



Girl Connection

For those who serve adolescent females

April 2009

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Iowa Gender-Specific Services Task Force

Brain Development Part II: Hormones

In the February edition of the Girl Connection, we explored the structural changes in the adolescent brain and the impact they can have on behavior. Now, we turn to hormonal changes in adolescence.

Before delving into the Big One (estrogen), it is important to explore other hormonal changes that effect all adolescents. As Laurence Steinberg explains in a 2008 paper, "According to dual-systems model, adolescent risk taking is hypothesized to be stimulated by a rapid and dramatic increase in dopaminergic activity within the socioemotional system around the time of puberty, which is presumed to lead to increases in reward seeking. However, this increase in reward seeking precedes the structural maturation of the cognitive control system and its connections to areas of the socioemotional system, a maturational process that is gradual, unfolds over the course of adolescence, and permits more advanced self-regulation and impulse control." To paraphrase another author, this dynamic is like starting the engines of a fast car with an inexperienced driver behind the wheel. Sensation seeking and risk taking hormones flood the adolescent body during puberty, yet it takes much longer for the regulatory areas of the brain to catch up. Is it any wonder adolescence is a time of such poor decision making?

So, not only is the adolescent brain structurally less equipped than the adult brain to regulate behavior, it is also hormonally less equipped than the adult brain. The good news for girls is that they seem to be somewhat less susceptible to this particular hormonal dynamic.

However, girls have other hormones to contend with when they hit puberty, namely estrogen and progesterone. During infancy, girls have high levels of estrogen in their bodies, which then goes dormant throughout girlhood. When puberty rolls around, they are again completely awash in both estrogen and progesterone.

Whether adults are comfortable with it or not, biologically this is the time in a females life when her body is gearing up for attracting a mate and producing offspring. Thus, the apparent adolescent obsession with appearance isn't purely a construct of pressure from the media or other outside sources. It is also supported from within by a young woman's biology.

Puberty is a time of upheaval. Until this point in her life, a young woman has experienced none of the extreme hormonal surges that are in store for her. Estrogen and progesterone come in unpredictable waves. They change daily preventing her from adjusting to them. These major shifts and the manner in which they stimulate the brain also make her more sensitive to interpersonal nuances like approval/disapproval. This sensitivity comes at a time when she has yet to develop the skill of discerning those often nonverbal cues. She realizes that people - particularly male people - are paying more attention to her, in large part due to her physical development, but she is not sure if they are looking at her with acceptance or rejection. As a result, her anxiety can shoot off the charts.

This type of reaction to relational concerns differentiates young women from their male counterparts. Though adults have long recognized that, in general, females place a higher value on interpersonal relationships than males, this is not solely a result of how they are nurtured. There is some nature involved here as well. As the brain is being bathed in estrogen and progesterone, it is also reinforcing the female desire to connect with others. It is reinforcing those relational connections with dopamine and oxytocin - feel good hormones.

This, in part, explains why girls react so strongly when a relationship is threatened. Just the thought of

losing an important relationship triggers stress hormones (cortisol) in females and at the same time shuts off the feel good hormones. Females are not at the mercy of their hormones any more than males are but their particular hormonal predisposition makes some behaviors more likely for them. Compromising themselves as individuals in order to save a relationships they value can in part be attributed to a desire to return the feel good hormonal state.

A final thought on hormones and the differences between the male and female. The Pittsburgh Psychobiologic Studies Center, in a stress responsivity study of girls and boys 16-17 years old, found that girls' brains reacted more strongly to relationship stresses and boys' brains reacted more strongly to challenges to their authority. Although this is a scientific affirmation of the gender-based differences we often see between the genders, it is important to remember that although generalizing about gender can be helpful and efficient, stereotyping can do unintended damage. We can all think of exceptions to every rule and it is no different with gender differences. It is crucial to remember that when working with young women.

Brizendine, Louann. (2006). *The Female Brain*. Random House. New York.

Steinberg, Laurence. (2009). *Adolescent Development and Juvenile Justice*. Annual Review of Clinical Psychology. 5: 47-73.

April 2009 ~ Brain Development: Part II

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