School Wide Discipline Research

Are Boys and Girls Wired to Learn Differently?

By GreatSchools Staff

John Gray's book *Women are from Venus, Men are from Mars* is a best-seller for good reason. It often seems that males experience - and react to - life quite differently than females do.

Gender differences become apparent at an early age and can be seen in the different ways girls and boys play and learn. In a first-grade classroom, it's not unusual to find the girls working quietly at their desks or cooperatively in small groups as the boys toss paper wads through the air, make silly faces at each other across the room, or seem bored, distracted and restless when seated. While many girls politely raise their hands to answer the teacher's questions, many boys blurt out their answers. Out on the playground girls play an orderly game of jump rope, reciting rhyming songs, while boys bounce balls, race around with no apparent purpose, while teasing girls and tackling other boys.

It may help to think about gender differences as being driven by both **internal forces** (biology and anatomy) and **external forces** (such as socialization and stereotypes). Here we'll focus on some of the internal forces by highlighting research that compares male and female biology, neurology and behavior.

Other Internal Forces at Work

Before we delve into gender differences, it's important to note that gender is only one of several inborn factors contributing to a person's unique makeup. Other internal forces that shape who we are and how we behave include:

- temperament (e.g., shyness, energy level)
- intelligence
- natural abilities (e.g., creativity) and disabilities (e.g., dyslexia, AD/HD)

With that caveat in mind, let's review what researchers have discovered about gender-based learning differences.

Brain Science: "Looking Under the Hood"

Over the past decade or so, researchers have attempted to determine what, if any, natural differences exist between male and female brains when it comes to learning. Research in neuroscience has found gender variation in human brain anatomy, chemical processes and function. These variations occur throughout the brain and influence language, memory, emotion, vision, hearing and navigation - all elements in human learning.

Researchers now know that the size of almost every lobe of the human brain is different in males and females. While researchers still don't fully understand how this relates to cognitive ability, they can make some good guesses.

For example, imaging studies consistently show that the region of the brain called the *hippocampus*, which is crucial to memory storage and spatial mapping of the physical world, is larger in women than in men. This might explain why, for example, men and women navigate differently. (Yes, that includes why "men don't stop and ask for directions!") Research suggests that men tend to navigate by estimating distance in space and orientation, while women use monitoring landmarks. Having a larger hippocampus may explain why girls generally have an easier time remembering what they learn.

In girls, the *corpus callosum*, which connects the two hemispheres (or halves) of the brain, is generally larger than in boys. This enables more "cross talk" between the hemispheres of the brain. Boys' brains, on the other hand, are structured to compartmentalize learning. As a result, girls are usually better than boys at multitasking and can make quick transitions between lessons and tasks (Havers, 1995). On the other hand, a boy's ability to compartmentalize learning might result in better clarity and focus in certain situations.

Studies have shown that girls tend to use the areas of the brain devoted to verbal and emotional functioning, while boys generally use the areas of the brain geared toward spatial and mechanical tasks. (Moir and Jessel, 1989; Rich, 2000).

The male brain needs to recharge and reorient by entering what brain scientists call a rest state. Boys may naturally drift off or "space out" during a lesson. However, they are able to stay engaged in visual or hands-on learning that involves symbols, objects, diagrams and pictures but zone out when too many words are used (Gurian, 2001).

Eyes and Ears: His and Hers

In addition to brain variation, research has shown there are anatomical differences between male and female eyes and ears. It seems that girls acquire binocular vision (using both eyes at the same time) at a much younger age than boys do, and that the visual cortex appears to be organized in very different ways in boys and girls (Gwiazda, Thorn, 1994).

Other research suggests that girls naturally have a keener sense of hearing than boys do, especially at higher frequencies that are important to speech discrimination (Cassidy and Ditty, 2001).

Since vision and hearing are closely related to one's learning experience, these findings are important.

Behavioral Studies: Show and Tell

Behavioral studies are also quite revealing. To filter out the societal influences on gender roles, behavioral studies have been done on human infants and other young primates. Melissa Hines of City University London and Gerianne M. Alexander of Texas A&M University observed monkeys, one of our closest animal cousins. When given a selection of toys, including dolls, trucks, and gender-neutral items like picture books, the male monkeys gravitated toward the "masculine" toys while the female monkeys spent more

time with dolls and types of toys generally associated with girls. Boy and girl monkeys spent equal time playing with the gender-neutral toys.

In another study, Simon Baron-Cohen and his team at the University of Cambridge found among 1-year-old children, given a choice of films to watch, the girls look longer at a film of a human face, while boys seemed more interested in a film featuring cars (Baron-Cohen, 2003).

Might one's attraction to certain types of toys, films or subject matter determine what type of learning environment will be the most natural fit?

Puzzle Pieces Create Unique Patterns

Again, the research on gender differences should be considered part of a bigger picture, including other inborn traits and external forces at work in any one individual. For example, many girls with AD/HD don't openly display their symptoms and are often diagnosed later than boys. This may be so, in part, because society pressures girls to act a certain way (to "behave well and play nice"), yet researchers wonder if the size, structure and function of the female brain causes girls with AD/HD to exhibit different strengths and weaknesses than we see in boys with AD/HD.

When it comes to gender differences, researchers are on the brink of understanding how brain mechanisms differ between the sexes, and what these differences could mean for creating optimal learning environments (teaching styles and settings) for boys and girls. Meanwhile, experts, educators and parents debate the pros and cons of single-sex education.