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Advanced Policy Analysis

Promises and Pitfalls of Single-Sex Education

A Study Conducted for the American Institute for Boys and Men

by

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Definition of Key Terms

This section provides definitions of key terms used throughout this report, acknowledging the social construction of these categories and the importance of precise terminology when discussing sex and gender.

Term	Definition
Sex	Refers to a set of biological attributes in humans and animals. It is primarily associated with physical and physiological features including chromosomes, gene expression, hormone levels and function, and reproductive/sexual anatomy. Sex is usually categorized as female or male but there is variation in the biological attributes that comprise sex and how those attributes are expressed. "Assigned" or "designated" sex refers to the sex noted on a birth certificate for that person.
Gender	Refers to the socially constructed roles, behaviors, expressions and identities of girls, women, boys, men, and gender diverse people. It influences how people perceive themselves and each other, how they act and interact, and the distribution of power and resources in society. Gender is usually conceptualized as a binary (girl/woman and boy/man), yet there is considerable diversity in how individuals and groups understand, experience, and express it.
Girl/Woman	Terms typically used to refer to individuals who identify with the female gender, regardless of assigned sex at birth. These terms reflect gender identity rather than biological characteristics.
Boy/Man	Terms typically used to refer to individuals who identify with the male gender, regardless of assigned sex at birth. These terms reflect gender identity rather than biological characteristics.
Transgender	An umbrella term for people whose gender identity and/or gender expression differs from their assigned sex at birth (i.e., the sex listed on their birth certificates). Some groups define the term more broadly (e.g., by including intersex people) while other people define it more narrowly (e.g., nonbinary people who do not consider themselves transgender). Transgender people may or may not choose to alter their bodies hormonally and/or surgically.

Nonbinary	Describes people whose assigned sex is different from their gender identity, but who identify as neither male nor female. Many nonbinary people consider themselves transgender, and this group is often included as a subset of transgender people. However, some nonbinary people do not consider themselves transgender.

Source: Tufts Office of the Vice Provost for Research

Executive Summary

This report examines single-sex education as a potential policy intervention to address academic and social challenges faced by boys, particularly those from low-income backgrounds and communities of color. Through comprehensive literature review and expert interviews, this report investigates whether single-sex schooling represents an effective strategy to improve educational outcomes for boys without disadvantaging girls in the education system.

Key Findings

1. Shifting Landscape in Single-Sex Education: Public single-sex education has expanded significantly since the 2006 Title IX regulatory changes. Public single-sex schools increased from just 2 schools in 1995 to 102 by 2022, with additional thousands of coeducational schools offering single-sex classrooms (Office of Civil Rights Data Collection, 2022). This growth is particularly concentrated in urban and rural areas serving predominantly Black and Latino student populations (83% of students in single-gender public schools, compared to the national average where about 50 percent of students are white) (Mitchell et al., 2017). However, the expansion has plateaued in the late 2010s, with public single-sex schools for boys actually declining by 22% between 2016-2022. Academic and policy discussions about boys' educational achievement gaps have gained recent momentum, but since data is only available through 2022, we cannot yet determine whether these emerging conversations have translated into institutional growth.

2. Evidence Reveals Minimal Impact in Academic Outcomes: After reviewing high-quality research on single-sex education, this report finds little evidence supporting academic advantages for boys. This report focused on studies that properly account for the fact that families and students who enroll in single-sex schools (vs. coeducational schools) may possess characteristics in factors like income, motivation, and values that contribute to their success or failure in school - a research approach recommended by leading scholars in this field:

- **Academic Performance:** The highest-quality research shows almost no difference in mathematics performance between boys in single-sex schools and boys in coeducational settings (with an average effect of just 0.06 where conventions consider 0.2 small) (Pahlke et al., 2014). In reading and writing, some research actually suggests boys might perform worse in single-sex environments compared to coeducational settings (Clavel and Flannery, 2023).
- **School-Level vs. Classroom-Level Effects:** Research consistently shows that when benefits do appear, they come from attending full single-sex schools

rather than single-sex classrooms within coeducational settings. This suggests school-wide environmental factors (i.e., facilities, classroom practices, health supports, and disciplinary policies) may be more influential than classroom gender composition alone.

- **Historical Context:** Academic performance patterns between boys and girls have remained relatively stable for over a century, with girls consistently outperforming boys in academic reports since at least 1914 (Voyer & Voyer, 2014). However, significant shifts in college enrollment ratios began appearing only in the 1990s. This suggests that the current educational disparities likely stem not from new cognitive disadvantages, but from changing social expectations and opportunities that have allowed girls to capitalize on their consistent academic advantages, while boys' educational motivation and engagement have not evolved correspondingly.

3. Developmental Differences Play a Role, But Don't Tell the Whole Story: Research confirms that girls typically reach developmental milestones earlier than boys, but further research reveals a more complex picture. Studies show that boys receive lower "returns" on their maturity compared to girls - meaning that even when boys reach the same level of physical maturity as girls, they don't receive the same academic benefits from that maturity (Røed et al., 2025). Early-maturing Black youth face additional challenges as physical development intersects with racial stereotypes—adults often perceive Black children as older and needing less support than White peers (Goering et al., 2023). These findings suggest that even if educational approaches were perfectly tailored to boys' developmental timeline – as single-sex schooling often claims – other factors affecting motivation and engagement would still need to be addressed, with particular attention to how race and socioeconomic status interact with physical development.

4. Behavioral Outcomes Understudied but Promising: Limited evidence indicates potential benefits to single-sex education in areas such as decreased delinquency rates and improved teacher-student relationships, though this remains significantly understudied compared to academic outcomes (Jackson, 2021).

5. Boys' Sensitivity to Educational Environments: Studies show that boys are particularly responsive to school-quality factors and educational environments, which may explain their stronger reaction to different school settings compared to girls (Autor et al., 2019). Boys appear especially vulnerable to under-resourced learning conditions, with poor educational environments having a greater negative impact on their behavioral development compared to girls.

6. Context Matters Significantly: The effectiveness of single-sex education varies based on:

- **Implementation factors and school resource level:** How well the program is designed, resourced, and executed makes a significant difference in outcomes.
- **Student age:** Research suggests older boys (older than 13 years) may benefit more from single-sex environments than younger boys (younger than 13 years), who often show higher motivation in coeducational settings (De Witte and Holz, 2015).
- **School type and access:** Of all boys' schools in the U.S., 94.6% are private institutions. Among public all-boys schools, 36% are charter schools and 14% are magnet schools, granting them greater independence and flexibility in staffing, curriculum, and scheduling (Office of Civil Rights Data Collection, 2022; Raymond et al., 2023). These factors create significant gaps in access that are tied to a family's economic situation and where they live. Similar patterns exist for girls' schools, influencing which students benefit from the resources associated with single-sex education.
- **Cultural and educational context:** The effectiveness varies considerably between different countries and educational systems, making it difficult to generalize findings across different contexts.

Policy Implications

The research suggests that single-sex education may offer limited benefits for certain populations of boys under specific conditions, but is not universally advantageous. The most promising aspects appear to be related to school-wide factors that could potentially be replicated in coeducational settings and offer strategies to boost boys' motivation and engagement in school.

Recommendations

Based on the comprehensive analysis, this report recommends a strategic approach that focuses on understanding and implementing effective educational elements rather than promoting single-sex education as a comprehensive solution:

1. **Commit to Evidence-Based Advocacy:** Maintain rigorous commitment to evidence-based advocacy, acknowledging the current limitations in research supporting single-sex education while pursuing deeper understanding of mechanisms that might benefit specific populations of boys.
2. **Invest in Research on Effective Educational Elements:** Focus on understanding and disseminating knowledge about specific educational

elements that benefit boys across various settings, particularly the five key elements observed in successful schools:
    a. Strong teacher-student relationships (relational teaching)
    b. Supporting positive identity development (emphasis on well-being)
    c. School culture and community (rites of passage)
    d. Professional development for teachers
    e. Progressive educational strategies (project-based learning, critical exposures)
3. **Bridge Research and Practice Through Demonstration Sites:** Establish partnerships with exemplary schools (both single-sex and coeducational) to serve as demonstration sites for effective practices in boys' education, documenting and disseminating successful approaches.
4. **Address Critical Research Gaps:** Prioritize research addressing significant gaps in understanding single-sex education's impact, particularly regarding long-term outcomes, impacts on diverse demographic groups, and behavioral outcomes for boys from different backgrounds.
5. **Maintain a Nuanced Understanding of Gender Inequality:** Ground all advocacy and research in a sophisticated and evidence-based understanding of structural inequality, recognizing that while boys face specific educational challenges, girls and women continue to experience significant disadvantages in career advancement, leadership representation, and economic outcomes.

Acknowledgment

Attention to girls of color and low-income girls deserve national attention as well. This work does not negate the real challenges facing girls of color or diminish the progress made in educational opportunity. The findings from this report may inform work to improve educational outcomes for all students.

Introduction

In the United States, boys—particularly those from low-income backgrounds and communities of color—are experiencing widening academic gaps compared to their female peers. This concerning trend begins early in their educational journey and continues throughout their academic achievement, potentially limiting their educational attainment which, like for any student, can affect career opportunities and overall well-being. This focus on boys' educational challenges must acknowledge broader gender inequality patterns. Despite women's educational gains, they continue to face significant barriers in professional advancement, experiencing "commitment penalties" in hiring (Rivera & Tilcsik, 2016), underrepresentation in leadership positions, and persistent wage gaps especially for women of color (Blau et. al., 2023). These disparities highlight the complex nature of gender inequality, where educational advantages for girls don't necessarily translate to proportional economic and professional advantages in adulthood. Ultimately, this project aims to investigate the potential of single-sex schooling as an effective policy lever to address the unique educational challenges boys face in today's educational system without undermining progress toward comprehensive gender equity.

The data clearly demonstrates that boys are falling behind their female peers in multiple academic metrics, with longstanding gaps in reading proficiency and classroom grades now translating into widening disparities in college enrollment rates (Goldin et al., 2006; Burkham et al., 2007; Reardon et al., 2018; Diaz & Easton, 2023; Goldhaber and Liddle, 2023). However, the underlying causes of these disparities remain complex and multifaceted, requiring nuanced analysis and targeted interventions. As debates surrounding school choice have intensified in recent years (Wong, 2018), single-sex education has re-emerged as a potential strategic approach. While existing research on its effectiveness presents mixed results, the potential benefits for specific populations—particularly boys from low-income backgrounds and communities of color—warrant further investigation.

Background

The history of single-sex education in the United States reflects broader social and educational trends over time. Historically, single-sex schooling was the predominant model; however, the modern educational landscape shifted dramatically toward coeducation during the first half of the 20th century (Salomone, 2013). This transition aligned with changing societal views on gender equality and educational opportunity as well as the cost-effectiveness of teaching boys and girls together, leading to a significant decline in single-sex options within the public education system.

A pivotal moment for single-sex education came with the enactment of the No Child Left Behind Act (NCLB) in 2001 and the following changes in Title IX regulations in 2006, which allowed single-sex settings within public schools for the first time. This legislative change provided schools with the ability to implement single-sex classrooms or entire single-sex schools as potential strategies for improving student outcomes. The policy modification sparked renewed interest in examining the potential benefits and drawbacks of sex-segregated learning environments, particularly for schools serving underperforming students and vulnerable populations.

Despite this renewed interest, research findings on single-sex education remain largely inconsistent (Bracey 2006; Haag 1998; Mael et al. 2005; Pahlke et al., 2014). Some studies suggest positive impacts on academic performance, classroom behavior, and self-esteem for both boys and girls, while others report minimal or no significant differences compared to coeducational settings. This mixed evidence base has complicated policy discussions and implementation decisions.

The conversation surrounding single-sex education has gained fresh momentum in recent years as concerns about boys' academic performance have intensified among parents, educators, researchers, and mental health professionals. Discussions about gender-based academic disparities highlight an urgent need to address educational inequities through evidence-based approaches. In this context, single-sex education presents a potential avenue to support boys—especially those from disadvantaged backgrounds—without shortchanging girls in the education system. This research aims to evaluate whether single-sex schooling represents an effective strategy to improve educational outcomes for boys who may benefit most from this specialized approach at no expense to their female peers.

Research Objectives, Questions, and Methods

Research Objectives

This project seeks to assess the viability of single-sex schooling as a policy tool to address educational challenges faced by boys, particularly those from low-income backgrounds and communities of color. Through rigorous analysis and stakeholder engagement, this research provides evidence-based insights to inform educational policy decisions. Specifically, the project:

1. Investigates the efficacy and limitations of single-sex schooling through a systematic literature review and expert interviews.

   a. For the purposes of this research, “efficacy” in educational outcomes is defined as:
      i. Enhanced academic engagement and achievement in core subject areas
      ii. Increased educational attainment and college enrollment rates
      iii. Reduced behavioral issues and disciplinary incidents
      iv. Improved social-emotional development and positive identity formation
      v. Better teacher-student relationships that support long-term educational success
2. Identifies key statistics and demographics on single-sex education through descriptive analysis of enrollment trends, institutional characteristics, and student outcomes.
3. Evaluates the current policy and advocacy landscape, identifying pathways for the American Institute for Boys and Men (AIBM) to engage in meaningful educational reform.
4. Develops strategic recommendations for AIBM, including alternative interventions and research opportunities aligned with its mission to support boys' educational achievement.

Research Questions

This investigation is guided by a central research question: To what extent can single-sex schooling serve as an effective policy tool to enhance academic outcomes and address behavioral issues among boys, particularly those from socioeconomically disadvantaged groups? In this context, 'enhancement' refers specifically to measurable improvements in achievement scores, engagement metrics, educational attainment, and reductions in negative behavioral indicators as outlined in the research objectives.

To thoroughly explore this question, the research addresses several key dimensions:

1. **Efficacy Assessment:** How does current research define effectiveness of single-sex education? Per those definitions, what does the research indicate about the effectiveness of single-sex education in improving academic and social outcomes for boys, particularly those from disadvantaged backgrounds?

2. **Demographic Analysis:** What are the current enrollment trends and demographic characteristics of students in single-sex schools compared to co-educational schools in the United States?

3. **Context Specificity:** Under what conditions and for which student populations does single-sex education demonstrate the most promising results?

4. **Implementation Challenges:** What are the primary obstacles to implementing effective single-sex educational programs within the current public education system?
5. **Policy Landscape:** What is the current state of policy regarding single-sex education at federal, state, and local levels, and how has it evolved since the No Child Left Behind Act?
6. **Stakeholder Perspectives:** How do key stakeholders—including educators, policymakers, and researchers—perceive the value and limitations of single-sex education?
7. **Transferability:** What specific educational strategies or pedagogical practices from single-sex environments might be effectively implemented in co-educational settings?

Research Methods

This project employs a mixed-methods approach to comprehensively examine the potential of single-sex schooling as an educational intervention:

Literature Review

A systematic review of peer-reviewed academic literature, policy papers, and educational reports was conducted with particular emphasis on:

- Majority of research published after 2014 to ensure contemporary relevance
- Studies examining causal effects and outcomes of single-sex education
- Analyses addressing selection bias and external validity concerns
- Comparative studies between single-sex and co-educational environments
- Research specifically focused on boys' educational outcomes and developmental needs

The literature review adhered to the criteria established by Pahlke et al. (2014), focusing on studies that implement adequate controls for both observable and unobservable variables to counter the biases that frequently compromise research in this field.[1]

Descriptive Data Analysis

[1] A substantial portion of the highest-quality research on single-sex education comes from international contexts, particularly Western countries outside the United States. This is because these education systems often allow for better research designs, including random assignment of students to different school types, which is rarely possible in the U.S. context. While we prioritized findings from these methodologically rigorous studies, care must be taken when applying these results to the U.S. educational system given the significant differences in cultural, policy, and institutional frameworks.

Statistical analysis of data from Department of Education Office of Civil Rights Data Collection (CRDC) on single-sex schooling in the United States was conducted, examining:

- Enrollment trends in public and private single-sex schools
- Demographic characteristics of students (socioeconomic status, race/ethnicity)
- Geographic distribution of single-sex educational opportunities

Through this analysis, a comprehensive inventory of all single-sex public schools in the United States, categorized by gender-specific enrollment (all-girls and all-boys institutions), is provided in Appendix A.

Expert Interviews

Semi-structured interviews were conducted with 14 stakeholders across multiple categories:

- School leaders and educators from single-sex schools (n= 6)
- Researchers specializing in gender and education (n=5)
- Community organization leaders (n=3)

Interview protocols were tailored to each stakeholder group to maximize the relevance and depth of information gathered. Interviews were analyzed using qualitative coding in MAXQDA software, with thematic analysis conducted to identify key patterns, challenges, and effective practices across different stakeholder perspectives. Complete interview protocols are provided in Appendix 5.

Case Studies

The research examined select single-sex educational institutions or programs demonstrating:

- Innovative approaches – educational strategies that differ significantly from traditional models by incorporating research-based practices specifically designed to address boys' developmental needs and learning styles
- Successful implementation – programs that have operated for at least three years with stable or growing enrollment, strong stakeholder support, and documented processes for overcoming initial implementation barriers
- Notable outcomes – institutions showing measurable improvements in at least two of the defined metrics (academic achievement, engagement, behavior, or social-emotional development) based on longitudinal data or pre/post comparisons.

- Replicable practices – approaches with clearly documented procedures, reasonable resource requirements, and potential for adaptation across different educational contexts and socioeconomic settings

Policy Analysis

A comprehensive assessment on the federal level was conducted of:

- Regulatory frameworks governing single-sex education since the 2006 Title IX amendments
- Funding mechanisms and sustainability models
- Advocacy under current political and social landscape
- Potential pathways for implementation

This multi-faceted methodological approach enabled a thorough investigation of single-sex schooling as a potential policy lever, addressing both empirical evidence of effectiveness and practical considerations for implementation and advocacy.

Report Overview

This report begins with an examination of key facts on single-sex education, providing a comprehensive overview of current enrollment trends, demographic patterns, and institutional characteristics across the United States. Following this foundation, a detailed literature review evaluates research on single-sex education's effectiveness, particularly for boys, examining academic outcomes, behavioral impacts, and contextual factors that influence results. The report then analyzes the legal and policy landscape governing single-sex education, including historical developments, current regulations, and implementation challenges. A reconciliation of claims section integrates findings from both research and practitioner perspectives, identifying areas of consensus and addressing points of disagreement. Based on this analysis, the report presents a design element framework for boys' education before concluding with strategic recommendations for policy consideration and further research.

The following section establishes essential facts about single-sex education in the United States, creating a foundational understanding of the current landscape before delving into research findings and policy implications.

Promises and Pitfalls of Single-Sex Education

Key Facts on Single-Sex Education

Single-sex schools experienced significant growth in the late 1990s and early 2000s, expanding rapidly across the United States during this period. However, this trend has stabilized since the late 2010s, with modest declines in overall numbers. Today's landscape shows a diverse but relatively stable network of single-sex public schools serving diverse student populations. This analysis uses data from the Department of Education Office of Civil Rights Data Collection and excludes juvenile justice facilities, alternative schools, and special education schools.

PUBLIC SCHOOLS

102

The number of public single-sex education schools as of 2022. Additional thousands of coed public schools offer single-sex classrooms.
(Source: CRDC, 2022)

83%

Percentage of students in single-gender public schools who are Black or Latino, much higher than the national average of 50%.
(Source: EdWeek, 2017)

2 in 5

Fraction of single-sex public schools that are charter schools, while about 1 in 8 are magnet schools.
(Source: CRDC, 2022

5000%

From 1995 to 2022, the number of single-sex public schools in the U.S. grew by 5000% —increasing from just 2 schools to 102.
(Source: CRDC, 2022)

1.5x

Students attending single-sex schools are 1.5 times more likely to be eligible for free or reduced-price meals compared to their peers nationally.
(Source: EdWeek, 2017)

57%

Percentage of single-sex public schools that are all-girls in 2022. 43% are all-boys.
(Source: CRDC, 2022)

PRIVATE SCHOOLS

95.3%

Percentage of private schools that are coeducational. (*Source: National Center for Education Statistics (NCES), 2021)*

640

Number of private schools that enroll only girls, making up 2.1% of all private schools. (*Source: NCES, 2021)*

792

Number of private schools that enroll only boys, making up 2.6% of total private schools. (*Source: NCES, 2021)*

	Public	Private	Total
All-Girls Enrollment (SY21-22)	58	640	698
All-Boys Enrollment (SY21-22)	45	792	837

The table above provides a snapshot of single-sex schools in the United States for the 2021-2022 school year. For complete listings of these schools by state, including their locations and school type (i.e., charter or magnet), please refer to the detailed tables in the appendixes.

Year	All- Girls Enrollment	All-Boys Enrollment	Total Single-Sex Public Schools
2016	63	58	121
2018	61	50	101
2021	55	47	102
2022	58	45	102

Counts exclude juvenile-justice, mental health, and coeducational schools, as well as schools that have closed. Alternative schools for pregnant and parenting students were also excluded.[2]

[2] This list was calculated based on the Feminist Majority Foundation's criteria for comparison purposes, excluding alternative schools, juvenile-justice facilities, mental health facilities, and schools that closed or became coeducational. By 2021–2022, all-girls public schools remained relatively stable (41% charter, 12% magnet) while all-boys schools declined to 45 (36% charter, 14% magnet).

Key Insights on Trends

- **Black and Latino students remain overrepresented in public single-sex schools.** While just over half of U.S. public school students are white, 83% of students in single-gender public schools are Black or Latino—a reflection of where these schools are most commonly established and who they are intended to serve.
- **Public single-sex schools continue to be concentrated in low-income urban and rural areas**, often operating as charter or magnet schools. These models provide greater flexibility in curriculum, staffing, and school culture—features that may help explain their prevalence in communities serving at-risk student populations. This geographic and demographic concentration is directly correlated with the racial composition of these schools' student bodies.
- **All-boys public schools have declined significantly over the past six years**, dropping from 58 schools in 2016 to 45 in 2022 (a 22% decrease). This decline contrasts with the more modest 8% decrease in all-girls schools during the same period, suggesting different sustainability challenges or shifting priorities in addressing gender-specific educational needs.
- **The gender balance in public single-sex education has shifted notably.** All-girls schools now represent a clear majority (57%) of public single-sex schools, compared to 43% for all-boys schools. This reverses earlier trends when boys' schools were more common, with the change driven primarily by closures of all-boys institutions rather than growth in girls' schools.
- **Private schools in the United States remain predominantly coeducational** (95.3%), with single-sex institutions making up less than 5% of the private school landscape. The highest concentration of single-sex private schools is in the Northeast.
- **Recent discussions around boys' educational achievement gaps have not yet translated into institutional growth.** Academic and policy discussions about boys' educational needs have gained momentum since 2022. While current data shows a declining number of all-boys public schools through 2022, these emerging conversations may influence future developments in single-sex education. The forthcoming data for 2023 and beyond will determine whether these discussions translate into a reversal of the downward trend in all-boys schools.

Single-Sex Research Reviews

Rationale

The purpose of this review is to investigate the efficacy and limitations of single-sex schooling, particularly focusing on its impact on the academic and non-academic outcomes of boys compared to similar boys in coeducational settings. This review will cover various studies and reports to explore why girls outpace boys in academic achievements, to determine how single-sex schooling might address these disparities, and identify any existing gaps in current research.

Educational Disparities Facing Boys

Boys are increasingly falling behind in educational settings worldwide. From an early age, boys are more likely than girls to repeat kindergarten, an experience that often sets the stage for future academic and behavioral struggles. Burkham et al. (2007) found that boys who repeat kindergarten are more likely to face ongoing challenges in literacy and behavior, trailing behind both their male and female peers by the end of first grade. The academic lag extends beyond the early years. A 2018 report by the Stanford Center for Education Policy Analysis reveals that by third grade, boys typically trail behind girls by approximately half a grade level in reading and writing. To put this into perspective, research shows that students who aren't reading proficiently by third grade are four times more likely not to graduate high school on time compared to proficient readers – a relationship they describe as a 'critical milestone' in a child's educational journey (Hernandez, 2011). This gap ultimately widens to nearly a full grade level by eighth grade.

Although boys historically performed better in mathematics, this advantage has diminished significantly over the past few decades. Girls not only close the gap but also outperform boys in math class GPAs by approximately 0.29 grade points on a 4.0 scale (Diaz et al., 2021). This occurs despite boys scoring higher on standardized tests like the SAT—where they receive 61% of the top-decile math scores (Reeves & Smith, 2025).

By high school, the gap continues to widen in several measurable ways. While approximately 46% of girls enroll in advanced placement or International Baccalaureate courses, only about 38% of boys do so (Burns & Leu, 2019). Gender disparities in academic achievement are particularly evident in GPA distribution. Girls are 1.9 times as likely to be in the top 5% of graduating GPAs. Conversely, boys are 1.6 times more likely to be in the bottom 5% of their class (Goldhaber & Liddle, 2023). These statistics are not just numbers. They culminate into a striking trend where, as of 2019, women are attending four-year colleges at a rate 30% higher than men (Leukhina & Smaldone, 2022).

Unpacking the Underlying Causes

The reasons behind these disparities are complex. Some researchers, such as Goldin et al. (2006) and Leukhina and Smaldone (2022), suggest that male students may perceive a diminished value in academic achievement, which influences their educational engagement and attainment. Others argue current educational approaches and instructional methods fail to effectively engage boys in the learning process. Both perceptions, combined with boys' generally slower social development and more pronounced behavioral challenges, may be impeding their academic and social success.

Purpose of This Review

Amid these growing concerns, there's a heightened focus from various stakeholders—including educational practitioners, mental health professionals, and policymakers—to better understand and tackle the issues that disproportionately affect boys' educational outcomes. This national and international attention has spurred interest in exploring how single-sex schooling might serve as a viable intervention to improve boys' academic engagement, reduce behavioral issues, and increase their educational attainment and college enrollment rates.

Given this context, the purpose of this review is to assess whether single-sex schooling offers a valuable policy option to mitigate these issues. By examining over 20 relevant studies and reports, this section will explore whether such educational settings can truly make a difference in the academic lives of boys and the challenges they face, offering a clearer picture of the potential benefits and drawbacks of single-sex education.[3]

Mixed Outcomes in Single-Sex Education Research

Research on single-sex education over the past three decades has yielded mixed findings, illustrating a complex landscape of outcomes. In an effort to clarify these results, the Department of Education commissioned Mael et al. (2005) to conduct a meta-analysis aimed at “document[ing] the outcome evidence for or against the efficacy of single-sex education as an alternative form of school organization.” This meta-analysis reviewed 40 viable studies, which painted a varied picture: 41% of these studies found advantages to single-sex schools, 45% reported negative effects,

[3] The literature review adhered to the criteria established by Pahlke et al. (2014), focusing on studies that implement adequate controls for both observable and unobservable variables to counter the biases that frequently compromise research in this field. Studies were identified through systematic searches of academic databases including ERIC, PsycINFO, and Google Scholar using terms such as "single-sex education," "same-sex schooling," and "gender-segregated education." Priority was given to research published after 2014 to ensure contemporary relevance, with particular emphasis on studies addressing selection bias through methodologically rigorous approaches. A complete list of the studies included in this analysis can be found in Appendix 3.

and the remaining 6% produced mixed results (Anfara & Martens, 2008). Notably, this meta-analysis did not distinguish between outcomes specifically for boys versus girls in these overall calculations, and the available research was weighted toward studies of girls' single-sex schooling, with fewer studies focused exclusively on boys' outcomes.

Critically, the reliability of this meta-analysis has been extensively questioned. Researchers such as Signorella, Hayes, and Li (2013) and Pahlke et al. (2014) have raised concerns about the credibility of the report, suggesting a failure to use rigorous meta-analytic methods. This critique sets the stage for a deeper exploration of why discrepancies exist in the research findings, leading directly into the next section on research challenges.

Challenges in Researching Single-Sex Education

Conducting rigorous research on the efficacy of single-sex education in the United States presents significant challenges. Ideally, evaluations would involve a random selection of students assigned to one type of schooling – single-sex – or the other – coeducational. However, in the U.S., regulation requires that students and their families must choose to enroll in single-sex schools voluntarily, which complicates this approach.

Subsequently, families and students who enroll in one form of schooling over the other may possess characteristics that contribute to their success or failure in school. For example, families who choose single-sex schools might already have certain advantages or preferences that influence educational success—such as higher income levels —which can make these schools appear more effective than they truly are. Additionally, single-sex schools might differ from coeducational ones in observable ways, like class size, and unobservable ways, like the quality of the curriculum or the expertise of the teachers (Pahlke et al., 2014; Jackson, 2012). Without the ability to assign students randomly, these confounding factors may misrepresent the effectiveness of single-sex schooling.

Given these complexities, this literature review adheres to the criteria established by Pahlke et al. (2014), which recommend the inclusion of only those studies that implement adequate controls for both observable and unobservable variables. By 'adequate controls,' Pahlke et al. specify studies that account for selection bias through methods such as random assignment or careful statistical approaches that address pre-existing differences between students who choose single-sex versus coeducational schools. This includes controlling for factors like student demographics, prior achievement, socioeconomic status, and parental preferences—factors that might influence both a student's school choice and their academic outcomes independent of the school's gender composition. By focusing

on controlled studies, this review aims to counter the biases that frequently compromise research in this field, providing a clearer, more accurate assessment of the true impact of single-sex education.

Recognizing that educational systems and cultural contexts vary widely across countries, this review also looks at studies from outside the United States. For example, South Korea's educational system often allows for more controlled experiments, providing insights that, although from a different cultural setting, are based on rigorous research practices. Approximately one-third of the studies included in this review were conducted in the United States or include the U.S. among the countries studied, with the remainder representing diverse educational systems worldwide. These international studies are relevant, as they help us understand whether the findings about single-sex education can be applied globally or if they might vary significantly in different settings (UAW, 1998).

Underlying Assumptions of Single-Sex Schooling

As previously mentioned, single-sex education has garnered global interest as a tool for addressing challenges faced by boys in their academic lives. This section will further discuss the theories that supporters of single-sex education present to explain improved student achievement and academic attitudes and to justify the expansion of single-sex schools and classes. The most common perspectives claim either (a) there are cognitive and developmental differences between sexes that justify tailored instructional methods, (b) single-sex environments might mitigate the negative effects of sexism and traditional gender roles, potentially improving academic self-perception and engagement, and (c) single-sex schooling is particularly beneficial for low-income boys and boys of color, addressing the complex interplay of socioeconomic factors and educational outcomes.

From a neuroscientific perspective, advocates of single-sex education argue that there are inherent cognitive and developmental differences between the sexes that warrant tailored instructional methods (Gurian et al., 2009; Sax, 2005). This viewpoint suggests that boys and girls learn differently and, therefore, could benefit from teaching strategies specifically designed to cater to these distinct learning styles. The validity of these neuroscientific claims will be critically examined in the reconciliation of claims section later in this report.

Another theory states that single-sex environments can help reduce the negative impacts of sexism and traditional gender roles. In such settings, boys might experience an improved sense of academic self-perception and greater engagement in their studies, as they are free from the pressures and stereotypes that often accompany what it means to be “masculine” in coeducational environments. This may help to increase the share of men working in HEAL jobs (health, education,

administration and literacy) (Reeves, as cited in Klein, 2023). However, this reasoning is more often applied to the "girl power" view, citing the problem that disruptive, attention-seeking boys and sexist attitudes in coed environments may decrease girls' interest in school and STEM-related fields (Sadker and Sadker, 1994). "Girl power" comes into play under the pretense that single-sex classrooms may better empower young women in "male-dominated" fields of study.

Lastly, a third group of supporters claim single-sex schooling may benefit boys of color, who research shows are often alienated in conventional public school environments characterized by standardized curriculum, traditional disciplinary practices, and potential cultural misalignment. These factors may limit their academic potential by creating environments where boys of color experience disproportionate disciplinary actions and decreased engagement. This alienation stems from social influences, including teachers who may have biased perceptions of student behavior and underestimate the ability of African American and Hispanic students (Redding, 2019; Blazar, 2021). Evidence supports this concern, as studies show African American and Hispanic male students are more likely to receive harsher disciplinary actions — suspensions or expulsions – than their White and Asian counterparts for the same misdoings (Rios, 2011). Supporters argue that single-sex schooling environments can better address these disparities through targeted interventions specific to boys of color, increased access to male role models, and educational approaches that positively reshape students' perceptions of themselves and their academic abilities.

Review of Research Findings

I. Academic Outcomes

A. Mathematics and Science

The most extensively researched area regarding single-sex education effectiveness is mathematics performance. Research findings can be organized into three categories: studies showing advantages for boys in single-sex settings, those showing no difference, and those indicating potential disadvantages for boys in single-sex schools compared to similar boys in coeducational environments.

Mixed Evidence on Mathematics Performance

Studies Showing Advantage: Jackson (2021) provides evidence of improved academic performance for boys when examining within-school transitions in Trinidad and Tobago, where schools changed from coeducational to single-sex. The effect size shows an improvement of 0.14 standard deviations, which the author argues is substantial given the large sample size (n=124,382). The author equates this

improvement to "going from a teacher at the fifteenth percentile to one at the eighty-fifth percentile" in quality (Interview with Probable Causation). Notably, these positive effects were more pronounced for boys than girls.

Studies Showing No Significant Difference: The majority of rigorous studies find no meaningful difference in boys' mathematics performance between single-sex and coeducational settings when properly controlling for selection factors:

- Pahlke et al. (2014) conducted a comprehensive meta-analysis of 26 controlled studies and found a weighted average effect size of only 0.06 for boys—statistically significant but well below the 0.2 threshold considered a 'small' effect according to Cohen's (1988) criteria. This near-zero effect size suggests minimal practical impact of single-sex education on boys' mathematics performance when proper controls are added.
- Jackson (2012) initially found improved test performance in single-sex schools, but these differences disappeared when controlling for student preferences. The study concluded that "conditional on school type and preference, there are no meaningful differences between single-sex schools and coed schools," suggesting that student self-selection rather than school gender composition drives apparent advantages.
- Lee and Park (2024) found significant improvements in test scores for female students after accounting for selection bias, but no academic gains for boys in mathematics. This finding suggests that single-sex education may have different effects based on gender - potentially benefiting girls academically while having neutral effects for boys in certain contexts.
- Kwak and Ku (2013) isolated the effects of single-sex classroom teaching from the broader effects of attending a single-sex school. After accounting for school resources, they found no significant difference in mathematics performance.
- Clavel and Flannery (2023) similarly found no significant difference in mathematics performance between single-sex and coeducational schools after accounting for individual, parental, and school-level factors.

Studies Showing Potential Disadvantage: Else-Quest and Peterca (2015) reported poorer achievement in mathematics for boys in single-sex schools compared to those in coeducational settings, showing a moderate disadvantage (d = -0.42, a small-to-medium negative effect). Interestingly, these same boys showed higher achievement in science compared to boys in coeducational schools (d = 0.67, a medium-to-large positive effect), suggesting that single-sex education may have different effects across different academic subjects.

Key Insights: Mathematics and Science Performance

These findings suggest that while isolated studies may show benefits, the prevalence of evidence indicates that single-sex education alone does not significantly improve boys' mathematics performance. Any apparent advantages are likely attributable to selection effects (student and family preferences), school-level resources and quality, and implementation factors unrelated to gender composition.

B. Literacy and Reading

Many of the same studies that examined mathematics performance also assessed literacy outcomes, though with some notable differences in findings. This parallel analysis offers an opportunity to compare how single-sex education might affect reading performance differently than math performance.

Studies Showing Advantage: Park et al. (2013) leveraged random assignment of students to single-sex or coeducational high schools in Seoul, South Korea to evaluate impact on academic outcomes. Their findings demonstrated that students in all-boys schools scored significantly higher on Korean and English tests compared to counterparts in coeducational schools. These students were also more likely to attend four-year colleges. These effects persisted even after controlling for teacher quality, student-teacher ratios, and socioeconomic factors.

Studies Showing Disadvantage: Unlike mathematics where findings were predominantly neutral, literacy outcomes show more concerning patterns for boys. Else-Quest and Peterca (2015) reported that students in single-sex schools within urban settings had significantly poorer achievement in reading and more negative attitudes about English/reading compared to students in mixed-sex schools. These negative literacy outcomes are particularly noteworthy because they contrast with the science advantages found in the same study.

Studies Showing No Significant Difference: As with mathematics, several rigorous studies found no meaningful difference in literacy outcomes when controlling for selection factors:

- Jackson (2012) found no significant differences in overall academic performance, including literacy measures, when accounting for student preferences.
- Lee and Park (2024) reported no substantial academic gains for boys in literacy assessments.
- Clavel and Flannery (2023) found no significant differences from Ireland data in reading performance after appropriate controls were applied.

Key Insights: Literacy and Reading Performance

The evidence regarding literacy outcomes appears more concerning than for mathematics, with some studies specifically highlighting potential disadvantages for boys in single-sex settings. This subject-specific finding suggests that single-sex education may have different effects across subject areas, with literacy being an area where boys in single-sex schools potentially face greater challenges rather than benefits. This pattern aligns with broader educational research showing that boys generally struggle more with literacy than mathematics, raising the possibility that single-sex environments may not adequately address—and in some cases might exacerbate—existing gender differences in literacy development (Clavel and Flannery, 2023). The contrast between Park et al.'s positive findings and others' neutral or negative results also highlights how important cultural and educational contexts are when evaluating the effectiveness of single-sex education.

II. Behavioral and Social Outcomes

Behavioral and non-cognitive outcomes represent the most understudied field within single-sex education research. Despite the limited evidence, supporters of single-sex education often cite behavioral improvements as a main rationale for single-sex learning environments. These advocates suggest that boys' behavior may improve through tailored instructional strategies, increased exposure to male role models, and better self-perception and academic confidence. Much of this reasoning relies on anecdotal evidence. Of the key studies available, I present those showing evidence on school attitudes, self-concept, stereotype threat, and other behavioral indicators for boys, highlighting both the findings and significant research gaps in this domain.

A. School Attitudes and Self-Concept

Research on how single-sex education affects boys' attitudes toward school and self-concept reveals a more complex picture than academic outcomes. Studies examining these factors can be categorized into those showing advantages, disadvantages, and no differences.

Studies Showing Advantage: Several studies indicate potential benefits for boys' school attitudes in single-sex environments. De Witte and Holz (2015) found age-related differences in motivation, with older boys (>13 years old) showing higher motivation in single-sex settings compared to their peers in mixed groups. Their analysis revealed age-dependent effects, suggesting developmental factors may influence when single-sex education is most beneficial.

Lee and Park (2024) reported that single-sex schooling creates a more structured and engaged academic environment for both genders. Their findings indicate that single-sex schooling significantly reduced student absences and increased

engagement for both boys and girls, though girls showed greater improvements in these areas.

Lee et al. (2014) identified a potential mechanism for improved performance in single-sex schools through increased study time and effort. They found that boys in single-sex schools outperformed those in coed classes by 0.15 of a standard deviation. Importantly, they concluded that this improvement stemmed from increases in student effort and study time rather than classroom gender composition itself, as boys in single-sex schools spent approximately 1.25 more hours per week on academic activities and reported effort levels 0.5 standard deviations higher than boys in coeducational settings. This suggests that the school-wide environment, rather than simply the absence of female peers, contributes to improved attitudes and effort.

Studies Showing No Significant Difference: Pahlke et al. (2014) conducted a meta-analysis that found minimal differences in school attitudes between single-sex and coeducational environments for boys. When averaging five independent controlled effect sizes, the difference in boys' school attitudes was nearly zero (weighted average effect size = 0.03). Similarly, self-concept differences were negligible (d = –0.02 for boys). These near-zero effects suggest that, when properly controlled, single-sex education may not significantly impact boys' attitudes toward school or their self-perceptions in most contexts.

Studies Showing Disadvantage: The available research reveals few studies documenting clear disadvantages in school attitudes and self-concept for boys in single-sex environments, representing a gap in the literature.

Key Insights: School Attitudes and Self-Concept

The effects of single-sex education on boys' school attitudes and self-concept appear to vary by age and context. De Witte and Holz (2015) found clear age-dependent effects in their randomized experiment in Flanders (Belgium). Their research demonstrated that younger boys (<13 years old) showed higher motivation in coeducational groups, while older boys (>13 years old) displayed significantly increased motivation in single-sex settings . This developmental transition point around age 13 suggests a shift in how boys respond to educational environments. Their qualitative observations further revealed that boys-only groups participated more actively in class discussions and were better able to discuss sensitive topics, despite requiring more classroom management from teachers.

This evidence suggests that developmental factors play an important role in determining when single-sex education might be most effective. Lee et al. (2014) found that any benefits may result from changes in study habits and effort rather

than simply the gender composition of the classroom. However, the most rigorous meta-analyses by Pahlke et al. (2014) found minimal differences in school attitudes between settings, suggesting that individual, implementation, and contextual factors may be more important than the single-sex classroom environment itself.

B. Stereotype Threat

Stereotype threat is an area of great concern for opponents of single-sex education. The primary concern is that attending a single-sex school might increase students' endorsement of sexist or gender-based stereotypes. Critics of single-sex education often cite developmental intergroup theory, which explains how emphasizing gender differences through segregation can lead to increased "in-group favoritism" and "out-group bias" (Bigler and Liben, 2006; Pahlke and Hyde, 2016). According to this theory, practices like gender segregation, along with explicit labeling and social grouping, can trigger stereotyping and prejudice formation. However, researchers continue to debate whether single-sex schooling increases students' awareness of gender differences.

The evidence presents a mixed picture. Wong et al. (2018) found that high school students from single-sex schools were more conscious of gender, experienced more anxiety in mixed-gender situations, and had fewer friends of the opposite gender. These effects persisted into college, with graduates from single-sex schools reporting continued anxiety about mixed-gender interactions and maintaining fewer cross-gender friendships. These findings suggest potential long-term implications for social development and relationship formation with down the line concerns for the marriage market.

In contrast, studies examining gender-specific effects have found different patterns, particularly for girls. Kessels and Hannover (2008) observed that female students in single-sex physics classrooms demonstrated greater academic self-confidence and were less likely to identify with gender-typical traits. Notably, boys in single-sex settings showed no significant differences compared to their counterparts in coeducational classes. Pahlke et al.'s (2014) meta-analysis supports these observations, indicating that girls in single-sex schools were less likely to endorse gender stereotypes than those in coeducational environments.

A significant limitation in this research area is the lack of studies specifically examining stereotype threat for boys. As Pahlke et al. (2014) noted, there were insufficient studies to conduct a comprehensive analysis of how single-sex education affects boys' endorsement of gender stereotypes or their susceptibility to stereotype threat.

Key Insights: Stereotype Threat

The limited research on stereotype threat in single-sex education presents contradictory findings. While some evidence suggests single-sex schooling may increase gender awareness and potentially hinder cross-gender social development, other studies indicate it might reduce gender stereotyping, particularly for girls. The notable absence of research focused specifically on boys represents a significant gap in our understanding of how single-sex education affects male students' gender perceptions and stereotypes.

C. Other Behavioral Indicators

The effects of single-sex education on behavioral outcomes remains one of the least explored areas in this field of research. While academic performance can be readily measured through standardized tests, behavioral outcomes require more nuanced assessment methods and longer-term studies, contributing to the research gap in this area. Nevertheless, a few studies have examined specific behavioral indicators such as delinquency rates and teacher relationships, offering limited insights while highlighting significant areas for future investigation.

Studies Showing Advantage: Jackson (2021) found evidence that transitions from coeducational to single-sex schools in Trinidad and Tobago resulted in decreased juvenile delinquency rates among boys. This study also reported that single-sex classrooms enabled "efficiency gains" through teacher behaviors, as educators were able to provide more individualized instruction and demonstrate greater warmth toward students—what the author calls a "focus effect." These findings suggest that the structured environment and adapted teaching approaches in single-sex schools may provide protective factors against certain risky behaviors.

Lee and Park (2017) noted improved student-teacher relationships in single-sex environments. Their research indicated that boys in single-sex schools were 0.287 standard deviations less likely to agree that teachers have low expectations compared to their counterparts in coeducational settings, with an even stronger effect observed for girls at 0.437 standard deviations. This suggests that single-sex settings may foster more positive teacher-student dynamics where students perceive higher expectations from their educators.

Research Gaps: Despite these promising findings, there remains a critical shortage of comprehensive research examining a wider range of behavioral indicators. Areas particularly lacking investigation include:

- Bullying and peer aggression patterns in single-sex versus coeducational environments
- Mental health outcomes, including anxiety, depression, and self-esteem
- School engagement metrics such as absenteeism and truancy

- Disciplinary incidents and suspension rates
- Social skill development and peer relationship quality

These non-cognitive outcomes are especially relevant for boys, as research by Autor et al. (2019) indicates that behavioral factors such as absenteeism and suspensions are stronger predictors of high school completion for economically disadvantaged boys than academic performance metrics like test scores.

Key Insights: Other Behavioral Indicators

While limited evidence suggests potential behavioral benefits of single-sex education for boys, particularly regarding delinquency rates and teacher relationships, the research base remains insufficient to draw firm conclusions. This gap is particularly significant given that behavioral interventions may be more impactful than academic interventions for addressing educational challenges faced by boys (Autor et al., 2019). Future research needs to expand beyond academic outcomes to comprehensively assess how single-sex environments affect various dimensions of boys' behavioral development and school engagement.

III. Peer Effects

Another critical dimension of single-sex education research examines peer effects in the classroom. Peer effects refers to how students' achievement and behavior are influenced by their classmates. This section explores how classroom gender composition—particularly the presence of female peers—affects boys' academic performance and behavioral outcomes.

A. Classroom Gender Composition

Research on classroom gender composition has consistently demonstrated that a higher proportion of female peers generally improves boys' educational outcomes, though with important nuances across age groups and contexts. This growing body of evidence offers valuable insights into how gender dynamics in the classroom affect boys' academic performance and development.

Studies Showing Positive Effects of Female Peers: Several rigorous studies have found that a higher proportion of female students in the classroom benefits boys' academic performance. Hoxby's (2000) seminal research established this relationship, which was later confirmed by Lavy and Schlosser (2011), who found that a 10 percentage point increase in the proportion of female students increased boys' test scores by 3.1 percent of a standard deviation. This suggests that female classmates may create a more conducive learning environment through channels such as reduced classroom disruption and improved peer interactions.

Whitmore (2005) added nuance to these findings by identifying age-dependent effects, noting that younger boys particularly benefited from female peers. Black et al. (2013) similarly found evidence supporting the positive influence of female classmates on boys' academic outcomes in certain contexts.

Studies Showing No Difference: Not all research supports the conclusion that gender composition significantly affects outcomes. Anderson and Lu (2015) found that while girls' performance improved with more female peers, boys' performance showed no significant difference. Anelli and Peri (2019) reported no peer effects on college major choice except in predominantly male classes, which tended to push male students toward traditionally male-dominated fields. These studies suggest that gender composition may have less influence on boys than other factors.

Studies Showing Negative Impacts: Some research indicates that female peer effects may not always be beneficial for boys. Whitmore (2005), while finding positive effects for younger boys, noted that these benefits diminished or reversed as boys entered third grade. Black et al. (2013) reported that an increase in the share of girls in the classroom, while beneficial for girls' long-term outcomes, often proved detrimental for boys' high school completion. Lee and Park (2024) found that single-sex schooling increased boys' likelihood of pursuing STEM majors compared to coeducational environments, suggesting that the absence of female peers may reinforce traditional academic pathways for boys.

Peer Quality as a Confounding Factor: Several studies have identified peer academic quality as a potential confounding factor in single-sex education research. Hayes et al. (2011) and Jackson (2013) found that when controlling for peer achievement levels, many apparent benefits of single-sex education diminished. This suggests that in uncontrolled studies, the positive outcomes attributed to single-sex environments may actually reflect the influence of high-achieving peers rather than gender composition itself.

Key Insights: Classroom Gender Composition

The relationship between classroom gender composition and boys' educational outcomes appears highly context-dependent, with effects varying by age, subject area, and outcome measure. While younger boys often benefit from female peers academically, these advantages may diminish or reverse as they age. The research suggests that coeducational settings may promote better academic performance for boys through positive female peer effects, while also potentially broadening their career considerations beyond traditional male-dominated fields. Single-sex environments, while showing benefits in some areas, may inadvertently reinforce gender segregation in career choices, limiting boys' interest in entering HEAL professions where men are underrepresented. These findings underscore the

importance of considering how educational environments might either expand or constrain students' perceptions of appropriate career paths, alongside traditional academic measures of success.

IV. Single-Sex Schools vs. Single-Sex Schooling

Recent studies have made significant progress in disentangling the effects of attending a single-sex school versus experiencing single-sex classroom teaching within a coeducational school. As Dustmann, Kwak, and Ku (2018) explain, existing research has largely followed two distinct paths: studies estimating the effects of attending single-sex schools, and studies examining the effects of single-sex classrooms within coeducational institutions.

What makes the authors' contribution particularly valuable is that they identify and contrast three distinct parameters for measuring a causal effect: (1) comparing students at single-sex schools with those at coed schools (the "between-school effect"); (2) tracking changes when a school converts from single-sex to coed or vice versa (the "within-school effect") (3) examining how students perform in single-sex classrooms versus mixed-gender classrooms (the "class-level effect") (2018). This framework helps explain why research findings seem to diverge across these different approaches.

A. Types of Single-Sex Education Research

The research on single-sex education generally falls into three categories:

1. Between-School Effects: Studies comparing outcomes between students at single-sex schools and coeducational schools. This research "tends to find robust positive effects of attending a single-sex (versus a coed) school for both boys and girls" (Dustmann et al., 2018).
2. Within-School, Between-Classroom Effects: Research examining students in single-sex classrooms within otherwise coeducational schools. This approach "reports mixed findings on the benefits of single-sex (versus mixed-gender) classrooms for boys and girls" (Dustmann et al., 2018).
3. School Transition Effects: Studies tracking outcomes when schools convert from single-sex to coeducational or vice versa, which can help isolate the "within-school effect of school-type conversion" while controlling for permanent school characteristics.

B. School-Level vs. Classroom-Level Effects

School-Level Benefits for Boys: Research consistently shows that boys benefit more from attending a single-sex school than from single-sex classrooms within coeducational schools. Lee et al. (2014) found that boys performed best in all-boys schools but actually performed worse in boys-only classrooms within coed schools

compared to mixed-gender classes. This suggests the benefits extend beyond just classroom peer effects.

Dustmann, Kwak, and Ku (2018) reinforced this finding, demonstrating that "for boys, the disadvantage is largely due to the school-level coed environment." This helps explain why single-sex classrooms within coeducational schools often fail to produce the same benefits for boys as full single-sex schools.

Resource Advantages: Kwak and Ku (2013) discovered that many performance advantages in single-sex schools could be attributed to resource differences rather than gender segregation itself. Their research indicated that coed classroom teaching actually benefited boys across all subjects, while having mixed or negative effects for girls. In a similar observation, Pahlke et al. (2014) also found that resource differences between schools often explained more variance in outcomes than gender composition alone.

Classroom Teaching Effects: Kwak and Ku (2013) found that coed classroom teaching benefits boys across all subjects. Jackson (2021) expanded on this in an interview, noting that "the effect of a single-sex school is different from that of a single-sex classroom... when you get in an environment where everyone is all boys or all girls in the whole school, it might lead to changes in practices that improve outcomes for the boys and improve outcomes for the girls that you wouldn't necessarily see just from small changes in gender composition" (cite interview).

C. Transition Effects

School transitions provide particularly compelling evidence about the impact of school-wide gender composition on boys' outcomes.

SSS to Coed Transitions: Multiple studies document negative effects when single-sex schools begin admitting the opposite gender. Lee and Park (2017) found that boys' test scores dropped when their all-boys schools started admitting girls, though these effects diminished over time. Kwak and Ku (2013) and Dustmann, Kwak, and Ku (2018) similarly found negative effects on boys during transitions to coeducational environments.

Coed to SSS Transitions: Conversely, Jackson (2021) found improved academic performance and behavioral outcomes for boys when schools transitioned from coeducational to single-sex environments. The effect size showed an improvement of 0.14 standard deviations, a statistically significant improvement given the large sample size.

Key Insights: School vs. Classroom Effects

The evidence strongly suggests that boys benefit more from school-level factors than from classroom-level gender composition alone. As Dustmann et al. (2018) highlight, this has important policy implications: "a school's pupil gender type—a variable in policy maker's choice set—is indeed capable of altering student outcomes: boys through school-level coed exposure and girls through class-level exposure."

These findings help reconcile seemingly contradictory research results and emphasize that the benefits of single-sex education for boys appear to be school-wide rather than classroom-specific. This understanding is crucial for policymakers considering single-sex education initiatives, as it suggests that simply creating single-sex classrooms within coeducational schools may not produce the desired benefits for boys that full single-sex schools might offer.

V. Contextual Factors

Beyond the direct effects of gender composition, research has identified important contextual factors that influence how single-sex education affects boys' outcomes. These include age-related differences and varying sensitivity to school quality and socioeconomic factors.

A. Age-Related Differences

Several studies indicate that the effects of single-sex education vary significantly across different age groups, suggesting that developmental factors play an important role in determining when and how boys benefit from these environments.

De Witte and Holz (2015) found that younger students (<13 years old) showed higher motivation in coeducational groups, while older boys (>13 years old) displayed increased motivation in single-sex settings. This age-dependent pattern suggests that the optimal learning environment for boys may change as they progress through different developmental stages.

Similarly, Whitmore (2005) identified that younger boys benefited from female peers academically, but these benefits diminished or reversed as they entered third grade. This finding implies that the ideal classroom gender composition might need to shift as boys mature.

B. School Quality and Socioeconomic Factors

A growing body of research indicates that boys may be particularly sensitive to school-level factors and socioeconomic conditions, which could explain why they respond differently to various educational environments than girls do.

Multiple studies examining school-type transitions and school-level effects (Kwak and Ku, 2013; Dustmann, Kwak, and Ku, 2018; Lee et al., 2017; Jackson, 2021)

consistently find that boys' academic and behavioral outcomes are significantly affected by school-wide factors (i.e., facilities, classroom practices, health supports, and disciplinary policies) beyond simple classroom gender composition.

Autor et al. (2019) provide a compelling explanation for this pattern through their quasi-experimental research. They find that boys are significantly more sensitive to adverse environments, with disadvantageous conditions such as low availability of household resources, limited child-rearing inputs (including nutrition, safety in the home, and cognitive stimuli), and low parental attention and support, disproportionately harming their behavioral development compared to girls. This heightened sensitivity may explain why boys respond more strongly to variations in school quality and structure than girls do.

The research also indicates a significant gap in our understanding of how these effects might vary across different racial and socioeconomic groups. While studies suggest that lower-income boys are particularly vulnerable to school quality issues, few studies have directly examined how single-sex education impacts boys from different demographic backgrounds.

Key Insight: School Quality and Socioeconomic Sensitivity
Boys appear to be more responsive to school-level factors and quality than girls, suggesting that the benefits of single-sex education for boys may be largely mediated through improvements in overall school environment rather than gender segregation itself. This sensitivity to school-level factors helps explain why transitions between school types affect boys differently than girls and underscores the importance of whole school quality when addressing boys' educational challenges.

VI. Summary of Key Takeaways

A. Synthesis of Major Findings

The research on single-sex education reveals several important patterns that help reconcile seemingly contradictory findings across studies. First, school-level factors appear more significant than gender segregation itself in determining outcomes for boys. The overall school environment, resources, and implementation approaches matter more than simply separating students by gender.

Boys demonstrate greater sensitivity to school-wide level factors compared to girls, which helps explain their stronger response to different educational settings. This sensitivity makes boys particularly vulnerable to transitions between school types and variations in school quality.

A critical distinction emerges between single-sex schools and single-sex classrooms. Boys benefit most from attending full single-sex schools but may not experience the same advantages in single-sex classrooms within coeducational schools. Interestingly, research indicates that boys' academic performance often improves with coed classroom teaching, while girls show more consistent benefits from single-sex instruction at the classroom levels.

School transitions provide particularly compelling evidence of these effects. When single-sex schools become coeducational, boys typically experience negative impacts on their academic performance, though these challenges often diminish over time. Conversely, when schools transition from coed to single-sex environments, boys show improved academic and behavioral outcomes.

While promising evidence exists for positive behavioral effects of single-sex education for boys, including decreased delinquency rates and improved teacher relationships, research in this area remains limited compared to academic outcomes.

B. Refined Research Questions

Based on these findings, two key questions emerge for future investigation:

(1) What specific school qualities (management, infrastructure, curriculum, teaching pedagogy, student-teacher ratio, etc.) are most important to male students' behavior and academic achievement?
(2) Why are boys more sensitive to school-level factors and educational environment quality compared to girls, and how might single-sex schools address these specific vulnerabilities?

Answering these questions would help identify the mechanisms through which single-sex schools benefit boys and potentially inform interventions in coeducational settings as well. In the following sections of this report, I will explicitly address the first question and explore what aspects of these environments drive positive outcomes for boys.

VII. Gaps in Research and Future Directions

A. Identified Research Gaps

Despite decades of research on single-sex education, significant gaps remain in our understanding of its effects, particularly for boys. The most notable gaps include:

- Limited assessment of non-cognitive outcomes: While academic performance has been extensively studied, far fewer studies examine

behavioral, social, and emotional outcomes that may be equally important for long-term success.

- **Few studies on economically disadvantaged boys:** Research rarely examines how single-sex education might differently affect boys from various socioeconomic backgrounds, despite evidence suggesting that disadvantaged boys may be most sensitive to the educational environment.
- **Lack of research on long-term impacts:** Most studies focus on immediate academic outcomes rather than tracking how single-sex education affects college completion, career choices, and life outcomes. This limitation is particularly notable when we consider that despite educational challenges faced by boys, men continue to dominate leadership positions in business, politics, and other influential sectors of society. This creates something of a paradox - boys may struggle more in educational settings, yet men still hold disproportionate power in adult professional contexts despite women's educational achievements.
- **Limited understanding of mechanisms:** Research has identified that single-sex schools can benefit boys through the school-wide environment, but we know little about which specific aspects of these environments drive the positive outcomes.

B. Suggestions for Future Research

To address these gaps, several promising research directions emerge:

- **More rigorous methodologies to control for selection bias:** Future studies should employ stronger controls for both observable and unobservable factors that influence which students attend single-sex schools.
- **Longitudinal studies tracking long-term outcomes:** Research following students from single-sex environments through college and into careers would provide valuable insights into lasting effects.
- **Research on specific school-level factors that benefit boys:** Studies should isolate particular aspects of school environment, structure, and practice to identify what specifically helps boys thrive. School organization types such as charter schools and magnet will be particularly useful to examine.
- **Studies on socioemotional development in different educational settings:** Research examining how single-sex environments affect boys' social skills, emotional regulation, and non-cognitive development would provide a more complete picture of educational effects.
- **Comparative research across demographic groups:** Studies examining how single-sex education affects boys from different racial, ethnic, and socioeconomic backgrounds would help determine which populations might benefit most from these approaches.

By pursuing these research directions, we can develop a more nuanced understanding of when, how, and for whom single-sex education might serve as an effective intervention to address educational challenges faced by boys.

This literature review reveals that single-sex education presents a complex picture with both opportunities and limitations for addressing educational challenges facing boys. The evidence suggests that school-level factors—beyond merely separating students by gender—play a crucial role in determining outcomes. Boys appear particularly sensitive to educational environments, potentially explaining their stronger response to school-wide structures and practices compared to classroom-level interventions alone. While single-sex education shows promise in specific contexts, understanding its effectiveness requires examining the legal and regulatory frameworks that govern its implementation in public education. The following section explores the legal and policy landscape of single-sex education, outlining how constitutional requirements, regulatory changes, and implementation challenges shape opportunities for using this approach to address boys' educational needs within the American public school system.

Legal and Policy Landscape

Previous sections of this report have examined key details of single-sex education schools across the US and the efficacy and limitations of their study. This section supplements these findings by outlining the current state of law and policy regarding single-sex education and identifying primary obstacles to implementing effective single-sex educational programs within the current public education system.

Legal Evolution and Current Framework

Legal Constitutional Foundations

The legal landscape of single-sex education has evolved distinctly from that of racial segregation in America's schools. Unlike racial segregation, which the Supreme Court ruled as "inherently unequal" in Brown v. Board of Education (1954), gender-segregated education has a more complex historical foundation. The Court has never declared that separate educational facilities for males and females are inherently discriminatory, allowing single-sex educational settings to persist under certain conditions while remaining subject to evolving standards of constitutional scrutiny (Georgetown Journal of Gender and the Law 2023).

The constitutional and statutory framework governing single-sex education has developed through landmark cases and legislative actions. Early cases like Vorchheimer v. School District of Philadelphia (1977) and later ones like Garrett v. Board of Education (1991) addressed questions about equality, stigma, and acceptable reasons for separating students by gender. The most definitive judicial statement came in United States v. Virginia (1996), where the Supreme Court established that gender-based classifications must have an "exceedingly persuasive justification" and serve "important governmental objectives." The Court distinguished between unacceptable stereotyping and potentially valid educational approaches, acknowledging that sex classifications may be allowable where they "advance full development of the talent and capacities of our Nation's people" and "dissipate, rather than perpetuate, traditional gender classifications."

Regulatory Evolution and Policy Shifts (2001-2015)

The early 2000s marked a turning point for single-sex education in America. With the No Child Left Behind Act of 2001, Congress explicitly allowed federal funds for single-sex programs "consistent with applicable law," reflecting growing bipartisan interest in expanding educational options (Salomone, 2013). This led to the Department of Education's 2006 revision of Title IX regulations, which significantly expanded opportunities for single-sex education by permitting non-vocational

elementary and secondary schools to establish single-sex classes if they were voluntary, provided a "substantially equal" coeducational alternative, and were based on either a "diversity" or "educational needs" rationale (Georgetown Journal of Gender and the Law 2023).

Legal challenges to the new regulations soon followed. In *A.N.A. ex rel. S.F.A. v. Breckinridge County Board of Education* (2011), the Western District of Kentucky upheld the constitutionality of the regulations, distinguishing between separation based on sex and separation based on race. The court noted that unlike racial segregation, sex separation doesn't necessarily create "a feeling of inferiority" (Georgetown Journal of Gender and the Law 2023). In *Doe v. Wood County Board of Education* (2012), while the Southern District of West Virginia found a specific program's implementation unconstitutional because it wasn't truly "voluntary," the court affirmed that "single-sex classes would [not] ever withstand scrutiny under the Constitution or Title IX" (Salomone 2013). In 2012, the ACLU launched the "Teach Kids, Not Stereotypes" initiative, sending cease-and-desist letters to school districts they believed were violating federal law by "forcing students into a single-sex environment, relying on harmful gender stereotypes" (Salomone 2013).

Legal challenges to these regulations followed, but courts generally upheld their constitutionality while ensuring specific implementations met the required standards. The Every Student Succeeds Act (ESSA), passed in 2015, replaced No Child Left Behind and reduced federal oversight while giving states more decision-making power. ESSA continued the trend toward local control, maintaining provisions allowing single-sex education while emphasizing state flexibility in implementation (Georgetown Journal of Gender and the Law 2023).

IV. Current Legal Requirements and Compliance Framework

The combination of expanded regulatory permission and ongoing legal challenges has created a complex landscape where single-sex programs must carefully balance educational innovation with legal compliance. Summarizing the previous sections, the following framework outlines the key requirements for implementation subject to legal standards:

Requirement Area	Legal Standard	Implementation Example
Justification	"Exceedingly persuasive justification" (U.S. v. Virginia)	Young Women's Leadership School in East Harlem: Focus on math, science, and leadership for underserved minority girls
Program Design	"Substantially equal"	Dual academies with equal

	opportunities (U.S. v. Virginia)	resources, facilities, and curriculum options for both sexes
Voluntary Nature	Affirmative opt-in with signed consent (Doe v. Wood County)	Advance notice to parents with detailed program information and explicit consent forms
Program Rationale	Evidence-based educational needs (Title IX Regulations)	Documentation of gender gaps in specific academic areas that program aims to address
Avoiding Stereotypes	No "overbroad generalizations" (U.S. v. Virginia)	Focus on academic culture rather than assumptions about how girls or boys learn differently
Ongoing Compliance	Regular evaluations (Title IX Regulations)	Annual assessment of academic outcomes and program effectiveness

V. Special Considerations in Implementation

Implementing single-sex education programs requires careful attention to emerging legal considerations, particularly regarding transgender and nonbinary students. The legal landscape has evolved significantly since 2014, when the Department of Education's Office for Civil Rights first issued guidance stating that Title IX protects transgender students from discrimination (Georgetown Journal of Gender and the Law 2023). This guidance has fluctuated with changing administrations, creating implementation challenges for single-sex programs.

Schools must also balance educational innovation with anti-discrimination principles by avoiding gender stereotyping in program design and implementation. The ACLU has documented practices in some programs, including classrooms painted different colors for boys and girls, teachers advised to "shout at boys" but "speak softly to girls," and gender-specific teaching methods based on questionable neuroscience claims, that risk reinforcing harmful stereotypes (Salomone 2013). Successful implementation requires focusing on evidence-based practices that address specific educational needs without relying on generalized assumptions about how girls or boys learn.

The intersection of race, gender, and educational equity presents additional implementation considerations, particularly for programs serving minority students. Data show persistent achievement gaps affecting minority students, with specific concerns for African-American boys who face disproportionately high suspension, dropout, and incarceration rates (Salomone 2004). Programs designed to address

these challenges must document specific evidence supporting the need for gender separation while ensuring equitable resources and opportunities.

VI. Future Legal Landscape

The future legal landscape for single-sex education appears relatively stable, despite ongoing tensions between competing educational philosophies and legal interpretations. The current composition of the Supreme Court, with its 6-3 conservative majority, makes it improbable that the Court would impose stricter scrutiny on single-sex education programs in the foreseeable future.

This legal stability is reflected in practical experience as well. According to Professor Rosemary Salomone, co-author of the 2006 regulations and legal expert on single-sex education, inquiries from schools and districts seeking legal support for compliance challenges have decreased significantly compared to the early 2000s and 2010s. This suggests that either fewer programs are being challenged or that schools have developed greater confidence in navigating the existing legal framework.

Despite this relatively favorable legal environment, important considerations remain for schools implementing or maintaining single-sex programs. Research continues to play a vital role in developing defensible program rationales that can withstand potential challenges. While the "exceedingly persuasive justification" standard from *VMI* remains the constitutional benchmark, programs can meet this requirement by documenting specific educational needs and regularly evaluating outcomes. The evolving understanding of gender identity presents new implementation questions that programs must address thoughtfully.

As one school administrator noted, "The legal questions have settled down, but the educational challenges remain—how do we design programs that truly benefit students without reinforcing outdated stereotypes?" This practical concern, rather than fear of legal challenges, may ultimately determine the future direction of single-sex education in America.

Implementation Lessons

To comprehensively examine the legal and policy landscape of single-sex education, this section explores two pivotal case studies: South Carolina's 2007 statewide initiative for single-gender schools and New South Wales' 2025 government approach to educational access. These examples give light to the complex policy considerations surrounding single-sex education, providing insights into practical implementation challenges, policy dynamics, and what advocacy may look like in this realm.

South Carolina's Single-Sex Education Initiative (2007)

The South Carolina Department of Education's 2007 statewide initiative stands as a landmark attempt to expand single-gender schooling within the public education system. Under the leadership of State Superintendent, Dr. Jim Rex sought to improve test scores and reduce behavioral problems with minimal costs to the state (McNeil, 2008). He created a dedicated state-level position to coordinate administrative tasks and support teacher training, positioning the initiative as an innovative school choice option (Chadwell, 2009; Augusta Chronicle, 2010).

The initiative's initial results were promising yet ultimately mixed. Within two years of implementation, over 200 schools had introduced single-sex classes, serving approximately 22,000 students. However, this number quickly declined to 124 schools with roughly 17,000 students within the following year, highlighting the challenges of sustaining such educational programs.

Key initial findings from the initiative include:

- In a statewide survey from the South Carolina Department of Education at the end of 2007, 75 percent of the 1,700 students who completed the survey self-reported improved performance.
- 80 percent of girls thought single-sex classes boosted their self-confidence, slightly higher than their male counterparts.
- Some schools reported significant reductions in disciplinary incidents (McNeil, 2008).

Despite these positive perceptions, empirical research told a different story. A University of South Carolina report found no statistically significant improvements in academic outcomes, student discipline, student attendance, and perceptions of teachers, students, and parents during the first year, suggesting the reform needed more refinement and research (Houston, 2011).

The initiative's decline was attributed to several critical factors. Most notably, increasing budgetary constraints prevented schools from having enough teachers and the funds needed to train the teachers. During this time, Dr. Rex, the state superintendent, warned against disrupting the progress of the schools. However, he had dwindling influence as his term was coming to an end (Augusta Chronicle, 2010). This case study showcases that sustainable implementation demands:

- Consistent political champions
- Robust, long-term funding
- Rigorous, ongoing evaluation

- Evidence-based decision-making

More so, this case study raises fundamental questions about the scalability and universal applicability of single-sex education in the public school system. It demonstrates that legal compliance is just one aspect of successful program implementation. Educational innovations must navigate complex political, financial, and pedagogical landscapes to achieve meaningful, lasting impact. As it relates to the current administration, states and school districts will face more budget cuts than their predecessors, leading to many educational innovations being put on the back burner.

New South Wales' Educational Access Policy (2025)

International experiences with single-sex education provide valuable insights for the US education system. In parts of Sydney, all public high schools have traditionally been single-sex, significantly limiting families' options. The New South Wales (NSW) Government's 2025 initiative marks a pivotal policy shift, ensuring families in these areas will finally have access to co-educational public high schools (Cassidy and Rose, 2024; NSW Department of Education, 2024). This policy commits to providing co-educational options throughout the state by 2027, with implementation beginning in some areas as early as 2025.

The initiative's first phase involves converting several single-sex schools to co-educational institutions. Within two years, multiple schools will transition, serving as a pilot for broader statewide changes. Key findings from the policy development process revealed:

- Extensive community engagement involving over 120 schools and 401 respondents
- Strong parental preference for co-educational options (75% of primary school parents in Asquith and 65% in Bayside)
- Mixed community responses overall: 40.2% positive, 24% neutral, and 35.8% negative (NSW Department of Education, 2024)

Despite varied feedback, the government maintained its commitment to expanding educational choices. Deputy Premier and Minister for Education Prue Car articulated the fundamental principle: "No family should have to leave their local area to access a co-educational high school. Life is co-ed, and parents and students should have access to a co-ed school option" (The Educator Online, 2024).

The implementation strategy addresses several crucial considerations:

- Adjusting intake boundaries for 20 co-educational high schools

- Maintaining access to single-sex schools for families who prefer them
- Factoring in enrollment trends, public transport access, school capacity, and student population distribution

The NSW approach differs notably from US single-sex education strategies. While the United States has maintained a more fragmented approach, NSW is implementing a systematic, statewide transition. This policy demonstrates a balanced educational reform that respects institutional traditions while responding to community preferences.

This case study highlights the importance of family recruitment, parental input, and community engagement in educational policy development in addition to the critical factors outlined in the previous section above – legal compliance, consistent political champions, long-term funding, rigorous evaluation, and evidence-based decision-making. Excitingly, this initiative also offers valuable research opportunities as these schools transition to co-educational environments.

Advocacy Landscape for Single-Sex Education

The advocacy environment for single-sex education in the United States presents a complex picture characterized by both supportive information sharing and active opposition. This section examines the current advocacy landscape and identifies key challenges and opportunities for advancing single-sex education awareness.

Limited Institutional Advocacy and Opposition Forces

Public and independent schools in the US typically focus on information sharing about their own programs rather than directly advocating for specific policies. However, significant opposition to single-sex education has emerged from civil liberties organizations, most notably the ACLU. Through its "Teach Kids, Not Stereotypes" initiative, the ACLU has actively worked to challenge single-sex programs in public schools, sending cease-and-desist letters to districts they believe are violating federal law by "forcing students into a single-sex environment, relying on harmful gender stereotypes" (Salomone, 2013).

The ACLU's opposition contributed significantly to the shutdown of the National Association of Single-Sex Public Education and has posed threats to numerous public schools implementing single-sex programs. In one notable instance, they sent a letter to DC's Statesmen College Preparatory Academy in their launch year, challenging the legality of their program. The DC Attorney General ultimately handled the issue, having managed similar challenges previously.

Information Sharing Approaches

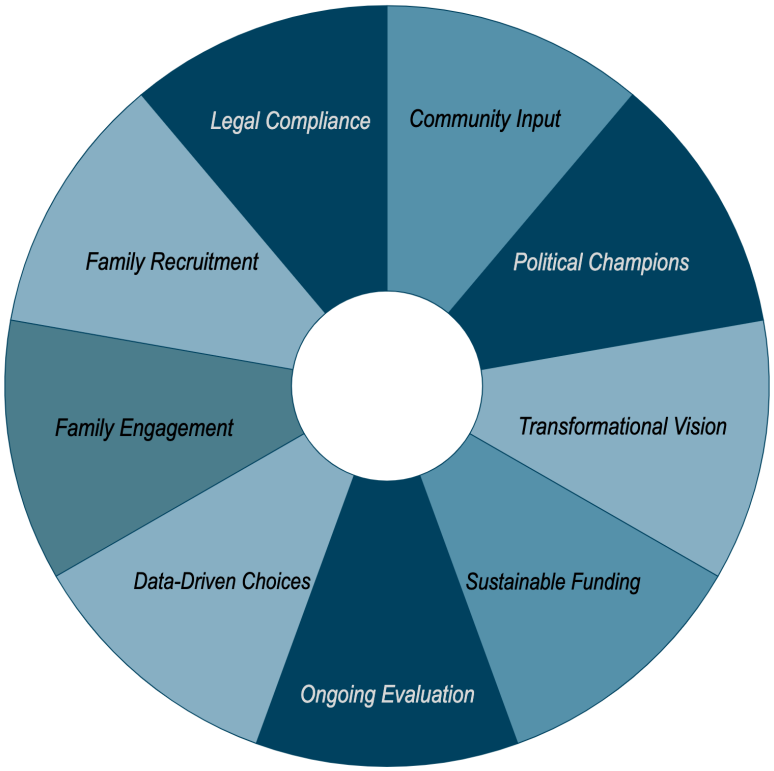
In this contested environment, schools and organizations supporting single-sex education have developed various strategies to promote awareness and understanding of their educational approaches. These include sharing information about curriculum and educational philosophy, media engagement highlighting student success stories, parent testimonials, and educational open houses. Professional development opportunities, research publications, school-specific marketing, and educational symposiums also serve to share best practices and educational outcomes rather than advocating for specific policy positions.

The International Boys' Schools Coalition (IBSC) represents one of the most significant organized networks in single-sex education. Founded in 1995, this nonprofit membership organization has grown to include nearly 300 member schools across more than 15 countries and five continents. IBSC's primary mission centers on connecting educators and boys' schools through research, programs, engagement, and information sharing, working to raise awareness that boys' education is a distinctive educational approach deserving recognition.

A significant feature of the single-sex education landscape is the notable absence of political champions holding office, which limits specific focus on single-sex education in policy discussions. This reflects the current political climate surrounding single-sex educational policy in the US, where implementation depends more on local initiative than coordinated national advocacy.

This decentralized advocacy landscape introduces significant sustainability challenges. A former school leader observed that 'after 10 years, funders and the public lose their appetite if there are not transformative results,' potentially contributing to the documented 22% decline in all-boys public schools between 2016-2022 (Lennon, 2025), of which nearly 40% are charter schools. Leadership pipeline issues compound these challenges, with some experts noting cultural expectations that “all-boys schools need male leaders,” despite shortages of such candidates in leadership development programs. These constraints on resources and leadership contribute to what one expert characterized as overly traditional approaches, where many boys' schools simply implement 'school as is, just separate from girls' rather than developing truly innovative models. This is where the opportunity lies for advancing single-sex education awareness. Successful advocacy efforts must address these sustainability concerns by focusing on identifying and demonstrating which specific elements of boys' education create value, while developing more imaginative conceptualizations of how these environments can effectively serve boys' educational needs beyond simply segregating them by gender.

Comprehensive Implementation Framework



The implementation framework illustrated above synthesizes the key elements required for successful single-sex education programs identified through our case studies and research. Legal compliance forms the foundation, ensuring programs meet constitutional and regulatory requirements. However, as both the South Carolina initiative and New South Wales policy demonstrate, compliance alone is insufficient. Sustainable funding, political champions, and transformational vision collectively drive program viability and purpose. This vision component—where leaders articulate innovative approaches that respond to contemporary educational challenges rather than simply replicating traditional models without girls—connects political advocacy with sustainable funding. Ongoing evaluation and data-driven choices ensure educational effectiveness, while family engagement and teacher training—particularly regarding evidence-based approaches rather than stereotypical assumptions about how boys and girls learn—complete this comprehensive framework.

This legal and policy analysis reveals that single-sex education exists within a complex ecosystem where educational innovation must navigate intersecting legal, financial, political, and social considerations. The most successful implementations

address all eight framework elements rather than focusing exclusively on legal compliance or academic outcomes. As we transition to our reconciliation of claims, this multifaceted understanding provides essential context for evaluating competing perspectives on single-sex education's role in addressing educational challenges, particularly regarding developmental differences between boys and girls that may impact academic achievement.

Reconciliation of Claims

This section integrates evidence from the literature review with insights from expert interviews (n=14) to address key areas where research findings and expert opinions diverge in single-sex education research. The experts encompass leaders in public and private schools (i.e., founders, principals, former educators, etc.), education organizations, and in the academic field of research across the US and UK. Rather than simply reporting different viewpoints, this analysis seeks to reconcile competing claims by examining the underlying evidence, identifying areas of potential synthesis, and addressing implications for educational policy.

Despite their different perspectives, experts demonstrate remarkable consensus in several areas. Researchers consistently acknowledge that as methodological controls become more rigorous in studies, the differences between single-sex and co-educational outcomes diminish, particularly for academic achievement, interests, and self-esteem measures. They also agree that conducting causal research in the US context is exceedingly difficult, with several describing it as "nearly impossible." Additionally, experts concur that behavioral outcomes—potentially the most promising outcome of single-sex education—remain the least studied, with findings heavily influenced by researchers' methodological choices, especially regarding stereotype effects and gender salience.

The most significant disagreements center on whether cognitive differences between sexes justify gender-specific teaching approaches or separate educational environments. These disagreements extend beyond scientific interpretations into fundamental philosophical and practical divides. Some experts argue that biological differences between boys and girls are substantial enough to warrant distinct educational approaches. However, developmental science indicates these differences are typically modest with substantial overlap between gender groups. Other experts emphasize that individual variation within gender groups far exceeds average differences between them, suggesting that educational approaches should focus more on individual needs than gender-based distinctions. The scientific consensus points toward a more nuanced understanding that recognizes both biological factors and environmental influences in cognitive development.

Experts also diverge in their preferred system responses to educational inequities: some advocate reforming existing coeducational systems to better serve all students, while others support creating alternative environments like single-sex schools. Political values further shape these perspectives—those who support girls' education often find themselves logically compelled to consider that boys might similarly benefit from tailored educational approaches. Moreover, If there is such a thing as

girls' education, then it is rational to believe that boys' education could also exist and lead to benefits.

This section will focus on the most contentious issue—cognitive differences by sex—as it forms the cornerstone of the single-sex education debate. After examining the scientific evidence and its practical significance for classrooms, the analysis then moves beyond this contentious area to explore school-level factors supported by researchers, school leaders, and organizations alike. For each factor, I define its importance, elaborate on insights from expert interviews, and highlight practical applications schools might consider. I also examine a distinctive theme that emerged during interviews: the leadership approaches that characterize successful all-boys schools. The section concludes with experts' perspectives on single-sex education's future and the questions it might answer for addressing the educational challenges facing boys.

Debating Cognitive Sex Differences: Science and Educational Implications

One of the most hot-button debates surrounding single-sex education centers on whether cognitive differences between sexes are significant enough to warrant different educational approaches. This debate has important implications for educational policy, as claims about brain-based learning differences often form the foundation for arguments supporting single-sex classrooms and schools. The following section will address the question: Are the brains of females and males so different that they justify separate educational experiences tailored to the way girls vs. boys learn?

Competing Perspectives

Scientific perspectives on cognitive sex differences range from those identifying significant differences to those emphasizing minimal or contextual differences. Some educational practitioners like Gurian et al. (2001) and Sax (2005) have argued that male and female brains are "wired differently," with boys developing certain cognitive abilities on different timelines than girls (e.g., reaching comparable brain maturation around age 15 versus age 11 for girls). These authors contend these differences call for tailored educational approaches to maximize learning potential. Some of the approaches include changes in room temperature for classrooms with boys versus girls, as well as utilizing educational strategies that incorporate movement for boys. They suggest if we separate our students by age, why wouldn't we do the same for their stage of cognitive development?

On the other hand, most academic researchers like Hyde (2016) and Eliot (2021) maintain that while some statistical differences exist in cognitive testing between males and females, they are typically small and are not deterministic to the child's academic ability or achievement. Additionally, meta-analyses by Hyde demonstrate that cognitive differences are influenced by social factors – experiences, environments, and societal expectations. Furthermore, neuroscientific research indicates that variations within genders far exceed average differences between boys and girls, making broad gender-based educational approaches questionable at best. Similarly, researchers have largely debunked the concept of distinct "learning styles" (such as visual, auditory, or kinesthetic), finding little evidence that matching teaching methods to a student's preferred learning style improves educational outcomes (Pashler et al., 2008).

What Research Actually Shows

The research reveals a more nuanced picture than either position suggests:

Established Cognitive Differences Cognitive development literature consistently accepts and identifies several areas where cognitive differences between sexes appear. Girls generally outperform in verbal abilities like verbal recall and expression, reading comprehension, writing, and emotional recognition (Halpern & Wai, 2020; Herlitz et al., 2013; Voyer & Voyer, 2014). In a large-scale study with 75 countries examined, findings show the female advantage in reading appeared across multiple cultures (Stoet & Geary, 2013). In contrast, boys tend to show advantages in specific spatial tasks, particularly mental rotation (Halpern & Wai, 2020). However, differences are smaller in spatial perception and spatial visualization tasks (Linn & Petersen, 1985; Halpern & Wai, 2020). Some cognitive differences emerge very early – studies have detected male advantages in mental rotation among infants as young as 3-5 months, and early language advantages for girls (Miller & Halpern, 2014). Despite having certain favored abilities, girls consistently earn higher grades at all grade levels, including mathematics. This, however, is not new. A study with data from 1914 to 2011 has shown girls have outperformed boys in academic reports for over a century (Voyer & Voyer, 2014). However, it was not until the turn of the century, around the 1990s, that changes in college enrollment rates took place with girls and boys enrolling at a 60/40 ratio (Goldin et al. 2006).

This suggests that while cognitive differences and academic performance patterns between boys and girls have remained relatively stable for over a century, social and cultural shifts in the 1970s with grand scale effects manifesting in the 1990s fundamentally changed how these patterns translated to educational attainment. As women gained greater access to higher education and faced fewer barriers to pursuing careers, the long-standing female advantage in school performance began

to manifest in college enrollment rates. This indicates that the current "boy crisis" in higher education likely stems not from new cognitive disadvantages or changing academic performance, but rather from changing social expectations, educational aspirations, and career opportunities that have allowed girls to capitalize on their consistent academic advantages while boys' motivation and engagement in education may not have evolved correspondingly.

Developmental Timing and Maturation Without a clearer connection between cognitive sex differences and academic performance, the attention moves to physical maturation and timing of puberty to understand if it is timing of maturation that impacts boys abilities to capitalize on education during changing social times. Research on physical and cognitive development reveals that girls largely outpace boys in meeting developmental milestones. Specifically, girls typically reach puberty 1-2 years before boys (Torvik et al., 2021), suggesting that developmental timing may play a role in educational outcomes independent of purely cognitive factors. This developmental gap raises questions about whether educational approaches should consider these biological timing differences.

In recent years, literature has seen increases in research on pubertal development as it relates to academic achievement. While some studies yield mixed results (Beyens et al., 2015; Herlitz et al., 2013), multiple studies indicate that physical maturation relates to academic achievement especially when they explore the role of off-time pubertal timing (i.e., both early and late maturation) in relation to academic performance (Goering, Albright, and Mrug, 2023). According to Torvik et al. (2021), puberty doesn't directly cause changes in academic achievement. Instead, the same genetic factors that influence when a person goes through puberty also influence their academic performance. Specifically, genetic influences on pubertal development accounted for approximately 8% of the variation in academic achievement for boys and 7% of the variation in academic achievement for girls. This suggests that early or late puberty is an indicator of academic risk rather than the cause of academic differences. The relationship exists because the same genes influence both the timing of puberty and factors related to academic achievement (such as cognitive development or behavioral traits like conscientiousness).

To fully address developmental timing, an important consideration is maturity effects. Røed et al. (2025) found that about 11% of the boy gap in GPA can be explained by differences in maturity levels. Interestingly, the researchers also found “differences in returns to maturity.” What this means is that not only are girls more physically mature than boys at the same age, but they also appear to benefit more academically from their maturity. For example, if a boy and a girl are both at the same level of physical maturity, the girl might still get a higher GPA boost from that

maturity level than the boy would. The authors contend that this may explain up to 49% of the boy gap in GPA.

These findings raise two important items. First, pacing boys in school by developmental milestones may improve outcomes (Torvik et al., 2021) but does not address their lower returns to maturity compared to girls. Second, this difference begs the question, why aren't boys able to capitalize on their maturity in the same way girls do? This suggests that biological differences alone cannot explain the achievement gap, pointing to the need to examine how environments and social expectations might interact with developmental differences.

This issue becomes even more complex when considering students of color, particularly those from low-income backgrounds. According to Goering, Albright, and Mrug (2023), early-maturing Black youth face unique challenges as their physical maturation interacts with racial stereotypes and discrimination. The Phenomenological Variant of Ecological Systems Theory (PVEST) suggests that off-time pubertal timing creates additional challenges for Black youth already exposed to racial discrimination. Research shows that adults often perceive Black children as older than their White peers of the same age (Goff et al., 2014), leading to assumptions that Black girls need less support and protection (Epstein et al., 2017). This perception contributes to Black girls experiencing harsher school discipline practices (Blake et al., 2011), while Black boys are disproportionately viewed as "deviant and unteachable" (Rowley et al., 2014) and face higher rates of suspensions and expulsions (Losen & Martinez, 2013). Since Black girls, on average, experience puberty earlier than other groups (Slyper, 2006), they become particularly vulnerable to these biased perceptions. For low-SES boys, early puberty is associated with worse performance on attention and executive functioning tasks both immediately and over time (Stumper et al., 2020), creating a paradoxical situation where their accelerated physical development becomes an academic disadvantage rather than an advantage.

Why? Nature versus Nurture: A Biopsychosocial Perspective

There is no "smarter sex" - research consistently shows that overall intelligence does not differ between males and females. What does vary are specific cognitive strengths that manifest differently across sexes, with substantial overlap between groups and considerable individual variation within each sex. Understanding these differences requires examining both biological predispositions and social influences that shape cognitive development.

To understand these differences fully, we must move beyond the simplistic nature-versus-nurture dichotomy. American psychologist and former president of

the American Psychological Association, Diane Halpern's biopsychosocial model provides a more sophisticated framework that recognizes the continuous interplay between biological and environmental factors. As Halpern explains, "nature and nurture mutually influence each other in reciprocal ways and cannot be separated" (2006). This dynamic relationship creates a feedback loop where biological factors and environmental experiences constantly shape and reshape one another throughout development.

Biological Factors in Context Biological factors contribute to some observed cognitive variations between sexes but always operate within environmental contexts. Prenatal hormone exposure appears influential, as demonstrated by studies of girls with congenital adrenal hyperplasia (a condition resulting in increased exposure to male sex hormones during development) who display more male-typical patterns in spatial abilities and play preferences (Berenbaum et al., 1995). Brain organization shows some sex-related patterns, but experience actively shapes neural structures - London cab drivers' hippocampi enlarged after years of navigational work, demonstrating how cognitive demands reshape biological structures (Maguire et al., 2000; cited in Halpern, 2006).

Even supposedly fixed biological factors like hormones demonstrate remarkable contextual flexibility—testosterone levels rise or fall depending on competitive outcomes (Schultheiss et al., 2005), while cognitive performance varies slightly over hormonal cycles, though with differences too small to meaningfully impact everyday functioning (Halpern & Tan, 2001). This plasticity extends to the relationship between physical development and academic achievement. According to Torvik et al. (2021), genetic factors simultaneously influence both pubertal timing and academic performance, suggesting early or late puberty isn't a direct cause of academic differences but rather indicates shared genetic influences affecting both developmental processes.

These biological factors translate into cognitive processing differences between males and females as mentioned previously. Rather than reflecting overall ability disparities, these differences represent variations in cognitive approaches. Halpern's research reveals that females generally excel at accessing information in episodic memory, word knowledge, and phonetic information, while males typically access and transform visuospatial information more efficiently (Halpern, 2006). These processing differences manifest in mathematics problem-solving, where male students more often employ flexible strategies for spatially-oriented problems, while females more successfully solve problems with familiar contexts that utilize verbal skills or require retrieval of known solutions (Gallagher et al., 2000, cited in Halpern, 2006).

The biopsychosocial model also highlights the substantial plasticity in cognitive abilities. Spatial abilities—where males typically demonstrate advantages—improve markedly with training for both sexes, sometimes with females showing greater gains (Miller & Halpern, 2014). Studies demonstrate that male advantages on standardized math tests can be minimized, equalized, or maximized simply by altering how problems are presented and which cognitive processes are engaged for solutions (Gallagher, Levin, & Cahalan, 2002, cited in Halpern, 2006).

Environmental Plasticity and Social Context Social contexts further shape how these cognitive differences manifest across environments. Cross-cultural studies reveal complex interactions between biology and environment, with the counterintuitive finding that some cognitive sex differences actually grow larger in more gender-equal societies (Lippa et al., 2010). Additionally, educational settings appear to impact boys and girls differently, with research indicating boys may be particularly sensitive to school-wide environmental factors, potentially explaining their lower returns on physical maturity compared to girls (Autor et al., 2019). Performance can also be affected by stereotype threat, where awareness of negative group stereotypes impairs cognitive function, though recent meta-analyses show these effects vary considerably across contexts (Miller & Halpern, 2014).

The classroom environment itself reinforces certain sex-linked behaviors through assessment practices. School grads heavily incorporate noncognitive variables that typically align with female socialization patterns—attentiveness, rule-following, consistent organization, cooperation rather than competition, self-regulation, and neat presentation of work (Halpern, 2006; Dwyer & Johnson, 1997; Kimball, 1989). Since these behaviors factor into classroom assessments but not into standardized tests, they help explain the consistent pattern where girls outperform in course grades across subjects while boys sometimes excel on standardized measures that focus exclusively on content knowledge (Halpern, 2006).

Evidence Assessment

The evidence points to several key principles that help reconcile seemingly contradictory findings:

(1) Distinguishing between statistical averages and individual needs: Cognitive differences between sexes represent statistical trends with substantial overlap between distributions, where within-group variation is greater than average differences between genders. Even where average differences exist, they don't justify treating all boys or all girls as homogeneous groups.

(2) Recognizing the interaction between biology and environment: Biological factors and social influences interact dynamically to shape academic performance. Cognitive development reflects an ongoing interplay between biological predispositions and environmental influences, not fixed, immutable differences. The relationship between physical maturation and cognitive development is nuanced, with the association between puberty and academic achievement appearing to stem from shared genetic factors rather than direct causation.

(3) Acknowledging developmental complexity: The relationship between physical maturation and cognitive development is nuanced. As Torvik et al. (2021) found, the association between puberty and academic achievement appears to be due to genetic factors that affect both processes rather than direct causation.

(4) Focusing on equity implications: These interactions have significant equity implications, particularly for students of color and those from low socioeconomic backgrounds. Black youth face unique challenges when their early physical development intersects with racial stereotypes, as adults often perceive Black children as older than White peers of the same age (Goff et al., 2014). Meanwhile low socioeconomic status can influence early puberty for boys, through multiple mechanisms like chronic stress and nutritional factors affecting hormonal changes (Boynton-Jarrett & Harville, 2010), which is associated with "worse performance on attention and executive functioning tasks" (Stumper et al., 2020).

(5) Differentiating between types of outcomes: Sex differences vary considerably across different cognitive domains and types of assessments. Girls consistently outperform boys in school grades across all subjects, while boys sometimes show advantages on standardized tests less directly tied to curriculum.

Implications for Educational Practice

As Halpern & Wai (2020) concluded, "There are no cognitive reasons to support sex-segregated education, especially given the large amount of overlap in test scores for girls and boys on all tests of cognitive ability." This statement reflects the core finding from decades of research on cognitive sex differences—while statistical patterns exist, the substantial overlap between distributions and greater within-group than between-group variation means educational approaches should focus on individual needs rather than gender-based groupings.

Educational approaches should acknowledge developmental complexity, avoid deterministic models based on cognitive differences or puberty, support individual development trajectories, and implement evidence-based practices. Educational strategies should be based on robust research evidence rather than commercial claims like changing room temperatures by gender. Most importantly, this analysis suggests educational policy should aim to boost boys' motivation and engagement in education and look to educational practices that help boys capitalize on later maturity and development.

Beyond Cognitive Differences: Consensus on School-Level Factors

While evidence on cognitive abilities does not provide justification for separating students by sex in educational settings, interview respondents revealed important consensus around school-level factors that benefit students, particularly boys. These organizational and pedagogical approaches represent areas where successful single-sex schools and coeducational environments may find common ground to improve educational outcomes for all students. The identified factors align with educational literature to boost boys' motivation and engagement in school, as well as help them capitalize on their later maturity and development

Across perspectives, experts consistently identified the following school-level factors as key motivators for boys' success in school:

1. Relationship-Driven Environment
2. Supporting Identity Development
3. School Culture and Community
4. Professional Development for Teachers
5. Progressive Educational Strategies

In the following sections, I will delve into each factor, drawing from both the expert interviews and academic literature. By weaving together research findings with practitioners' firsthand insights, I'll explore how these factors benefit boys' development and examine specific design elements that schools and organizations have successfully implemented. This synthesis of theory and practice offers a comprehensive framework that can inform approaches across various educational settings.

Relationship-Driven Environment

Definition and Importance

A relationship-driven environment places strong teacher-student relationships at the foundation of educational practice. This approach recognizes that a sense of belonging and connection with committed adults who maintain high expectations is

crucial for boys' academic engagement. Throughout the interviews, experts consistently identified the quality of relationships as the primary motivator for boys' learning. As one school leader powerfully stated, "That's the opportunity. That's the power of this work" (Post, 2025). This sentiment was echoed across multiple interviews, with respondents emphasizing that relationships form the foundation upon which effective learning occurs, especially for boys.

Research supports this observation through the well-documented *Pygmalion Effect* - the phenomenon where students rise or fall to the level expected of them by their teachers (Boser et. al., 2014). When teachers communicate belief in students' abilities through their interactions, students internalize these expectations and perform accordingly. Multiple studies demonstrate that teacher-student relationships and teacher expectations significantly predict student outcomes, with students whose teachers hold high expectations being three times more likely to graduate from college than peers with teachers who hold lower expectations (Boser et. al., 2014).

Building Effective Relationships with Boys

Existing literature describes several key elements for establishing productive relationships with boys. First, they emphasized the importance of teachers demonstrating genuine interest in students' lives beyond academics. Reichert and Hawley (2013) found that "reaching out and going beyond" standard procedures to meet students' unique needs creates a foundation for trust and engagement. Similarly, Nelson (2016) identified "personal advocacy" - consistently tapping into boys' individual interests and talents - as a crucial strategy, particularly for resistant students.

Second, experts highlighted the role of authenticity and vulnerability in relationship-building. As one school leader explained, "You can't be in a relationship with another unless you know yourself. And frankly, you love yourself. We're in an all boys environment and we're not afraid to use that term love" (Post, 2025). This willingness to be genuine and reveal appropriate aspects of oneself as an educator creates space for boys to do the same, challenging restrictive notions of masculinity that can inhibit relationship formation.

Third, several participants described the importance of establishing common ground with students. Whether through shared interests, experiences, or characteristics or introducing students to as much, finding points of connection strengthens the relational bond. This approach proves especially important for boys of color, as Land et al. (2014) found that trusted relationships with adults who understand their unique experiences provided critical support for successful African American male students.

Impact on Boys' Development and Learning

The impact of strong relationships extends far beyond immediate academic performance. Interviewees described how positive teacher-student relationships transformed boys' engagement with school, their sense of self, and ultimately their life trajectories. As one practitioner shared, "what exists in this school, because of the good work of adults, has changed, maybe saved kids' lives" (Post, 2025).

Research confirms that relationship quality significantly influences multiple aspects of boys' development. Land et al. (2014) found that trusted relationships supported the development of self-esteem, self-efficacy, and inner determination among African American male students. Nelson (2016) observed that relational teaching strategies helped Black boys resist negative stereotypes and express themselves more authentically. Reichert and Hawley (2013) documented how positive relationships preceded desired school outcomes, including reduced behavioral problems, increased engagement, and greater willingness to complete challenging tasks.

Applications Across Educational Settings

A significant finding from both the interviews and supporting research is that relationship-driven approaches benefit boys across diverse educational contexts. While implementation strategies may vary, the fundamental importance of prioritizing relationships applies universally. As one interviewee noted, "I think that if the academic institution[s] were committed to these kinds of pillars, it works for everybody. It really works for everybody" (Hunter, 2025).

Practical applications include creating structured advisory programs, scheduling time specifically for relationship-building, training teachers in relational approaches, and evaluating relationship quality as an educational metric. These strategies can be adapted for both single-sex and co-educational environments, providing a common foundation for supporting boys' educational success regardless of school structure.

Supporting Identity Development

Definition and Importance

Supporting boys' identity development emerged as a primary theme across expert interviews. Practitioners consistently emphasized the importance of creating spaces where boys can explore their authentic selves beyond restrictive masculine norms. As one school leader noted, "If given space for these boys, they can really make transformative breakthroughs about who they are from an identity standpoint, what they value in school, what areas of opportunities they have" (Hunter, 2025).

The Challenge of Masculine Norms

Traditional masculine norms often pressure boys to exhibit emotional stoicism, physical toughness, and excessive control. Way et al. (2014) found that while 78% of boys showed moderate to high resistance to these norms during early adolescence, this resistance typically declined as they entered high school, with only 43% maintaining this resistance by 11th grade. This suggests that societal pressures intensify during adolescence, making it increasingly difficult for boys to express their authentic selves.

The impact of these restrictions can be significant. According to Reichert et al. (2012), boys in traditional school environments often describe a culture that demands they "prove their masculinity" and discourages emotional expression. One student in their study characterized regular school life as being "all about machismo," highlighting how these expectations become embedded in educational settings.

Creating Spaces for Authentic Expression

When schools intentionally create safe environments for emotional expression, boys demonstrate remarkable capacity for growth. Reichert et al. (2012) documented how a peer counseling program provided a confidential space where boys could "shed off that stereotype that we're supposed to be tough, we're supposed to be unemotional." This permitted participants to develop crucial emotional skills:

- Identifying and articulating feelings
- Listening effectively to others
- Expressing vulnerability
- Engaging in meaningful self-reflection

As one expert emphasized, "The importance of the all boys middle school is that when you hold space intentionally for students to, kind of freely express themselves, you can really make inroads on identity building. It [is] almost like deprogramming and resocializ[ing] them in ways that allow them to express themselves in a more human way" (Hunter, 2025).

Implementation Strategies

Interviewees described several effective approaches for supporting boys' identity development:

1. **Structured Opportunities for Expression**: Cofounder of Journeymen, Alex Craighead and Headmaster Christopher Post highlighted the value of programs like talking circles from Journeymen and the senior speeches at Boys Latin School of Maryland. These structures provide frameworks that normalize sharing personal experiences and feelings in a supportive environment.

2. **Adult Modeling and Support**: Tom Batty, Head of International Boys School Coalition, emphasized the importance of adults not shutting down when boys externalize emotions, but instead helping them process and rationalize their feelings. This commitment to staying present during vulnerable moments was identified as crucial for boys' development.
3. **Diverse Interest Development**: Several interviewees pointed to the importance of developing hobbies and interests beyond traditional masculine domains (Batty, 2025; Colberg, 2025). One mentioned Christ School's afternoon programming and photography classes as examples of activities that allow boys to explore different aspects of their identities (Colberg, 2025).
4. **Embracing Vulnerability as Strength**: Practitioners consistently highlighted the importance of redefining vulnerability not as weakness but as a source of strength and authentic connection (Craighead, 2025; Hardnett, 2025).
5. **Inclusive Understanding of Boyhood**: "There's no one way to be a boy" was a sentiment echoed throughout interviews, with experts emphasizing the importance of creating space for diverse gender expressions, including support for cisgender, transgender, and nonbinary students.

Special Considerations for Marginalized Groups

Interviewees emphasized that identity development presents unique challenges for students of color, particularly Black boys, who often navigate difficult choices between playing into or defying stereotypes. As Hardnett, Founder of Statesmen College Preparatory Academy for Boys, noted in his interview, teaching Black boys that "their bodies are sacred" provides a powerful counter-narrative to harmful societal messages (Hardnett, 2025).

Experts also stressed that self-perception, confidence, and agency are heavily shaped by a school's disciplinary practices. These systems can either support positive identity development or reinforce harmful stereotypes, making intentional design of discipline systems essential for supporting boys' identity formation.

Benefits for Development and Learning

Research demonstrates that boys who maintain resistance to restrictive masculine norms typically show better psychological and social adjustment. Way et al. (2014) found that resistance to masculine norms was generally associated with better mental health and deeper friendships. Similarly, Reichert et al. (2012) documented how participants in their program reported relief from emotional suppression, improved relationships, greater authenticity, and enhanced emotional regulation. These outcomes directly support academic engagement and success by creating a foundation of wellbeing necessary for learning.

Applications Across Educational Settings

While the research highlights examples from single-sex environments, the principles for supporting healthy identity development can be applied across educational contexts. Special attention should be given to boys from marginalized groups who face additional identity challenges. As one interviewee noted, young Black and brown boys are "oftentimes seen in society as grown men, and so they don't have that opportunity to fully express themselves as children or preteens" (Hunter, 2025).

By creating intentional spaces that validate emotional expression and authentic identity development, all educational settings can better support boys in developing healthy relationships with themselves and others.

School Culture and Community

Definition and Importance

School culture and community represent the backbone for student success, particularly for boys. A positive school climate creates a sense of belonging and engagement that supports learning. This includes the role of shared values, traditions, and community practices that bring students and faculty together. Throughout the interviews, experts' schools and programs demonstrated that the best school culture maintains a careful balance between competition, collaboration, and celebration.

As one school leader stated, "We believe our purpose as a school is to help shape [and] form...the full humanity of a young man" (Post, 2025). This whole-student approach recognizes that education extends far beyond academic instruction to develop character, values, and community connection.

Throughout the expert interviews, three key themes consistently emerged regarding school culture and community: the importance of ritual and ceremony, the role of healthy competition and motivation, and the value of physical movement in learning. These themes were not only mentioned frequently but were described as essential components of successful educational environments for boys. The following sections explore the research evidence supporting each of these practitioner-identified themes.

The Power of Ritual and Ceremony

Research shows that ceremonies and rituals significantly impact school communities. Rituals are collective practices that "serve to bind individuals together into a community, providing a shared sense of meaning and purpose" (Smith, 2003). These practices help students understand both school culture and broader social values.

Kapferer's (1981) research demonstrates that rituals communicate a school's values by creating special moments that stand apart from daily routines. By connecting abstract values to tangible experiences and public celebrations, rituals make the school's mission concrete and accessible. Kapferer also contends that private schools particularly excel at using these practices to build parent commitment and reflect community values. These practices help bring people together when conflicts might otherwise arise, while also strengthening school spirit and community bonds. Over time, rituals help develop shared ways of thinking, behaving, and understanding that become part of the school's identity.

Developmental Benefits of Ritual

Rituals benefit boys' development by engaging both their minds and emotions simultaneously, teaching important values through direct participation rather than abstract instruction (Mullis & Fincher, 1996). For boys who often respond better to active learning than passive listening, this dual-channel approach proves particularly effective.

Well-designed rituals follow a three-part structure: preparation, participation, and reflection (Van Gennep, 1960). This structure provides boys with clear expectations, meaningful engagement, and opportunities to internalize lessons - addressing their needs for structure, action, and purpose.

Research by Conway (1990) found that schools can significantly improve climate by emphasizing ritual over rules, creating "a strong, unified culture of excellence" that motivates students intrinsically rather than through external discipline. For boys who may resist arbitrary authority, this approach transforms compliance into meaningful participation.

Competition and Motivation

Research on competition reveals a more nuanced picture than commonly assumed. In physical activities, competition can boost attention and engagement, but it may actually interfere with learning when applied to purely thinking-based tasks (Hanus & Fox, 2015). This distinction is important for schools designing activities that effectively build community without hindering academic performance.

The idea that boys are naturally more competitive than girls isn't supported by research. Studies by Dreber and colleagues (2011) found no gender differences in competitive behavior among Swedish children, with both boys and girls performing equally well in competitive settings across various activities. What seems to matter more is the environment rather than gender itself - girls in single-sex schools and same-gender groups choose competitive activities more frequently than girls in mixed settings (Booth & Nolen, 2012).

This research suggests that competition, when thoughtfully structured, can benefit all students. Rather than assuming boys need competition while girls don't, schools should focus on creating environments where competition builds community and motivation without undermining learning. The key is balancing competitive elements with collaboration and ensuring that competition occurs in supportive contexts that don't create unnecessary pressure or anxiety.

Physical Movement and Learning

Movement plays a vital role in learning for all students. As Hannaford (1995) puts it, "the human qualities we associate with the mind never exist separate from the body." This mind-body connection is an important consideration for developing effective educational practices, especially considering that many boys struggle with traditional sedentary classroom settings. A recent EdWeek Research Center survey found that boys typically have more difficulty sitting still in class, with 51% of teachers reporting boys "often" or "always" have this challenge compared to just 18% for girls (Huebeck, 2025).

When students move, their brains benefit in multiple ways. Exercise increases blood flow to the brain, releases mood-enhancing chemicals, improves alertness, and may even stimulate the growth of new brain cells (Jensen & Dabney, 2000). These physical changes directly support learning and attention.

Research consistently confirms these benefits. The California Department of Education (2005) found that students with higher fitness levels achieved higher SAT scores, especially in mathematics. Students meeting fitness standards in multiple areas showed the greatest academic improvement.

Even modest amounts of physical activity make a difference. Jensen (1998) and Hannaford (1995) found that students participating in daily physical education not only became more fit but also performed better academically and showed more positive attitudes toward school.

A comprehensive review of 54 studies with nearly 30,000 elementary school children found that incorporating movement into academic lessons improved both physical activity levels and learning outcomes in 28 out of 29 cases(Petrigna et al., 2022). The evidence overwhelmingly supports making movement a regular part of the school day for all students.

Implementation Strategies

Based on both research evidence and practitioner interviews, several implementation strategies emerge for creating positive school cultures that benefit boys:

- **Community-Building Activities:** Interviewed schools emphasized community-building activities, ceremonies reinforcing shared values, balanced approaches to competition (including "house" systems), and movement strategies such as pre-school play. As one school leader noted, "Boys do well with physical activity. They do well with choice. They do well with having meaning in their work. And they do best when they understand they're a part of something much larger. So we take the first hour or more of the day and we really build community" (Post, 2025).
- **Movement-Based Learning:** Effective movement-based learning activities include outdoor structured nature-based play, games-centered interventions, activities using tools like pedometers with mathematics tasks, free play or semi-structured physical activity, play with balls featuring academic symbols, and cooperative activities integrating content. Specific examples include physically enacting words for language learning (e.g., for "fly," children ran and moved hands as if flying), "traveling" between continents for geography lessons, using foam number blocks on the floor for mathematics, jumping in place for each letter when spelling, and jumping to solve multiplication problems.
- **Competition Framework:** Research by Burguillo on Competition-based Learning (CnBL) demonstrates how properly structured competition can enhance student motivation and performance. By combining competitive elements with collaborative learning, schools can create frameworks where students work together in small groups while engaging in friendly competition with other groups. Successful implementation includes ensuring that competition occurs in a supportive context, learning remains independent of competition results, collaboration within groups balances competition between groups, and tournaments help transform stress into excitement.

Applications Across Educational Settings

While many of these strategies emerge from single-sex educational environments, they can be effectively adapted across different school types. Research indicates that inclusive community-building benefits all students, with studies showing that girls benefit from physical activity and appropriate competition just as boys do (Eliot, 2010).

Recommendations for school events and traditions include:

1. Developing intentional ritual practices that build community cohesion
2. Incorporating regular physical activity throughout the academic day
3. Creating structured contexts for healthy competition balanced with collaboration
4. Establishing traditions that celebrate student achievements and reinforce shared values

As one expert noted, "You need these spaces where people can come together around the campfire, so to speak, with folks who share their social identity and other forms of identity to be able to think through that. To say: are you seeing this? Is this what I'm seeing?" (Ballard, 2025). This perspective highlights the importance of creating spaces where students can explore their identities within supportive communities.

In conclusion, school culture and community provide the essential context within which boys thrive academically and developmentally. Through intentional design of rituals, traditions, physical activities, and community structures, schools can create environments that engage boys' tendencies toward movement, meaning, and belonging while supporting their growth as complete human beings.

Professional Development for Teachers

Definition and Importance

Professional development for teachers emerged as a significant theme throughout interviews with school leaders and researchers. Professional development includes specialized training addressing boys' developmental needs, building capacity for culturally-responsive teaching practices, and strengthening the connection between teacher confidence and student outcomes. While teachers work diligently within the current system, many face challenges due to outdated approaches and insufficient resources.

As Alex Craighead notes, "I just acknowledge and honor the educators because I don't think it's their fault. I don't think they're doing anything wrong. I think they're doing their best in a broken system and a system that's very outdated, that hasn't adapted and adjusted to the needs of these times, and it's underfunded" (Craighead, 2025). This perspective represents this report's acknowledgement that teacher effectiveness often depends on the systems and supports in place rather than individual shortcomings.

Research Evidence

Research consistently demonstrates the significant impact of teacher development on student outcomes. Dobbie and Fryer (2013) collected data on 39 charter schools to identify specific policies contributing to school effectiveness. They found that five key

policies, including frequent teacher feedback and data-driven instruction, explained approximately 45% of the variation in school effectiveness. This research underscores the importance of systematic approaches to teacher development.

Studies on professional development impact show promising results when implemented effectively. According to Yoon et al. (2007), teachers receiving an average of 49 hours of professional development can increase student achievement by approximately 21 percentile points (effect size of .54). Their research also found that professional development programs exceeding 14 hours showed positive and significant effects on student achievement, while those with fewer hours did not demonstrate significant impacts.

More recent research by Basma et al. (2017) challenges the assumption that more training hours always yield better results. Their study found that shorter, high-quality professional development (10-28 hours) actually produced a larger effect size (.37) than longer programs of 30+ hours (.09). These findings suggest that quality matters more than quantity when it comes to teacher training.

The key features of effective professional development include fidelity checks, continuous support through follow-up sessions, purposeful activities directly applicable to classroom practice, and highly structured delivery models with skilled trainers (Basma et al., 2017). This aligns with findings from the Learning Policy Institute, which identified seven elements of effective professional development:

1. Content focus - Training that addresses specific curriculum content and teaching strategies
2. Active learning - Hands-on experience designing and practicing new approaches
3. Collaboration - Opportunities for teachers to share ideas in job-embedded contexts
4. Models and modeling - Clear examples of best practices through lesson plans, sample work, and observations
5. Coaching and expert support - Specialized guidance focused on teachers' individual needs
6. Feedback and reflection - Dedicated time for teachers to consider and refine their practice
7. Sustained duration - Adequate time to learn, implement, and reflect on new strategies (Darling-Hammond et al., 2017)

These elements create a framework for designing professional development that translates into improved teaching practices and student outcomes.

Implementation Strategies

Interviews with school leaders revealed several important implementation strategies for professional development specifically addressing boys' educational needs. Nakia Douglas, Founder of The Barack Obama Male Leadership Academy, emphasized the importance of training focused on the "psychology of educating boys" to help foster excellence and cultivate teacher confidence. This approach recognizes that teachers need specialized knowledge about boys' development to create appropriate learning environments.

Jerome Hunter identified committed adults as the primary factor in successful schools for boys. This perspective highlights the importance of not just developing teachers' technical skills but also fostering their commitment to serving boys effectively. Statesmen Preparatory Academy for Boys takes this commitment to teacher support a step further by having psychologists on staff who work exclusively with teachers, providing specialized guidance and support for addressing the unique needs of their students.

As Aukeem Ballard notes, traditional approaches may create tensions for innovative educators: "As an educator, I think one of the biggest barriers that I faced was being told that what I was doing in terms of trying to create affirming spaces and inclusive spaces, was not going to get us towards the AYP, annual yearly progress, on the academic mark" (Ballard, 2025).

Effective professional development programs described by interviewed schools emphasized consistency and diversity in training approaches. Rather than relying solely on district-provided training, successful schools incorporated a wide range of speakers and perspectives. This ongoing, multifaceted approach helps teachers develop comprehensive skills for working with boys.

Applications Across Settings

While specific applications may vary, certain professional development needs appear universal across different school types. All teachers benefit from understanding boys' developmental patterns, effective engagement strategies, and approaches to building positive relationships. At the same time, different educational contexts may require specialized training opportunities.

For sustainable professional development models, the research suggests several recommendations. First, training should balance quality and duration, focusing on high-impact, structured programs rather than simply accumulating hours. Second, professional development should incorporate all seven elements identified by the

Learning Policy Institute, with particular emphasis on active learning and ongoing support.

As Ballard explains, effective teacher development moves beyond compliance toward empowerment: "Those tools and tactics are grounded in control. I don't want to control people. I want to see the brilliance that's already in them, and I want to create the conditions where that brilliance can come out" (2025). This perspective aligns with research showing that professional development works best when it builds teacher agency rather than simply imposing new requirements.

In conclusion, professional development represents a critical investment in creating effective educational environments for boys. When designed with attention to quality, relevance, and sustainability, teacher training can significantly improve both teaching practices and student outcomes. This requires moving beyond one-size-fits-all approaches to create context-specific, responsive professional learning opportunities that genuinely support teachers in meeting boys' unique needs.

Progressive Educational Strategies

Definition and Importance

Progressive educational strategies for boys focus on hands-on learning that develops the whole student. These approaches combine experiential activities, project-based work, and physical movement with academic content. They create learning environments where boys can engage actively rather than passively receiving information. As one educational leader explains, effective programs involve "taking some intentional time as a school or an institution to think about normalizing communication, normalizing emotions, doing all this without at the expense of rigorous academics" (Hunter, 2025).

These methods address boys' needs for physical activity, meaningful challenges, and social connection while maintaining high academic standards. Though particularly helpful for boys who struggle with traditional classroom structures, educators report these approaches benefit all students by connecting intellectual development with social-emotional growth. The following analysis combines insights from educational research with firsthand perspectives of experienced single-sex school practitioners to provide actionable approaches for supporting boys' learning needs.

Research Evidence Supporting Progressive Approaches

(1) Project-Based Learning

Emerging from interviews with experts, project-based learning (PBL) represents one well-researched progressive approach that shows significant benefits for students across grade levels. According to Kokotsaki et al. (2016), PBL is characterized by:

- Student autonomy and active involvement in learning
- Constructive investigations and goal-setting
- Collaboration, communication, and reflection
- Learning grounded in real-world contexts and practices

Research evidence from various educational contexts demonstrates PBL's effectiveness:

- Pre-school and primary students show improved content knowledge, group work skills, and positive attitudes toward learning
- Middle and high school students develop deeper conceptual understanding versus procedural knowledge, particularly in mathematics, science, and humanities
- PBL approaches have shown particular benefits for narrowing achievement gaps for low socioeconomic status students

Effective implementation of PBL includes carefully scaffolded instruction, balanced technology integration, and assessment practices focused on reflection and formative evaluation.

(2) Critical Exposures and Experiential Learning

Interview participants frequently emphasized the importance of "critical exposures" - structured opportunities for students to experience new environments and perspectives. One powerful form of these exposures is study abroad programming. Research on study abroad programs, even for younger students, reveals significant educational benefits:

- Enhanced language acquisition through immersion in authentic contexts
- Improved academic performance upon returning to home schools
- Development of independence, self-management, and problem-solving abilities
- Cultural competence and global citizenship perspectives
- Heightened resilience and adaptability to new situations

Notably, these programs can have profound impacts on personal development, with one school leader from Statesmen College Preparatory Academy, a charter school in DC, observing that "there are more passports in this class of students than there are in some of the neighborhoods that these boys come from." (Hardnett, 2025). This highlights how experiential learning opportunities can broaden horizons and open

new possibilities for students who may otherwise have limited exposure to diverse contexts.

Other Implementation Strategies

Successful implementation of progressive educational strategies requires thoughtful design and sustained commitment. Based on practitioner experiences from single-sex schools, several key implementation approaches emerge:

- **Daily Advising Models:** Schools like Boys Latin School in Maryland have implemented daily advising structures that build community and establish strong student-teacher relationships. As one school leader described: "Boys ... do best when they understand they're a part of something much larger. So we take the first hour or more of the day and we really build community" (Post, 2025). These advising structures create a foundation for academic engagement by addressing social-emotional needs first.
- **Community Involvement in Education:** Programs that integrate community resources into education—such as local business owners leading practical skills courses—provide authentic learning experiences that connect classroom content to real-world contexts. These connections help students understand the relevance of their learning and expose them to diverse career pathways and mentorship opportunities.
- **Developmental Science Integration:** Several programs intentionally teach students about their own developmental processes, helping them understand that "their brain is under construction" and apply that knowledge to managing emotions and academic challenges (Hunter, 2025). This metacognitive approach gives students tools to understand their own responses and develop greater self-regulation.
- **Extended Days or Schedule Adjustments:** Some all-boys schools implement more fundamental schedule adjustments. One leader reported success with dedicating “30-45 minutes of movement outside or in the gym” daily, addressing boys' physical energy needs. Another described an extended school day model where “if you had more than 1 C [letter grade], then you stay past the school day hours,” with “tutoring baked into the day.” While noting this could lead to "burned out teachers” if not properly organized, they observed “great academic gains,” suggesting the importance of balancing intensive support with sustainable staffing models (Lennon, 2025).
- **Rites of Passage Programming:** Organizations like Journeymen have developed structured rites of passage programs that help boys navigate key developmental transitions. These programs often include challenging experiences designed to build resilience: "...We have a lot of activities intentionally structured throughout our camps and our rites of passage that

require these guys to struggle through things and we won't save them" (Craighead, 2025). These programs redirect natural developmental needs for initiation and belonging into positive community leadership rather than potentially destructive alternatives (i.e., gangs). The transformative nature of these experiences is evident in student outcomes: "It feels like magic. Because consistently we'll have boys come into the program on day one, not looking you in the eye, looking at the ground... And by the end, on day ten, they're standing proud. They're glowing, they're beaming, they're speaking loud and proud, and they're expressing love and compassion and affection for one another, too" (Craighead, 2025).

Applications Across Educational Settings

While many of these strategies emerge from single-sex educational environments, they can be effectively adapted across different settings, including coeducational public schools. The principles underlying these approaches—active learning, relationship development, identity exploration, and community connection—offer benefits to all students regardless of gender.

Adapting Strategies Within Standardized Frameworks

Educators working within standardized educational frameworks can still incorporate progressive strategies by:

- Creating structured time for community building and relationship development
- Integrating project-based components within traditional curriculum units
- Incorporating movement and experiential learning into daily classroom routines
- Developing advisory programs that address social-emotional development
- Partnering with community organizations to expand learning opportunities

Challenges and Opportunities in Different School Contexts

Implementing these approaches may face different challenges depending on the school context:

- **Public Schools**: Time constraints and standardized testing pressures can limit innovation. As one practitioner noted, "Tough working with school districts because there's so much demand for their time already" (Craighead, 2025). Additionally, some educators report resistance to boy-specific programming. Ballard (2025) described facing institutional barriers when attempting to create affirming and inclusive spaces for all students, as administrators prioritized standardized test performance metrics over innovative approaches to student engagement and belonging.

- **Private/Independent Schools**: While these settings may offer more flexibility for innovation, they must address concerns about academic rigor and college preparation alongside holistic development approaches.
- **Charter Schools**: These environments often provide more latitude for structural innovation but must demonstrate academic outcomes to maintain their charters.

Despite these challenges, practitioners across settings emphasize that core principles can be adapted to different contexts. These approaches work by meeting developmental needs, building relationships, and creating authentic learning experiences that connect to students' lives. Their core principles can be adapted for various educational settings despite differences in resources and constraints.

The following section explores specific leadership approaches that create the conditions for progressive educational strategies, professional development, school culture and community, identity formation, and quality relationships to flourish. These leadership models prioritize relationships, demonstrate nuanced understanding of gender identity, focus on holistic development, and build strong community connections. Together, these educational strategies and leadership approaches offer a comprehensive framework for supporting boys' development and achievement across diverse educational settings.

Effective Leadership Approaches

The preceding analysis of school-level factors reveals that effective implementation depends heavily on leadership approaches that align with and support these practices. This section examines specific leadership characteristics that create optimal conditions for boys' development and achievement across diverse educational settings.

(A) Relational Focus

Effective leaders place relationships at the center of their educational model, allocating resources to prioritize relationship development. As Post (2025) states, "You can't be in a relationship with another unless you know yourself. And frankly, you love yourself. We're in an all boys environment and we're not afraid to use that term love." Key leadership behaviors include maintaining visibility throughout the school, modeling appropriate vulnerability, establishing consistent communication systems, and recognizing students' individual strengths and challenges.

Schools like Boys Latin of Maryland implement this approach through daily advisory models where administrators maintain direct student contact, while Journeymen

structures share experiences that foster natural relationship development between boys and mentors.

(B) Gender Awareness

Successful leaders demonstrate sophisticated understanding of gender identity that avoids both gender-blind approaches and rigid stereotyping. They recognize developmental patterns typically observed in boys while acknowledging individual variation. As Hardnett (2025) notes, "Boys and girls are different. And that's okay. That's okay. One is not better than the other or worse than the other."

These leaders create environments where multiple expressions of masculinity are valued, challenging stereotypes, developing gender-responsive policies, ensuring diverse representation, and creating opportunities for boys to explore activities outside their typical interests.

(C) Educating the Whole Child

Leaders supporting boys' development emphasize mental health alongside academic achievement, recognizing gender-specific patterns in how boys manifest distress. Batty (2025) references American psychologist Lisa Damour's work, noting: "We shine the light on areas like anxiety, depression, self-harm, eating disorders, social media use and unhappiness as signs of distress... We don't look for signs of distress that boys send us because boys externalise them." As Damour (2023) explains in her piece "Boys are Suffering Too," we tend to focus on well-researched conditions more common in girls while overlooking potential indicators of distress in boys such as "exposure to violent pornography, problematic gaming, or compulsive online gambling." These behaviors, often dismissed as merely problematic or disruptive, may actually represent underlying emotional struggles that society finds uncomfortable to address. Rather than engaging with these expressions of distress, adults frequently respond with discipline or look away rather than the supportive interventions these young men need.

This awareness leads effective leaders to develop systems that identify externalizing behaviors as potential indicators of underlying distress rather than simply disciplinary issues. They integrate academic excellence with socio-emotional development through approaches that develop skills alongside character, emotional intelligence, and social responsibility.

(D) Community-Centric Leadership

Effective leaders create intentional structures that build community, including advisory systems, house models, cross-age mentoring, community meetings, and shared activities that develop collective identity.

These leaders also develop meaningful rituals and traditions that communicate values, build identity, and mark important transitions. Their practices demonstrate cultural responsiveness that recognizes diverse backgrounds and communication styles, particularly for boys from marginalized groups.

(E) Transformational Vision

Successful leaders reject deficit-based approaches to boys' education, instead seeing boys' capabilities and potential. Craighead (2025) articulates this clearly: "I think it's important that we see boys and young men as part of the solution, not the problem." They maintain focus on long-term developmental outcomes rather than immediate metrics, investing "upstream" in approaches that may take time to demonstrate results.

These leaders demonstrate courage to challenge dominant cultural narratives about boys. As Post (2025) explains, "All the things that we have talked about are truly countercultural... I often say being a boy is not a pathological condition from which you need to be cured." This perspective manifests in policies and practices that may differ from traditional education but better address boys' developmental needs.

Additionally, successful leaders recognize that educational innovation requires strategic positioning, no matter what type of school they lead. Single-sex education has been around for generations, but as one school leader put it, we need to be 'more imaginative' in how we present its value today (Lennon, 2025). This insight highlights that even evidence-based approaches may face sustainability challenges if perceived as outdated or merely traditional rather than solutions to today's problems. Transformational leaders must not only implement effective practices but also share their vision in compelling ways that resonate with parents, funders, policymakers, and communities. This may require framing single-sex approaches not as a return to the past but as innovative responses to persistent educational challenges facing boys today.

These leadership approaches—relational focus, gender awareness, whole child development, community-centric practice, and transformational vision—create the foundation for school-level factors to flourish. When implemented effectively, they create environments where boys develop not just academic knowledge but also the character, identity strength, and relational capabilities needed for success in all aspects of life.

Conclusions

Consensus Across Perspectives

Despite ongoing debate about cognitive differences between genders, this report has identified significant consensus among researchers and practitioners regarding approaches that support boys' development and engagement in school. This consensus emerges across diverse settings—public and private, single-sex and coeducational, traditional and progressive—suggesting core principles that transcend specific educational contexts.

The evidence consistently shows that boys benefit from:

- Strong, supportive relationships with committed adults
- Environments that validate emotional expression while maintaining high expectations
- Community structures that create belonging and purpose
- Physical and experiential learning approaches
- Adults who understand boys' developmental needs

Student-Centered Approaches

The most successful approaches place individual student development at the center rather than focusing primarily on programmatic structures or specific instructional methods. This student-centered orientation recognizes boys as complex individuals with unique needs, interests, and challenges rather than as a monolithic group defined solely by gender.

Post (2025) captures this ultimate aim: "I want our boys and young men to be great husbands and partners and fathers and professionals and understand that there is no substitute for smart, hard work, but that can yield some opportunities for them that they otherwise might not have at the end of the day."

This vision extends far beyond academic achievement to encompass character development, relationship capacity, and personal fulfillment—a holistic perspective that recognizes education's role in preparing boys for complete lives rather than simply for college or careers.

Call to Action for Educators and Policymakers

This section concludes with several calls to action:

1. **For School Leaders:** Examine current practices through the lens of the five school-level factors identified in this report. Where are relationships being prioritized? How is identity development supported? What community structures exist? How are teachers prepared? What progressive educational approaches are employed?

2. **For Teachers:** Seek professional development specifically addressing boys' development and effective relationship-building. Experiment with approaches that integrate academic content with physical activity, experiential learning, and social-emotional development.
3. **For Policymakers:** Support flexible frameworks that allow schools to implement relationship-centered, identity-supportive approaches while maintaining accountability. Fund professional development addressing the specific needs of boys while avoiding policies based on stereotypes or deterministic assumptions.
4. **For Researchers:** Develop more nuanced studies examining how educational approaches affect different subgroups of boys across various contexts, moving beyond simple gender comparisons to explore intersections with race, class, and individual differences.

By addressing these calls to action, we can create educational environments where all boys—regardless of background or personal characteristics—can develop the academic skills, emotional intelligence, and character needed for fulfilling lives and positive contributions to society.

The framework that follows provides school leaders and educators with practical design elements focused on relationship infrastructure, identity development, and whole-child systems. While implementing these approaches may challenge conventional educational structures and require reallocation of limited resources, the potential benefits for boys' engagement and development make this investment worthwhile. Drawing on the wisdom of successful practitioners, the following section offers a structured pathway for putting the approaches outlined throughout this report into meaningful practice.

Design Element Framework for Boys' Education

FRAMEWORK COMPONENTS	KEY ELEMENTS
Actionable Design Elements	Relationship Infrastructure: Advisory programs, mentoring systems, structured time for relationship building, community activities Identity-Supportive Environment: Programs addressing masculine identity development, challenging restrictive norms, diverse representation, structured discussions Whole-Child Systems: Integrated curriculum design, balanced assessment practices, schedule adjustments to support physical and social-emotional development alongside academics
Implementation Components	Assessment Tools: Surveys, focus groups, and observational instruments to evaluate current practices and benchmark progress Professional Learning Modules: Training sequences in boys' development, relationship-building strategies, and culturally responsive practices Phased Implementation Plans: Templates for progressive implementation starting with focused areas before expanding Community Engagement Models: Structures for involving parents, community members, and students in planning and implementation
Resource Requirements	Time Allocations: Protected time within school schedules for relationship-building and identity development work

	Professional Development: Ongoing training pathways for understanding boys' development and implementing effective strategies Leadership Support: Administrative practices that prioritize development alongside traditional academic metrics Partnership Frameworks: Connections with organizations for mentoring, experiential learning, and additional resources
Evaluation Frameworks	Relationship Quality Indicators: Measurements of student-teacher and peer relationships through surveys and observational tools Identity Development Metrics: Assessments of self-concept, emotional expression, and resistance to restrictive gender norms Academic Integration: Combining traditional academic metrics with engagement and growth indicators Longitudinal Tracking: Following students beyond graduation to assess long-term life outcomes

"If we invest in our young people upstream, they're going to be more supported and successful when they actually are released into adulthood at 18."

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Appendixes

Appendix 1: Complete List of All-Girls Public Schools

This appendix provides a comprehensive inventory of public single-sex schools for girls in the United States as of 2022 (Civil Rights Data Collection, 2022). The list includes 58 all-girls public schools, with 57 meeting standard research criteria, which excludes non-traditional schools such as juvenile justice facilities, special education schools, and most alternative schools. One additional alternative school has been included to maintain consistency with previous research conducted by the Feminist Majority Foundation (FMF) in 2017. For those wishing to verify this information for implementation purposes, I recommend consulting with state education departments and Title IX coordinators to confirm the operational status and classification of these institutions.

State	LEAID	LEA Name	School ID	School Name	Charter School	Magnet School
ARIZONA	0400144	Florence Crittenton Services of Arizona Inc. (4300)	1717	Girls Leadership Academy of Arizona	Yes	No
CALIFORNIA	0601466	Girls Athletic Leadership School Los Angeles District	13973	Girls Athletic Leadership School Los Angeles	Yes	No
CALIFORNIA	0622710	Los Angeles Unified	13968	Girls Academic Leadership Acad Dr. Michelle King Sch STEM	No	No
COLORADO	0803360	School District No. 1 in the county of Denver and State of C	6473	Girls Athletic Leadership School Middle School	Yes	No
DISTRICT OF COLUMBIA	1100030	District of Columbia Public Schools	519	Excel Academy	No	No
DISTRICT OF COLUMBIA	1100113	Girls Global Academy PCS	537	Girls Global Academy PCS	Yes	No
FLORIDA	1200390	MIAMI-DADE	7016	YOUNG WOMEN'S PREPARATORY ACADEMY	No	Yes
FLORIDA	1200480	DUVAL	8011	WAVERLY ACADEMY	Yes	No
FLORIDA	1200870	HILLSBOROUGH	7782	FERRELL MIDDLE MAGNET SCHOOL	No	Yes
GEORGIA	1300120	Atlanta Public Schools	3980	Coretta Scott King Young Women's Leadership Academy	No	No
GEORGIA	1300226	State Charter Schools-Ivy Preparatory Academy- Inc	4023	Ivy Preparatory Academy- Inc	Yes	No
GEORGIA	1300244	State Charter Schools II- Genesis Innovation	4272	Genesis Innovation Academy for Girls	Yes	No

		Academy for Gi				
KENTUCKY	2102990	Jefferson County	1425	Frederick Law Olmsted Academy South	No	Yes
MARYLAND	2400090	Baltimore City Public Schools	1682	Baltimore Leadership School for Young Women	Yes	No
MARYLAND	2400090	Baltimore City Public Schools	330	Western High	No	No
MICHIGAN	2601103	Detroit Public Schools Community District	7972	Detroit International Academy for Young Women	No	No
MISSOURI	2900615	KANSAS CITY GIRLS PREP ACADEMY	3364	KANSAS CITY GIRLS PREP ACADEMY - Middle School	Yes	No
NEVADA	3200001	STATE-SPONSORED CHARTER SCHOOLS	954	Girls Athletic Leadership School	Yes	No
NEW YORK	3600033	BRIGHTER CHOICE CHARTER SCHOOL FOR GIRLS	4311	BRIGHTER CHOICE CHARTER SCHOOL FOR GIRLS	Yes	No
NEW YORK	3600136	GIRLS PREPARATORY CHARTER SCHOOL OF NEW YORK	5765	GIRLS PREPARATORY CHARTER SCHOOL OF NEW YORK - Elementary	Yes	No
NEW YORK	3600967	BGLIG-SHIRLEY RODRIGUEZ-REMENE SKI CS	6008	BGLIG-SHIRLEY RODRIGUEZ-REME NESKI CS	Yes	No
NEW YORK	3600986	GIRLS PREPARATORY CHARTER SCHOOL OF THE BRONX	6161	GIRLS PREPARATORY CHARTER SCHOOL OF THE BRONX - Elementary	Yes	No
NEW YORK	3600986	GIRLS PREPARATORY CHARTER SCHOOL OF THE BRONX	99999	Girls Preparatory Charter School of the Bronx - Middle	Yes	No
NEW YORK	3601006	ALBANY LEADERSHIP CHARTER HIGH SCHOOL FOR GIRLS	6202	ALBANY LEADERSHIP CHARTER SCHOOL FOR GIRLS	Yes	No
NEW YORK	3601080	YOUNG WOMEN'S COLLEGE PREP CHARTER	6316	YOUNG WOMEN'S COLLEGE PREP CHARTER	Yes	No
NEW YORK	3601160	BROOKLYN EMERGING LEADERS ACADEMY CHARTER SCHOOL	6622	BROOKLYN EMERGING LEADERS ACADEMY CHARTER SCHOOL	Yes	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	5653	WOMEN'S ACADEMY OF EXCELLENCE	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	5764	URBAN ASSEMBLY SCHOOL OF BUSINESS FOR YOUNG WOMEN	No	No

NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	5832	YOUNG WOMEN'S LEADERSHIP SCHOOL-QUEENS	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	5928	URBAN ASSEMBLY INSTITUTE OF MATH AND SCIENCE FOR YOUNG WOMEN	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	5948	YOUNG WOMEN'S LEADERSHIP SCHOOL - ASTORIA	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	5955	URBAN ASSEMBLY SCHOOL FOR LEADERSHIP AND EMPOWERMENT	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	6345	YOUNG WOMEN'S LEADERSHIP SCHOOL OF THE BRONX	No	No
NORTH CAROLINA	3700407	Girls Leadership Academy of Wilmington	3397	Girls Leadership Academy of Wilmington	Yes	No
NORTH CAROLINA	3701920	Guilford County Schools	2667	Early/Middle College at Bennett	No	No
NORTH CAROLINA	3704720	Wake County Schools	3237	Wake Young Women's Leadership Academy	No	No
OHIO	3904378	Cleveland Municipal	5395	Warner Girls Leadership Academy	No	No
OHIO	3904378	Cleveland Municipal	5433	Douglas MacArthur	No	No
OHIO	3904380	Columbus City School District	5610	Columbus City Preparatory School for Girls	No	No
OHIO	3904384	Dayton City	5101	Charity Adams Earley Girls Academy	No	No
OHIO	3904490	Toledo City	5292	Ella P. Stewart Academy for Girls	No	Yes
TENNESSEE	4701590	Hamilton County	2211	Chattanooga Girls Leadership Academy	Yes	No
TEXAS	4800264	KIPP TEXAS PUBLIC SCHOOLS	12486	KIPP VOYAGE ACADEMY FOR GIRLS	Yes	No
TEXAS	4807710	ALDINE ISD	14248	YOUNG WOMEN'S LEADERSHIP ACADEMY	No	No
TEXAS	4808940	AUSTIN ISD	11354	RICHARDS SCH FOR YOUNG WOMEN LEADERS	No	No
TEXAS	4808940	AUSTIN ISD	13132	SADLER MEANS YWLA	No	No
TEXAS	4816230	DALLAS ISD	10561	IRMA RANGEL YOUNG WOMEN'S	No	Yes

				LEADERSHIP SCHOOL		
TEXAS	4816230	DALLAS ISD	13321	SOLAR PREPARATORY SCHOOL FOR GIRLS AT BONHAM	No	No
TEXAS	4818150	EDGEWOOD ISD	14176	LAS PALMAS LEADERSHIP SCHOOL FOR GIRLS	No	No
TEXAS	4818300	EL PASO ISD	13596	YOUNG WOMEN'S STEAM RESEARCH & PREPARATORY ACADEMY	No	No
TEXAS	4819700	FORT WORTH ISD	12392	YOUNG WOMEN'S LEADERSHIP ACADEMY	No	No
TEXAS	4821420	GRAND PRAIRIE ISD	12690	YWLA AT BILL ARNOLD	No	No
TEXAS	4823640	HOUSTON ISD	12621	YOUNG WOMEN'S COLLEGE PREP ACADEMY	No	Yes
TEXAS	4828500	LUBBOCK ISD	11896	TALKINGTON SCHOOL FOR YOUNG WOMEN LEADERS	No	Yes
TEXAS	4830570	MIDLAND ISD	13970	YOUNG WOMEN'S LEADERSHIP ACADEMY	Yes	No
TEXAS	4838730	SAN ANTONIO ISD	11806	YOUNG WOMEN'S LEADERSHIP ACADEMY	Yes	No
TEXAS	4838730	SAN ANTONIO ISD	13930	YOUNG WOMEN'S LEADERSHIP ACADEMY PRI AT PAGE	Yes	No
TEXAS	4846680	YSLETA ISD	13208	YOUNG WOMEN'S LEADERSHIP ACADEMY	No	No

Appendix 2: Complete List of All-Boys Public Schools

This appendix provides a comprehensive inventory of public single-sex schools for boys in the United States as of 2022. The list includes 45 all-boys public schools meeting standard research criteria. Schools excluded from analysis include juvenile justice facilities, special education schools, and alternative schools.

Note: Imagine Me Leadership Charter School appears in this list to reflect the 2022 data, though it has since converted to a coeducational institution in 2023. For those wishing to verify this information for implementation purposes, I recommend consulting with state education departments and Title IX coordinators.

State	LEAID	LEA Name	School ID	School Name	Charter School	Magnet School
CALIFORNIA	0622710	Los Angeles Unified	14106	Boys Academic Leadership Academy	No	No
DISTRICT OF COLUMBIA	1100030	District of Columbia Public Schools	512	Ron Brown College Preparatory HS	No	No
DISTRICT OF COLUMBIA	1100110	Statesmen College Preparatory Academy for Boys PCS	518	Statesmen College Preparatory Academy for Boys PCS	Yes	No
FLORIDA	1200390	MIAMI-DADE	7420	YOUNG MEN'S PREPARATORY ACADEMY	No	Yes
FLORIDA	1200870	HILLSBOROUGH	7794	FRANKLIN MIDDLE MAGNET SCHOOL	No	Yes
FLORIDA	1201230	MANATEE	8256	VISIBLE MEN ACADEMY	Yes	No
GEORGIA	1300120	Atlanta Public Schools	3558	B.E.S.T Academy	No	No
GEORGIA	1300217	State Charter Schools II- Fulton Leadership Academy	3961	Fulton Leadership Academy	Yes	No
GEORGIA	1300248	State Charter Schools II- Genesis Innovation Academy for Bo	4288	Genesis Innovation Academy for Boys	Yes	No
INDIANA	1800131	Smith Academy for Excellence	2539	Smith Academy for Excellence	Yes	No
KENTUCKY	2102990	Jefferson County	781	Frederick Law Olmsted Academy North	No	Yes
LOUISIANA	2201170	Orleans Parish	2507	The Delores Taylor Arthur School for Young Men	Yes	No

MICHIGAN	2601103	Detroit Public Schools Community District	7415	Frederick Douglass Academy for Young Men	No	No
NEW JERSEY	3411340	Newark Public School District	3227	Eagle Academy for Young Men of Newark	No	No
NEW JERSEY	3412690	Paterson Public School District	3369	Young Men's Leadership Academy	No	No
NEW YORK	3600032	BRIGHTER CHOICE CHARTER SCHOOL FOR BOYS	4307	BRIGHTER CHOICE CHARTER SCHOOL FOR BOYS	Yes	No
NEW YORK	3600114	EXCELLENCE BOYS CHARTER SCHOOL OF BEDFORD STUYVESANT	5700	EXCELLENCE BOYS CHARTER SCHOOL OF BEDFORD STUYVESANT	Yes	No
NEW YORK	3600945	GREEN TECH HIGH CHARTER SCHOOL	5946	GREEN TECH HIGH CHARTER SCHOOL	Yes	No
NEW YORK	3601008	UNIVERSITY PREPARATORY CHARTER SCHOOL FOR YOUNG MEN	6204	UNIVERSITY PREPARATORY CHARTER SCHOOL FOR YOUNG MEN	Yes	No
NEW YORK	3601031	IMAGINE ME LEADERSHIP CHARTER SCHOOL	6238	IMAGINE ME LEADERSHIP CHARTER SCHOOL	Yes	No
NEW YORK	3601115	BOYS PREPARATORY CHARTER SCHOOL OF NEW YORK	6454	BOYS PREPARATORY CHARTER SCHOOL OF NEW YORK	Yes	No
NEW YORK	3601117	VERTUS CHARTER SCHOOL	6470	VERTUS CHARTER SCHOOL	Yes	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	5670	EAGLE ACADEMY FOR YOUNG MEN	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	6078	EAGLE ACADEMY FOR YOUNG MEN II	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	6190	EAGLE ACADEMY FOR YOUNG MEN III	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	6379	EAGLE ACADEMY FOR YOUNG MEN OF HARLEM	No	No
NEW YORK	3620580	NEW YORK CITY PUBLIC SCHOOLS	6522	EAGLE ACADEMY FOR YOUNG MEN OF STATEN ISLAND (THE)	No	No
NORTH CAROLINA	3701920	Guilford County Schools	2669	A&T Four Middle College at NC A&T State University	No	No
NORTH CAROLINA	3704720	Wake County Schools	3239	Wake Young Men's Leadership	No	No

				Academy		
OHIO	3904378	Cleveland Municipal	491	Kenneth W Clement	No	No
OHIO	3904378	Cleveland Municipal	5414	Ginn Academy	No	No
OHIO	3904378	Cleveland Municipal	544	Valley View Elementary School	No	No
OHIO	3904380	Columbus City School District	5572	Columbus City Preparatory School for Boys	No	No
OHIO	3904490	Toledo City	5543	Martin Luther King Academy for Boys Elementary School	No	Yes
PENNSYLVANIA	4200760	Boys Latin of Philadelphia CS	6107	Boys Latin of Philadelphia CS	Yes	No
TENNESSEE	4701590	Hamilton County	2510	Chattanooga Preparatory School	Yes	No
TEXAS	4800264	KIPP TEXAS PUBLIC SCHOOLS	12173	KIPP POLARIS ACADEMY FOR BOYS	Yes	No
TEXAS	4808940	AUSTIN ISD	13169	GARCIA YMLA	No	No
TEXAS	4816230	DALLAS ISD	12569	BARACK OBAMA MALE LEADERSHIP ACAD AT A MACEO SMITH	No	Yes
TEXAS	4816230	DALLAS ISD	13841	SOLAR PREP FOR BOYS AT JOHN F KENNEDY	No	No
TEXAS	4819700	FORT WORTH ISD	12717	YOUNG MEN'S LEADERSHIP ACADEMY	No	No
TEXAS	4821420	GRAND PRAIRIE ISD	12691	YMLA AT JOHN F KENNEDY MIDDLE	No	No
TEXAS	4823640	HOUSTON ISD	12618	MICKEY LELAND COLLEGE PREP ACAD FOR YOUNG MEN	No	Yes
TEXAS	4838730	SAN ANTONIO ISD	13107	YOUNG MEN'S LEADERSHIP ACADEMY	Yes	No
PUERTO RICO	7200030	PUERTO RICO DEPARTMENT OF EDUCATION	137	ESCUELA ESPECIALIZADA EN BÉISBOL-MANUEL CRUZ MACEIRA	No	No

Appendix 3: Literature Review Study Selection

Based on meta-analysis structure from Pahlke, Hyde, & Allison (2014).[4]

Study	Domain[5]	Quality	Educational Setting Effect[6] (Girls)	Educational Setting Effect (Boys)	Sample Size	Age	Country	School or Class	SS Public/ Private	CE Public/ Private
Hoxby, C. (2000)	2, 6, 9	2	Females perform better in mathematics in classrooms with higher proportions of females. Peer effects on achievement are evident: a 1-point change in peers' reading scores raises a student's own score between 0.15 and 0.4 points.	Males perform better in mathematics in classrooms with higher proportions of females. Peer effects are stronger intra-race, suggesting that same-race peer interactions may have stronger influences on academic outcomes.	100,000 students from Texas Public Schools administrative data	Grades 6-12	USA	2	N/A	Public

[4] Literature Review Chart Template | Based on Pahlke, E., Hyde, J. S., & Allison, C. M. (2014). The effects of single-sex compared with coeducational schooling on students' performance and attitudes: A meta-analysis. Psychological Bulletin, 140(4), 1042-1072.
[5] This literature review uses numerical domain codes to categorize the outcomes studied in each paper. The domain codes (detailed in the appendix) represent specific areas of investigation such as academic performance (e.g., 6 = mathematics performance), social-emotional outcomes (e.g., 3 = self-concept), and aspirational measures (e.g., 13 = occupational aspirations). These domains help identify patterns across studies despite their methodological differences.
[6] Effect sizes throughout this review are reported in various formats depending on how they were presented in the original studies. Some researchers report standardized effect sizes (Cohen's d, Hedges' g) with specific values (e.g., "d = 0.87" indicating a large positive effect), while others report percentage changes, unstandardized coefficients, or descriptive categorizations (e.g., "small positive effect"). When interpreting these effects, readers should consider both statistical significance and practical significance within the context of each study's design and sample characteristics. The "Effect Size Interpretation" table in the appendix provides guidelines for understanding the magnitude of standardized effect sizes.

Whitmore, D. (2005)	2, 6, 16, 9	2	Small classes (K-3): Positive effect of small classes Predominantly female classes (K-2): Positive effect of higher female percentage Predominantly female classes (Grade 3): Neutral effect of higher female percentage	Small classes (K-3): Positive effect of small classes Predominantly female classes (K-2): Positive effect of higher female percentage Predominantly female classes (Grade 3): Negative effect of higher female percentage	11,600 students total in Project STAR	K - Grade 3	USA	2	N/A	Public
Mael, F., Alonso, A., Gibson, D., Rogers, K., & Smith, M. (2005)	3, 5, 6, 7, 8, 9, 10, 11, 13, 14, 16	1	Mathematics performance: Very small positive effect of SS (46% of studies showed SS advantage) Science performance: Small positive effect of SS (40% of studies showed SS advantage) Verbal performance: Small positive effect of SS (12.5% of studies showed SS advantage) General achievement: Small positive effect of SS (63% of studies showed SS advantage) Self-concept:: Moderate positive	Mathematics performance: Small positive effect of SS (33% of studies showed SS advantage) Science performance: Small positive effect of SS (33% of studies showed SS advantage) Verbal performance: Small positive effect of SS (33% of studies showed SS advantage) General achievement: Moderate positive effect of SS (75% of studies showed SS	1.7 million students across 40 studies	K-12	Multiple countries included. Most from English-speaking nations.	1	Mixed	Mixed

			effect of SS (75% of studies showed SS advantage) Educational aspirations: Strong positive effect of SS (100% of studies showed SS advantage) Occupational aspirations: Strong positive effect of SS (100% of studies showed SS advantage)	advantage) Self-concept: Small positive effect of SS (33% of studies showed SS advantage)						
Black, Devereux, & Salvanes (2013)	Long-run outcomes[7]	2	Higher proportion of female peers positively affects girls' outcomes: increased educational attainment (+.14 years), reduced teen pregnancy rates, increased full-time work participation and earnings (+8%)	Higher proportion of female peers negatively affects boys' outcomes: reduced academic track enrollment, reduced educational attainment (-.2 years) reduced full-time work participation and earnings (-3%)	884,903 students (434,001 females and 450,902 males)	Grade 9	Norway	N/A study used public schools	Public	Public
Lavy & Schlosser (2011)	6, 9, 16	2	Higher proportion of female peers improved academic outcomes; reduced classroom disruption and	Higher proportion of female peers improved academic outcomes; reduced classroom	404,929 high school students; 110,000 elementary school	Grades 5 - 10	Israel, mixed	1	N/A	Public

[7] (educational attainment, teen pregnancy, IQ scores, labor market status, earnings)

			violence; improved inter-student and teacher-student relationships; and lowered teacher fatigue	disruption and violence; improved inter-student and teacher-student relationships; and lowered teacher fatigue	students; 105,000 middle school students					
Hayes, Pahlke, & Bigler (2011)	9	2	No significant effect of gender composition on achievement after controlling for selection effects and peer quality	Not studied (girls-only sample)	484 girls (121 in single-sex school, 229 rejected applicants to single-sex school, 134 in coed magnet school)	Grades 6-8	USA	1	Public	Public
Jackson (2012)	6, 9, 16	2	For girls with strong preferences for single-sex schools: positive effects on achievement; passing more exams; higher likelihood of earning a certificate. Most girls experienced no benefits. Girls at single-sex schools took fewer science courses.	No significant effects on achievement for boys regardless of preference level	219,849 students across 123 schools	Grades 6-10	Trinidad and Tobago	1	Public	Public
Park, Behrman, & Choi (2013)	6, 9, 16	2	Positive effects on college entrance exam scores (Korean: +1.3 points or 6.5% of 1 SD; English: +1.3 points);	Positive effects on college entrance exam scores (Korean: +2.2 points or 10% of 1 SD; English: +3.0 points or 15% of 1 SD);	88,353 students (42,162 females and 46,191 males) in high school	Grades 10-12	South Korea (Seoul)	1	Mixed (91% of single-sex schools were	Mixed (30% of coed schools were private)

			higher four-year college attendance rates (+3.1 percentage points, equivalent to 0.5 SD); lower two-year junior college attendance rates (-3.2 percentage points)	higher four-year college attendance rates (+5.6 percentage points, equivalent to 0.8 SD); lower two-year junior college attendance rates (-2.7 percentage points)					private)	
Ku & Kwak (2013)	6, 9, 16	2	Single-sex "schools" showed overall advantage, but single-sex "schooling" itself showed neutral or negative effects: negative effect on Korean (-0.06) and English (-0.13), neutral effect on math (-0.03)	Single-sex "schools" showed overall advantage, but single-sex "schooling" itself showed negative effects: negative effect on Korean (-0.15), English (-0.09), and math (-0.16)	912,196 students (434,001 females and 478,195 males) across multiple cohorts	Grades 10-12	South Korea (Seoul)	1	Mixed (80% of single-sex schools were private)	Mixed (33% of coed schools were private)
Jackson, C. K. (2013)	9	2	Positive effects from attending selective schools - females who attend schools with 0.2 SD higher peer quality passed 0.27 more exams (38% larger effect than boys). Within-school analyses showed females benefited from exposure to higher-achieving peers (coefficient = 0.265, p<0.05), passing 0.064 more exams when	Smaller positive effects from attending selective schools - males who attend schools with 0.2 SD higher peer quality passed 0.2 more exams. Within-school analyses showed no significant benefit from exposure to higher-achieving peers (coefficient = -0.067, not significant), with	150,701 students across seven cohorts	Grades 6-10	Trinidad and Tobago	1	Public	Public

			peer scores were 0.2 SD higher. Gender differences in peer response explained gender differences in school response.	males passing 0.0134 fewer exams when exposed to peers with 0.2 SD higher scores.						
Pahlke, E., Hyde, J. S., & Allison, C. M. (2014)	Multiple (key domains: 3, 5, 6, 7, 8, 9, 10, 11, 16)	2	Mathematics performance: Trivial positive effect of SS (g = 0.10) Science performance: Trivial positive effect of SS (g = 0.06) Verbal performance: Trivial positive effect of SS (g = 0.07) General achievement: Very small positive effect of SS (g = 0.12) Gender stereotyping: Medium negative effect of SS (g = -0.57) Educational aspirations: Small negative effect of SS (g = -0.26) Self-concept: Trivial negative effect of SS (g = -0.08)	Mathematics performance: Trivial positive effect of SS (g = 0.06) Science performance: Trivial positive effect of SS (g = 0.04) Verbal performance: Very small positive effect of SS (g = 0.11) Self-concept: Trivial negative effect of SS (g = -0.06)	1,663,662 students across 184 studies	K-12	21 countries included	Mixed	Mixed	Mixed
Lee, S.,	9	2	No significant effects	Significant positive	150,701	Grades	South	1 and 2	Both-	Both-

Turner, L. J., Woo, S., & Kim, K. (2014)			on achievement for females in single-sex schools compared to females in coed schools. Female students in single-sex classrooms within coed schools performed slightly worse in English (0.11 SD lower) than females in mixed-gender classes. Overall, peer gender composition had minimal impact on female students' achievement, with no statistically significant differences in test scores across school types. Female students reported higher perception of peer effort in single-sex schools (13 percentage points higher) compared to single-sex classes within coed schools.	effects for boys in single-sex schools, who scored 0.15-0.17 SD higher across all subjects compared to boys in coed classes. Conversely, boys in single-sex classes within coed schools performed worse, scoring 0.10 SD below boys in mixed-gender classes. The positive impact of single-sex schools on male achievement was largely accounted for by increased student effort and study time - boys in single-sex schools spent approximately 1.25 more hours per week on academic activities and reported effort levels 0.5 SD higher than boys in coed settings. However, they were also 3 percentage points (14%) less likely to report being happy at school.	students across 280 schools	6-9	Korea		controls for this factor	controls for this factor
Else-Quest,	Multiple	2	Single-sex schools	SSS associated with	88 students	Grade 11	USA	1	Public	Public

N. M., & Peterca, O. (2015)	domains (5, 6, 8, 9, 15, 16)		(SSS) associated with significantly higher standardized test achievement compared to girls in mixed-sex schools (MSS). Girls in SSS significantly outperformed MSS girls on math (d = 0.87), science (d = 0.70), reading (d = 1.27), and writing (d = 1.10) tests. Girls in SSS were also significantly more likely to achieve proficiency on math, reading, and writing assessments compared to girls in MSS. However, girls in SSS reported more negative attitudes about English/reading compared to girls in MSS (reading self-concept d = -0.45; reading expectations d = -0.73), while showing no significant differences in math or science attitudes. The large positive effects on	poorer academic achievement for boys compared to boys in MSS. Boys in SSS performed worse than boys in MSS on math (d = -0.42) and writing (d = -0.57) standardized tests, with negligible differences in reading scores (d = -0.03). Boys in SSS showed slightly higher science achievement (d = 0.67), though this didn't translate to proficiency levels. There were no significant differences in the percentage of boys achieving proficiency across school types. Boys in SSS reported somewhat more positive science and math attitudes than boys in MSS, but these differences were small and not statistically significant. Boys from both	(46 from SSS, 42 from MSS)					

			achievement (particularly in traditionally male-dominated STEM subjects) weren't accompanied by more positive academic attitudes.	school types showed similarly negative attitudes about English/reading (d = -0.45).						
Lu, F., & Anderson, M. L. (2015)	6, 9	2	For female students, peer gender composition significantly affected academic performance. Girls surrounded by five female peers rather than five male peers experienced increased test scores by 0.2 to 0.3 standard deviations. This gender homogeneity effect was particularly strong with girls benefiting from having other girls seated in front of them (coefficients for "front female peers" were statistically significant at 0.16, while "rear female peers" had a positive but insignificant effect of 0.07). These results suggest	For male students, being surrounded by five males rather than five females did not significantly decrease test scores, and may have increased them by 0.1 to 0.3 standard deviations (though the effects were not consistently statistically significant across all analyses). Boys particularly benefited from having other boys seated behind them (coefficient for "rear female peers" was negative and statistically significant at -0.19). The study's evidence suggests gender homogeneous environments improved academic	682 students (approximately 43% female)	Grade 7	China	2	Public	Public

			that cooperative learning behavior among same-gender peers, rather than reduction in disruptive behavior, was the primary mechanism for performance gains.	outcomes for both genders, though the effects were stronger and more consistently significant for girls.						
De Witte, K., & Holz, O. (2015)	8, 14	2	For 12-13 year-old girls, both single-sex and coeducational settings were associated with significantly higher motivation levels compared to boys-only groups. However, for 13-14 year-old girls, the girls-only group experienced significantly lower motivation than the boys-only group. Qualitative observations indicated girls-only groups asked fewer questions, were quieter, collaborated less, and were more silent during class, though they appeared more intrigued by course content. In terms of educational attainment, only the youngest age group	Boys-only groups demonstrated higher motivation than girls-only groups overall, particularly for older students (13-14). The qualitative analysis showed boys-only groups were more active, participated more in class, and asked more questions compared to girls-only groups. In coeducational settings, boys were observed to be more actively seeking attention from teachers and fellow students. For 12-13 year-olds, boys-only groups had lower motivation than coeducational groups, while for 13-14	645 students	Grades 7-8	Belgium	2	Public	Public

			(12-13) showed a significant difference between single-sex groups, with girls-only groups significantly outperforming boys-only groups, though this difference was not attributed to classroom gender composition.	year-olds, they had higher motivation. No significant differences in educational attainment were found between class compositions for boys.						
Wong, Wang Ivy, Shi, Sylvia Yun, & Chen, Zhansheng (2018)	2,3	2	Girls from single-sex schools showed higher gender salience (greater awareness of gender as a categorizing dimension) in the high school sample. They reported fewer mixed-gender friendships in both high school and college samples - only about 20% of their friendships were with the opposite gender compared to 30% for coeducational school students. Single-sex school girls also reported higher levels of anxiety in mixed-gender situations even after controlling for general social anxiety.	Similar to girls, boys from single-sex schools showed higher gender salience in the high school sample. They also reported fewer mixed-gender friendships in both high school and college samples. Single-sex school boys reported higher levels of mixed-gender anxiety, including fear of negative evaluation and anxiety in mixed-gender social situations. These effects persisted even after graduation and transition to college, suggesting that	High school sample: 2,059 students; College sample: 456 students	HS Age Average 15.78 years and College Age Average 19.53 years	Hong Kong	1	Public	Public

			These differences were maintained even after graduation, with single-sex school female graduates in college still showing greater mixed-gender anxiety and fewer mixed-gender friendships than their coeducational counterparts.	gender-segregated schooling has long-lasting effects on boys' social development and anxiety in mixed-gender contexts.						
Anelli, M., & Peri, G. (2019)	6, 9, 16	2	Peer gender composition had no significant effect on female students' choice of college major, academic performance, or labor market outcomes. Even classes with >80% or >90% female peers showed no impact on women's probability of choosing traditionally male-dominated fields.	Males in classes with >80% male peers were 6-15 percentage points more likely to choose traditionally male college majors (Economics, Business, Engineering). Effects were strongest for academically weaker male students (20-46 percentage point increase). These effects faded by college graduation due to major changes and higher dropout rates, with no significant impact on income or employment outcomes.	30,000 students across 13 college-preparatory high schools	Grade 12	Italy	2	N/A	Public

Autor, D., Figlio, D., Karbownik, K., Roth, J., & Wasserman, M. (2019)	6, 9, 16	2	Family disadvantage disproportionately negatively affects behavioral and academic outcomes of girls, but to a lesser extent than for boys. Girl-favorable gaps in educational and behavioral outcomes are smaller in more advantaged families.	Family disadvantage has a stronger negative effect on boys' behavioral and academic outcomes than on girls'. Boys from disadvantaged families have higher rates of absences and suspensions, lower test scores, and are less likely to graduate high school than girls from similarly disadvantaged families.	Over 1 million children born in Florida between 1992 and 2002	K-12	USA	1	N/A	N/A
Jackson, C. K. (2021)	6, 9, 16	2	No significant effect on short-term academic scores three years after transition; improved performance on secondary school leaving exams; more likely to take advanced courses; lower teen pregnancy rates (~40% reduction); 8.25 percentage points (~20%) more likely to earn secondary school completion credential.	Significant positive effects on academic scores (~0.2 SD); more likely to take advanced courses; ~60% reduction in arrest rates by age 18; improvements concentrated at bottom and top of achievement distribution; no significant effect on secondary school completion.	119,279 students across seven cohorts	Ages 11-16	Trinidad and Tobago	1	Public	Public
Clavel, J. G., & Flannery, D. (2023)	6, 9, 16	2	No significant differences in mathematics, reading, or science performance between girls in single-sex schools and girls in	No significant differences in mathematics, reading, or science performance between boys in single-sex schools	4,944 students (PISA participants) (1,906 attending single-sex schools; 3,038	Ages 15 -16	Ireland	1	Public	Public

			coeducational schools after controlling for socioeconomic and school-level factors. Gender differences in reading (favoring girls) were larger in single-sex schools than in coeducational settings.	and boys in coeducational schools after controlling for socioeconomic and school-level factors. Gender differences in mathematics (favoring boys) were larger in single-sex schools than in coeducational settings.	attending coeducational schools)					
Lee, J., & Park, Y. (2024)	6, 9, 13, 7, 8	2	Single-sex schooling enhanced academic performance for girls across multiple subjects (math: 0.248 SD, English: 0.230 SD, Korean: 0.215 SD). Single-sex schools created a more positive academic environment with reduced disruptive behavior and misconduct for girls. Single-sex schools reduced female interest in STEM majors, potentially disadvantaging them in future labor market outcomes.	No significant effect on boys' academic performance across subjects after controlling for selection effects. Single-sex schools increased STEM major interest among boys, potentially widening the gender gap in STEM fields. Some improvement in school atmosphere for boys, though less pronounced than for girls.	1,569 students (739 boys and 830 girls)	Grades 10-12	South Korea	1	Mixed (84% of single-sex schools were private)	Mixed (23% of coed schools were private)

Domain Codes

Code	Domain	Description
1	Aggression	Measures of aggressive behaviors or tendencies
2	Interpersonal relations	Measures of relationships with peers and others
3	Self-concept	Measures of overall self-perception and self-esteem
4	Victimization	Experiences of being bullied or victimized
5	Science performance	Academic achievement in science
6	Mathematics performance	Academic achievement in mathematics
7	Science attitudes	Interest and attitudes toward science
8	Mathematics attitudes	Interest and attitudes toward mathematics
9	General achievement	Overall academic performance
10	Gender stereotyping	Endorsement of gender stereotypes
11	Educational aspirations	Aspirations for educational attainment
12	Body image	Perceptions of physical appearance
13	Occupational aspirations	Career goals, particularly in math/science fields
14	School attitudes	Attitudes toward school and education
15	Verbal attitudes	Interest and attitudes toward verbal subjects

16	Verbal performance	Academic achievement in verbal subjects

Study Quality Codes

Code	Quality Type	Description
1	Uncontrolled	No random assignment or controls for selection effects
2	Controlled	Random assignment OR controls for selection effects through: - Statistical controls for SES, prior achievement - Verification of group equivalence - Pre/post test designs

Effect Size Interpretation

Effect Size (g)	Interpretation
< 0.10	Trivial difference
0.10 - 0.19	Very small difference
0.20 - 0.49	Small difference
0.50 - 0.79	Medium difference
≥ 0.80	Large difference
Positive values	Single-sex schooling advantage
Negative values	Coeducational schooling advantage

School/Class Setting Codes

Code	Setting	Description
1	School	Single-sex school (entire school environment is single-sex)
2	Class	Single-sex classroom within a coeducational school

Appendix 4: Interviews Conducted

The following experts were interviewed between February 2025 and April 2025 to gather insights on single-sex education practices, outcomes, and trends. Interviews followed the protocol outlined in Appendix 5.

- **Aukeem Ballard**, PhD Candidate in the Berkeley School of Education with a Designated Emphasis in Critical Theory. Former secondary public-school educator, organizer, and school leader.
- **Tom Batty**, Executive Director of the International Boys' Schools Coalition and former Headmaster of Scotch College in Melbourne, Australia.
- **Benjie Colberg**, Special Assistant to the Head of School and Dean of Campus Life at Christ School in North Carolina.
- **Alex Craighead**, Cofounder & Program Director of Journeymen.
- **Nakia Douglas**, Founding Principal of "The" Barack Obama Male Leadership Academy in Dallas ISD. Currently serves as the Executive Director for the Dallas Education Collective.
- **Susan Engel**, Senior Lecturer in Psychology at Williams College and Director of the Program in Teaching. Her expertise includes the development of curiosity, children's ideas, education psychology, and school reform.
- **Shawn Hardnett**, CEO & School Founder of Statesmen College Preparatory Academy for Boys in Washington, DC.
- **Jerome Hunter**, Founder and Chief Academic Officer of the Seattle School for Boys.
- **Janet Hyde**, Helen Thompson Woolley Professor of Psychology and Gender & Women's Studies at the University of Wisconsin-Madison. Her research focuses on meta-analysis of psychological gender differences.
- **Luke Lennon**, Senior Director of Leadership and School Development at Mind Trust. Former Principal of Tindley Prep, the only all-boys public school in Indianapolis.
- **Erin Pahlke**, Associate Professor of Psychology at Whitman College. Expert in researching children's and adolescents' understanding of discrimination, stereotyping, and experiences with racial and gender socialization.
- **Christopher Post**, Headmaster of The Boys' Latin School of Maryland.
- **Rosemary Salomone**, Kenneth Wang Professor of Law at St. John's University. Specializes in Comparative Equality and Anti-Discrimination Law and Children and the Law.
- **Leonard Sax**, American psychologist and family physician. Author of "Boys Adrift," "Girls on the Edge," and "Why Gender Matters."

Appendix 5: Interview Protocol and Method of Analysis

Interview Protocol Development

This analysis developed three distinct interview protocols tailored to specific stakeholder groups:

1. **School Leaders and Educators Protocol**: Focused on implementation strategies, pedagogical approaches, and operational challenges within single-sex educational environments.
2. **Academic Researchers Protocol**: Emphasized methodological considerations, research findings, and theoretical frameworks related to single-sex education efficacy.
3. **Community Organization Leaders Protocol**: Explored complementary approaches to supporting boys' development outside traditional educational settings.

Each protocol followed a semi-structured format, allowing for consistency across interviews while providing flexibility to explore unique insights from each participant's expertise. All protocols included a standard informed consent introduction explaining participants' rights, confidentiality options, and the intended use of information gathered.

Participant Selection

Interview participants (n=14) were selected through purposive sampling to represent diverse perspectives across the following categories:

- **School leaders and practitioners** (n=6): Including headmasters, founding principals, and educators from both public and private single-sex institutions
- **Academic researchers** (n=5): Scholars with expertise in gender and education, developmental psychology, and educational policy
- **Community organization leaders** (n=3): Directors of organizations providing complementary support services for boys' development

Selection criteria prioritized individuals with significant experience (minimum 5 years) in their respective fields and representing diverse geographic regions, institutional types, and theoretical orientations regarding single-sex education.

Interview Process

Interviews were conducted between February and April 2025 via video conferencing platforms. Each interview lasted approximately 45-60 minutes and was recorded with participant consent. The interviewer followed the tailored protocol while

allowing for emergent lines of inquiry based on participants' unique insights and experiences.

Key question categories across all protocols included:

- Assessment of single-sex education as a strategic intervention
- Unique educational strategies and design elements
- Implementation challenges and barriers
- Policy and funding considerations
- Future directions and innovations

Analytical Framework

Interview data was analyzed using a multi-stage approach:

1. **Transcription and Initial Coding**: All interviews were professionally transcribed and imported into MAXQDA 2024 for qualitative analysis. Initial coding used both deductive codes derived from the literature review and inductive codes emerging from the interview content.
2. **Thematic Analysis**: Using the code system developed in MAXQDA, I identified recurring themes, patterns, and discrepancies across participant responses. Primary thematic categories included:
    - Relationship-driven environment
    - Supporting identity development
    - School culture and community
    - Professional development for teachers
    - Progressive educational strategies
    - Leadership approaches
    - Implementation challenges
3. **Comparative Analysis**: Responses were systematically compared across different stakeholder groups to identify areas of consensus and divergence. Particular attention was paid to differences between practitioner experiences and academic research findings.
4. **Triangulation with Documentary Evidence**: Interview findings were triangulated with literature review findings to strengthen validity and identify areas where practitioner knowledge aligned with or diverged from published research.

Limitations

The interview analysis acknowledges several limitations:

1. **Sample Representativeness**: While efforts were made to include diverse perspectives, the sample cannot represent the full range of experiences and viewpoints in single-sex education.
2. **Self-Selection Bias**: Participants who agreed to interviews may have stronger opinions (either positive or negative) about single-sex education than those who declined participation.
3. **Positionality**: As a researcher, my own positionality and the framing of questions may have influenced participant responses.
4. **Temporal Constraints**: The interviews captured perspectives during a specific time period and may not reflect evolving views or changing conditions in the field.

Despite these limitations, the interview data provided valuable insights that complemented and enriched the literature review findings, offering a more nuanced understanding of single-sex education's implementation challenges and potential benefits for boys' development and academic achievement.