

## WHAT DOES SCIENCE TELL US?



# 8. Adolescent Brain Development

**W**hen we think about digital media overuse and addiction among adolescents, we must consider their stage of brain development. The adolescent's brain is different from an adult's brain because it is still in the process of maturing and developing. Although the brain is plastic, meaning it can change throughout the lifespan, experiences during childhood and adolescence are very important and can influence learning and brain development.

As human beings, we are not born with fully developed brains. Instead, our brains are in a process of maturing from before birth until our mid-twenties.<sup>1</sup> Thus, an adolescent's brain is still "in progress." Maturation of the brain starts at the base (the area responsible for the most primitive functions) and moves gradually up to the front of the brain (called the prefrontal cortex, which is responsible for reasoning, self-control, and planning). Thus, during adolescence, the part of the brain that is involved in emotional drives, motivation, and reward (mid-brain) is *more* mature, and the part of the brain that is involved in executive functions, inhibitory control, and decision making (prefrontal cortex) is *less* mature.<sup>2</sup> So during the teenage years, the limbic system of the midbrain is moving faster than the prefrontal cortex.<sup>3</sup>

What does that mean for adolescents? During this stage of brain development, it is as if the part of the brain that says, "That felt good, let's do it again!" is louder than the part of the brain that says, "Wait a second... let's think about the possible consequences... didn't this go badly for you last time?" The part of the brain responsible for emotions, motivation, and rewards is moving very fast, and the more reasonable, control-oriented part of the brain is not as developed and thus is moving a bit slower. This is why adolescents can benefit from having an adult

pause them to consider the pros and cons of a decision so their prefrontal cortex has a chance to weigh in with self-regulation and goal-oriented decision making.

The unique stage of brain development during adolescence is why teens are more sensitive to rewards,<sup>4</sup> more likely to return to rewards once they experience them,<sup>5</sup> and engage in more impulsive, risk-taking behaviors.<sup>6</sup> This can sound scary, but it is not all bad! Risk-taking during adolescence is essential for growth, exploration, and for teens to establish an independent identity with unique hobbies and interests. However, this stage of brain development also places adolescents at risk for engaging in unhealthy rewarding behaviors, like substance use and behavioral addictions. When it comes to digital media use, which is heavily marketed toward adolescents, we must keep in mind that the teenage brain is not fully mature, so they may need help making appropriate decisions with regard to highly rewarding digital behaviors. This help may include rules, limits, education, and the implementation of healthy online practices.

Also, since the adolescent's brain is still "in progress," digital media overuse can have broader, more detrimental effects, potentially causing changes to normal brain development.<sup>7,8,9</sup> This reality is why adult involvement in limit setting, assistance in decision making, and exploration of potential consequences with regard to digital media use is necessary to set adolescents up for success. The adolescent, in-progress brain is very influenced by experiences, both good and bad. Thus, intentionality regarding digital media use during this time period is critical.

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