Boys and Girls: Differences in Brain Development

PINNACLE PRESBYTERIAN MARCH 23, 2023

Child development outlines the predictable course that a child will travel in their development. However, every child walks their own unique path along this course. There are many factors that will impact an individual child's development. Brain research suggests gender holds an important influence and there are key differences between how boy and girl brains typically develop.

Two-thirds of learning disability diagnoses are for boys. They also lead in brain-related learning disorders, such as ADD/ ADHD with millions already on medication. Ninety percent of discipline referrals are for boys. Males make up 80% of high school dropouts and less than 40% of college students. Why? Research into gender and education suggests a serious misalignment between how boy's and girl's brains learn and our current educational system.

Children naturally gravitate towards activities the brain deems pleasurable. What is rewarding to the brain is, on average, strongly impacted by gender. These

generalizations represent what is true for the majority of data collected, not necessarily what is true for every single individual person.

The “Girl” Brain:

- The female corpus callosum (aka the bundle of tissues connecting the two hemispheres) on average is larger than boy’s which enables more “cross talk” between the two sides of the brain.

- Girls typically have stronger neural connectors in the temporal lobe allowing for better detailed memory storage, listening skills, and discrimination of tones of voice.

- Another memory storage area of the brain, the hippocampus, is also larger in girl’s development which further increases girl’s advantage in learning, especially related to the language arts.

- The female prefrontal cortex is generally more active and develops at an earlier age. Girls are also likely to have more serotonin in the blood stream of their brain. Both of which allow girls to make less impulsive decisions overall.

In general, the minds of girls are biologically wired to support memory, sitting still, and listening from an earlier age which often results in complex learning such as reading and writing to develop easier.

The “Boy” Brain:

- The male brain typically has more cortical areas dedicated to spatial-mechanical functioning, making boys typically more likely to move objects through space (balls, airplanes, or body limbs). In addition, most boys experience words and feelings very differently than girls.

- Boys have less serotonin and less oxytocin (the primary human bonding chemical) than girls resulting in more physical impulses and less likely to sit still for

long, empathetic chats with friends.

- Typically, boys lateralize their brain activity. They operate with less blood flow and their brain is structured to compartmentalize learning. As a result, they do not multitask as well as girls, often having more issues with attention span and transitions.

- The male brain is designed to "renew, recharge, and reorient" by entering a rest state. As a result, boys are more likely to zone-out when more words are used to communicate. Instead preferring the use of symbols, pictures, diagrams, and objects moving through space over words.

Typically, the minds of boys support learning higher math and physics easier and more abstractly. It also demonstrates why boys are more likely to gravitate towards physical movement and get in trouble for impulsiveness, boredom, fidgeting, and difficulty listening and verbalizing.

The *nature-based approach* is based on "strategies on research-driven biological understanding of human learning." **By understanding where the brain naturally gravitates in development, it allows parents and educators to value where a child is while also encouraging them to strengthen areas for growth.**

Supporting the "Boy" Brain:

- Boys are experiential and kinesthetic learners, meaning they construct knowledge using all their senses and with their entire body. Movement helps boys stay focused. The simple act of bouncing a ball back and forth outside can support self-regulation.

- Greater blood flow to the cerebellum - the "doing" center of the brain - allows boys to more easily verbalize what they are *doing* versus how they are *feeling*. For example, asking boys to describe their building in the block area, such as the steps they are taking to create it, will encourage more expansion of verbal skills. They may be more easily focused on the what of their doing, than the why. (By contrast, the "girl" brain may more easily gravitate towards imagination and storytelling).

- Boys benefit from additional opportunities for fine-motor development, as they are on average behind girls in this area of development. Games using tweezers, chopsticks, and other items that encourage pincer grasps can provide support.

- Limit verbalize instructions as much as possible, ideally under a minute. Using visual schedules and instructions that utilize pictures or symbols will be more effective.

Supporting the “Girl” Brain:

- Girls benefit from increased opportunities to manipulate objects, build, design and explore spatial challenges. They can be encouraged and supported as they navigate areas they are more likely to struggle with.

- Boys are typically more advanced than girls in gross motor development. Girls should be encouraged to engage in physical games and large body movements.

- Water and sand tables will support girls in spatial exploration and science. Puzzles foster perceptual learning.

- Open-ended manipulatives support math development, as well as building and construction. A variety of building materials such as large wooden blocks, smaller blogs (lincoln logs, magnetic tiles, kapla blocks, etc.), and natural materials that are less symmetrical and more difficult to balance are a few examples.

This blog is a summary of the article “With Boys and Girls in Mind” (November 1, 2004) from ACSD (Volume 62, No. 3). The full article can be **read here**.