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HNR 499

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# Screen Time Effects on Children and Adolescents in Both the United States and Australia

## **Abstract**

Technology and screen time have become an essential part of everyday life in many countries across the world. Children in Australia and the United States are exposed to increasing hours of technology exceeding recommendations by pediatricians in both countries. Pediatricians suggest limiting screen time due to the research indicating possible impact on social development, and unhealthy emotional and physical outcomes in children. The objective of this paper was to review the mental and physical impacts of screen time on young and adolescent children and to compare and contrast policies regulating screen time in the United States and Australia. The information collected for this project was taken from online databases, websites, and books as well as a reflection from the author's experience in both the BOUNCE youth program of Australia and Helen Devos Children's Hospital of the United States. The results of this project conclude that young children and adolescents in both countries are suffering both emotional and physical harm for excessive screen time. Additionally, the educational benefits of educational software are small and limited to young children in low socioeconomic status with poor access to early education. Finally, neither country has adequate policies to protect children, therefore the burden is on parents to follow pediatric guidelines for restriction of screen time.

## **INTRODUCTION**

During the past 20 years, there has been a rapid evolution of technology available to the general public. The devices with screens such as smart phones, laptops, iPads and Tablets are more portable than ever and can be taken anywhere. Not surprisingly, these advancements allow both adults and children to have high access to these devices. A study analyzing the effects of increased sedentary time as a result of technology found children watch 1.8-2.8 hours of television on average each day (Marshall, et al, 2006). This data does not account for other forms of screen time kids experience daily. When incorporating time spent on video games, an additional 60 minutes of screen time is added each day. This is more likely to occur in boys, as they play more video games than girls. Computer time appears to contribute a total of 30 minutes to children's screen time. Studies that have focused on total screen time have found similar totals with 299 minutes (approximately 5 hours) a day reported in South Australian children (Admin, 2017). Other reports indicate an even greater average daily time spent on screens (8.3 hours a day) in children and adults in developed countries (Admin, 2017).

Television (TV) was the first screen introduced in the US in 1940's and in Australia in the 1950's. In both countries, TV became a common, affordable screen in homes in the 1960's. The available broadcasting or streaming hours and content has drastically expanded from its introduction into the home. As with the parents in the 1960's, today's parents often use the television as a babysitter. It is not uncommon for parents to have the television on in the background, resulting in reports that children aged eight months to eight years of age are exposed to approximately four hours a day of background television (Lapierre, Piotrowski, Linebarger 2012). This unconscious viewing of television may not be formally collected in research on screen time but does add to overall screen time in both children and adults.

One of the most versatile form of screen time is the smart phone. This device allows access to the internet essentially anywhere at all times of the day (Lepp, et al., 2014). A majority of the time spent on smart phones is consumed by a plethora of different apps available on the phone. A 2018 survey conducted in the U.S. revealed social media platforms such as YouTube, Instagram and Snapchat are the most popular platform for teenagers to view on their phones. In addition, 45% of these teenagers claim to be online constantly (Anderson, et al., 2018). Children in younger years now obtain cell phones in order for their parents to have 24-hour access to reach their kids. Cell phone usage goes past its intended purpose and also serves as an amusement toy. It has become common practice in the United States to give children smart phones before they enter elementary school, resulting in the increase of children aged 2-4 years of having a cell phone from 39% in 2011 to 80% in 2013. This early access is not limited to the United States as 54% of young children in Australia have their own phones (ATMA, 2006).

Screen time does not stop with television and mobile phones, as video and computer games have swept the nation as well. Computer games have evolved and can be played on multiple platforms, such as laptops, PlayStations and handheld gaming devices. In the United States, 72% of households have video games which are played daily (Entertainment Software Association, 2011). The amount of time individuals spend playing video games has been mainly researched in the United States. One study in the United States found that sixty percent of children between the ages of eight and seventeen have a computer, and most are connected to the internet (Turow, 1999) A study by Cummings, et. al. found that one and a half hours per day was the average time Americans play video games (Cummings, et al., 2007).

These high amounts of daily screen time have raised concerns regarding the physical and mental health consequences, especially in children. Wartella, et. al. reported impaired

development in children with high amounts of daily screen time and concerns of potential social delays. These social/mental health outcomes were also reported in young children and adults when exposed to excessive hours of screen (Anderson, Berk, 2003). A highly researched concern is the lack of physical activity resulting in obesity in children and adults (Robinson, 2001).

Despite these possible negative impacts associated with screen time, schools promote and may even require students to use computers or tablets in the classroom to maximize learning (Griffiths, 2002). Educational programs and software such as Jump Start and Reader Rabbit are advertised to parents to improve the reading abilities and school readiness of their children despite limited research on the educational impact of these programs.

### **Objective**

The purpose of this honor thesis was to review the impact of screen time on development/social skills, obesity, violence and education in young children and adolescents. In addition, to discuss the differences in screen time regulation, and access in Australia and the United States. Finally, I provided my personal reflection on my internship experience working with children in an after-school program in Australia from June thru October of 2019.

### **Impact of Screen time**

#### *Development/Social skills*

Recently developed social media apps present the ability for teenagers to become connected to their peers from across the globe. However, this constant access to their smart phones has created a dependence on technology for self-assurance and ultimately has created a decrease in personal interaction (Kraut, et al., 1998). When adolescents are placed in a social

setting, they struggle to interact with others not utilizing technology. The technological devices used by tweens and teenagers across the world have created social isolation (Costa, 2020). This issue has evolved further than social interaction and has started to take a toll on their overall quality of life. A study in American teenagers found that more than one hour a day of screen time was associated with lower psychological well-being. These teenagers were also found to have reduced curiosity, lower self-control, greater difficulty making friends and less emotional stability (Twenge, et al., 2018). Teenagers are vulnerable to how they believe the world perceives them. When they are constantly exposed to the fabulous lives people claim to live, their self-confidence is greatly affected. Living in a state of comparison creates the idea that they do not have the ability to take the same chances as the “too good to be true” public figures they follow.

This potential effect of technology is not limited to teenagers but spans across all ages of children. In fact, the younger the age, the greater potential harm to affecting their development. This threat has resulted in both the American Academy of Pediatrics and Australian Parents Council releasing a statement to restrict children under two years of age from access to any screen time at all (APA, 2020). Early introduction to screen time shows potential harm to the child’s development in several mental and social areas such as creativity and socialization. These effects on the development of children could be life altering as research indicates the quality, intensity, and types of stimulation encountered during this age may have lasting effects on cognitive development (Kirkorion, et al., 2008).

Children form most of their cognitive development from their everyday life interactions. In “Glow Kids,” Nicholas Kardaras writes of the damages done by technology on the minds of the youth. According to Kardaras, the increase in phone usage as a distraction for children on a

daily basis prevents the children from learning to notice and engage with their surroundings (Kardaras, 2017). A child's time spent playing with other children and exploring the world around them has been replaced with a screen a couple inches in front of their face. Technology also plays a large role in the social development of children. Social development is the process by which children develop role-taking skills, learn to comprehend the motivations and consequences of behaviors, and come to understand human relationships in the social world (Wartella, et al., 1979). Studies have shown that increasing technology during the early part of one's life can result in less social interaction (Kraut, et al., 1998). Children's development comes from their daily experiences, and they are extremely susceptible to being influenced by what they see.

Additionally, the countless hours of screen time may alter a child's ability to visualize creatively. Technology is often used as a distraction tool to prevent boredom in children. This ultimately prevents them from coming up with their own unique forms of entertainment using their imagination. Kids no longer have to mentally create a world to play in because now any world you could imagine is several inches from their faces. Encouraging imagination gives children a set of skills to adapt to challenges thrown their way and come up with creative solutions to fix them (Singer, 2012). Early childhood years are essential to growing this imagination and this learning period can easily be dampened by technology.

### *Physical Health*

Another potential harm technology could impose on children involves the physical health of the child including, physical complaints, sleeping habits and weight gain (Keane, et al., 2016).

Those children with a greater amount of screen time have greater reports of headaches and backaches typically caused by posture while using the technology (Brindova, et al., 2015). The increase in reported physical complaints in children have coincided with rapid increase in technology use. Technology use also appears to be a risk factor in the increasing obesity in children (Edelson, et al., 2016). Zhang, et al. reported 13% greater risk of obesity in children with each additional hour of television per day (Zhang, et al., 2016). This increased risk applied to both girls and boys of young ages. The association of obesity in children with hours of screen time are potentially multifactorial such as increased sedentary time, decreased activity time, mindless eating and advertising of high calorie foods (Robinson, 2001). The combination of access to high calorie foods and sedentary hours during television viewing increases the risk of obesity in these young children (Kelly, et al., 2007).

In obese adolescents the type of attention, direct or primary attention, is associated with BMI (Bickham, et al., 2013). Additionally, in these obese adolescents, the time spent on certain screens exacerbates their risk for chronic disease. The sedentary time from video gaming has been found to increase the risk of cardiovascular disease by causing elevated blood pressure and increased lipid counts (Goldfield, et.al., 2011), while TV viewing increases the risk for diabetes (Goldfield, et al., 2011).

### *Sleep Habits*

The constant use of technology during the day has created a negative impact on the sleeping patterns of kids during the night. According to a United States study, the more screen time children are exposed to each day leads to fewer hours of sleep at night and the few hours they do get are less efficient (Twenge, Campbell, 2019). Specifically, children with access to a portable device near bedtime have been shown to have 79% higher odds of sleeping less than 9

hours than those kids without the devices (Carter, Rees, Hale, 2016). The reasoning screen time has such a great effect on sleeping habits has to do with how our eyes react to the artificial light of the screen. Looking at a screen, such as a phone or television, late at night confuses your brain cells into thinking it is still daytime and resets the body's internal clock and circadian rhythms (Salk Institute, 2018). Children are especially susceptible to this and need to be careful about getting enough sleep for their developing bodies.

This lack of sleep may exacerbate the impact of screen time on obesity and other health outcomes in children. Sleep deprivation in children has been associated with 45% greater risk of developing obesity (Li, et al., 2017). In adolescence sleep deprivation is associated physical and mental health issues (Owens, 2014).

### *Emotional Impact*

Screen time provides access to violent/mature content to children and adolescents. This content has been associated with emotional issues/aggressive behaviors in children and adolescents (Zink, et al., 2019). A survey showed more than 40% of children eight and younger have a TV in their own bedroom (Strasburger, et al., 2012). This privacy for watching television makes it harder for parents to regulate what their children are watching and how often the television is on. This lack of parental guidance can result in children watching programs with content of violent behavior or glamorizing risky behavior such as smoking, alcohol and sex (Klein, et al., 1993). This negative impact can be reduced when a parent is in the room as it has been found when parents take the time to explain the topics featured on the television, the negative or harmful content creates less of an impact (Boyer, et al., 2011). Aggressive viewing as

a child has been found not only to impact behavior during childhood but also carries into their adulthood (Huessman, et al., 2003).

As children age, the type of screen they spend most of their time on changes. Typically, for children older than 10 years of age and mainly boys, realistic and intense first player video games are the main technological source for violent content (Marshall, et al., 2006). These modern gaming systems are filled with realistic shooting, blood and theft. Children become dependent on this high stimulus (Pruett, 2003). There is some concern that high usage of these games can result in blurring the game with reality (Karadas, 2017).

#### *Impact on Aggressive Behavior/Addiction*

This fear of loss of reality has come to fruition as children form addictions to these video games. A countless number of reports have been made of children gamers experiencing a psychotic break after spending hours, days, even months straight playing violent video games (Karadas, 2017). A psychotic break occurs when one loses contact with reality and senses things that are not really there (Lisman, et al., 2010). These psychotic breaks can be detrimental to the youth's health and create a state of mind where the virtual violence could be converted into real life violence. The constant playing of violent video games leads to increased dehumanization, which in turn evokes aggressive behavior (Karadas, 2017). A growing number of violent episodes have been credited to excessive gaming. In China, a thirteen-year-old boy jumped to his death after playing 'World of Warcraft' for thirty-six hours straight leaving a note on his desires to "join the heroes of the game he worshipped" (Kardaras, 2017). These games have the ability to effect children whose minds are not fully developed, and it is essential to stick to moderation while they are growing.

No matter the type of technology, games, television, etc research has shown the continuous interaction with violent media has been linked to greater aggression as children continue their lives (Anderson, Berk, et al., 2003). If a child has pre-existing tendencies to aggression, media violence can increase physiological arousal and trigger an imitational response. (Anderson, Gentile, et al., 2007). Violence is not hard to come by on any form of media and threatens to instill or stimulate violent behaviors in the children watching it. Kids are learning their ethical principles from the media they watch creating a greater likelihood to engage in illicit sexual and criminal behavior (Denisova, Cairns, 2015).

Even when aggression is not taken into account, excessive exposure to technology negatively affects the frontal cortex, which is responsible for decision making. This damage can prevent people from knowing when to stop something that has become addictive (Karadas, 2017). These effects come into play in everyday life as the child then forms a dependence on the technology.

### *Education*

Technology is not limited to entertainment purposes and instead may be used as an education tool for children. Different gaming devices, television shows, and tablets have taken partial roles in raising the next generation and teaching them basic concepts (Kirkorian, et al., 2008). Several technological learning programs, such as Leapfrog, has been utilized in households to create a fun and safe way for kids to get engaged in the process of learning. Technology is now responsible for some children learning to read and write and some families have become dependent on it. Computers are considered an educational advantage as they have the power to teach children skills that are necessary to society (Griffiths, 2002). Research has

consistently shown playing computer games of all kinds help to produce reduction in reaction times, improve hand-eye co-ordination and increase self-esteem (Griffiths, 2002). A separate study credited computer games to improving thinking development, observation and creativity (Sălceanu, 2014)

There are many variables that must be accounted for when studying the effectiveness of educational television. For example, one study demonstrated a correlation between reading achievement with low television viewing for children from high socioeconomic status (SES) families. However, when analyzing low SES families, it was high viewing of television that correlated toward reading achievement (Searls, Mead, & Ward, 1985). A possible explanation for these differences is children in low SES have less access to structured, expensive classes taken by higher SES children. Therefore, interactive educational programs only have an impact on lower SES children.

Despite all of the contradicting results based on different variables, a recent clinical trial indicated screens in the classroom do not improve learning outcomes (Carter, Greensberg, Walker, 2017). In this study, college students taking an introductory economic class were randomly prevented or allowed to use computers in the classroom. The outcome test scores indicated the computers were not beneficial to education as students allowed computers scored 0.18 standard deviations lower (Carter, Greensberg, Walker, 2017). Technology can often serve as a distractor to classroom learning instead of its beneficial claim.

### *Limitations of Research on Young Children*

This paper is unable to address the impact of technology on the development in children from birth to 5 years of age due to limited research in these children (Guernsey, 2017). A major barrier to research is the limited verbal abilities in these young children. One study does suggest that children are consuming technology by the age of 18 months. In this study Australian children were shown two clips of “Teletubbies”. One clip showed the episode in original order and the other where scenes were cut into segments that made no logical sense. The researches then watch the baby’s facial cues to see if they were following the episode. The results indicated children as young as 18 months were able to discriminate between the two clips (Guernsey, 2017). This demonstrates how great of an impact technology can have on a child as young as eighteen months.

The other limitation of determining the impact of technology on children is that most studies are cross-sectional in design. The lack of longitudinal studies makes it hard to determine causal direction. Therefore, it difficult to determine if characteristics of the child attracts them to technology or if technology impacts on the child’s characteristics.

### **Similarities between USA and AUS**

#### *Regulating Screen Time*

Regardless of which type of technology is being utilized many studies show moderation is key. This the basis for the American Pediatric Association recommendations of a screen time limit for children of only two hours of screen time per day (APA, 2020). Despite this recommendation, parents have been reported to not follow the guidelines for a multitude of reasons. (APA, 2020) An Australian study published in BMC Public Health gathered screen time

data on children aged 8 to 16. On average around 40% of the children aged eight years old exceeded the two-hour guideline. As age increased this number increased rapidly to approximately 60% of children aged sixteen reporting more than two hours of screen time a day (Houghton, et al., 2018).

### *Government Regulations*

The government has tried to counteract the potential harms that could come from the television messages by enacting the Children's Television Act of 1990. This act requires three hours per week of educational material to be broadcasted to the children (Strasburger, et al., 2012). The majority of such programing is available through the Public Broadcasting System aimed at low to middle-income kids. A study published by Wright, et. al. indicates these shows achieved their goals of improved school readiness greatest with 2 and 3-year old children who viewed these programs (Wright, et al., 2001). Children at this age are often not exposed to any other teaching tool, such as preschool, which would give television a greater role in their advancements.

The advertisements children are exposed to while watching TV and playing games has a lot of influence on their still developing minds. A study focusing on a child's understanding of television advertisements, found that those under the age of ten were not mature enough to view the advertisement in a skeptical manner. When children reach 12 years of age, they appear to be able to understand the advertisements might not contain truthful information (Gunter, et al., 2012). This gives advertisement companies a lot of power over the kids that could lead to misinterpretations. One technique used in the advertising agency is known as the "behavioring model". This is demonstrated by consumers being more likely to select the color of a ballpoint pen they had seen advertised with pleasant rather than unpleasant music (Gorn, 1982). This gives

advertisers a certain control over children as they do not understand advertisements are meant to persuade you. Children are more likely to fall for advertisements that make them feel happy and excited even if the product is not good for them.

### *Advertising to Children on TV*

Due to funding reasons advertisements have become an essential component of media. Those in charge of creating advertisements typically try to shape their message to best fit the target audience, such as a commercial for children's toys are during a children's program. The majority of the advertising of high calorie, low nutrient foods are during young children programs (Kelly, et al., 2007). Watching these commercials everyday may lead children to believe it is okay to consume this sugary cereal every day and cause them to ask their parents for it. This concept, also known as pester power, is what advertisements count on because it is the parents that buy the product (Gunter, 2012). The advertisements have the capacity to promote activities outside of the appropriate age range of the viewers as well. Depending on what network the child is watching there is potential of ads involving drinking alcohol (Gunter, 2012). These ads could lead to the children believing that if they do these things they will fit in with society. Television commercials also hold the power to glorify sexuality as they display their actors in outfits not suitable for young ages. Ultimately both the United States and Australia face similar situations when it comes to screen time and their children.

### **Differences – Advertisement Regulations**

Australian Association of National Advertisers created many regulations regarding advertisements for children. Oftentimes, advertisements involving food and beverages are

regulated the most due to their health impact. All advertisements to children are not allowed to promote or encourage an inactive lifestyle or unhealthy eating or drinking habits (AANA, 2014). This association also bans any reference to alcohol or a company that supplies alcohol in advertisements during children's programming. Both of these regulations are enforced to protect children not of age to make sound decisions from an unhealthy lifestyle.

On the other hand, the United States is run by a self-regulation system where each industry is solely responsible for following their own regulations (Hawkes, 2005). This system stems from the United States Freedom of Speech where the government has limits on what they can censor. Many different organizations are rallying for further restrictions on advertisements towards children in regards to food and beverages. Research shows a correlation between advertising for unhealthy food and a child's dietary habits (Hastings, et al., 2003). In 1974, the Children's Advertising Review Unit (CARU) was created to oversee the guidelines for children's advertising in order to limit promotion of unhealthy choices (Hawkes, 2005). CARU runs through internal monitoring and does not have the capability to force a company to change their advertisement, which results in little impact for the unit as a whole. There are also areas CARU has no say in regulating, such as quantity and location of the advertisements (Hawkes, 2005).

### **Reflection**

In the summer of 2019, I had the opportunity to study abroad in the Gold Coast of Australia. While there I was able to interact with Australian children through volunteering at the Bounce Youth Program giving children the opportunity to express themselves and grow while surrounded by their peers. The mission of this program was to tackle obstacles as a group, where if one kid needs help, they are all there to provide support. For instance, one child was dealing

with problems with obesity and a change was essential for her to stay healthy. In response, the program replaced all of their sugary snacks with healthier options to help not only the one child but everyone gain a healthier lifestyle. At the BOUNCE center, computers lined the walls for the kids to play on. When they were using the technology for too long the center would unplug the computers and force the kids to go outside to play. This might not be the case for the country as a whole but there was greater support for the physical health of the children in Australia.

I was also given the opportunity to volunteer at a children's hospital in the United States. Working in the ophthalmology department, I would be with the kids waiting for their eyes to dilate. The room they waited in was filled with toys, games, and iPads to help pass the time. While volunteering, I noticed a vast majority of the kids would go directly to the iPads to play their favorite games. Even blurry vision could not keep the kids away from the screen.

My role with both of these organizations allowed me to help promote activities to keep the kids physically and mentally active. I was able to see first-hand how addicting some of these devices can be as I watched kids from both countries find themselves constantly wanting more screen time. When I was able to create other games and activities that sparked imagination and creative thinking, it allowed the kid to still have fun while remaining engaged.

Prior to my experience in Australia, I always believed that children in the United States used technology more than any other country. My time in the BOUNCE program demonstrated children from all over are equally likely to desire technology, the two countries just have different ways of dealing with regulations. Specifically, the program I was involved with in Australia was more likely to promote the option not involving technology.

All countries need to continue to work on moderation of technology time for children and creating a balanced lifestyle. Finding innovative ways to keep children active while incorporating the positive aspects of technology can help the children's development.

### *Conclusion*

The increase in unhealthy children and obesity rate of both countries is correlated with different effects of technology that has been introduced to their lives. The action of having a technological device, regardless of the mental impact, takes away time from children's active time. Instead of going outside and releasing energy, they are sitting stagnant for long periods of time. This change in activity has been related to health risks and is not good for the children long term. The technology they are observing is also not helping the problem, as shown by the thousands of advertisements the children watch daily. The research shows a majority of the advertisements promote unhealthy foods and the kids do not have the mental capacity to understand why it is not good for them. The more often they see the sugary breakfast cereals the more likely they will ask for it. The decreased physical activity and the increased sugar intake caused by technology are reasons enough to keep children on route to health issues such as obesity.

In order to combat these negative effects, actions must be taken to limit the amount of access of screen time for children. Educating parents on the impacts of excessive screen time is the best way to create a direct solution. It is crucial to find the line between a overprotective parent and no parental guidance to allow the child to grow. Evidence shows parent-child relationships with open communication are the most effective in limiting the use of negative screen time (Turow, 1999). In regards to government regulations, the United States should model regulations bases upon Australian regulations on children's advertising. These increased

restrictions have been shown to decrease the negative effects of unhealthy commercials leading to obesity (Bickham, et al., 2012). As technology continues to develop it is essential to continue to research the impact it has on children's development. There is still little research on the role technology plays on children's social communication and depression scores. Further analysis will help to keep technology use to a healthy level for growing children.

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