

How Youth Brain Development impacts Risk-Taking in Youth

Youth Gambling Awareness Program

YMCA of Greater Toronto

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Learning about a subject as complex as youth brain development can often seem overwhelming. However, having accurate knowledge related to youth brain development can help us better understand the young people that we work or live with and prepares us to better support them. The Youth Gambling Awareness Program (YGAP) explored how brain development impacts youth behaviors to ensure that the programming we provide is accurate and relevant to parents, adults and youth.

The youth brain continues to develop until the age of 25, with the prefrontal cortex developing last. However, the amygdala develops early on in adolescence and is the component of the limbic system responsible for identifying and processing emotionally important or motivationally relevant information (Tottenham & Gabard-Durnam, 2017). The amygdala is continually assessing the environment to evaluate safety. When safety is perceived, the remainder of the brain can focus on learning and memory. However, if a threat is perceived, the amygdala communicates this to the higher cortex of the brain where a physiological and behavioral response is promoted (Siegel, 2010). As humans mature, the prefrontal cortex is able to exert top-down control over the amygdala to determine if the threat the amygdala senses requires a response (Siegel, 2010). The prefrontal cortex is also responsible for functions such as impulse control, planning, understanding consequences and critical thinking. However, because the prefrontal cortex continues to develop until the mid-twenties, it is unable to exert complete top-down control over the amygdala during adolescence or young adulthood. This means, as a result of typical brain development, exerting executive functioning over emotional responses may be challenging (Siegel, 2010).



Two important remodelling processes occur within the brain during adolescence. One of these processes is pruning, in which the brain removes synaptic connections that are no longer necessary in order to increase brain efficiency (Noel, 2014). This allows the brain to become more specialized, as youth further develop their passions, interests and hobbies in life (Siegel, 2018). The phrase “use it or lose it” is used to describe this period, as synapses that are not used often are pruned. The second process is myelination, where there is an increase in fatty lipids and proteins around the activated neuronal processes and fibres in the brain (Fraser-Thrill, 2020). Similarly, myelination improves the efficiency of communication within the brain and signals cognitive development. Myelination begins to occur in the prefrontal cortex during adolescence, as executive functioning and impulse control begins to develop (Siegel, 2018). Therefore during this period of remodeling, it is important for youth to participate in safe, rewarding activities they enjoy in order to reinforce the specific knowledge, skills or traits they would like to hold onto (Siegel, 2018).

The period of adolescence serves as an opportunity for young people to establish their independence from their caregivers (Galván, 2013). Youth do this by seeking out novel experiences and experimenting with new behaviors, which are some of the most effective ways of learning for the maturing brains (Chambers & Potenza, 2003). These novel experiences are often accompanied by the release of dopamine within the Ventral Striatum, which is the reward center of the developing brain. This encourages youth to continue pursuing these types of experiences while promoting the development of the prefrontal cortex (Brezing et al., 2013). Adolescents also engage in a process called hyper-rational thinking when making decisions, wherein the appraisal centers of the brain emphasize the positive aspects or rewards of an



experience and minimize the potential risks (Siegel, 2010). It is for these reasons that youth continue to seek out novel experiences.

The draw to novel experiences and the tendency to engage in hyper-rational thinking can also lead youth to participate in risky activities, such as gambling. There are a number of theories that further explain why youth are drawn to participating in risky activities. One of these theories is the “Dual Systems Model,” which posits that youth are drawn to higher risk-taking because of a heightened reward sensitivity and a decreased impulse control ability (Noel, 2014). Functional MRI studies, a technique that measures brain activity through blood flow, have supported the idea that when compared to children and adults, youth have higher activation in the area of the brain involved in the reward system, the striatum, when given a reward. Reward sensitivity appears to increase from childhood to adolescence and then decrease from adolescence to adulthood, which may be a result of the prefrontal cortex developing greater control (Galván, 2013). Furthermore, youth have a decreased ability to inhibit particular behaviors, especially in emotionally salient situations that can also be linked to the developing prefrontal cortex (Noel, 2014). When gambling, the competition and desire to win has the potential to heighten emotions, making it a possible example of an emotionally salient environment where one’s ability to inhibit behaviors is decreased (Knowyourodds.org, 2013). Similarly, studies have indicated that adolescents are more comfortable than adults in accepting offers within ambiguous circumstances or when odds are unknown, which further demonstrates their greater tolerance for risky activities, such as gambling (Bjork et al., 2014). Lastly, when compared to older adults, research states that youth are drawn to immediate, short-term rewards even if the reward is smaller (Cauffman et al., 2010) which may contribute



to an interest in gambling activities (i.e. slot machines, scratch tickets, etc.) where an immediate reward may be experienced.

Youth have explicit knowledge of the potential harms or consequences of their behaviors. However, it appears that they are less sensitive to these potential consequences or minimize their potential impact and are therefore more likely to participate in risky activities (Noel, 2014). A secondary explanation as to why youth are more comfortable taking risks revolves around habituation. Kashifa Rahman conducted a study to investigate the impact of risk-taking on future youth behavior. Rahman found that, as youth continued to participate in risky activities, the negative emotions associated with risk-taking (such as guilt, fear or shame) decreased. Rahman's study suggested that habituation occurs when youth continue to participate in risky activities, which in turn allows them to continue risk-taking (2019).

YGAP also explored one explanation of how gambling addiction is formed within the human brain. When an individual is anticipating a reward, the brain's reward hub is activated. The prefrontal cortex is able to mediate the reward signals from the reward hub by telling the individual to stop or slow down the activity (Brain Connections, n.d.). However, an addiction can form when there is a breakdown in communication between the reward hub and the prefrontal cortex. If the prefrontal cortex fails to respond with the proper signals to stop or slow down, the individual will continue to seek the reward. One reason that the prefrontal cortex is unable to send the proper signals is because a habit has formed. The dorsal striatum is the area of the brain responsible for habit formation (Brain Connections, n.d.). Once a habit has formed, the individual will become more aware of gambling cues and the presence of gambling



cues, which cause an urge to gamble. In order to eliminate or relieve the discomfort caused by these urges, the individual will gamble, thus continuing the cycle (Brain Connections, n.d.).

The Youth Gambling Awareness Program utilizes a balanced, neutral and harm reduction focused approach towards gambling and related activities. Having knowledge of how the youth brain develops supports the use of such an approach, because although youth may be aware of the potential risks, they remain drawn to the short-term rewards (i.e. the thrill or chance to win something) that are often present with gambling. By discussing ways to stay safe, we provide youth with realistic, relevant information that may choose to employ when given the opportunity to participate in a risky activity.

Youth do not participate in novel or risky activities because they are careless or irresponsible. Instead, they participate in these activities because their brain requires these experiences in order to continue learning and developing (Siegel, 2018). If we know that experimentation is required for the maturing brain to develop, we should look for opportunities to encourage youth participation in novel experiences in a safe way. Examples of these opportunities include encouraging a youth to try a new sport or activity that is outside of their comfort zone, such as acting, a different art form or a new workout class. We can also encourage the use of harm reduction strategies for activities with more risk, such as gambling. An example of a harm reduction strategy for gambling is to set a monetary budget or a time limit when participating in a gambling activity.

It is important to promote the development of protective factors against problem gambling. Protective factors are conditions that are associated with a decreased likelihood of problem gambling, regardless of exposure to risk factors (Dowling et al., 2016). Conversely, risk



factors are conditions that are associated with an increased likelihood of problem gambling (Dowling et al., 2016). Research into protective factors against problem gambling in youth is limited. However, protective factors may have one of three effects: minimizing the impact of risk factors, disrupting the mechanism through which risk factors operate, or preventing initial occurrence of particular risk factors related to problem gambling (Dickson et al., 2008).

Protective factors that prevent problematic drug and alcohol use or reckless driving could be similarly employed against problem gambling (Dickson et al., 2008). Although more research is needed, it is believed that protective factors against problem gambling include concepts such as mentorship, involvement in conventional activities, coping strategies, school connectedness (Dickson et al., 2008), mindfulness, and self-efficacy (Mishra et al., 2019). Prevention initiatives, such as YGAP, should strive to not only decrease risk factors related to problem gambling but increase protective factors against problem gambling as well.

One way that the Youth Gambling Awareness Program promotes the development of protective factors is through Youth Engagement projects. Youth Outreach Workers across the province implement Youth Engagement projects to promote youth expression and community action related to youth gambling. Youth are empowered to participate in the planning, decision making and execution of a project of their choice within their community while individually developing valuable skills. The process followed within the Youth Engagement project has been specifically designed to educate about youth gambling while simultaneously promoting the development of social-emotional learning and media literacy skills. Youth Engagement projects are usually conducted with a group of youth between the ages of 9 and 15, when their brains are extremely plastic, and they are drawn to novel experiences. By participating in the Youth



Engagement project, youth are able to try a new experience, work with youth they may have never worked with before, take on an unfamiliar role within a project and learn more about themselves. The Youth Outreach Worker ensures that a safe, supportive environment exists for each participant, so they are able to comfortably explore and learn. They also act as a supportive, caring adult that can provide affective support or mentorship to participants. Lastly, the Youth Engagement project facilitates a sense of connectedness between participants and their communities.

Youth brain development is complex. By understanding the processes that take place, YGAP can implement programming that is both appropriate and relevant. Furthermore, we can share this information with parents and adults who work with youth, which will allow them to better support the youth in their lives. YGAP's Youth Engagement project is one component of the program that promotes the development of protective factors, while also encouraging the development of social-emotional learning and media literacy skills. To learn more about YGAP connect your youth group with a Youth Engagement opportunity or to book an awareness workshop, please go to: <https://ymcagta.org/youth-programs/youth-gambling-awareness-program>.



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