

Introduction



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The ninth-grade physical science class was hard at it one day. They heated thin strips of wood in a test tube and found that when they were finished, the wood had shrunk and turned a dark gray. A thick, dark brown smelly substance was stuck to the walls of the test tube, and a colorless, odorless gas had been produced. There were lots of giggles when they discovered that the gas was methane, and that it did indeed burn, but there was some discussion in the back of the room as to whether methane was actually odorless. The dark smelly substance turned out to be tar, and that started a conversation about where tar on the roads came from and whether it was the same tar as in cigarettes. The gray wood was charcoal, and a debate ensued about the relative merits of charcoal versus wood for barbecuing. At the end of the lab period, the classroom stunk, most of the boys had a bit of tar on them somewhere, and they had used open flames. One boy turned to me as he left and said, "Mrs. James, this has been more fun than I have ever had in class in my life."

This lab is part of a science course that was designed expressly for boys. Each day the students find a bin with materials and a lab sheet. The teacher spends no more than five minutes helping the boys set up the exercise before they begin. The lab sheet helps structure the collection of data and provides some direction about what the boys are to do. The teacher helps with troubleshooting by asking questions to help the boys figure out what they are doing. At the end of the lab, with prompts from the teacher, the class discusses the findings and figures out what happened and why. For most lab exercises, a written lab report is required.

This course works because boys in the ninth grade learn best by being active, by putting their hands on the materials, and by talking about the material once they have some context to work with; they like doing something in class, and they can better grasp concepts when they have a concrete visual reference. When I developed the course, I didn't know why this approach worked with my students. I knew what worked with boys, but I wasn't always sure why. Consequently, it was hard for me to convince other teachers to try this course because I couldn't explain to them the reasons for the way the course was constructed. I can now explain why this course works for boys.

Would this method work for you? How does your brain work?

To determine how you best process information, read the following statements and select the choice that most nearly describes you.

1. When putting something together, you are more likely to
 - A. Read the directions first
 - B. Look at the diagrams first

2. When working together with others, you are more likely to
 - A. Choose to work with people you know you get along with
 - B. Choose to work with people who know a lot about the subject
3. When you have to learn a skill, you are more likely to
 - A. Read about how to do it
 - B. Ask someone to show you how to do it
4. How important is the teacher in how well you do in a course?
 - A. I work hard regardless of the teacher
 - B. I am more likely to do well if the teacher and I get along
5. When you are bored in class or in a meeting, you are more likely to
 - A. Daydream
 - B. Doodle
6. When watching TV with other people, you are likely to find that the sound is
 - A. Too loud
 - B. Not loud enough
7. If you had a choice you would rather
 - A. Write a poem to be given to everyone to read
 - B. Recite a poem in front of a group
8. If you give directions, you are more likely to describe the route
 - A. Using landmarks
 - B. Using mileage and compass directions
9. You are more likely to select a book to read that is
 - A. A sensitive treatment of family relationships in turmoil
 - B. A thriller about daring exploits
10. How easy is it for you to understand how someone feels by looking at their facial expression and body language?
 - A. Easy
 - B. Difficult

If you select more A choices, you are likely to be a reflective learner whose auditory/hearing and verbal/reading skills make experiential/hands-on learning a problem, but who will shine in a traditional classroom where reading and writing are important.

If you select more B choices, you are likely to be an active learner whose kinesthetic/physical and iconic/visual skills make learning in a

traditional classroom more difficult, but who will shine in laboratory exercises and other hands-on tasks.

The “B” brain is usually described as the Male Brain because more men appear to think and reason in this fashion. There are women who think this way as well, although not nearly as many as men. As a female with a male brain, I had a hard time in school because my teachers assumed that I should be able to work like my female classmates. What helped me realize how I learned best was working with my male students, especially when I taught them in coed environments. It was there that I began to understand how the methods I had learned in a single-sex environment—both boys’ schools and girls’ schools—could make a difference for my “B” brain students in a coed environment. From this point on, I’ll refer to the “B” brain as a male brain even though the methods will work just as well with girls who learn this way.

What follows is a discussion of the unique ways that most boys learn, together with some applications for schools and classrooms. This book addresses the belief that boys and girls do not always learn in the same way, and different approaches to teaching benefit both. As schools are presently configured, girls appear more successful in school settings. In 1990, the results from the reading portion of the National Assessment of Educational Progress (NAEP) indicated that at ages 9, 13, and 17, girls had an 11 to 12 point advantage over boys. In 2012, the same test showed that boys had made some progress but primarily among 9-year-olds. In the same years on the mathematics test, there were essentially no differences between boys and girls at ages 9 and 13, and that did not change from 1990 to 2012. At age 17, the three-point difference which boys enjoyed in mathematics in 1990 had only grown by one point in 2012 (National Assessment of Educational Progress [NAEP], 2012). Since it is verbal skills that are used to indicate the success of students in schools, these scores indicate that boys continue to fall behind girls in academic proficiency.

Some boys have no trouble in school, but others are failing, dropping out, or not continuing in education past high school. Data from the National Center for Education Statistics (NCES) showed that in 2012, 57 percent of those receiving bachelor’s degrees, 59 percent of those receiving master’s degrees, and 51 percent of those receiving doctorate degrees were women (National Center for Education Statistics [NCES], 2014). Colleges are concerned with the lack of male applicants (Gose, 1997). It is for the boys who are having trouble that this book is written, or rather, for their teachers and families. Boys who are not succeeding in an educational setting are not necessarily unable to learn, but it is likely that they learn in very different ways than those for which classrooms are now structured.

One caveat. Not all boys will fit the model used for this work. More important, cognitive differences within gender—girls compared to girls and boys to boys—are far greater than differences between the two genders (Halpern, 2012). These differences in how children process information are

largest at birth and shrink over time but never really disappear. However, differences in other areas, such as hearing and smell, are large and remain that way throughout life. Additionally, differences between genders can be magnified in a school setting. Stereotyping, peer pressure, social expectations, and environmental influences from families, peers, and teachers, as well as the media and entertainment industry, all work together to intensify the importance placed on gender differences. Students enter your classroom with beliefs about gender-appropriate behavior for them and for their classmates and for you. Understanding those beliefs and helping children cope with how those beliefs affect classroom performance is preferable to pretending that the beliefs don't exist.

All of those influences are what makes it hard to determine exactly which differences are due to biology and which are due to environment. We will begin with biological factors that are the source of gender attributes and then show how those factors are influenced by the world. For example, it is generally thought that boys, ages 20 to 36 months, are more active than girls. Research has shown that when children are very young, the difference in activity level is related more to the amount of space allowed each child than to the child's gender (Maccoby, 1998). Boys may be noisier and more active than girls because of expectations and not biology, but most are still noisier and that can have a deleterious effect on their classroom experience.

Certain terms are used extensively in this book, and what follows are brief definitions of how those terms are used here.

Cognition refers to all of our mental functions, such as thinking, remembering, dreaming, and problem solving. If a child's cognitive skills are not a good fit for the academic activity at hand, the child may appear to be learning disabled. For example, if a child does not learn well from auditory information, the child is going to have trouble in a conversational Spanish class. However, the same child may have little trouble learning Spanish when the material is presented in written form. Some cognitive abilities and weaknesses are typical of boys, but you will find girls with the same cognitive patterns, and the information presented here will help them as well. Remember, the information included here is typical for most boys but not necessarily for all boys.

Stereotype refers to beliefs that we have about the way people behave as a result of their membership in a group. What facts those beliefs are based on and where they begin is the subject of much speculation. Many stereotypical beliefs have no basis in fact; for example, blondes are not thought to be academically capable in spite of many examples to the contrary. Other stereotypical beliefs do have some factual basis—for example, the view that males don't like to read. In fact, many men do like to read, but the learning curve for reading is different for girls and boys. In general, girls learn to read earlier than boys, and the stereotype of males not liking to read begins there, even though most boys will catch up to girls later.

What is the difference between sex and gender? *Sex* is a biological descriptor and refers to areas that apply to individuals because of their genetic makeup. During puberty, the growth pattern of girls tends to be slow and steady, and the growth pattern of boys tends to be in rapid bursts (Berk, 2012). Those growth patterns reflect the different hormonal levels present in girls and boys as a result of their sex. One result of these sex-determined growth patterns is vocal change. Girls' voices drop gradually and usually only the choral teacher is aware of their changing vocal ranges. Boys' voices can change rapidly, and the resultant squeaks and cracks may be embarrassing. That is one reason why some middle school boys stop participating in class discussion.

Gender is a sociological descriptor and refers to areas that apply to individuals because of their membership in society. Many boys do not see school success as a masculine trait. Their belief is that school is for girls, and many girls would agree. The difference between the way that boys and girls view school is based on gender stereotypes. Just because the beliefs are based on stereotypes does not make them any less real or any less of a problem in the classroom. Acknowledging these beliefs about what is gender-appropriate behavior will allow the student and teacher the chance to address the issues. Ignoring these gender differences will not make them disappear. Part I of the book will cover material based on sex differences, and references will be made to brain and neurological research. Part II will cover material based on gender differences, and references will be made to survey and opinion research.

SUBSTANTIATING RESEARCH

In the past 100 years, the process of teaching has changed a great deal. Our attitudes about appropriate classroom activities have changed and continue to change. Part of the reason for the changes is that educational research shows that different teaching methods and approaches produce better results. Teachers and families hear the experts say that new methods will produce superior outcomes and 5 years later hear that the experts now think some other way is better. Does that mean that educational research is somehow flawed or unreliable? Not at all. Our ideas about what are good outcomes for education change over time, leading us to reevaluate what we do in the classroom. In addition, new methods affect other aspects of the learning environment, prompting further changes in methods or curricula.

You will not be asked to believe the assertions in this book, and the suggestions based on those assertions, simply because another teacher suggested that you might try them. The assertions are based on research, which comes in three categories:

1. Classic research that was done more than 10 years ago, but that has been replicated and whose findings are generally agreed upon

2. Recent research that has been replicated and whose findings have been found to be useful by teachers of boys
3. Cutting-edge research that has not been replicated but that has been carefully designed, and whose findings are being applied in all-male classrooms right now

The evidence for sex differences is based on neurobiological research, which generally involves passive information from brain sections, electroencephalograms (EEGs), and magnetic resonance imaging (MRI), and active information from responses to challenges to the neurological system. This active information comes from reflex responses to stimuli such as discrimination of colors or sounds, physiological responses such as differences in pain thresholds or attention, and biological maturational differences such as pubertal timing.

The evidence for gender differences is based on more qualitative research because gender has to do with how behavior is affected by environment and those differences do not necessarily show up in brain structures. A great deal of this information comes from survey and opinion research and, as such, is open to questioning and differences in interpretation. If there is no definitive opinion in a particular area, you will find all of the major opinions included. For example, it is generally agreed that boys have an advantage in spatial rotation ability; what is in question is whether or not that is the reason boys usually do better in math. Some experts in the field are very sure that the spatial ability makes the difference; others are just as sure that it does not.

One of the questions that underlies all of this material is whether boys are really all that different from girls and if they are different, what causes the difference—are children born that way, or does the society in which they live shape their behavior? Because research is mixed on this point, the lack of clarity means that the results are applied differently depending on the background of the expert. Some reports would indicate that gender differences are due primarily to societal expectations based on gender stereotypes (Eliot, 2009; Fine, 2010). Fine (2010) states that the differences you will read in this work are not as extreme as I would have you believe. She reasons that the results reported are exacerbated by “neurosexism,” and Eliot has shared Fine’s viewpoint on cognitive gender differences.

Recently, Eliot did point out that a great deal of neuroscience research has been conducted primarily using male subjects with the result that it is difficult to determine whether gender differences exist or not (Eliot, 2011). However, she was concerned about the use of research on cognitive gender differences to promote single-gender education saying that this use is inappropriate and without foundation since the research does not look at classroom behaviors. She and others authored an opinion which took single-sex education to task for unsuitable use of neuroscience research to support gendered educational programs (Halpern et al., 2011). That article

was restricted in scope because of the limited choice of supporting research. A more comprehensive look at whether single-gender schools work or not concluded that they certainly have validity and that there was no reason to bar the existence of such schools (Salomone, 2013). While this was not a ringing endorsement, the review pointed out that these schools have been shown to be of benefit for many students and that it is imprudent to sweep them away simply based on social political dogma. This disagreement in the significance of the findings underlies all of the lack of coherence among the experts as to whether there are really differences or not and whether you, as a teacher, should pay attention to gender differences in your classroom. The problem is that the experts do not agree on the significance of the findings and whether those findings can be applied to education. Just so you know, few of the experts have much experience teaching in the primary or secondary school classroom.

HOW THE BOOK IS STRUCTURED

The first part starts with information on basic brain differences. If the idea of neurobiology seems a bit overwhelming, do not worry. I include research that uncovers areas that make a difference in the learning process and how the educational environment can be responsive to those differences. I will describe sex differences in neurobiology and how those differences affect learning, but you will not find sex differences that, while substantiated by research, do not seem to have merit for the educator. Following this will be an examination of sex and gender differences in sensory, physical, and cognitive systems and how those affect what happens in the classroom.

The second part explores the relationship between society and biology on boys in school. We will begin with a discussion of Attention Deficit Hyperactivity Disorder (ADHD) and learning disabilities. There is no question that ADHD and other learning concerns are brain based, but the problems that result are exacerbated by social concerns and so this information will be found here. This will be followed by a study of emotional and social factors, together with information on students who have cultural, linguistic, and socioeconomic differences. The discussion and suggestions are based on stereotypes, and while these stereotypes are common for the United States, they may not apply in your particular situation. Please know that I have tried to cover as many bases as possible, but won't cover them all.

The final part offers specific strategies for the classroom teacher. This section begins with some suggestions for classroom management of boys, particularly focusing on the issue of discipline. This will be followed by subject-specific suggestions providing strategies for teachers across the curriculum. These ideas are presented not as models for you to emulate,

but as possibilities for you to use in enlarging your teaching strategies. A new chapter on how to teach boys in the coed classroom has been added here. This information can be found all through the book, but is put in this section so that the teacher can find this material more easily. Finally, I will address how to integrate the boy learning style with other learning styles because most boys are in classrooms with students who do not learn in this way—either other boys or the majority of girls. Don't forget, some girls learn more like boys and much of what follows will help them as well.

Just because boys and girls are in the same classroom does not mean that we can assume that they learn in similar ways. In fact, in the rest of the book you will find out how very different they are. It is important to approach teaching from a gendered perspective, as not all students learn the same way and teaching them as if they did will not change that fact.

LEARNING OBJECTIVES

I have to admit that I really like teaching boys. Partially, it is because I learn the same way that many of them do, but primarily it is because it is so exciting to see boys come alive in a classroom when the lesson is structured for them. In my attempt to make sure that I've covered all the bases and that there are appropriate references for each suggestion, I may not have conveyed that enthusiasm. However, I know that teachers who try a few of the ideas here will also find that teaching boys is really rewarding.

My purpose in writing this book is to show how boys learn, how those learning patterns affect what happens in the classroom, and how schools and teachers can modify the classroom experience to help boys (and therefore all students) learn better. Consequently, there are three learning objectives:

1. To gain an understanding and awareness of the sociological and neurobiological foundations of cognitive gender differences as they relate to education
2. To look critically at curricula and teaching practices with respect to their responsiveness to cognitive gender differences and to uncover areas where changes can and should be made
3. To develop educational approaches based on research and classroom practice to provide an instructional climate responsive to cognitive gender differences