Adolescents and Social Media

As we learn more about the human brain, we bear more responsibility for our decisions and actions. Neuroplasticity is no longer a theory but has been demonstrated repeatedly, and no period in our neural development is it move vital to our lives than during adolescence. (Griffin, 2017) In childhood our development is vulnerable to our environment, during adolescence our development is vulnerable to the decisions we make. Our brains allow us to learn, to remember, to imitate, to imprint, to absorb culture, and to express instincts and they are active throughout our lives switching on and off, dismantling and rebuilding synapses in response to experiences. They are both cause and consequence of our actions. (Ridley, 2003) “Our temperaments, dispositions, and personalities, regardless of genetic propensities, are developed within sets of meanings and values that we call ‘culture’.” (American Anthropological Association 1998) Connectivity between the medial and lateral pre-frontal cortex and the striatum are crucial for integrating signals relevant to social and environmental contexts and these connections are developed during the increasingly long period of development we call adolescence. (van Duijvenvoorde 2016) What are the implications of our increasingly digital world on our development during this period?

The adolescent brain provides as much mystery for those studying it as it does for those who have it. Luckily, over the past decade or so we have been able to use new technology to increase our understanding of how our brains work. Before I go further, I think it bears acknowledging that everyone is unique and that each part of our brain develops asynchronously; however, research has given us a good blueprint of the changes that occur and rough timelines of when this happens (Sousa 2011). The patterns are consistent. In pre-adolescence and early adolescence there is a "pruning" of synapses in the prefrontal cortex. This is the part of the brain that helps us plan, express our personality, make decisions, and moderate our social behaviour. It is also the part of our brain that helps us to be aware of long-term consequences. Increasingly research shows that this area of our brain is not fully formed until our mid-twenties. "As the pre-frontal cortex develops, utilizing feedback from the environment to shape its progress, we learn how to manage long term planning, monitoring what is going on and adjusting smoothly while keeping our emotions and behaviours appropriate to the context." (Griffin 2017) Concurrently, there is a proliferation of dopamine activity in the brain that is higher during this period than at any other point in our development. (Steinberg 2009) This has significant implications for risk taking and sensation seeking. So, while our executive functioning skills are in their infancy our reward systems are in their unfettered prime. Our environment, then, will play a significant role in our development when we are cognitively most vulnerable.

Another part of brain development particularly crucial during adolescence is the development of working memory. Our working memory contains a limited amount of information at any one time that is used for processing information. Children with poor working memories struggle academically and have difficulty following instructions. Working memory helps us hold on to information long enough to use it and plays a significant role in our abilities to concentrate. Without a good working memory, learning and many daily tasks are very difficult. Peverill and his colleagues found that “While most measures of working memory performance have been shown to plateau by mid-adolescence, working memory filtering … may still be maturing throughout adolescence and into adulthood." (Peverill 2016) Our working memory is also important for reasoning and the guidance of decision-making and behaviour. James Olds, a professor of neuroscience at George Mason University, writes about the brain having “the ability to reprogram itself on the fly, altering the way it functions.” (Carr 2011) “Once we’ve wired new circuitry in our brain,” Norman Doidge a professor of Psychiatry at the University of Toronto

and a member of the research faculty at Columbia University argues that “we keep it activated.” That is the way the brain fine-tunes its’ operations. Routine activities are carried out ever more quickly and efficiently, while unused circuits are pruned away. “If we stop exercising our mental skills,” writes Doidge, “we do not just forget them: the brain map space for those skills is turned over to the skills we practice instead.” (Carr 2011) Therefore, if we are constantly bombarding our working memory with interruptions, distractions, and stimuli, it becomes accustomed to this, seeks it out, and does not develop the ability to reason or to think deeply.

In addition to the neurological changes occurring, adolescents are also changing their social behaviours. Parents are being replaced by peers in the attention of our youth. Approval by peers often outstrips approval from parents. However, it is important to note that adolescents still rely heavily on their parents as the most significant and trusted source of support despite their actions and words. During adolescence we begin the laborious task of creating and understanding our identity. (Healthy Families BC 2014) Ultimately, adolescence is a time of extreme vulnerability and impressionability that needs to be carefully and mindfully developed. It has always been thus, but over the past twenty-five years the landscape has changed significantly.

The first smartphone was unveiled in 1992; it wasn’t available to consumers until 1994, and after 6 months there were approximately 50,000 units worldwide. In 2007 the iPhone was presented to the marketplace, and it is estimated that there will be more than 5 billion smartphone users by the end of 2019. (Statista 2019) In 1997 the first social media platform, *Six Degrees*, was launched, allowing people to make individual profiles and add others to their personal network. In 2018, 89% of our teens (North America) had smartphones and 70% of North American teens were using social media multiple times a day (Common Sense Media 2018). What is the impact of these changes on our adolescents? While creating causal links is challenging at this point, there are some disturbing trends in our youth that we need to pay attention to, such as the rising rates of depression and anxiety (Kelland 2019), and lower rates of life satisfaction and empathy. (Bernd 2018)

While the advent of smartphones and social media is very recent, we do have a growing body of research that helps us understand the impact these technologies have on us as humans. For example, we know that constant interruptions make it very difficult to focus and to think deeply, impairing our working memory. Our smartphones provide constant interruptions, if we let them, through the various apps we have on them. We have also found that "The presence of a smartphone, even when off, can reduce cognitive capacity by taxing the attentional resources that reside at the core of both working memory capacity and fluid intelligence." (Ward 2017) If these are results of studies with adults, what are the implications for adolescents who’s working memory and executive functioning skills are vulnerable and developing? According to Common Sense Media (2018), in a survey of 1,141 US teens ages 13-17, 57% agreed that using social media often distracts them when they should be doing homework; 54% agreed that social media often distracts them when they should be paying attention to the people they are with; and 29% said they've been awakened by their phones during the night. Sleep deprivation is a growing epidemic in youth and can limit their ability to learn, listen, concentrate and solve problems. It has also been linked to aggressive and inappropriate behaviour. (National Sleep Foundation)

Social Media also impacts our sense of identity. As people post their “polished selves” and “packaged selves” (Gardner 2013) others increasingly pale by comparison. People rarely share their mistakes, weaknesses, or foibles; they manicure their identity because it brings positive attention, and when others view this sharing, it is very rarely when the others are doing something equally fun, exciting, glamourous or rewarding. Our identity is also challenged as we transition ourselves between our

multiple audiences on-line. When we share, we are performing for an audience, imagined or real, and so we strive to impress that audience often moving further and further away from our own identity. (Westlake 2008) Erving Goffman (Fawkes 2015) explored the relationship between internal and external creation of personal identity and the crafting of a public persona to share sixty years ago. The concept is not new and is a part of the human condition; however, the impact of technology has amplified this creativity with destructive impact. Erik Erikson identifies identity as one of the eight challenges we face in our development and the one we address in adolescence. He says that we must "forge a persona that fits comfortably with our own desires and aspirations; it must also make sense to the surrounding community." (Gardner 2013) The curated self has made this particularly difficult as it has undermined our ability to trust what we see or read about others. "It is the interaction of the technology with our common, often subconscious psychological biases that makes so many of us vulnerable to misinformation." (Carey 2017) Digital media technologies have given us a plethora of new tools and contexts for youth to express and explore their identities. And, like their adult counterparts, they modify their behaviour for a specific imagined audience on the web to build community and to communicate in ways that will forever alter the ways in which they relate in person. (Westlake 2008) 42% of teens agree that social media has taken away from time they could spend with friends in person. (Common Sense Media 2018) Now, the public and private selves are rarely separated; with underdeveloped impulse control, empathy and judgement compared to adults, youth face a particularly perilous journey of identity played out in a forever public domain.

Our use of portable technology, especially our use of social media, has many other impacts on our lives. We increasingly feel pressure from a variety of sources. FOMO (Fear Of Missing Out) causes passive anxiety through negative emotions and feelings of distraction. (Milyavskaya 2018) Giving constant access to ourselves by carrying devices, and leaving notifications on, is common and has negative implications. 72% of teens and 48% of parents feel the need to immediately respond to texts, social-networking messages, and other notifications (Common Sense Media 2016) which immediately removes us from being present for what we are currently doing and is connected to feelings of anxiety and stress. However, this pales in comparison to the effect social media has on depression, which also fuels anxiety. Social media use has been linked to poor body image, poor self-esteem, online harassment, and poor sleep: all of these contribute significantly to depression and anxiety. (Kelland 2019) And, despite this, we often can't put our phones down.

There is a growing body of research that shows the addictive nature of our social media fixation; however, there is little that demonstrates a causal relationship between social media and addiction. From "phantom notifications" to physical reactions to withdrawal, our phones have increasingly gained power by our own design. In a thoroughly entertaining Ted Talk, teenager Jake Swayze uses an example of the "little red number" that come up on Facebook pages. These numbers have been strategically designed to create a desire to want more. All they represent is the number of times someone has acknowledged our existence, "like and electronic thumbs up", yet we make up rules and stories around them to validate our self worth. (Swayze 2015) Addictive use of social media has been linked to lower self-esteem and higher narcissism (Andreassen 2017). Those prone to addiction are particularly vulnerable to the siren call of portable technology fueled by social media. "We know for a fact, teens have very underdeveloped impulse control and empathy and judgment compared to adults." (Heid 2017) This may lead them to seek disturbing online content or encounters - stuff a more mature mind would know to avoid. Teens also have a hyperactive risk-reward system that allows them to learn - but also to become addicted - much more quickly than grown-ups. Research has linked social media and other phone-based activities with an uptick in feel-good neurochemicals like dopamine, which could

drive compulsive device use and promote feelings of distraction, fatigue, or irritability when kids are separated from their phones. (Heid 2017)

Our neuroplasticity and constant development make the human mind and genome unique. Neuroplasticity carries great potential and great vulnerability. Adolescence is a pivotal period in the development of human beings. The development of our executive functioning capabilities in our prefrontal cortex shapes our future. The increasing capacity of our working memory allows us to learn at unprecedented rates providing the foundation, context, connections and meaning making in our hippocampus (long-term memory) region. And the abundance of dopamine coursing through our bodies provides no shortage of excitement and distractions. All of this put together, makes the human being infinitely capable of great things. The technologies we create are also infinitely capable of great things. It is the intersection of these two phenomena that needs attention. Social media does impact our identity, our sense of reality, and our psyche; but, that does not have to be a bad thing. If we allow it to go unchecked and if we remain ignorant of the effects it is having on our minds, then we become extremely vulnerable, especially when we are at our most susceptible: in adolescence. However, that is a choice we can make. We shape our technology; but, our technology also shapes us. We can take what we know and use it help our youth harness the power of unprecedented connectivity and access; to harness the power of creative flow; and to harness the power of unparalleled opportunity. This will not happen if we remain passive on the sidelines, burying our heads in the sand by making policies that ignore, deny, and avoid reality.

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