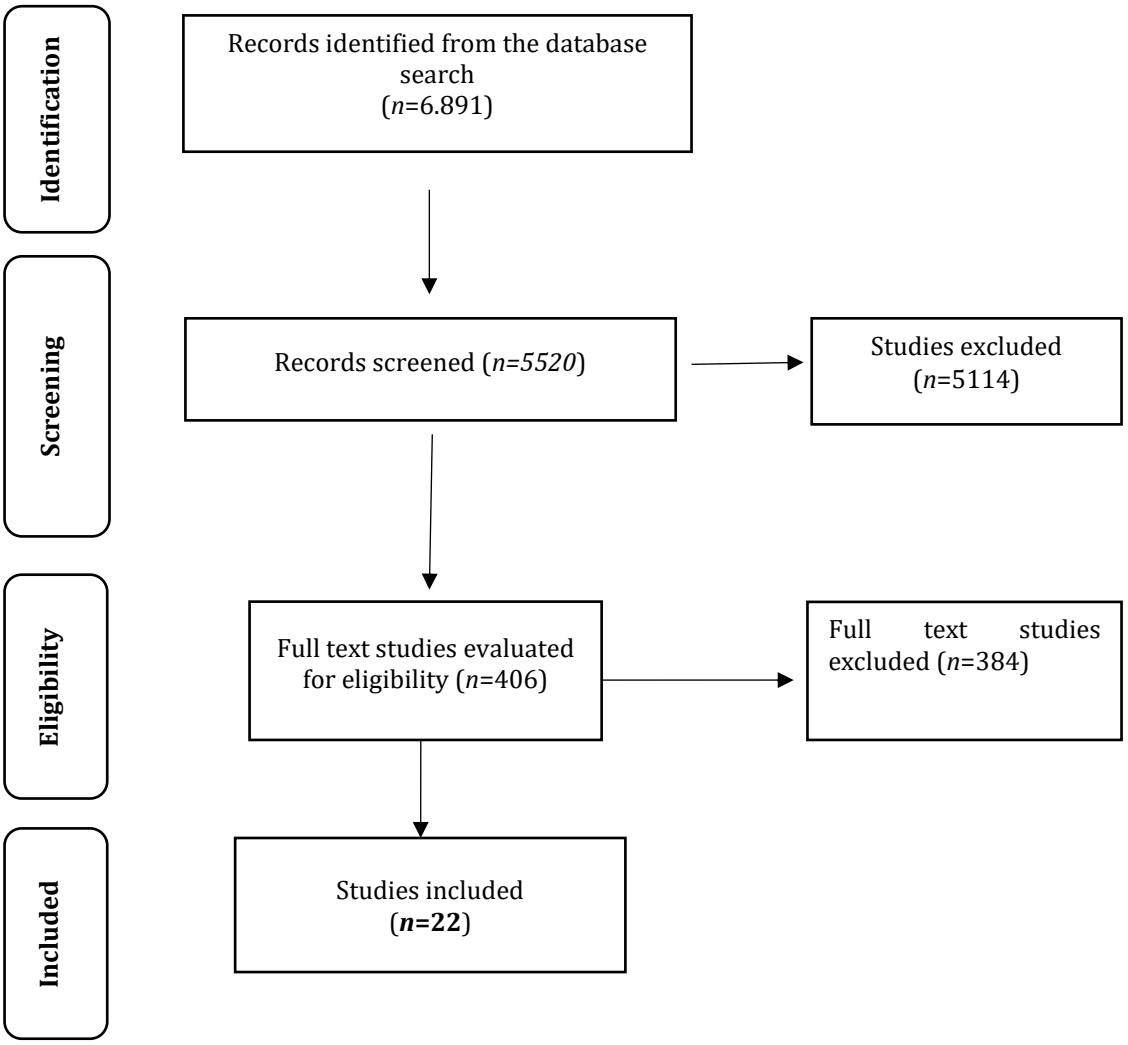

Figure 1. The PRISMA Flow Chart (Moher et al., 2009).

This study includes only studies published in peer-reviewed journals between January 2000 and December 2022 in the English or Turkish language. Regarding the study design, only quantitative research that reported a correlation coefficient is included. The focus of the included studies is primarily on examining the relationship between a sense of school belonging and overall academic achievement.

Studies that focus on topics such as engagement, adjustment, and acceptance are not included, nor are studies that report success for a single course or academic motivation. The aim is to keep the analysis focused on a specific set of criteria. Qualitative studies are excluded from this meta-analysis. While qualitative research provides deep insight into the contexts and perceptions of a sense of school belonging, this study focuses solely on quantitative studies that report correlation coefficients, allowing for a statistical synthesis of data and more definitive conclusions regarding the strength and nature of

the relationship between a sense of school belonging and academic achievement. Studies solely aimed at measuring perceptions of a sense of school belonging, and studies that are not suitable for meta-analysis evaluation, in other words, those lacking appropriate statistical data or where sufficient statistical analysis has not been conducted, have not been included. A PRISMA flow chart for the screening process is presented in Figure 1.

In order to discover the studies for meta-analysis, several methodologies were employed. First, a pool of 6,891 studies was generated which included titles containing the terms 'a sense of school belonging' and 'academic achievement'. Of these, 5,520 records underwent initial screening where duplicates and clearly irrelevant studies (based on their titles and abstracts) were removed. A total of 5,114 studies were excluded at this stage for studies not published within the specified period (January 2000-December 2022), articles not in English or Turkish, qualitative studies or quantitative studies that did not include sufficient statistical data for a robust meta-analysis, and studies measuring only perceptions of school belonging without reporting quantitative results on academic achievement. The remaining 406 full-text studies were evaluated more thoroughly. Exclusion at this stage was due to the study failing to report correlation coefficients or the focus of the studies on irrelevant topics, such as student engagement, adjustment, or acceptance, which did not directly assess the relationship between a sense of school belonging and academic achievement. Out of the 406 studies assessed, 384 were excluded for additional specific reasons, such as studies reporting success for only a single course or focusing solely on academic motivation, After this process, twenty-two studies met all the criteria for inclusion in the meta-analysis, focusing directly on the correlation between a sense of school belonging and academic achievement. An overview of the studies included in the analysis is presented in Table 1.

Table 1.
An Overview of the Studies Included in the Meta-Analysis

No	**Study**	**Sample**	**n**	**Operational Definition**	**r**	**Measurement Tool**
1	Adelabu (2007)	High school students	232	Sense of school belonging	0.25	The Psychological Sense of School Membership Scale (Goodenow, 1993)
2	Benner, Graham and Mistry (2008)	Middle school students	1.120	Sense of school belonging	0.17	The School Interracial Climate Scale (Green, Adams, & Turner, 1988)
3	McMahon, Wernsman and Rose (2009)	Primary school students	149	Sense of school belonging	0.12	The Psychological Sense of School Membership Scale (Goodenow, 1993)
4	Perry, Liu and Pabian (2010)	Middle school students	285	School identification	0.29	The School Engagement Questionnaire (Dornbusch & Steinberg, 1990)
5	Sanchez, Colon and Esparza (2005)	High school students	140	Sense of community	0.12	The Psychological Sense of School Membership Scale (Goodenow, 1993)
6	Singh, Chang and Dika (2007)	High school students	373	Sense of school belonging	0.28	The Psychological Sense of School Membership Scale (Goodenow, 1993)
7	Wang and Holcombe (2010)	Middle school student	1.046	School identification	0.23	The School Engagement Index (Eccles et al., 1993).
8	Bonny et al. (2000)	High school students	1.959	School connectedness	0.31	National Longitudinal Study of Adolescent Health/The school connectedness score (SCS)
9	Kaminski et al. (2011)	High school students	4.131	School connectedness	0.15	The Centers for Disease Control and Prevention's Student Health and Safety Survey
10	Mo and Singh (2008)	Middle school student	1.971	Sense of school belonging	0.20	Emotional Engagement/Belonging (Items derived from various existing scales)

Table 1. continuing

No	Study	Sample	n	Operational Definition	r	Measurement Tool
11	Rostosky et al. (2003)	High school students	1.725	Sense of school belonging	0.29	The Psychological Sense of School Membership Scale (Goodenow, 1993)
12	Wilkinson and Lee (2011)	High school students	4.198	School connectedness	0.19	CDC Classroom Climate Scale (Dahlbert et al. 2005)
13	Prelow, Bowman and Weaver (2007)	Middle school students	206	School connectedness	0.13	The Perceived School Connectedness National Longitudinal Study on Adolescent Health
14	Liu and Lu (2011)	High school students	567	Sense of school belonging	0.02	The Psychological Sense of School Membership Scale (Goodenow, 1993)
15	Wang and Eccles (2012)	Middle school students	1.148	Sense of school belonging	0.10	The Maryland Adolescent Development in Context Study
16	Kuperminc, Darnell and Alvarez Jimenez (2008)	High school students	324	Sense of school belonging	0.27	The Psychological Sense of School Membership Scale (Goodenow, 1993)
17	Fall and Roberts (2012)	High school students	14.781	School identification	-0.01	Identification with School (Fall & Roberts 2012)
18	Boston and Warren (2017)	High school students	105	Sense of school belonging	0.22	California Healthy Kids Survey; School Connectedness (WestEd, 2008)
19	Dotterer and Wehrspann (2016)	Middle school students	108	School bonding	0.22	The National Longitudinal Study of Adolescent Health (Add Health; Udry, 1998)
20	Okilwa (2016)	Primary school students	12.026	Sense of school belonging	0.16	School belonging (Items derived from various existing scales)
21	Lam et al. (2015)	High school students	406	Sense of school belonging	0.17	The Psychological Sense of School Membership Scale (Goodenow, 1993)
22	Li, Chen and Li (2020)	High school students	813	Sense of school belonging	-0.13	The Psychological Sense of School Membership Scale (Goodenow, 1993)

The descriptive statistics encompassing the twenty-two studies are detailed in Table 2. This table describes the characteristics of the studies based on the moderator variables.

Table 2.
Characteristics of the Studies Included in the Meta-Analysis

Variables	1	2	3	Total
Year of Publication	2000-2010	2011-2020		
n	12	10		22
%	54	46		100
Measurement Tool	The Psychological Sense of School Membership Scale	Adolescent Health	Others (engagement/climate/school bonding/connectedness/identification)	
n	9	6	7	22
%	41	27	32	100

As shown in Table 2, 54% of the research studies included in the meta-analysis were conducted between 2000 and 2010, while the remaining 46% were conducted between 2011 and 2020. Regarding the measurement tools, it was discovered that the Psychological Sense of School Belonging Scale was used in nine of the studies, the Adolescent Health Scale developed in the field of adolescent health was used in six of the studies, and the remaining seven studies assessed school belonging using definitions such as engagement/climate/school bonding/connectedness/and identification.

Coding Process

Before statistical analysis began, a coding form was created to ensure comprehensive data capture. This form was designed to encompass all the components of the studies and to establish a specific coding system tailored to capture the unique characteristics of each study. The following categories were included in the study coding form: (i) research references; (ii) sample details; (iii) data collection instrument; and (iv) quantitative values.

Statistical Process

A Pearson's correlation coefficient (r) was used to calculate the effect size. The estimated r value was evaluated by converting it to the z-score identified in the z-table (Hedges & Olkin, 1985). When multiple correlation values were available for the same structural categories, this study utilized the conservative estimate if the correlations were dependent (Borenstein et al., 2009). A random effects model was considered appropriate for this research because it accounts for variability that exceeds subject-level sampling error (Lipsey & Wilson, 2001). This study assumed that the variability above the sampling error at the subject level may be attributable to systematic differences that could be identified.

Moderator Variables

The moderator variables of this study were the publication year and the measurement tool, both of which were expected to have an average effect on a sense of school belonging and academic achievement. The significance of the difference between the moderators was determined using the Qb statistic. The Qb statistic is commonly employed in meta-analyses to test for the presence of heterogeneity between groups, and a significant result indicates that the effects observed in the groups are significantly different from each other (Hedges & Olkin, 1985).

Publication Bias

The relationship between the standard error and the effect size was visualized using a funnel plot, and the level of bias was calculated using the Duval and Tweedie's trim-and-fill test. This test may help identify and adjust for potential bias in the meta-analysis results that may arise from any publication bias in the included studies (Duval & Tweedie, 2000). Figure 2 shows evidence of the publication bias effect in the research studies included in the meta-analysis.

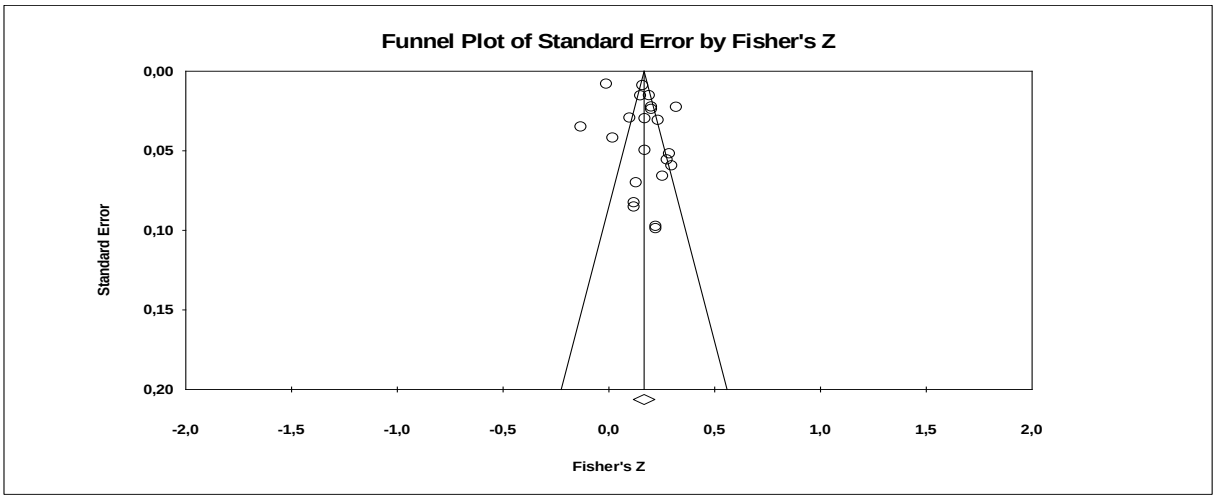

Figure 2. Funnel Plot

If a publication bias is present, a significant asymmetry in the funnel plot would be expected (Duval and Tweedie, 2000). However, in this research, the funnel plot displays symmetrically on both sides of the center line, suggesting a non-disparity. The trim-and-fill test results for publication bias are also shown in Table 3.

Table 3.
Duval and Tweedie's trim and fill test results.

	Excluded Study	Point Estimation	CI (Confidence Interval)		Q
			Lower Limit	Upper Limit	
Observed Value		0.11666	0.10768	0.12564	506.30161
Adjusted Value	0	0.11666	0.10768	0.12564	506.30161

There are no differences between the observed and adjusted values created to mitigate the effects of publication bias as seen in Table 2. This indicates that the meta-analysis results are not significantly affected by publication bias and the estimated effect size is likely an accurate representation of the actual effect size.

Findings

Graph 1 contains a forest plot that provides a visual summary of the results from individual studies included in the analysis. This plot systematically displays each study's effect size alongside its confidence intervals and the weight assigned of each study within the meta-analysis.

Model	Study name	Statistics for each study					Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	-1,00 -0,50 0,00 0,50 1,00
	Adelabu	0,250	0,125	0,367	3,865	0,000	
	Benner,	0,170	0,113	0,226	5,737	0,000	
	Bonny et al.	0,310	0,269	0,350	14,089	0,000	
	Kaminski et	0,150	0,120	0,180	9,711	0,000	
	McMahon,	0,120	-0,042	0,275	1,457	0,145	
	Perry, Liu, &	0,290	0,180	0,393	5,014	0,000	
	Sanchez,	0,120	-0,047	0,280	1,411	0,158	
	Rostosky et	0,200	0,154	0,245	8,413	0,000	
	Singh &	0,280	0,184	0,371	5,534	0,000	
	Mo& Singh	0,200	0,157	0,242	8,994	0,000	
	Wang &	0,230	0,172	0,287	7,563	0,000	
	Wilkinson&L	0,190	0,161	0,219	12,457	0,000	
	Prelow,	0,130	-0,007	0,262	1,863	0,062	
	Liu d Lu	0,020	-0,062	0,102	0,475	0,635	
	Wang and	0,100	0,042	0,157	3,395	0,001	
	Kuperminc	0,270	0,166	0,368	4,960	0,000	
	Fall &	-0,010	-0,026	0,006	-1,214	0,225	
	Boston &	0,220	0,030	0,395	2,259	0,024	
	Dotterer &	0,220	0,032	0,393	2,292	0,022	
	Okilwa	0,160	0,143	0,177	17,696	0,000	
	Lam et al.	0,170	0,074	0,263	3,446	0,001	
	Li, Chen&Li	-0,130	-0,197	-0,062	-3,721	0,000	
Fixed		0,116	0,107	0,125	25,472	0,000	
Random		0,165	0,115	0,214	6,412	0,000	

Graph 1. Forest Plot

Upon examining the forest plot derived to display the confidence intervals and estimated results for each study included in the meta-analysis, it can be observed that the studies by Liu and Lu (2011), Li, Chen and Li (2020), and Fall and Roberts (2012) represent the extremes in terms of effect sizes.

The findings, which state a positive relationship between a sense of school belonging and academic achievement, supported the H1 hypothesis. The effect size of a sense of school belonging on academic achievement was calculated to be 0.16, indicating that a sense of school belonging has a small effect on academic achievement (see Cohen, 2013). The findings are shown in Table 4.

Table 4.

The correlation between a sense of school belonging and academic achievement: Meta-analysis result

Variable	k	N	r	CI (Confidence Interval)		Q	Qb
				Lower Limit	Upper Limit		
Academic Achievement	22	47.993	.16*	.11	.21	506.302*	
Moderator [Year of Publication]							7.38
2000-2010	10	13.455	.22*	.16	.28		
2011-2020	12	34.538	.09*	.02	.16		
Moderator [Measurement Tool]							
The Psychological Sense of School Membership Scale	9	4.731	.17*	.09	.25		0.55
Adolescent Health	6	7.451	.19*	.08	.29		
Others (engagement/climate/school bonding/connectedness/identification)	7	35.831	.14*	.05	.22		

*p<.001

The H2 was supported by the findings, which suggested that the year of publication would play a moderating role in the effect of a sense of school belonging on academic achievement. The results of the moderator analysis showed a statistically significant difference between the effect sizes of publication years (Qb=7.38, p <.05). The effect size for the studies included in the meta-analysis from 2000 to 2010 [r =0.22] and 2011 to 2020 [r =0.09] was found to be small.

The findings did not support H3 where the measurement tool would play a moderating role in the effect of a sense of school belonging on academic achievement. The difference between the measurement tools was not statistically significant (Qb=0.55, p >.05). The effect size for the measurement tools, 'Psychological sense of belonging to the school' [r =0.17], 'Adolescent health' [r =0.19], 'Other-engagement/climate/school attachment/connectedness/and identification' [r =0.14], was found to be small.

Discussion and Conclusion

The findings of this study support the hypothesis proposing a positive relationship between a sense of school belonging and academic achievement. The results reveal a statistically significant yet small effect of a sense of belonging on academic achievement. It is, however, important to note that findings with relatively low levels of explained variance should not necessarily be viewed as negative outcomes (Cohen, 1977). Even effects accounting for as small as 1.0 percent of the variance explained could hold significant theoretical or practical importance (Cohen, 2013). The positive relationship between a sense of school belonging and academic achievement indicates that students who experience a strong sense of belonging and acceptance in their school environment are more likely to perform well in school. This relationship has been identified in several studies (Booker, 2004; Rostosky et al., 2003, Korpershoek et al., 2020) and proposes that a sense of belonging may help students feel more motivated to acquire knowledge, become more involved in academic tasks, and be more willing to ask for help when needed.

The results from recent meta-analyses underscore the significance of a sense of school belonging on various academic outcomes. The correlation between a sense of school belonging and academic achievement, as reported by Moallem (2013) with a coefficient of r = .24. This finding suggests that students who feel a greater sense of belonging at school are likely to achieve at higher levels academically compared to their peers who do not feel as connected to their school environment. The relationships between a sense of school belonging with both academic achievement and dropout rates were found to be small, showing correlation coefficients of r = .18 and r = -0.16, respectively (Korpershoek et al., 2020). This suggests that students who feel more belonged to their school are somewhat less likely to drop out. Furthermore, the correlation between academic motivation and a sense

of school belonging (Allen et al., 2018) at r = .31, underscores the motivational aspect of feeling connected to one's school. This implies that a sense of school belonging not only influences academic outcomes through direct involvement in school activities, but also by fostering an internal drive towards academic pursuits (Allen et al., 2018). These findings collectively underscore the positive albeit small effect of a sense of school belonging on students' academic achievement. The finding of this study aligns with the broader literature, suggesting that enhancing students' sense of school belonging may lead to modest improvements in academic achievement. The difference in magnitudes could be attributed to varying methodologies or demographic factors across studies but consistently points toward a positive effect of a sense of school belonging on academic achievement. According to Fong Lam et al. (2015), a sense of belonging may be one of the primary determinants of students' academic emotions, impacting academic engagement and achievement. On the other hand, a lack of school belonging might be associated with poorer academic achievement and life satisfaction. Students who feel like outsiders at school are almost three times more likely to be unsatisfied with their lives (Avvisati, 2019). Learning among peers who feel the same sense of belonging may encourage positive learning attitudes, leading to improved academic achievement. The subjective experience of being accepted and supported by other members of the school community fosters a sense of belonging in school, motivating students to engage in more academic activities and achieving higher levels of academic achievement (Fong Lam et al., 2015).

In addition, it is essential to acknowledge that a number of studies have reported contradictory findings from the results of this study. For instance, Fall and Robert (2012) identified a negative correlation between school belonging and academic achievement, while Okilwa (2016) and Lam et al. (2015) demonstrated a weak correlation between the two variables. Furthermore, additional studies, such as those conducted by Boston and Warren (2017), Dotterer and Wehrspann (2016), and Rostosky et al. (2003), also reported a weak relationship between school belonging and academic achievement. Therefore, it is important to recognize the variability in findings across different studies and to consider potential factors contributing to these discrepancies for a more comprehensive understanding.

Furthermore, according to the self-determination theory (Ryan & Deci, 2000), when three psychological needs are met, individuals can become self-motivated and initiate their behavior without any external influence. A stronger sense of school belonging may help meet students' needs for competence and may foster a positive evaluation of their own learning capacities, both of which may contribute to student academic achievement. To summerize, students who feel more a part of their school community may experience better psychological well-being and a more positive outlook on school life, which will foster their academic achievement. Therefore, it is critical for schools to develop a sense of belonging among their students to support academic achievement.

The results also demonstrate that the effect of a sense of school belonging on academic achievement varies depending upon the year of publication. However, the differences between the years (2000 to 2010 0.13; 2011 to 2020 0.09) were relatively small, and the effect size gradually decreased over the years. With this in mind, it can be asserted that schools have evolved over time (Van Houtte & Maele, 2012), which can impact the relationship between these variables. There may be a possible correlation between historical educational institutions emphasizing the development of a cohesive community and fostering a sense of belonging among students, potentially resulting in improved levels of academic achievement. As schools underwent changes in policies, curriculum, and teaching approaches, the emphasis on fostering a cohesive community and promoting a sense of belonging among students may have fluctuated. This may have caused a decrease in the effect size of a sense of school belonging on academic achievement over the years. Additionally, societal shifts, technological advancements, and cultural influences could have also played a role in shaping students' perceptions of belonging within the school environment. Therefore, a more thorough analysis or theorizing on these factors could provide a deeper understanding of the decreased effect size.

According to Milner IV (2012), there has been a potential trend in schools toward priotizing academic rigor and testing during the last decade. It is possible that the decreasing sense of belonging at school is an indication of a general decrease in offline communities as online social networks become more popular for making friends and expressing one's identity (Avvisati, 2019). While students find new opportunities in online forums, the rapid growth of mobile internet services may also reduce the time

spent offline interacting with others in the school community. This trend could have led to a decreased emphasize on the importance of a sense of belonging compared to academic achievement.

Furthermore, it is essential to note that the research methodologies used to assess a sense of belonging and academic achievement may have undergone changes over time. Therefore, previous studies may have used diverse instruments or surveys to assess these constructs, potentially influencing the documented relationship between the variables. It should be considered that changes in research methodologies over time may have influenced the assessment of both a sense of school belonging and academic achievement. For instance, studies conducted between 2000 and 2010 typically employed correlational research designs with self-report data, focusing on assessing the relationship of a sense of school belonging with a limited number of variables (for example, Adelabu, 2007; McMahon et al., 2009; Prelow et al., 2006). In contrast, more recent studies have utilized cross-sectional or correlational designs to examine more complex models related to a sense of school belonging and academic achievement (for example, Boston and Warren, 2017; Kuperminc et al., 2020; Li and Li, 2020). These differences in methodologies could lead to variations in how the constructs are operationalized and measured, potentially affecting the observed relationship between school belonging and academic achievement.

The results of this study also reveal that there was no statistically significant difference between the moderators of the measurement tool. Therefore, hypothesis 3 was not supported. This finding indicates that the effect of a sense of belonging on academic achievement remains consistent regardless of the measurement tool used. This is a significant result because it implies that researchers can employ various measurement tools to explore the relationship between these variables without the need for concern regarding bias or unreliability.

This finding extends on prior research by highlighting the role of measurement tools as moderators, which could otherwise limit the generalization of results across studies using different measurement tools and assessing academic achievement. It also suggests that it would be helpful for researchers to keep investigating the correlation between these variables by applying various measurement tools, thereby enhancing their understanding of the factors contributing to academic achievement.

Implications and Limitations

The finding that a sense of school belonging positively affects academic achievement confirms the importance of examining the impact of students' experiences on their educational achievements. The findings of this meta-analysis provide statistical evidence for the assertion made by Goodenow (1993) regarding the significance of teachers establishing clear guidelines and expectations related to social interactions within the classroom to foster a sense of belonging among students. This finding illustrates the necessity of considering both objective metrics of academic success and students' personal perceptions within the educational setting, as well as how these perceptions can influence their motivation and academic outcomes.

The results show that the effect size has decreased over time. This finding points out the necessity to conduct continuous research into the potential impact of transforming contexts on the variables that contribute to academic achievement. Furthermore, according to the results of this meta-analysis, the hypothesis that the measurement tool moderates the relationship between the variables is not supported. The significance of this result proves the necessity of cautiously selecting measurement tools that are both valid and reliable in order to evaluate the complex structures of academic achievement and a sense of school belonging. It also encourages researchers to utilize a range of measurement tools to gain a deep insight of these structures. In conclusion, this study, presents a synthesis of what is known in regard to school belonging and academic achievement, while also revealing conceptual and methodological patterns that have remained relatively unexplored.

The implications of this study are significant for educators, school leaders, and counselors, who can focus on strategies to promote a sense of belonging among students. These strategies may involve creating opportunities for peer communication and collaboration, as well as recommendations for inclusive policies and practices. Despite the recent decrease in the association between the variables, the results still point out a positive relationship between the structures. In order to develop a broad

comprehension of the factors that contribute to academic achievement, it is necessary for researchers to remain open to employing varied measurement tools to assess the efficacy of interventions to foster a sense of school belonging. Scholars could next work on developing theories to explain the various moderator effects discovered in this study. Several research questions and early hypotheses have been proposed in the area of contextual moderators. As a result, it is critical to emphasize that this meta-analysis acts as a guide for future studies rather than a definitive conclusion.

It is essential to acknowledge the potential influence of varying school levels, student age groups, and national contexts on the relationship between a sense of school belonging and academic achievement. These factors could serve as significant moderators in understanding how educational environments and developmental stages affect students' sense of school belonging and their academic achievement. By not incorporating these moderators into the analysis, the study may not fully capture the nuanced ways in which the constructs of a sense of school belonging and academic achievement interact across different educational and developmental contexts. Future research should consider these moderators to enhance the generalizability and applicability of the findings. This approach will help in tailoring interventions aimed at improving a sense of school belonging and academic achievement to be more context-specific.

When compared to typical literature reviews, meta-analysis provides an efficient way to combine study data (Hunter & Schmidt, 2004), shifting the emphasis away from individual studies and toward a comprehensive investigation of a particular area of study. However, it is important to highlight that the quality and reporting of original investigations are beyond meta-analyses. The present study also had certain potential limitations because only a relatively small number of studies met the criteria for inclusion and were analyzed, which may have limited the findings' generalizability. In addition, the meta-analysis consisted of only papers published in English, which could lead to a language bias.

Acknowledgment

Ethics statement: In this study, I declare that the rules stated in the 'Higher Education Institutions Scientific Research and Publication Ethics Directive' are complied with and that I have not taken any of the actions based on the 'Actions Against Scientific Research and Publication Ethics'. At the same time, I declare that there is no conflict of interest between the authors, with all the authors contributing to the study, and that all the responsibility belongs to the article authors in the case of any ethical violations.

Author Contributions: The author confirms sole responsibility for the following: conceptualization; methodology; validation; formal analysis; writing; review and editing; supervision; and project administration.

Funding: This research has received no funding.

Institutional Review Board Statement: Ethics committee approval is not required as the research data is based on the literature.

Data Availability Statement: Data generated or analyzed during this study is available from the authors upon request.

References

*Adelabu, D.H. (2007). Time perspective and school membership as correlates to academic achievement among African American adolescents. *Adolescence,* 42 (167), 525-538.

Allen, K., Kern, M. L., Vella-Brodrick, D., Hattie, J., & Waters, L. (2018). What schools need to know about fostering school belonging: A meta-analysis. *Educational Psychology Review*, *30*, 1-34.

Anderman, L. H., & Freeman, T. M. (2004). Students' sense of belonging in school. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement* (pp. 27–63). Elsevier.

Avvisati, F. (2019). Have students' feelings of belonging at school waned over time? *PISA in Focus* (Report No. 69).OECD. https://www.oecd.org/pisa/PISA_in_Focus_100.pdf

*Benner, A.D., Graham, S., & Mistry, R.S. (2008). Discerning direct and mediated effects of ecological structures and processes on adolescents' educational outcomes. *Developmental Psychology,* 44 (3), 840-854.

*Bonny, A. E., Britto, M. T., Klostermann, B. K., Hornung, R. W., & Slap, G. B. (2000). School disconnectedness: Identifying adolescents at risk. *Pediatrics*, *106*(5), 1017-1021.

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. (2009). *Introduction to meta-analysis*. Hoboken, NJ: John Wiley & Sons, Ltd.

*Boston, C., & Warren, S. R. (2017). The Effects of Belonging and Racial Identity on Urban African American High School Students' Achievement. *Journal of Urban Learning, Teaching, and Research*, *13*, 26-33.

Booker, C. K. (2004). Exploring school belonging and academic achievement in African American adolescents. *Curriculum and Teaching Dialogue*, 6, 131–143.

Booker, K. (2021). Rules without relationships lead to rebellion: secondary teachers and school belonging. *School Community Journal*, *31*(1), 65-84.

Booker, K. C. (2023). Praise publicly, correct privately: how secondary teachers cultivate school belonging and classroom community. *Teachers and Teaching*, 1-17.

Cemalcilar, Z. (2010). Schools as socialisation contexts: Understanding the impact of school climate factors on students' sense of school belonging. *Applied Psychology*, *59*(2), 243-272.

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*, Rev. Ed. San Diego: Academic Press.

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic press.

Deci, E. L. (1992). Article commentary: on the nature and functions of motivation theories. *Psychological Science, 3*(3), 167-171.

*Dotterer, A. M., & Wehrspann, E. (2016). Parent involvement and academic outcomes among urban adolescents: examining the role of school engagement. *Educational Psychology*, 36, 812–830.

Duval, S., & Tweedie, R. (2000). Trim and fill: a simple funnel-plot–based method of testing and adjusting for publication bias in meta-analysis. *Biometrics, 56*(2), 455-463.

*Fall, A. M., & Roberts. (2012). High school dropouts: Interactions between social context, self-perceptions, school engagement, and student dropout. *Journal of Adolescence*, 35, 787–798.

Fong Lam, U., Chen, W. W., Zhang, J., & Liang, T. (2015). It feels good to learn where I belong: School belonging, academic emotions, and academic achievement in adolescents. *School Psychology International*, *36*(4), 393-409.

Frydenberg, E., Care, E., Freeman, E., & Chan, E. (2009). Interrelationships between coping, school connectedness and wellbeing. *Australian Journal of Education*, 5, 261–276.

Goodenow, C. (1993). The psychological sense of school membership among adolescents: Scale development and educational correlates. *Psychology in the Schools*, 3, 79–91.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. New York, NY: Academic.

Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and bias in research findings*. Sage.

Jak, S. (2015). *Meta-analytic structural equation modelling* (pp. 1-88). Dordrecht, Neth: Springer.

Jose, P. E., Ryan, N., & Pryor, J. (2012). Does social connectedness promote a greater sense of wellbeing in adolescence over time?. *Journal of Research on Adolescence,* 22, 235–251.

*Kaminski, J. W., Puddy, R. W., Hall, D. M., Cashman, S. Y., Crosby, A. E., & Ortega, L. A. (2010). The relative influence of different domains of social connectedness on self-directed violence in adolescence. *Journal of Youth and Adolescence*, *39*, 460-473.

Korpershoek, H. (2016). Relationships among motivation, commitment, cognitive capacities, and academic achievement in secondary education. *Frontline Learning Research, 4*(3), 28-43.

Korpershoek, E. T. Canrinus, M. Fokkens-Bruinsma & H. de Boer (2020) The relationships between school belonging and students' motivational, social-emotional, behavioral, and academic outcomes in secondary education: a meta-analytic review. *Research Papers in Education,* 35(6), 641-680

*Kuperminc, G. P., Darnell, A. J., & Alvarez-Jimenez, A. (2008). Parent involvement in the academic adjustment of Latino middle and high school youth: Teacher expectations and school belonging as mediators. *Journal of Adolescence*, *31*(4), 469-483.

*Lam, U. F., Chen, -W.-W., Zhang, J., & Liang, T. (2015). It Feels Good to Learn Where I Belong: School Belonging, Academic Emotions, and Academic Achievement in Adolescents. *School Psychology International*, 36, 393–409.

*Li, L., Chen, X., & Li, H. (2020). Bullying victimization, school belonging, academic engagement and achievement in adolescents in rural China: A serial mediation model. *Children and Youth Services Review*, *113*, 1-8.

*Liu, Y., & Lu, Z. (2011). Trajectories of Chinese students' sense of school belonging and academic achievement over the high school transition period. *Learning and Individual Differences*, *21*(2), 187-190.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. SAGE publications, Inc.

Ma, X. (2003). Sense of belonging to school: Can schools make a difference?. *The Journal of Educational Research*, *96*(6), 340-349.

*McMahon, S.D., Wernsman, J., & Rose, D.S. (2009). The relation of classroom environment and school belonging to academic self-efficacy among urban fourth- and fifth-grade students. *The Elementary School Journal*, 109 (3), 267-281.

Milner IV, H. R. (2012). Beyond a test score: Explaining opportunity gaps in educational practice. *Journal of Black Studies*, *43*(6), 693-718.

*Mo, Y., & Singh, K. (2008). Parents' relationships and involvement: Effects on students' school engagement and performance. *RMLE online*, *31*(10), 1-11.

Moallem, I. (2013). *A meta-analysis of school belonging and academic success and persistence.* [Unpublished doctoral dissertation]. Loyola University Chicago.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group*, T. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine*, *151*(4), 264-269.

*Okilwa, N. S. (2016). Exploring School-and Home-Related Protective Factors for Economically Disadvantaged Middle School Students. *Journal of At-Risk Issues*, *19*(1), 34-46.

Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research*, 70, 323–367.

*Perry, J.C., Liu, X., & Pabian, Y. (2010). School engagement as a mediator of academic performance among urban youth: The role of career preparation, parental career support, and teacher support. *The Counseling Psychologist*, 38, 269-295.

Pittman, L. D., & Richmond, A. (2008). University belonging, friendship quality and psychological adjustment during the transition to college. *The Journal of Experimental Education*, 76, 343–361.

*Prelow, H. M., Bowman, M. A., & Weaver, S. R. (2006). Predictors of psychosocial well-being in urban African American and European American youth: the role of ecological factors. *Journal of Youth and Adolescence*, 36, 543–553.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68-72.

*Rostosky, S. S., Owens, G. P., Zimmerman, R. S., & Riggle, E. D. (2003). Associations among sexual attraction status, school belonging, and alcohol and marijuana use in rural high school students. *Journal of Adolescence*, *26*(6), 741-751.

*Sanchez, B., Colon, Y., & Esparza, P. (2005). The role of sense of school belonging and gender in the academic adjustment of Latino adolescents. *Journal of Youth and Adolescence*, 34(6), 619-628.

*Singh, K., Chang, M., & Dika, S. (2010). Ethnicity, self-concept, and school belonging: effects on school engagement. *Educational Research & Policy Practice*, 9, 159-175.

Smerdon, B. (2002). Students' perceptions of membership in their high schools. *Sociological Education,* 75(4): 287–305.

Van Houtte, M., & Van Maele, D. (2012). Students' sense of belonging in technical/vocational schools versus academic schools: the mediating role of faculty trust in students. *Teachers College Record, 114*(7), 1–36.

*Wang, M. T., & Eccles, J. S. (2012). Adolescent behavioral, emotional, and cognitive engagement trajectories in school and their differential relations to educational success. *Journal of Research on Adolescence, 22*(1), 31-39.

*Wang, M, T., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. *American Educational Research Journal*, 47, 633–662.

Warne, M., Svensson, Å., Tirén, L., & Wall, E. (2020). On time: a qualitative study of Swedish students', parents' and teachers' views on school attendance, with a focus on tardiness. *International Journal of Environmental Research and Public Health*, *17*(4), 1430.

*Wilkinson-Lee, A. M., Zhang, Q., Nuno, V. L., & Wilhelm, M. S. (2011). Adolescent emotional distress: The role of family obligations and school connectedness. *Journal of Youth and Adolescence, 40*, 221-230.

*References marked with an asterisk indicate studies included in the meta-analysis