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The Gender Gap: A Persistent Problem that Congress Has Yet to Address

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THE GENDER GAP: A PERSISTENT PROBLEM THAT CONGRESS HAS YET TO ADDRESS

INTRODUCTION

- I. THE NO CHILD LEFT BEHIND ACT OF 2001 (NCLBA)
 - A. *Goals*
 - B. *The Federal Government's Ability to Intervene*
 - II. CLOSING THE GENDER GAP SHOULD BE A FEDERAL PROJECT
 - A. *The Likelihood of Success of a Federal Gender Gap Solution*
 - III. CAUSES OF THE GENDER GAP
 - A. *Innate Biological Differences*
 1. *Closing the Gender Gap Is the Government's Responsibility*
 - B. *Social Factors*
 1. *Self-Esteem*
 2. *Societal Pressure and Self-Perception*
 - C. *Teachers' Influence and Gender-Separated Classrooms*
 1. *Effect of the Gender of the Teacher*
 2. *Effect of Separating Students by Gender*
 - a. *The Legality of Separating Classrooms by Gender*
 - D. *Immigration's Effect on the Gender Gap*
 1. *Gender-Stratified Societies*
 2. *The Federal Government's Responsibility Remains*
 3. *Racially and Ethnically Influenced Gender Gap*
 - IV. CONSTITUTIONAL PROBLEMS WITH A GENDER GAP SOLUTION
 - A. *Tenth Amendment*
 - B. *Equal Protection*
 1. *Righting the Ship*
 2. *Differently Situated?*
 3. *Intermediate Review for Explicit Gender Differences*
 - V. THE MALE GENDER GAP
 - A. *Facts*
 - B. *Theories Behind the Male Gender Gap*
 - C. *Closing the Male Gender Gap*
 - VI. ALLOCATION OF FUNDS
 - A. *Follow NCLBA Guidelines*
 - B. *The Poverty Factor*
 - C. *Funds for After-School and Out-of-School Programs*
- CONCLUSION

INTRODUCTION

It is a well-known fact that women are noticeably outnumbered in the workplace when it comes to careers in math, engineering, and the sciences.¹ This is what is known as a gender gap: “a disproportionate difference or disparity between the sexes.”² What may not be as familiar to many is the concept of a gender gap in middle schools and high schools around the country, where young female students are outnumbered and outperformed by male students in math and science courses.³ Though there are reports of the gender gap closing,⁴ it remains an existing and unacceptable problem.⁵ Though Congress

1. See DIVISION OF SCIENCE RESOURCES STATISTICS, NATIONAL SCIENCE FOUNDATION, NSF 07-315, WOMEN, MINORITIES, AND PEOPLE WITH DISABILITIES: 2007 292 tbl.H-38 (2007), <http://www.nsf.gov/statistics/wmpd/pdf/nsf07315.pdf> (noting that of the 18,019,400 people employed as scientists and engineers in 2003, 7,582,200 (or forty-two percent) of them were women); DIVISION OF SCIENCE RESOURCES STATISTICS, NATIONAL SCIENCE FOUNDATION, NSF 04-317, WOMEN, MINORITIES, AND PEOPLE WITH DISABILITIES: 2004 16, 19 (2004), <http://www.nsf.gov/statistics/wmpd/pdf/nsf04317.pdf> (noting that “[f]emales made up [only] 26 percent of employed [science and engineering] doctorate holders in 2001” and that “[f]emales were less likely than males to be engineers or physical scientists”); Sharon Begley, *Math Is Hard, Barbie Said*, NEWSWEEK, Oct. 27, 2008, at 57 (“There is no denying that, at the elite levels of math, men vastly outnumber women. Women received 27 percent of the Ph.D.s in math awarded by American universities from 1993 to 2002, edging up to a still-woeful 29 percent last year.”).

2. Gertrude Abramson & Chris Stephenson, *Point/Counterpoint: Has the Gender Gap Closed?*, LEARNING & LEADING WITH TECH., May 2006, at 6, available at http://www.iste.org/Content/NavigationMenu/Publications/LL/LLIssues/volume_33_2006_2005/_May_no_8_/33806a.pdf.

3. See *id.* (noting that “progress has been made, but that in some areas the gender gap persists at alarming levels, for example in physics and computer science”); OECD, PISA 2006: SCIENCE COMPETENCIES FOR TOMORROW’S WORLD, OECD BRIEFING NOTE FOR THE UNITED STATES 22 (2006), <http://www.pisa.oecd.org/dataoecd/16/28/39722597.pdf> (completing a study on gender differences in science and mathematics performance and noting that boys do better than girls overall in mathematics); *Bridging the Math Gender Gap*, EUREKALERT, May 29, 2008, http://www.eurekaalert.org/pub_releases/2008-05/msl-btm_1052308.php [hereinafter *Bridging* EUREKALERT] (“On average, U.S. girls score almost 10 points lower than U.S. boys in mathematics . . .”); John Timmer, *Why Judy Can’t Add: Gender Inequality and the Math Gap*, ARS TECHNICA, June 2, 2008, <http://arstechnica.com/news.ars/post/20080602-why-judy-cant-add-gender-inequality-and-the-math-gap.html> (noting that “[i]t’s widely recognized that . . . there’s a gender gap in performance on tests of basic skills: boys tend to perform better at math”).

4. See Begley, *supra* note 1 (noting that a study “which looks at kids younger than 13 who score 700 or above on the math part of the SAT . . . found a 13-to-1 boy-girl imbalance,” but “[i]n 2005 it fell to 2.8 to 1”). But see Amanda Ripley, *Who Says A Woman Can’t Be Einstein?*, TIME, Feb. 27, 2005, at 59, available at <http://www.time.com/time/magazine/article/0,9171,1032332,00.html> (“We have a tendency to make too much of test-score differences between the sexes (which are actually very small compared with the differences between, say, poor and affluent students).”).

5. See *Bridging the Math Gender Gap*, E! SCIENCE NEWS, May 29, 2008, <http://escience.news.com/articles/2008/05/29/bridging.math.gender.gap> (“On average, U.S. girls score almost 10 points lower than U.S. boys in mathematics.”); Alice Park, *The Myth of the Math*

has attempted to bridge the so-called “achievement gap”⁶ with the No Child Left Behind Act,⁷ Congress has not managed to attack the educational gender gap issue in any form.⁸

This Note discusses the viability and constitutionality of a federal program to close the gender gap in math and science. The analysis will include an examination of the factors that affect the gender gap, including biology, society, and immigration. Part VI will discuss the form that a program to close the gap should take and how it should allocate funds. This Note concludes that the federal government has the ability and responsibility to close the gap no matter what the cause and can model a program to close the gap after the No Child Left Behind Act.

I. THE NO CHILD LEFT BEHIND ACT OF 2001 (NCLBA)

A. Goals

The stated purpose of NCLBA “is to ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging State academic achievement standards and state academic assessments.”⁹ Individual states can accomplish this goal by “meeting the educational needs of low-achieving children in our Nation’s highest-poverty schools, limited English proficient children, migratory children, children with disabilities, Indian children, neglected or delinquent children, and young children in need of reading assistance”¹⁰ and by “closing the achievement gap between high- and low-performing children, especially the achievement gaps between minority and non-minority students, and between disadvantaged children and their more advantaged peers.”¹¹ NCLBA thus identifies the type of children

Gender Gap, TIME, July 24, 2008, <http://www.time.com/time/health/article/0,8599,1826399,00.html> (noting “the very real gender gap in math, science and technology”).

6. See, e.g., Public Schools of North Carolina, *The Achievement Gap: A Definition*, <http://www.ncpublicschools.org/racg/resources/strategies/movement/definition> (last visited Jan. 2, 2010) (“The achievement gap is a persistent, pervasive and significant disparity in educational achievement and attainment among groups of students as determined by a standardized measure.”).

7. No Child Left Behind Act, Pub. L. No. 107-110, 115 Stat. 1425 (2002) (“An Act To [sic] close the achievement gap with accountability, flexibility, and choice, so that no child is left behind.”).

8. See 20 U.S.C. § 6301(2), (3) (2006) (identifying groups in need of academic achievement improvement and not including females as a group lagging behind in the achievement gap).

9. *Id.* § 6301.

10. *Id.* § 6301(2).

11. *Id.* § 6301(3).

who are to be specially targeted: poor children and minority children, especially those with disabilities and those with limited English language proficiency.¹²

The fact that Congress explicitly identified children who are poor, Indian, migratory, disabled, etc., indicates that if Congress meant to include female students in this list of special targets, it would have explicitly mentioned gender. This analysis follows the canon of statutory interpretation *expressio unius est exclusio alterius*, which means that expressly mentioning certain items of a class impliedly excludes others left unmentioned.¹³ Thus, because female students could reasonably be classed among the “minority” students that NCLBA expressly mentions, female students are not included within the meaning of “minority” when Congress discusses closing the achievement gap between minority and nonminority students.¹⁴

NCLBA offers federal funding to states that submit to the Secretary of Education a detailed plan¹⁵ describing, among other things, the challenging academic standards¹⁶ it will use for its students, including a list of specific elements,¹⁷ as well as an accountability system,¹⁸ including yearly progress reports¹⁹ that include “separate measurable annual objectives for continuous and substantial improvement for . . . [t]he achievement of . . . economically disadvantaged students; students from major racial and ethnic groups; students with disabilities; and students with limited English proficiency.”²⁰ Here again, Congress has detailed which students require special attention, but female students are not named.

B. The Federal Government’s Ability to Intervene

NCLBA demonstrates the federal government’s ability to intervene and take action against inequality in education in America’s

12. *Id.* § 6301(2), (3).

13. *See* *Chevron U.S.A., Inc. v. Echazabal*, 536 U.S. 73, 80 (2002) (noting that “the interpretive canon, *expressio unius est exclusio alterius*” means “expressing one item of [an] associated group or series excludes another left unmentioned” (quoting *United States v. Vonn*, 535 U.S. 55, 65 (2002))).

14. *See* *Barnhart v. Peabody Coal Co.*, 537 U.S. 149, 168 (2003) (“[T]he canon *expressio unius est exclusio alterius* does not apply to every statutory listing or grouping; it has force only when the items expressed are members of an ‘associated group or series,’ justifying the inference that items not mentioned were excluded by deliberate choice, not inadvertence.” (quoting *Vonn*, 535 U.S. at 65)).

15. 20 U.S.C. § 6311(a) (1) (2006).

16. *Id.* § 6311(b) (1) (A).

17. *Id.* § 6311(b) (1) (D).

18. *Id.* § 6311(b) (2).

19. *Id.* § 6311(b) (2) (B).

20. *Id.* § 6311(b) (2) (C) (v) (internal numerals omitted).

public schools. The government achieves this by offering federal funds to states that comply with NCLBA's requirements rather than forcing the states to comply, thus quelling Tenth Amendment concerns.²¹ The government does not force any of the states to comply, but rather incentivizes compliance through funding in an effort to close the achievement gap between advantaged and disadvantaged students.²² The specifics of the edification plans are left to the individual states, allowing the local governments to decide what is best for their students.²³ The federal government has done this on two previous occasions, beginning with President Lyndon Johnson's 1965 Elementary and Secondary Education Act and continuing with President Bill Clinton's Improving America's Schools Act in 1994.²⁴

The federal government can apply the same goals and reasoning that it uses in NCLBA to the gender gap problem. The government can entice states to close the gap by offering federal funds to those states that submit a plan to close the gender gap in science and mathematics. There may be, however, an Equal Protection issue if the federal government distributes funds solely for female students. This issue will be discussed in Part IV.B.

II. CLOSING THE GENDER GAP SHOULD BE A FEDERAL PROJECT

The gender gap does not merely pose an individual state problem.²⁵ Rather, the gender gap, as evidenced by the dearth of women

21. *See South Dakota v. Dole*, 483 U.S. 203, 207-08 (1987) (holding that Congress can use its spending power to induce states to take a particular action on an issue that is normally under the states' prerogative if the following conditions are met: the statute 1) cannot be prohibited by other provisions of the Constitution; 2) must be in pursuit of the general welfare of the people; 3) must be related to the federal interest in particular national projects or programs; 4) must be unambiguous so that the states are mindful of their choice and aware of the consequences). *But see* USLegal Law Digest, United States No Child Left Behind Act of 2001, <http://lawdigest.uslegal.com/education-laws/no-child-left-behind-act-of-2001/7227/> (last visited Jan. 2, 2010) (criticizing NCLBA for infringing on states' rights to control education).

22. *See* 20 U.S.C. §§ 6301, 6311 (describing the goal of closing the achievement gap and describing the funds that will be distributed to states that comply with NCLBA's requirements).

23. *See id.* § 6311(b) (1) (leaving it to the states to determine their own educational standards).

24. Chester E. Finn, Jr., *5 Myths About the Education Law Everyone Loves to Hate*, WASH. POST, Mar. 30, 2008, at B3, available at <http://www.washingtonpost.com/wp-dyn/content/article/2008/03/28/AR2008032802976.html> (noting that NCLBA does not compel the states to do anything; rather, states can comply with NCLBA's requirements to receive federal funds, similar to President Johnson's Elementary and Secondary Education Act and President Clinton's Improving America's Schools Act).

25. Urban Institute, Five Questions For Beatriz Chu Clewell, <http://www.urban.org/toolkit/fivequestions/BClewell.cfm> (last visited Jan. 2, 2010) (describing the importance of science and engineering to America's dominance and competitiveness in the world).

who grow up to work in science and engineering fields,²⁶ affects the entire nation.²⁷ Thus, since the gender gap problem is a national problem and not just a problem occurring in a few individual states, it should be handled nationally.²⁸ The argument for individual states tackling the problem independently would be stronger if the impact of the gender gap affected states separately and did not affect all citizens of the country.

A. *The Likelihood of Success of a Federal Gender Gap Solution*

Critics of NCLBA have complained that though it has admirable and desirable goals, it does not work.²⁹ These critics argue that NCLBA forces teachers to teach for the test.³⁰ Teaching for the test presents the illusion of deeper levels of comprehension and learning, while in reality the students have simply been taught the minimum information they will need to know to do well on the standardized

26. National Council for Research on Women, *Balancing the Equation: What We Know & What We Need*, <http://www.ncrw.org/research/scifacts.htm> (last visited Jan. 2, 2010) (“Women constitute 45 percent of the workforce in the U.S., but hold just 12 percent of science and engineering jobs in business and industry.”); Society of Women Engineers, *Statistics About Women in Engineering in the USA*, http://www.swe.org/SWE/ProgDev/stat/employ_table.html (last visited Jan. 2, 2010) (showing that less than eleven percent of employed engineers in 1999 were women).

27. See Urban Institute, *supra* note 25.

28. Gareth Vorster, *Gender Pay Gap Should be Fixed by Government, Polls Show*, PERSONNEL TODAY, Mar. 10, 2008, <http://www.personneltoday.com/articles/2008/03/10/44827/gender-pay-gap-should-be-fixed-by-government-poll-shows.html> (“88% of respondents believe it to be [the] government’s job [to close the gender pay gap] . . .”).

29. See Linda Darling-Hammond, *Evaluating ‘No Child Left Behind,’* THE NATION, May 21, 2007, at 13-14, 16, available at <http://www.thenation.com/doc/20070521/darling-hammond> (summarizing the reasons why NCLBA has not worked); Kathy Hirsh-Pasek & Roberta Golinkoff, *Hirsh-Pasek and Golinkoff: Five Problems with No Child Left Behind*, PROVIDENCE JOURNAL, Aug. 21, 2007, http://www.projo.com/opinion/contributors/content/CT_child21_08-21-07_R86M5KS.18ad591.html (citing five reasons why NCLBA does not work: 1) lack of a holistic approach to learning; 2) not responsive to different learning styles and capacities; 3) rote memorization instead of mastery of content to be applied in new contexts; 4) standardized tests are too stressful for children, which causes a drop in performance level; 5) does not groom a love of learning or life-long learners); Laura McCallum, Minnesota Public Radio, *No Child Left Behind at 5: Legislators Say it’s Not Working* (Jan. 11, 2007), <http://minnesota.publicradio.org/display/web/2007/01/08/nochild/> (noting that NCLBA does not work with bilingual students, especially when it comes to math). *But see* Press Release, U.S. Dept. of Educ., *Spellings Celebrates Fifth Anniversary of No Child Left Behind Act with Speech to Education and Business Leaders* (Jan. 8, 2007), available at <http://www.ed.gov/news/pressreleases/2007/01/010821007.html> (noting that five years after being signed into law, NCLBA is closing the achievement gap).

30. See Darling-Hammond, *supra* note 29, at 13 (“Critics claim that the law’s focus on complicated tallies of multiple-choice-test scores has dumbed down the curriculum . . .”); McCallum, *supra* note 29 (“Many students are doing better on statewide tests, yet the law’s one-size-fits-all approach doesn’t accommodate all of the school’s challenges.”).

exam.³¹ If the students are successful on the exam, the state can demonstrate the students' improvement and therefore receive the promised federal grant money.³²

Additionally, critics complain that NCLBA is underfunded.³³ Standing before the House Appropriations Committee, National Education Association President Reg Weaver stated that "[t]he bill for all 'No Child Left Behind' Programs is [nine and a half billion dollars] less than what was promised when the law passed, and is even below what President Bush has requested,"³⁴ and this "falls far short of what schools need to fully meet the mandates of the so-called law."³⁵ It must be noted, however, that "even though the allocated funds don't hit the maximum authorized level does not mean the programs aren't getting enough money. The arguments that NCLBA is underfunded are deceiving in the sense that the authorization levels are funding ceilings, not floors."³⁶ This means that NCLBA is not necessarily underfunded solely because Congress does not authorize the maximum amount it is allowed to approve.³⁷

With a similar program implemented to fight the gender gap problem, the federal government need not require standardized tests. Instead, the states should be allowed to provide statistics of girls' performance in science and math classes in middle schools and high schools across the country. These statistics should include the girls' improvements in their courses through their grades, the number of girls participating in each science and math course, as well as the levels of math and science courses the girls are taking. The goal would be to see both an increase in the number of girls participating in more advanced courses as well as an improvement in the girls' grades in the courses they take.

31. See Hirsh-Pasek & Golinkoff, *supra* note 29 (noting "[t]he curriculum is too narrow, focusing on math and reading while moving away from the education of the whole child. Art, music, and creativity are being driven out of education for testing and test preparation time"). The authors also note that "[t]eaching is aimed at minimum standards to ensure passing scores. . . . The [A]ct's emphasis on standardized assessments promotes memorization instead of mastery learning." *Id.*

32. 20 U.S.C. § 6311 (2006).

33. See Darling-Hammond, *supra* note 29, at 13 (noting that teachers have actually brought lawsuits against the federal government based on unfunded costs of NCLBA, among other things); Peter Brownfeld, Fox News, 'No Child Left Behind' Gets Mixed Reviews (Feb. 16, 2004), <http://www.foxnews.com/story/0,2933,111386,00.html> ("What we've always been critical about is the lack of funding. It's an unfunded mandate on our states." (quoting Democratic National Committee Communications Director Deborah DeShong)).

34. Joe Davidson, BlackPressUSA.com, Top Black Republicans Praise Bush as Protestors Demonstrate, <http://www.blackpressusa.com/news/Article.asp?SID=3&Title=National+News&NewsID=3425> (last visited Jan. 2, 2010).

35. The Heritage Foundation, Education Notebook: In Search of the "Magic Number" (Nov. 1, 2004), <http://www.heritage.org/research/education/ednotes4.cfm>.

36. Brownfeld, *supra* note 33.

37. *Id.*

Additionally, a federal project aimed at closing the gender gap would have to have a secure plan for funding that will not be abandoned once initiated. A funding floor may be more appropriate in this case so states are fully aware of the minimum amount of funding they will receive if they participate in the program. Furthermore, with a funding floor, states will be able to request additional funding, either because the state requires more money than other states to accomplish the same goal (for example, because of a bigger student population) or because the state has shown exceptional improvements.

III. CAUSES OF THE GENDER GAP

There is as of yet no consensus as to the absolute cause of the gender gap problem. Rather, the scholarship suggests a combination of causal factors for the gender gap, including innate biological differences between boys and girls as well as environmental factors.

A. Innate Biological Differences

In 1992, the first talking Barbie doll was released into the market, declaring, “[m]ath class is tough.”³⁸ Just over a decade later, Larry Summers, President of Harvard University from 2001 to 2006, sparked an uproar of criticism over his comment at the Conference on Diversifying the Science & Engineering Workforce, sponsored by the National Bureau of Economics Research.³⁹ According to Amanda Ripley of TIME Magazine,

He called for “rigorous and careful” thinking to explain the gender gap among top-tier tenured science professors. . . . The most likely explanations, he said, are that 1) women are just not so interested as men in making the sacrifices required by high-powered jobs, 2) men may have more “intrinsic aptitude” for high-level science and 3) women may be victims of old-fashioned discrimination. “In my own view, their importance probably ranks in exactly the order that I just described,” he announced.⁴⁰

The criticism and backlash to Summers’ comment mainly surrounded the “intrinsic aptitude” remark.⁴¹ Despite this backlash, “scientists

38. Jasna Jovanovic & Candice Dreves, National Network for Child Care, Math, Science, and Girls: Can We Close the Gender Gap? (May 1996), http://www.nncc.org/Curriculum/sac52_math.science.girls.html.

39. Lawrence H. Summers, former President of Harvard University, Remarks at NBER Conference on Diversifying the Science & Engineering Workforce (Jan. 14, 2005), available at http://www.president.harvard.edu/speeches/summers_2005/nber.php.

40. Ripley, *supra* note 4, at 51.

41. *Id.*

who have spent their lives studying sex differences in the brain (some of whom defend Summers and some of whom dismiss him as an ignoramus) generally concede that he was not entirely wrong.”⁴² On the other hand, Yu Xie, a sociology professor at the University of Michigan, states, “I don’t exclude biology as an explanation . . . [b]ut I know biological factors would not play a role unless they interacted with social conditions.”⁴³

The biological differences may come down to brain development.⁴⁴ It may be that different areas of the brain, such as the spatial versus verbal parts of the brain, mature at different times among boys and girls.⁴⁵ Harriet Hanlon, a researcher at Virginia Polytechnic Institute and State University (Virginia Tech), discovered that “some of the regions involved in mechanical reasoning, visual targeting and spatial reasoning appeared to mature four to eight years earlier in boys. The parts that handle verbal fluency . . . matured several years earlier in girls.”⁴⁶ As Professor Kingsley Browne notes, “[i]t is a reasonably accurate generalization to say that the more spatial, mathematical, and abstract the scientific field, the lower the frequency of women.”⁴⁷ Leonard Sax, a physician, psychologist and author of the book *Why Gender Matters*,⁴⁸ “is . . . convinced that boys and girls are innately different and that we must change the environment so differences don’t become limitations.”⁴⁹ Additionally, Sax states, “[i]f you ask a child to do something not developmentally appropriate for him, he will, [number one,] fail. [Number two,] he will develop an aversion to the subject By age 12, you will have girls who don’t like science and boys who don’t like reading,” and worse, “they won’t ever go back.”⁵⁰ Furthermore, Sax states, “[t]he reason women are under-represented in computer science and engineering is not because they can’t do it. It’s because of the way they’re taught.”⁵¹

Additionally, some studies have shown that the female sex may give up more easily.⁵² One study found that “[fifty-two] percent of women in private-sector science and technology jobs drop out without

42. *Id.* at 52.

43. *Id.*

44. *Id.* at 54.

45. *Id.* at 55.

46. *Id.*

47. Kingsley R. Browne, *Women in Science: Biological Factors Should Not be Ignored*, 11 *CARDOZO WOMEN’S L.J.* 509, 523 (2005).

48. Ripley, *supra* note 4, at 55.

49. *Id.* at 56.

50. *Id.*

51. *Id.*

52. *See id.* at 58-59 (describing how “[s]ome experiments show that baby girls, when faced with failure, tend to give up and cry relatively quickly, while baby boys get angry and persist”). It is unclear, however, whether this pattern continues into adulthood. *Id.*

returning” and that “the dropout is occurring even as gender differences in science study are starting to level out.”⁵³ This willingness to give up is significant because even if there is no innate biological difference when it comes to ability in math and science, girls may be more likely to give up on these subjects than boys, even boys who struggle more with those same subjects.⁵⁴ Additionally, those girls that do break through the gender gap and pursue fields in math and science are more likely than men to give up once they start their careers.⁵⁵ This means that as the gender gap in math and science closes in middle schools and high schools, the gender gap will not close nearly as quickly in those same professional fields.⁵⁶

In opposition to the theory of innate biological differences causing the gender gap is the theory that it is not innate ability⁵⁷ but rather social forces that cause the gender gap.⁵⁸ In an article in the *Washington Post*, the author discusses the factors that may cause the gender gap and implies that ultimately the cause is not differences in innate ability.⁵⁹ The article focuses on one of the nation’s top science

53. Ashley Phillips, ABC News, Women Dropping Out of Science Careers (June 24, 2008), <http://abcnews.go.com/Technology/story?id=5227334&page=1>.

54. See Joseph Adelson, *What We Don't Know About Sex Differences*, 3 CONST. COMMENT. 295, 303-04 (1986) (noting that “if a girl likes math but feels that the amount of effort it will take to do well is not worthwhile because it decreases the time she will have available for more preferred activities . . . she will be less likely to continue taking math. Similarly, if a girl sex-types mathematics . . . as masculine . . . she will be less likely . . . to continue her mathematical studies, especially if she does not expect to do well.”).

55. See Peter A. Lawrence, *Men, Women, and Ghosts in Science*, PUB. LIBR. SCIENCE, Jan. 17, 2006, <http://www.plosbiology.org/article/info:doi/10.1371/journal.pbio.0040019> (“But with higher and higher rank, the proportion of women [in science careers] falls inexorably — full professors are only about 10% female. Women drop out steadily, and many of them have demonstrated high ability.”).

56. See Univ. of Cal. San Diego, Scienceblog.com, UCSD Study Finds Women’s Attitudes Can Influence Drop-out Rates Among Female Engineering Students (Aug. 2002), <http://www.scienceblog.com/community/older/2002/C/20025931.html> (noting that “when males have trouble in their college classes, they more often consider it as a challenge that can be overcome by studying harder or taking a different approach to the problem” whereas women “who enter engineering majors have been told all their lives how good they are at math and science . . . [so] they tend to drop classes when faced with difficulty”). This implies that, while girls close the gender gap during their formative years, the gender gap reemerges after adolescence and into adulthood.

57. See Begley, *supra* note 1, at 57 (“If not even a structure as fundamental as the visual cortex is hard-wired, can we please retire the claim that boy brains are hard-wired for math and girl brains are not?”).

58. See Timmer, *supra* note 3 (noting that “[i]t has been suggested that these gaps are the result of biological differences . . . [b]ut a new study suggests that, when it comes to math, we can forget biology, as social equality seems to play a dominant role in test scores”).

59. See Valerie Strauss, *Decoding Why Few Girls Choose Science, Math*, WASH. POST, Feb. 1, 2005, at A7, available at <http://www.washingtonpost.com/wp-dyn/articles/A52344-2005Jan31.html> (discussing why there are no girls in the computational physics class or the school’s top math class and only one girl in the computer systems lab). “Ask

and technology high schools, which is attended equally by both genders but sees this equality fade in its top level courses.⁶⁰ Additional scholarship suggests that, if the gender gap is not caused by innate biological differences, both genders need equal time and encouragement in all subjects to make the gender gap disappear.⁶¹

Others believe that a line cannot be drawn between social and biological factors, and refuse to choose one or the other as the sole reason for the gender gap.⁶² Rather, proponents of this viewpoint suggest that both biology and social forces are factors that contribute to the gender gap.⁶³

1. *Closing the Gender Gap Is the Government's Responsibility*

Whether the gender gap is partly or wholly caused by biological factors, it remains the government's responsibility to close the gap. The theory that women may be more adept at other subjects, such as those that involve language,⁶⁴ does not mean that the government should not make an effort to encourage women to branch out into other fields. Despite the supposed innate biological differences, it has been shown that women do make significant contributions when they are involved in math and science fields.⁶⁵ Thus, even if women need more help and prodding than men in this arena, it is still in the government's best interest to encourage women to join these fields.

teachers, administrators and students at Thomas Jefferson [High School for Science and Technology] — where about 55 percent of the 1,694 students are boys — why such discrepancies exist in these classes, and they will say it has nothing to do with ability." *Id.*

60. *Id.*

61. See Abramson & Stephenson, *supra* note 2, at 6 ("Conventional wisdom is that differences between boys and girls in math and science are not a matter of biology; any observable differences are influences of the social environment. When parents encourage school-age children to excel in all subject areas, the school-based gender gap disappears.")

62. See, e.g., Browne, *supra* note 47, at 510 ("Thus, the suggestion offered here is not that social factors, sometimes including outright discrimination, are not part of the story. Instead, it is that the whole story cannot be understood without taking biologically influenced sex differences into account.")

63. *Id.*

64. Nikhil Swaminathan, *Girl Talk: Are Women Really Better at Language?*, SCIENTIFIC AMERICAN, Mar. 5, 2008, <http://www.scientificamerican.com/article.cfm?id=are-women-really-better-with-language> (noting that "[s]cientific literature has been littered with studies over the past 40 years documenting the superior language skills of girls" and that a new study "implies that boys need to be taught language both visually (with a textbook) and orally (through a lecture) to get a full grasp of the subject, whereas a girl may be able to pick up the concepts by either method").

65. See K. CASHATT & L. SMITH, SELECTION OF WOMEN'S CONTRIBUTIONS TO SCIENCE, <http://courses.washington.edu/wost/Win02/readings/BioTimeline.pdf> (listing over fifty women and their contributions to science); Inventions.org, *Minority and Female Contributions to Science and Industry*, <http://www.inventions.org/culture/science/women/index.html> (last visited Jan. 2, 2010) (providing biographies of successful women in science).

If the gender gap is not caused by biology but rather caused by social factors, the government remains responsible for countering these forces to close the gender gap. The government has a history of attempting to right social wrongs that have occurred because of prejudices, like those prejudices against race and ethnicity.⁶⁶ The government should apply this same principle to the gender gap problem to remedy decades of social inequality against women in the math and science fields.⁶⁷ Additionally, it is in the government's best interest for women to work in the math and science fields, so no matter what the reason for the current level of inequality, the government has the responsibility and the motive to eliminate the inequality in order to improve the quality of life of each of its citizens.

B. Social Factors

In opposition to, or perhaps in addition to, the theory of innate biological differences causing the gender gap is the theory of social factors causing the gender gap. These factors range from self-esteem issues to societal pressure to self-perception.

1. Self-Esteem

Self-esteem can be a major factor affecting many aspects of a young adult's life, including education.⁶⁸ It is possible, however, that self-esteem specifically affects a girl's ability to succeed in math and science.⁶⁹ As Strauss reports in the *Washington Post*, "boys don't mind being wrong as much as girls, both boys and girls said. 'I like to be safe rather than put myself out there,' said 16-year-old junior Beth Martin."⁷⁰ Additionally, this lack of self-esteem can be caused by an

66. See, e.g., *Brown v. Board of Educ.*, 347 U.S. 483, 483 (1954) (eliminating segregation on the basis of race in the realm of education); Darling-Hammond, *supra* note 29, at 11 (noting that part of NCLBA's focus was "on improving education for students of color").

67. William J. Cromie, *Barriers to Women in Science Discussed*, HARVARD U. GAZETTE, May 13, 1999, available at <http://www.hno.harvard.edu/gazette/1999/05.13/women.sci.html> (noting a senior woman scientist at Harvard who stated that "[d]iscrimination remains an ongoing fact in our scientific lives" and also that "[w]e might have been much more successful, which would have been beneficial not only to ourselves but to our universities and our fields, had we not been paying all the various costs of facing and fighting discrimination").

68. See OREGON RESILIENCY PROJECT, UNIV. OF OR., SELF ESTEEM IN CHILDREN AND ADOLESCENTS 1 (2003), http://74.125.155.132/scholar?q=cache:2wPp_VRYxQ0J:scholar.google.com/&hl=en ("Self-esteem is a critical aspect of child and adolescent development. When a child or adolescent has low self-esteem, their social and academic achievement can be negatively affected.").

69. See Strauss, *supra* note 59, at A7 (discussing girls' tendency to be more self-conscious in school).

70. *Id.*

already male-dominated classroom, which makes girls feel more uncomfortable, especially when speaking out.⁷¹ As Strauss notes, “[m]any girls find some classroom environments intimidating. Take, for example, the computer systems labs. All day, nearly all of the chairs are occupied by males. The teachers admit testosterone rules the room. The atmosphere ‘is intense,’ and many girls don’t see the room as ‘friendly’”⁷² Thus, it is important for the classroom to feel safe, for it to feel friendly and uncritical, so that girls will want to join the class.⁷³

2. Societal Pressure and Self-Perception

Young adults constantly absorb the different types of pressure that emanate from society; pressures that influence them in their daily lives.⁷⁴ Many of these signals come from adults, and many of those signals follow certain stereotypes.⁷⁵ For example, teenage girls may be influenced by their parents, teachers, or principals when they hear them discuss gender issues in education or when these adults interact directly with the female student.⁷⁶ A teenage girl may be discouraged from taking upper-level math and science courses because of her parents’ reactions⁷⁷ or due to the teacher’s tendencies in the

71. *Id.*

72. *Id.*

73. *See id.* (“Give [girls] an environment they are comfortable in, and they will come.”).

74. *See* News Release, Population Council, Social Pressures are Keys to Adolescent Reproductive Behavior (Dec. 16, 1998), http://www.popcouncil.org/mediacenter/news_releases/adolescence.html (discussing influences on adolescent reproductive behavior, including “social pressures deeply rooted in family systems, peer relations, and the social construction of gender”).

75. *See* Strauss, *supra* note 59, at A7 (“Students, teachers and administrators attribute class enrollment to factors including personal interests and personality, levels of exposure at younger ages and the subtle — and not so subtle — stereotypical signals sent by adults.”).

76. *See* Begley, *supra* note 1, at 57 (noting that “[i]n a 2007 study, girls reminded of the girls-are-spatially-challenged stereotype did worse on a test of spatial ability than those who were not” and further noting that “[a]nxiety triggered by social forces had muted activity required for spatial reasoning. Scale that up to years of messages telling girls they’re intrinsically inferior and then try to argue that a hard-wired brain rather than the messages society sends explains the math gender gap.”).

77. *See* Adelson, *supra* note 54, at 303 (“With respect to mathematical talent . . . belief has it that sex differences are a function of differential (and invidious) processes of socialization, initiated in the family . . . the intent of which is to inhibit expectations, and aspiration, and ultimately performance in areas deemed to be ‘masculine’ such as mathematics and science.”); Begley, *supra* note 1, at 57 (discussing social factors and forces telling girls they are inferior in math); Jovanovic & Dreves, *supra* note 38, at 2 (noting that “when parents believe boys are better at math than girls, they are willing to let their daughters drop out of math class when the going gets tough. With sons, however, the same parents encourage persistence.”).

classroom to favor boys, whether consciously or subconsciously.⁷⁸ As a result, she may begin to believe that she is innately inferior to her male counterparts in these subjects.⁷⁹ In sum, she may be unable to picture herself in math and science fields, which will serve to discourage her from pursuing math and science courses.⁸⁰ For example, there is societal pressure on young adults to be social and not a bookworm.⁸¹ As Strauss notes, “the goal is to help [girls] overcome social pressures, which weigh more on girls. Lisa Marrone . . . a junior, said in middle school she was torn between academics and not ‘having a reputation for being a bookworm.’”⁸² There is also societal pressure on young adults in the area of mathematics, due to the societal concept that math is only for “nerds.”⁸³ This corresponds with Begley’s observation that “[c]ountries whose girls lag behind boys tend to see math as for nerds only, which drives away many U.S. girls (who are more sensitive to social status than boys).”⁸⁴ Societal pressure is thus a real threat to female young adults with mathematical and scientific abilities.⁸⁵

Additionally, there is historical evidence that women were habitually suppressed and harassed in the math and science fields.⁸⁶ For example, Bill Bryson describes how Rosalind Franklin helped discover the double helix shape of DNA, but because of consistent harassment from male counterparts, this discovery was jeopardized.⁸⁷ Bryson states, “[i]f Franklin was not warmly forthcoming with her findings, she cannot be altogether blamed. Female academics . . . in the 1950s were treated with a formalized disdain . . . [S]he was being constantly pressed — at times actively harassed — to share her results”⁸⁸ As one of these men who harassed her later admitted,

78. See Jovanovic & Dreves, *supra* note 38, at 2 (“In the classroom, teachers, often unaware of their own biases, call on boys more, praise boys more for correct answers, and are more likely to ask boys for help in science and math demonstrations.”).

79. See *id.* (“The message girls get [from their parents and teachers] is that they are not as good as boys [at math].”).

80. See Londa Schiebinger, *Getting More Women Into Science: Knowledge Issues*, 30 HARV. J.L. & GENDER 365, 365 (2007) (“Historically, when prompted to ‘draw a scientist’ 70 percent [of children drew males] with some 16 percent of the scientists drawn being clearly female and another 14 percent ambiguous with respect to sex.”).

81. Strauss, *supra* note 59, at A7.

82. *Id.*

83. Begley, *supra* note 1, at 57.

84. *Id.*

85. See *id.* (“Whether mathematical ability is identified depends on social, cultural and other environmental factors”).

86. BILL BRYSON, A SHORT HISTORY OF NEARLY EVERYTHING 129-30, 405-07 (2003).

87. *Id.* at 405.

88. *Id.*

“I’m afraid we always used to adopt — let’s say a patronizing attitude toward her”⁸⁹

Bryson also describes female discoveries in astronomy in the early 1920s.⁹⁰ He discusses the ingenuity of two women, Henrietta Swan Leavitt and Annie Jump Cannon, who made their discoveries as a result of the drudge work into which they were forced, but which was the closest they “could get to real astronomy at Harvard.”⁹¹ Bryson contrasts the great discoveries of these two women, which include devising a system of stellar classifications and the discovery of a usable way to measure the large-scale universe,⁹² with the works of William H. Pickering, “who could of course peer into a first-class telescope as often as he wanted” and who “was developing *his* seminal theory that dark patches on the Moon were caused by swarms of seasonally migrating insects.”⁹³ These historical accounts display just how useful and important the female mind is in mathematical and scientific fields and just how damaging stereotypes and societal forces can be. These examples also show that women may not be inherently inferior to men in the math and science fields, but rather if they are let into the lab, they are capable of great contributions in areas that are typically male-dominated.

C. Teachers’ Influence and Gender-Separated Classrooms

1. Effect of the Gender of the Teacher

The gender of the teacher does not have as great an effect on the student as does the gender of the student.⁹⁴ Boys receive more attention and praise in the classroom, are asked harder questions, and are more likely to be assigned to higher ability groups in class, no matter the gender of the teacher.⁹⁵ This is a regrettable practice because “differences in treatment [may] contribute to girls’ lower

89. *Id.*

90. *Id.* at 129-30.

91. *Id.*

92. *See id.* at 130 (noting that Cannon “devise[d] a system of stellar classifications so practical that it is still in use today” and noting Leavitt’s discovery of “‘standard candles’ . . . was the first time that anyone had come up with a usable way to measure the large-scale universe”).

93. *Id.*

94. *See* MID-ATL. EQUITY CONSORTIUM, INC. & NETWORK, INC., BEYOND TITLE IX: GENDER EQUITY ISSUES IN SCHOOLS 5 (Sept. 1993), <http://www.maec.org/pdf/beyondIX.pdf> (providing an overview of Title IX and gender equality issues in education).

95. *Id.*

self-esteem, lower self-confidence, and reduced risk taking,”⁹⁶ all of which may contribute to the gender gap. The gender of the teacher is thus not as influential on the gender gap as the gender stereotypes that seem to be lingering in the classroom.

2. *Effect of Separating Students by Gender*

A new trend that is increasingly being practiced in the nation’s public schools is that of separating classes by the gender of the students.⁹⁷ The theory behind teaching boys and girls separately is that their brains mature differently, with certain areas maturing first in boys and others in girls.⁹⁸ However, simply separating the sexes and then teaching them as if they are the same is not sufficient.⁹⁹ The teacher must take into account the differences in the students’ brain development for the practice of separating the students to be fully effective.¹⁰⁰ Because public schools with gender-separated classrooms are only beginning to become available,¹⁰¹ statistics on the schools’ successes and failures are not readily accessible.¹⁰² There is some indication, however, that gender-separated classrooms are effective,¹⁰³ and are effective for young women in particular.¹⁰⁴

96. *Id.*

97. See Elizabeth Weil, *Teaching Boys and Girls Separately*, N.Y. TIMES MAG., Mar. 2, 2008, at 40, available at http://www.nytimes.com/2008/03/02/magazine/02sex3-t.html?_r=2 (“Separating schoolboys from schoolgirls has long been a staple of private and parochial education. But the idea is now gaining traction in American public schools. . .”).

98. See Ripley, *supra* note 4, at 56 (“Eventually, Sax concluded that very young boys and girls would be better off in separate classrooms altogether. . . . But coed schools do more harm than good, he decided, when they teach boys and girls as if their brains mature at the same time.”).

99. *Id.*

100. *Id.*

101. See Pauline Vu, Stateline.org, *Single-gender Schools on the Rise* (Sept. 24, 2006), <http://archive.stateline.org/weekly/Stateline.org-Weekly-Original-Content-2006-09-17.pdf> (“The number of public schools experimenting with single-sex education is still small but has shot up in recent years — from five to at least 241 in the last decade — as districts in more than half the states take the chance that separating boys and girls will help students learn better.”).

102. See Weil, *supra* note 97, at 87 (discussing the lack of scholarly debate over single-sex education and the lack of data on whether the schools are better or worse for students).

103. See *id.* at 41 (“Principal Mansell [of a gender-separated public school in Alabama] reports that her single-sex classes produce fewer discipline problems, more parental support and better scores in writing, reading and math.”). Additionally, “[Principal] Wright says that in 2001, after Marshall [Elementary School]’s first year in a single-sex format, the percentage of boys meeting the state’s academic standards rose from 10 percent to 35 percent in math and 10 percent to 53 percent in reading and writing.” *Id.* at 45.

104. See, e.g., *id.* at 84 (“The Young Women’s Leadership School in Harlem is widely considered the birthplace of the current single-sex public school movement. . . . stem[ming] from both its early beginnings and its success: since opening in 1996, every girl in every senior class . . . has graduated and been accepted at a four-year college.”).

a. The Legality of Separating Classrooms by Gender

Title IX, passed in 1972, prohibits schools that receive federal funds from discriminating on the basis of gender.¹⁰⁵ This statute does not, however, automatically prohibit schools from separating classes based on sex or even from forming entirely single-sex schools.¹⁰⁶ Rather, the legality of single-sex schools depends on context.¹⁰⁷ As Supreme Court Justice Ruth Bader Ginsburg noted, as long as single-sex schools worked to “dissipate, rather than perpetuate, traditional gender classifications,” single-sex education might be legal.¹⁰⁸ As Elizabeth Weil, contributing writer to the *New York Times Magazine*, eloquently explains, “Ginsburg’s opinion states that in some contexts . . . [t]he two sexes are not fungible’ . . . [and] the physical differences between the sexes are ‘enduring’ and ‘cause for celebration.’ Yet, Ginsburg warned, those differences cannot be used to place ‘artificial constraints on individuals’ opportunity.’”¹⁰⁹ This language furthers the notion that boys and girls are not the same in many ways, and these differences must be handled in a way that does not constrain but rather promotes and encourages them. This is the goal and theory behind single-sex education — to recognize developmental, physical, behavioral, and other differences between the sexes and utilize those differences to advance each gender’s opportunities.¹¹⁰

Additionally, NCLBA, “which aims to have all children reading and doing math at grade level by 2014, allowed federal money to be used for innovative programs such as all-boys’ and all-girls’ schools and classes.”¹¹¹ Thus, there is evidence that NCLBA itself condones single-sex education.¹¹² Furthermore, despite the Supreme Court’s infamous holding in *Brown v. Board of Education*¹¹³ that separate but equal education violates the Fourteenth Amendment because

105. 20 U.S.C. § 1681a (2006).

106. See Weil, *supra* note 97, at 85 (discussing the legality of single-sex education).

107. *Id.*; see also Sharon K. Mollman, *The Gender Gap: Separating the Sexes in Public Education*, 68 IND. L.J. 149, 152 (1992) (discussing attempts to institute all-male public schools in inner cities and the constitutionality of separating the sexes in education).

108. *United States v. Virginia*, 518 U.S. 515, 534 n.7 (1996) (citation omitted); see also Weil, *supra* note 97, at 85 (discussing Justice Ginsburg’s opinion).

109. Weil, *supra* note 97, at 85.

110. See Robert Kennedy, About.com, What Are the Advantages of Single-Sex Education?, <http://privateschool.about.com/cs/choosingaschool/a/singlesex.htm> (last visited Jan. 3, 2010) (discussing the reasons for and advantages of single-sex education). But see Meghan O’Rourke, *Single-Sex Ed 101: Welcome to the Latest Educational Fad*, SLATE, Nov. 15, 2006, <http://www.slate.com/id/2153505> (questioning whether the goals of single-sex education in actuality reinforce gender stereotypes).

111. Vu, *supra* note 101.

112. *Id.*

113. 347 U.S. 483 (1954).

“[s]eparate education facilities are inherently unequal,”¹¹⁴ segregation based on sex, rather than race, has been viewed in a more positive and acceptable light.¹¹⁵ As Mollman notes, “*Brown* dealt with schools separated by race, and several subsequent cases by lower courts ‘implicit[ly] accept[ed] the notion that separate facilities are more justifiable in the context of sex.’”¹¹⁶

D. Immigration’s Effect on the Gender Gap

1. Gender-Stratified Societies

Studies show that where societies are gender-stratified, the gender gap is more severe.¹¹⁷ As Ashley Phillips reports, “[t]he highest performer [in a worldwide study] in math was Iceland, which also has high gender equality In Turkey, which scored low in gender gap equality, girls performed the worst.”¹¹⁸ The question that follows is whether immigrants from gender-stratified societies who immigrate to the United States affect the gender gap problem in America.¹¹⁹

Record-high immigration levels are forever changing the demographics of America’s schools.¹²⁰ For example, Hispanic societies are traditionally gender-stratified societies.¹²¹ Immigrants from these nations may immigrate to the United States with the preconceived notion that girls are innately inferior to boys at math and science, or that because they are female, girls should not attempt to succeed in

114. *Id.* at 495.

115. Mollman, *supra* note 107, at 156-57.

116. *Id.*

117. See Begley, *supra* note 1, at 57 (“Countries whose girls excel in the [International Mathematical] Olympiad have rigorous national math curricula and cultures that encourage girls as well as boys who excel in math.”); Ashley Phillips, ABC News, Study: Girls in Sexist Societies Worse at Math (May 29, 2008), <http://abcnews.go.com/Technology/story?id=4956998&page=1> (discussing the higher levels of math comprehension among girls in nations with higher gender equality); see also *Bridging* EUREKALERT, *supra* note 3 (“The so-called gender gap in math skills seems to be at least partially correlated to environmental factors The gap doesn’t exist in countries in which men and women have access to similar resources and opportunities.”); Timmer, *supra* note 3 (noting that “a new study suggests that, when it comes to math, we can forget biology, as social equality seems to play a dominant role in test scores”).

118. Phillips, *supra* note 117.

119. See RANDY CAPPS ET AL., THE NEW DEMOGRAPHY OF AMERICA’S SCHOOLS: IMMIGRATION AND THE NO CHILD LEFT BEHIND ACT 1 (2005), http://www.urban.org/UploadedPDF/311230_new_demography.pdf (discussing the interaction of increased levels of immigration and NCLBA).

120. *Id.* at 7-10.

121. See Robert A. Hummer, Isaac W. Eberstein & Charles B. Nam, *Infant Mortality Differentials Among Hispanic Groups in Florida*, 70 SOC. FORCES 1055, 1060 (1992) (discussing the importance of marital status in “gender-stratified societ[ies]” such as Puerto Rico, Mexico, Cuba, and other Hispanic nations).

these fields. With immigration from Mexico and other Latin American countries accounting for approximately half of all foreign-born children in the United States,¹²² this preconceived notion can have an adverse effect on the American gender gap. The gap thus may grow due to immigration even as Congress and individual states work to close the gap, resulting in little or no change overall. The challenge that follows is a difficult one: convincing parents who were raised in gender-stratified communities that their daughters can be as capable and as talented at math and science as their sons, and that their daughters deserve equal opportunities to succeed in these fields.¹²³

2. The Federal Government's Responsibility Remains

Although part of the gender gap problem may be caused by immigration, the government continues to have the responsibility to close the gender gap. Though it may be difficult for the government to break through the preconceived notions of immigrants, Congress must still attempt to close the gap.

First, the government has a responsibility to care for its citizens and resident immigrants. No matter what their experience and beliefs might be, the government's attempt to assimilate immigrants into American culture includes transforming the way immigrants think about gender in education.

Second, it is in the government's best interest to close the gender gap among immigrants in the same way it is in the government's best interest to close the gender gap among American-born students: to reach every possible mind, whether male or female, and educate, train, and encourage that mind to pursue a career in any field whatsoever. Beatriz Chu Clewell, director of the Program for Evaluation and Equity Research, states it is important to see more minorities and women in science fields because "we're losing talent. Science and engineering really contribute to this country's preeminence in the world These fields are very vulnerable to talent deficiency. So by losing the contributions that women and underrepresented minorities could make to the talent pool in science, we really are losing a lot."¹²⁴

122. CAPPS ET AL., *supra* note 119, at 8.

123. See David A. Cotter, Joan M. Hermsen & Reeve Vanneman, Univ. of Md., End of the Gender Revolution?, <http://www.bsos.umd.edu/socy/vanneman/endofgr/gssattrace.html> (last visited Jan. 3, 2010) (displaying graph that suggests that whites, blacks, Asians, and Hispanics have liberalized their gender attitudes over the last thirty-five years, with Hispanics making the biggest leap towards a more liberal attitude of gender); Phillips, *supra* note 117 ("There's at least a hint this [gender gap] is driven by cultures. So it may be possibly [sic] to modify [gender gap] [sic] in some societies").

124. Urban Institute, *supra* note 25.

3. *Racially and Ethnically Influenced Gender Gap*

The gender gap also suffers from racial and ethnic influences and stereotypes.¹²⁵ As Clewell described, “[t]he case for minorities is different. They do not have access yet to high-quality education. Study after study shows that minorities are educationally segregated, virtually if not legally. We also know that schools with high minority enrollment have fewer teachers who are qualified to teach math and science.”¹²⁶ Though NCLBA is aimed at closing the racial and ethnic achievement gap, it does not focus specifically on minority women who have two barriers to break through, both gender *and* race or ethnicity.¹²⁷

IV. CONSTITUTIONAL PROBLEMS WITH A GENDER GAP SOLUTION

A. *Tenth Amendment*

The Tenth Amendment states, “[t]he powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.”¹²⁸ Thus, because the federal government was not expressly delegated the power to control education in the Constitution,¹²⁹ the Tenth Amendment states that the power to educate is reserved to the States.¹³⁰ Congress thus may not enact legislation that forces states to comply with federal orders concerning certain aspects of education. Congress may, however, enact legislation that encourages states to comply with federal mandates on education through federal funding, thus providing

125. See YUVAL ELMELECH & HSIEN-HEN LU, LEVY ECONOMICS INSTITUTE, ABSTRACT: RACE, ETHNICITY, AND THE GENDER-POVERTY GAP (2002), <http://www.levy.org/pubs/wp351.pdf> (“We find that Black and Puerto Rican women experience a double disadvantage owing to being both women and members of a minority group. As compared with whites, however, gender inequality among other minority groups is relatively small.”).

126. Urban Institute, *supra* note 25.

127. ELMELECH & LU, *supra* note 125.

128. U.S. CONST. amend. X.

129. See U.S. CONST. arts. I-VII (lacking any reference to education).

130. See Jonathan Alter, *Bill Gates Goes to School*, NEWSWEEK, Dec. 15, 2008, at 42 (“[Bill] Gates is right that there’s ‘little appetite’ politically for an increased federal role in education, which is mostly a state and local matter. But maybe he can expand that appetite by helping persuade Congress to fund proven models.”); Lynn M. Stuter, News WithViews.com, *Are Public Schools Constitutional?* (Jan. 20, 2003), <http://www.newswithviews.com/Stuter/stuter9.htm> (stating that “education is reserved to the States”); Donald A. Tevault, *Civics and Politics, The Tenth Amendment; Forgotten, But Not Gone*, <http://www.civicsandpolitics.com/tenth.html> (last visited Jan. 3, 2010) (positing that “the biggest problem with federal involvement in education is that it is unconstitutional”); J.C. Watts & J. Harvie Wilkinson III, *LawCrossing, The Tenth Amendment*, <http://www.lawcrossing.com/article/1158/The-Tenth-Amendment/> (last visited Jan. 3, 2010) (“The Tenth Amendment has ensured that education is funded primarily at the state and local levels . . .”).

incentives rather than demanding action.¹³¹ Part I.B of this Note provides a more detailed discussion of possible Tenth Amendment issues regarding a statute aimed at closing the gender gap.

B. Equal Protection

A logical and reasonable reaction to a proposed statute aimed at closing the gender gap is to ask whether the government can constitutionally provide public educational funding solely to girls. The answer is yes, for several reasons.

1. Righting the Ship

Closing the gender gap is comparable to affirmative action in that it will allow the government to right previous wrongs it has committed or allowed to take place.¹³² The government, though, must have an end point in sight and may not privilege one group over another for an unlimited amount of time.¹³³ In the case of closing the gender gap in education, there is a definite end point: the disappearance of the gender gap in math and science among school-aged girls and boys. Though the oppression of women in science and math cannot be compared to the severity of the oppression of former slaves, the government still has a duty and a right to correct its history and attempt to make its citizens equal. Due to the history of discrimination against women in math and science,¹³⁴ the federal government may provide extra help for women who deserve an equal opportunity in these fields. This opportunity begins with education.

2. Differently Situated?

There are biological differences between men and women (e.g., pregnancy) that make men and women differently situated in certain

131. See *South Dakota v. Dole*, 483 U.S. 203, 207 (1987) (holding Congress's use of the Tax and Spending Clause constitutional).

132. See *Grutter v. Bollinger*, 539 U.S. 306, 343 (2003) (holding the University of Michigan Law School's affirmative action policy constitutional).

133. See *id.* at 342 (stating that such plans "must have reasonable durational limits").

134. See You Jung Kim, Ohmy News, *Gender Discrimination in Science: Where Does It Begin?* (Dec. 13, 2008), http://english.ohmynews.com/articleview/article_view.asp?article_class=4&no=384406&rel_no=1 ("Although people treat this type of blatant gender discrimination as a cultural taboo in modern-day America, social scientists agree the overt sexism of the past has been replaced by unconscious sexism in the present."); Women's International Center, *Women's History in America*, <http://www.wic.org/misc/history.htm> (last visited Jan. 3, 2010) (discussing the history of women's issues in America and stating that "[f]ormal education for girls historically has been secondary to that for boys").

circumstances. The Supreme Court has stated that the government may treat differently-situated people differently.¹³⁵ If the gap is partly or wholly caused by biological factors, then men and women are arguably differently-situated, and the government may treat them differently by providing funds solely to girls. This may be a hard argument to make, both due to the inconclusive evidence of the effect of biological differences on the gender gap and the Supreme Court's outlook on gender-explicit legislation.¹³⁶ As the Supreme Court noted, "[r]ather than resting on meaningful considerations, statutes distributing benefits and burdens between the sexes in different ways very likely reflect outmoded notions of the relative capabilities of men and women."¹³⁷ Thus, the government would likely have to present conclusive evidence or empirical studies that show that the gender gap is partly or wholly caused by biological factors, in order to claim that the statute aimed at closing the gender gap is based on the "differently-situated" theory.

If the government cannot obtain such evidence to prove biological differences, then the government cannot treat girls differently than boys on the theory that they are differently situated. In this case, the government might decide to provide equivalent funds for boys in order to close the gender gap that is widening between boys and girls in reading and language.¹³⁸

3. *Intermediate Review for Explicit Gender Differences*

Gender-based issues are reviewed by the Supreme Court under the intermediate review standard.¹³⁹ Intermediate review means that the government must have an important state interest with means that are substantially related to that interest.¹⁴⁰ Additionally, the

135. See *Michael M. v. Superior Court of Sonoma County*, 450 U.S. 464, 469 (1981) ("[B]ecause the Equal Protection Clause does not 'demand that a statute necessarily apply equally to all persons' or require 'things which are different in fact . . . to be treated in law as though they were the same,' this Court has consistently upheld statutes where the gender classification is not invidious, but rather realistically reflects the fact that the sexes are not similarly situated in certain circumstances.") (citations omitted).

136. See *City of Cleburne v. Cleburne Living Center, Inc.*, 473 U.S. 432, 440-41 (1985) (stating that a classification based on gender "generally provides no sensible ground for differential treatment. '[W]hat differentiates sex from such nonsuspect statuses as intelligence or physical disability . . . is that the sex characteristic frequently bears no relation to ability to perform or contribute to society.'") (citation omitted).

137. *Id.* at 441.

138. See *infra* Part V for a discussion on the male gender gap.

139. See *City of Cleburne*, 473 U.S. at 440 ("Legislative classifications based on gender also call for a heightened standard of review.")

140. See *Craig v. Boren*, 429 U.S. 190, 197 (1976) ("To withstand constitutional challenge, previous cases establish that classifications by gender must serve important governmental objectives and must be substantially related to achievement of those objectives.")

Supreme Court states that gender is a quasi-suspect class.¹⁴¹ This means that gender does not receive the full strict scrutiny review of a suspect class, but should receive a higher level of review than a non-suspect class.¹⁴²

The Supreme Court applies intermediate review to analyze statutes that contain explicit gender differences that do not involve biological dissimilarities.¹⁴³ If the gender gap is not caused by biological differences, but rather social forces and a history of discrimination, then the government would be implementing an explicit gender statute by giving money to women who are not biologically different from men in this regard, i.e., ability in math and science. In this situation, the Supreme Court would apply intermediate review, and the government would have to show important interests and means substantially related to those interests.¹⁴⁴ Encouraging girls to become more involved in math and science so that they pursue employment in these fields is likely an important government interest. Giving states an incentive through funding to encourage girls to study these subjects and excel at them is substantially related to the government interest of encouraging girls to become more involved in math and science. Thus, under intermediate review, a statute modeled after NCLBA but focusing on closing the gender gap in education may indeed pass muster under Supreme Court review.

V. THE MALE GENDER GAP

A. Facts

Just as the female gender gap is closing,¹⁴⁵ a new gender gap is emerging: the male gender gap.¹⁴⁶ This gender gap does not revolve

141. *See id.* at 210 (Powell, J., concurring) (stating that “subsequent cases involving gender-based classifications make clear that the Court subjects such classifications to a more critical examination than is normally applied when ‘fundamental’ constitutional rights and ‘suspect classes’ are not present”).

142. *Id.*

143. *See id.* at 211 n.* (noting that “our decision today will be viewed by some as a ‘middle-tier’ approach. . . . [C]ompels the recognition that the relatively deferential ‘rational basis’ standard of review normally applied takes on a sharper focus when we address a gender-based classification.”).

144. *See id.* at 197 (majority opinion) (“To withstand constitutional challenge, previous cases establish that classifications by gender must serve important governmental objectives and must be substantially related to achievement of those objectives.”).

145. *See* Ned Potter, ABC News, Girls Bridge Gender Divide in Math (July 24, 2008), <http://abcnews.go.com/Technology/Story?id=5441728&page=1> (noting “a new study, published in this week’s edition of the journal *Science*, shows the gap has disappeared. . . . Whatever gender differences there once existed between girls and boys in terms of math performance are gone.”).

146. *See* Posting of Ryan Hagen to Freakonomics Blog, What’s Behind the Gender Gap in Education?, <http://freakonomics.blogs.nytimes.com/2008/03/13/whats-behind-the-gender-gap-in-education/> (Mar. 13, 2008, 12:30 EST) (“The underperformance of boys has

around math and science, but rather reading and writing.¹⁴⁷ As one school-aged boy put it, “[i]t’s mainly girls in the class that enjoy the reading. It’s just not a boy habit to read.”¹⁴⁸ While reasons that girls have surpassed boys in areas like college enrollment include reduced pressure on women to marry and have children young, as well as increased pressure on them to compete in the labor force,¹⁴⁹ reasons why boys are lagging behind in grade-school are puzzling.¹⁵⁰

B. Theories Behind the Male Gender Gap

One theory, posited by Richard Posner, is that “[f]rom the standpoint of most teachers, . . . the ideal student is well behaved, unaggressive, docile, patient, meticulous, and empathetic in the sense of intuiting the response to the teacher that is most likely to please the teacher. Those are traits less characteristic of boys than of girls.”¹⁵¹ Another of Posner’s theories is that girls are easier to teach because their IQs are less varied than boys’, so they are “‘rewarded’ (not deliberately) with higher average grades.”¹⁵² Posner goes on to speculate that, perhaps, “there is nothing more that men can do to improve their academic performance, given genetic limitations.”¹⁵³ Posner appears to suggest that it is possible that men have maxed out their innate academic capabilities while women, due to discrimination and suppression, have not yet reached their maximum academic capabilities.¹⁵⁴ Now that women are more able to attain a higher level of

contributed to a striking reversal of the gender gap in higher education over the last fifty years.”); David Kohn, CBS News, *The Gender Gap: Boys Lagging* (May 25, 2003), <http://www.cbsnews.com/stories/2002/10/31/60minutes/main527678.shtml> (noting that “after decades of special attention, girls are soaring, while boys are stagnating”).

147. See Kohn, *supra* note 146 (“Boys are falling further behind girls in reading and writing, and still, there’s no public outcry the way there was for girls . . .”).

148. See Susan Ormiston, CBC News, *Boy’s Own Story* (Nov. 25, 2003), <http://www.cbc.ca/news/background/gendergap/> (“Many boys lag behind girls in reading and writing for a while. But somehow we assumed developmentally they’d all catch up. Now it appears that’s not so. Educators now say some boys are falling further behind in reading and writing. The gender gap in literacy is significant; it’s growing, and some boys may never catch up.”).

149. Posting of Ryan Hagen, *supra* note 146; see Posting of Richard Posner to The Becker-Posner Blog, http://www.becker-posner-blog.com/archives/2008/03/the_new_gender.html (Mar. 2, 2008, 05:56 EST) (“The later age of marriage and childbearing and the greatly increased job opportunities of women explain the trend [of female enrollment in college increasing over the last half-century].”).

150. See Posner, *supra* note 149 (“That women are better students than men is pretty much a constant — and a puzzle.”).

151. *Id.*

152. See *id.* (“Moreover, there is more variance in IQ among boys than girls — to exaggerate, more morons and more geniuses — and both the morons and the geniuses are difficult for most teachers, the morons for obvious reasons, the geniuses because they are easily bored in a class. . . .”).

153. *Id.*

154. *Id.*

education and pursue careers in various fields, women may indeed surpass men who have maxed out their options and abilities.¹⁵⁵

A final theory hypothesized by Posner is the “possibility . . . that the decline of the conventional ‘patriarchal’ family since the 1960s has been harder on boys than on girls.”¹⁵⁶ Posner suggests that the lack of a father figure and subsequent lack of discipline has a more serious effect on boys than on girls.¹⁵⁷ Additionally, Dr. Joseph Adelson suggests that “boys who consider academic study to be unmanly, will be less likely to put any effort into school work, especially so if they do not expect to do well.”¹⁵⁸ Thus, the male gender gap suffers from the same efforts of students to be “cool” as the female gender gap, inhibiting students from reaching their full potential.¹⁵⁹

C. Closing the Male Gender Gap

A federal statute aimed at closing the female gender gap will likely be met with Equal Protection protests.¹⁶⁰ To alleviate this issue, the government can instead create a statute that will focus on closing *both* gender gaps. States should submit statistics on both gender gaps. States that have only one gender gap problem may receive funds to close only the gender gap problem that exists in that state, though it is unlikely that a state will have only one gender gap since both are prevalent. States with both gender gap problems should submit plans detailing how they will close both gender gaps and should receive funds relative to the intensity of each gender gap problem.

VI. ALLOCATION OF FUNDS

A. Follow NCLBA Guidelines

One of the principal complaints about NCLBA is that it is not properly funded.¹⁶¹ Thus, if Congress were to model a statute aimed

155. *Id.*

156. *Id.*

157. *Id.*

158. Adelson, *supra* note 54, at 304.

159. See Diane Connell, Scholastic, The New Gender Gap, http://teacher.scholastic.com/products/Instructor/Mar04_gendergap.htm (last visited Jan. 3, 2010) (“The rules of the Boy Code require boys to not show their true feelings, to act tough, and above all else to be ‘cool.’”); Linda Lowen, About.com, Women and Science — Why the Math and Science Gender Gap? (July 28, 2008), <http://womensissues.about.com/od/intheworkplace/a/WomenandScience.htm> (“If doing science is perceived as an uncool thing for a girl — in high school during a very vulnerable time in her life — she won’t perform as well and she won’t do as well as teenage boys.”).

160. See discussion *supra* Part IV.B.

161. See discussion *supra* Part II.A.

at closing the gender gap after NCLBA, it must ensure that the statute is properly funded. As discussed previously, the gender gap statute would encourage states to make efforts to close the gender gap by providing funding to the states that participate. Participating states can submit a plan detailing how the state plans to close the gender gap. This plan must provide initial statistics of the size of the gender gap, measured both through standardized testing scores and through the number of girls and boys taking math and science courses and the levels of those courses. States must continue to submit statistics to continue to receive funding. If the state's initial plan is effective at closing the gap, then the state can continue using that plan and receiving funds until the gender gap is closed. If the initial plan is not effective, the state must submit further plans on how it will modify the original plan in order to continue to receive funds.

Another key complaint about NCLBA is that it is grounded in standardized testing, forcing teachers to narrow the curriculum and teach for the test.¹⁶² A statute aimed at closing the gender gap can allow states to show through standardized tests that the gender gap is closing, but this should not be the only factor taken into consideration. States can also provide statistics of how many girls and boys they have per grade, how many of them are taking math and science courses, the level of those courses, and the average grades of the girls and boys taking those courses (in aggregate). If a state is successful at encouraging more girls to enter math and science courses, or more upper level courses, the state should receive funding. If the state can show improvement in the overall grades of girls, if those grades were initially lower than the boys' as a whole, then the state should receive funding. The state thus does not have to take away from the holistic approach to learning, which avoids the teaching for the test problems that NCLBA presented to teachers, administrators, parents, and students.

B. The Poverty Factor

A provision of the gender gap statute might provide that schools that contain a certain percentage of students who fall below the poverty line will receive extra funds in addition to the funds that a wealthier school would receive. This provision would be beneficial because poverty affects the gender gap problem.¹⁶³ These schools

162. See discussion *supra* Part II.A.

163. See, e.g., Choike.org, The Gender Gap in Education, http://www.choike.org/nuevo_eng/informes/1247.html (last visited Jan. 3, 2010) ("Poverty is one of the major factors that undermines girls' right to education.").

would likely need more help in closing the gender gap than wealthier schools, not only because the gender gap may be wider at the outset, but also because poorer schools may have fewer tools at their disposal to tackle the issue.

C. Funds for After-School and Out-of-School Programs

The gender gap statute should also provide a state with funding to initiate programs that will encourage girls to become interested in math, science, and to pursue careers in those fields. An interested state would submit a proposal describing the clubs, organizations, societies, etc., that it intends to initiate to accomplish the goal of encouragement. These after-school programs should be designed to help girls realize that math and science fields are not male-only fields, even if they are currently male-dominated. Girls should be encouraged to believe that they can help break the history of male domination in math and science. The programs should also be aimed at boosting girls' self-esteem in these subjects, making it more likely that they will pursue and succeed at math and science.¹⁶⁴ There are a number of existing non-profit¹⁶⁵ and private¹⁶⁶ groups that are currently functioning for this exact purpose.

164. See DIANE F. HALPERN, ET AL., ENCOURAGING GIRLS IN MATH AND SCIENCE 6 (2007), available at <http://ies.ed.gov/ncee/wwc/pdf/practiceguides/20072003.pdf> (“[G]irls, particularly as they move out of elementary school and into middle school and high school . . . often underestimate their abilities in mathematics and science. . . . [I]t is important to note that not all girls have less confidence and interest in mathematics and science, and that girls, as well as boys, who have a strong self-concept regarding their abilities in math or science are more likely to choose and perform well in elective math and science courses and to select math- and science-related college majors and careers.”).

165. See Expanding Your Horizons Network, About Us, <http://www.expandingyourhorizons.org/> (last visited Jan. 3, 2010) (explaining that it is a non-profit membership organization aimed at “motivating young women in science [and] mathematics”); GEMS: Girls Excelling in Math and Science, GEMS Information, <http://www.gemsclub.org/GEMSINFO.html> (last visited Jan. 3, 2010) (explaining that this after-school club was started by a teacher and mother of two and now runs on donations and aims to reverse the trend of fifth and sixth grade girls giving up on math and science); GIT Girls in Technology, <http://www.girlsintech.org/> (last visited Jan. 3, 2010) (explaining that it is a non-profit organization whose mission is “to support academic and community programs that engage school-age girls in technology and computer-related learning”).

166. See Carnegie Science Center, Girls Math and Science Partnership, <http://www.carnegiesciencecenter.org/default.aspx?pageid=156> (last visited Jan. 3, 2010) (“The Girls, Math & Science Partnership (GMSP) was created to address issues regarding girls, their participation in science, and the expansion of their opportunities in and influence on the science and technology workforce. Working with girls ages 11-17, their teachers, parents, and mentors, GMSP draws organizations, stakeholders, and communities together in an effort to ensure that girls succeed in math and science.”); Shweta Kumar, *GirlsTalk Program*, THE TARTAN, Mar. 26, 2007, <http://www.thetartan.org/2007/3/26/scitech/girltalk> (“GMSP . . . is ‘a focused campaign to influence and support girls’ interest and participation in math, science and technology in schools and for future careers.’”).

CONCLUSION

Though there is some evidence that the gender gap in math and science is closing, it continues to be a significant problem in America's schools. The federal government has the responsibility to close this gap so that more women will enter the fields of math and science as a career, providing more diversity in fields that can greatly benefit every citizen of the United States.

There may be constitutional Equal Protection arguments against the federal government forming a statute aimed at assisting one gender over the other, but the statute will likely survive intermediate review for gender explicit statutes in the Supreme Court.

The federal government should model a program to close the gender gap after NCLBA, which encourages states to improve children's education through federal funding. The program should take into consideration the level of poverty, immigration, and severity of the existing gender gap when distributing funds. States must submit a plan detailing how they will close the gender gap and must inform Congress of the effectiveness of these plans through statistics, grades, and standardized test scores. If the plan is successful, the state may continue to receive funds; if it is not successful, the state must modify its plan and resubmit it to Congress. In this fashion, states will chip away at the gender gap year by year. Soon, the gender gap in math and science will be just another piece of history about which grandmothers tell their granddaughters, who will listen in disbelieving awe about the days when women did not pursue careers in math and science.

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