The difference myth

We shouldn't believe the increasingly popular claims that boys and girls think differently, learn differently, and need to be treated differently

*Caryl Rivers and Rosalind C. Barnett**

WOMEN ARE THE chatty sex, using three times as many words each day as men. They are society's great communicators. The verbal parts of their brains are larger than men's and they are hard-wired for empathy, but they lack a natural ability to reach the top levels of math and science.

Men, on the other hand, have brains that are good at understanding systems, and they are adept at acquiring and using power. They are hard-wired to excel at math and science, but lag behind women in reading ability. They talk less and are not naturally inclined toward caring for others.

Sound familiar? In the past decade, such claims have coalesced into an almost unshakable conventional wisdom: Boys and girls are different because their brains are different. This idea has driven bestsellers, parenting articles, and even – increasingly – American education.

The problem is, a hard look at the real data behind these claims suggests they are simply untrue. Some of them are baseless, using the language of science to cloak an absence of serious research; others are built on tenuous studies, with methodological flaws and narrow margins of significance. More and more, they are simply coating old-fashioned stereotypes with a veneer of scientific credibility.

Scientists have turned up some intriguing findings of anatomical differences between the sexes. But we know very little about their real-world effect on how boys and girls behave – meaning that any conclusions based on these findings are premature.

Nonetheless, more policy makers, employers, parents, and teachers appear to be buying into the notion of great gender differences in cognitive abilities. The education world has seen a strong push for single-sex classrooms, with the Bush administration clearing the way for more public schools to segregate students by gender.

There are now more than 360 such classrooms in the United States, with more in the offing. And brain-difference theories are making their way into

business, medicine, psychotherapy, and parenting. As they do, we risk letting an avalanche of dubious science overwhelm decades of legitimate findings – and, more importantly, we risk limiting the futures of a whole generation of boys and girls.

The idea that men and women are cognitively different has deep historical roots. Victorian-era scientists generally accepted as fact that the larger brains of men made them intellectually superior; women's smaller brains made them closer to children than to mature adults. Medical wisdom held that women's brains and ovaries could not develop at the same time, making education dangerous to motherhood.

The 20th century saw those ideas debunked. We now know, for instance, that brain size is proportional to body size and doesn't determine intelligence. A 7-foot man is not smarter than a woman who is 5-foot-2. By the 1970s, the women's movement was applying social pressure behind that science, breaking down the barriers that had kept women out of the top medical and law schools, the Supreme Court, the military, the astronaut corps.

But then, in the 1990s, the tide appeared to turn back. New neurological findings, provocative but inconclusive, began to surface. Female „essentialism," a strain of feminist thought, argued that women were more naturally caring than men in how they made moral decisions. Spurred also by a broader social anxiety about women's new roles, a cornucopia of books began tumbling from publishing houses and selling briskly. By now they include titles such as "Why Men Don't Listen and Women Can't Read Maps" (Barbara and Allan Pease), „Boys and Girls Learn Differently!" (Michael Gurian), "Why Gender Matters" (Leonard Sax), and the granddaddy of them all, "Men Are From Mars and Women Are From Venus" by John Gray. Though written by a family therapist whose PhD came from a now-shuttered diploma mill, "Men Are From Mars" for a time outsold the Bible.

The broadest claim of the advocates of difference – and the most widely repeated – is the idea that boys and girls are innately different in math and science ability. One key piece of evidence is that boys tend to dominate the upper reaches of SAT math scores: In the top 1 percent of scorers on the SAT math test, for instance, boys widely outnumber girls. And that performance gap seems to be echoed in math and science careers: There are very few top women professors in those fields.

The quest to explain those facts, however, has fallen back on some very thin neurological explanations. Best-selling author Gurian argues, in his books and his lectures, that boys have brains naturally wired for understan-

ding systems, due to high testosterone, low serotonin, low oxytocin, and a smaller "corpus callosum," a bundle of nerve fibers that aids language by connecting the brain's two hemispheres. He's echoed by Sax, another best-selling author. In "Why Gender Matters," Sax writes, "Girls and boys behave differently because their brains are wired differently."

But their scientific-sounding lingo turns out to be not especially rigorous. A study published in the Neuroscience and Behavioral Reviews in 1997 found there were no gender differences in the size or shape of the corpus callosum, and recent studies using MRI images agree. Sax's argument that "boys have a brain-based advantage when it comes to learning math" is based on a very small study in which 19 participants looked either at faces or at a small white circle, while the blood flow in their brains was measured by an MRI. The data from the study, however, found so much variation among individuals that it would be meaningless to draw bigger conclusions about boys or girls as a group.

The SAT scores themselves are misleading as well. Though boys outnumber girls among top scorers, they also outnumber girls among the lowest scorers. The average score is nearly identical. And major new research finds that the gap at the top end is narrowing each year.

It's also not clear what very high SAT scores mean in practical terms. An exhaustive 2006 review of major studies, funded by the National Academy of Sciences, indicates no relationship between scoring in the upper tier of ability and eventual success in math or science careers.

In 2000, psychologist Diane Halpern of Claremont McKenna College reviewed a range of studies of cognitive abilities in areas in which you might expect to find sex differences, such as problem solving, computation, and spatial and verbal abilities. She found that differences were so slight as to be inconsequential. Cognitively, there is far more variation within each gender than there is between boys and girls.

Looking for explanations for the apparent boy-girl divide in math and science performance, some experts and numerous newspaper and magazine articles have seized on the idea that boys are biologically programmed to focus on objects, predisposing them to math and understanding systems, while girls are programmed to focus on people. This idea was based on a study of day-old babies done by British psychologist Simon Baron-Cohen in 2003. Baron-Cohen surveyed 100 babies and found that the boys looked at mobiles longer and the girls looked at faces longer.

His study, however, has since been attacked as unreliable by Elizabeth Spelke, a Harvard psychology professor. In an article in American Psycholo-

gist, she pointed out that the experiment lacked critical controls against experimenter bias. Female and male infants were propped up in a parent's lap and shown, side by side, an active person or an inanimate object. Since newborns can't hold their heads up independently, their visual preferences could easily have been determined by the way their parents held them.

In fact, there's a vast scientific literature showing that male and female infants respond equally to people and objects.

If girls get the short end of the stick in the math and science wars, boys also get their share of knocks from the new biological determinism. Males are increasingly seen as inherently deficient in verbal abilities. In The New Republic, education author Richard Whitmire writes of a "verbally drenched curriculum" that is "leaving boys in the dust." One suggested solution is boys-only classrooms in which boys would be taught in boot-camp fashion, with diminished emphasis on verbal abilities. Gurian writes approvingly of the '50s-style classrooms "that kept a lot of boys in line."

Do most boys lack verbal skills? In a word, no. In 2005, the University of Wisconsin's Janet Hyde synthesized data from 165 studies on verbal ability and gender and found a slight female superiority – a difference measurable in statistics, but so small as to be useless in distinguishing real-world boys and girls.

But the idea that boys are less verbal has gained wide currency. In the 2006 bestseller "The Female Brain," author Louann Brizendine argues that girls and women are the talkative sex, while males remain naturally strong and silent. A woman uses 20,000 words per day, while a man uses only 7,000, she asserts.

Brizendine is an academic neuropsychiatrist, and her statistic has been repeated in publications around the world. But it appears to be completely bogus. Brizendine's footnotes cite pop psychology writer Allan Pease – but Mark Liberman, a professor of linguistics and computer science at the University of Pennsylvania, has traced her citations in his popular blog Language Log, and says that Pease's work offers no source for the numbers.

In fact there is better, newer science that suggests those figures are wrong. The most recent study of word use found men and women in a statistical dead heat, with women clocking in at 16,215 words per day and men at 15,699. When that study was published earlier this year in Science, its co-author, James Pennebaker of the University of Texas, Austin, made a specific point of debunking Brizendine's claims.

The lack of hard findings on the real-world difference between boys' and girls' brains hasn't slowed down the impulse to change education.

South Carolina, for instance, aims to have sex-segregated classrooms available in public schools for all children in five years, and gender difference theories are starting to drive curriculum. Teachers are allowing girls to evaluate cosmetics for science projects and assigning action novels for boys to read.

Gurian has exploited his ideas with great success as an educational consultant, claiming to have trained 30,000 teachers in 1,500 schools. Sax runs a lobbying group for more single-sex public schools. When we gave a speech at a national teachers meeting, one private-school teacher in the audience stood up to say that his headmaster was revamping the entire curriculum based on Sax's theories of gender difference.

Of course, it would be naive and even harmful to pretend there are no differences between boys and girls. Boys, for example, are more vulnerable to autism and dyslexia – and teachers and parents need to be alert to that fact. But there's a mountain of evidence to show that gender is the wrong lens through which to view education policies and practice. Some kids learn best visually, others verbally; some do best in "boot-camp" type settings, while others thrive in informal classrooms with lots of freedom. But science and aptitude surveys tell us that gender isn't a helpful way to sort students into those groups.

As science becomes more central to our public and political conversations, it's perhaps not surprising that neurological factoids are being used to "prove" ideas on both sides of a debate. But science shouldn't be enlisted as an excuse for believing what we want to believe. Rather, it should be seen as part of a long series of steps that can lead to fresh understandings of the world.

What we can hope is that eventually, good science drives out bad, and that facts, by their sheer heft, ultimately crush the factoids. But we have to pay attention to make sure this happens. Otherwise, we will end up trusting our kids' futures to ideas and programs that – ironically – rely on science to shore up some of society's most unscientific prejudices.

Caryl Rivers, journalism professor at Boston University, and Rosalind C. Barnett, senior scientist at the Women's Studies Research Center at Brandeis, are at work on "The Truth About Boys and Girls: How Gender Stereotypes Harm Our Children."

* Updated version of Rivers, Caryl, and Rosalind C. Barnett. „The Difference Myth." *Boston Globe*, October 28, 2007, 1.

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