

Literature Review

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This literature review covers the issue of screen time and child development. Screen time can be defined as watching television, playing video games, browsing the Internet on a computer, tablet, or smartphone. To investigate this correlation, we first have to answer the question of what the correlation is between high amounts of screen time and a child's physical and mental development. There were 20 articles that were reviewed, all in which deal with the amount of screen time that children use and how it affects their physical and / or mental health. The research discussed also covers parental influence, children's attention during screen time, and intervention studies, all of which can play a vital role in the child development process.

Child Health Concerns

The biggest concern that many people have when it comes to screen time and child development is the child's physical and mental health. Increased amounts of screen time can have devastating effects on the physical and mental development in our children. All research studies went by the same recommendations that all children should have at least 60 minutes, or 1 hour, of active play time and a maximum of 2 hours of screen time. The study done by Zimmerman, Christakis, and Meltzoff (2007) investigated the amount of time that children 2 years old and younger were watching television.

Zimmerman et al. (2007) found that by 3 months, 40% of children were regularly watching television, DVDs, or videos. At 24 months the number of children watching television, DVDs, or videos regularly rose to 90%. They also found that children 12 months and under had an average of 1 hour of media per day, and that the amount rose to an average of 1.5 hours per day for children between 13 months and 24 months. The study also found that parents participated in screen time with their children about half of the time.

In another study, Mark, Boyce, and Janssen (2006) they determined the percentage of Canadian youth meeting the screen time guideline recommendations. They completed their study by giving their participants in grades 6-10 the World Health Organization Health Behavior in School Aged Children survey. The results showed that 41% of girls and 34% of boys in grades 6-10 met the recommended 2 hours of television usage per day. Mark et al. (2006) then included the leisure computer use in the daily screen time use, the results then dropped to 18% of girls and 14% of boys met the recommended amounts of screen time per day. The study's conclusions suggest that a public intervention is needed to reduce the amount of screen time.

To go along with the two studies by Mark et al. (2006) and Zimmerman et al. (2007), the study done by Anderson, Economos, and Must (2008) concluded that many children in the United States are reported to have behaviors with screen time and physical activity that do not match up to the recommendations for healthy child development. Children who are overweight, approaching adolescence, girls, and non-Hispanic blacks would benefit from public health policies and programs aimed at decreasing screen time and increasing physical activity.

The study was conducted by keeping records of when the children would play or have screen time. Active play, as defined by Anderson et al. (2008) is when the children exercise hard enough to sweat or breathe hard. Screen time is defined in this study as time spent by the children watching television or videos, using a computer, or playing computer games. The results of the study showed that 37.3% of the children that participated in the study had low levels of active play and 65% of the children had high screen time. Children who are overweight, approaching adolescence, girls, and non-Hispanic blacks had a higher probability of low active play and high amounts of screen time.

The study done by Subrahmanyam, Kraut, Greenfield, and Gross (2000) had similar findings. Their evidence showed that boys and girls spent about the same amount of time using the computer. Boys have always been thought to have used it more, but their study showed that girls feel just as confident using a computer as boys do. The study also showed that because both boys and girls use the computer for about equal amounts of time, both are at risk for childhood obesity. Subrahmanyam et al. (2000) also concluded that other issues in the child's physical development could be at risk. Eye, back, and wrist injuries are just as much of a concern as childhood obesity.

In the study done by Fakhouri, Hughes, Brody, Kit, and Ogden (2013) they set out to figure out how many elementary aged children met both recommendations for physical activity and screen time. Using proxy reports, they concluded that 70% of all children met physical activity recommendations and 54% met the screen time recommendations. However, only 38% of children simultaneously met both the recommendations for screen time usage and physical activity. The study also found that while screen time levels may be low, that does not necessarily increase the level of physical activity in the child.

Other factors can also lead to obesity and other health and developmental problems in children. In the study conducted by Laurson, Lee, Gentile, Walsh, and Eisenmann (2014) they aimed to research the simultaneous influence of physical activity, screen time, and sleep duration recommendations on the odds of childhood obesity. They were able to measure physical activity with a pedometer, while screen time and sleep duration were assessed via a survey from a cross sectional study that had a sample size of 674 children.

The children in the study by Laurson et al. (2014) were categorized into four groups based on the number of recommendations that they met. After analyzing the data and information, they found that 9.2% of all children who met all three recommendations simultaneously were the least likely to be obese. The conclusions met after conducting the study were that the odds of obesity increased for each recommendation that was not met.

Like the study before, the study conducted by Magee, Lee, and Vella (2014) also looked at sleep duration in children. The study stated that “sleep duration and media use (ie. computer use and television viewing) have important implications for the health and well-being of children.” The objective of the study was to see if a bidirectional relationship existed between sleep duration and media use (which is also defined as screen time) among children, as well as if the associations were moderated by child and household factors.

Magee et al. (2014) used a cohort study of a 3,427 children from Australia. They collected data in three waves, when the children were 4, 6, 8 years old. The data collected when the children were 4 years old helped predict the sleep duration and screen time when the children were 6 years old. When they were 6 years old the data collected was able to help predict the sleep duration for when they children were 8 years old. There were some socioeconomic factors that needed to be taken into account when doing the study, however the overall results of the study supported the hypothesis. There is a bidirectional relationship that exists between sleep duration and screen time among children.

Childhood obesity is not the only health concern that could come out of excessive amounts of screen time. A child’s increased exposure to television and video games could lead them to develop personality and attention problems. In the study conducted by Allen, Vella, and Laborde

(2015) they concluded that participation in extracurricular sports and screen time viewing are related to personality trait development in children. Their study shows that the more that young children participated in sports, the more likely they are to develop positive characteristics such as persistence, as well as become more extroverted. Likewise, high levels of introversion and low levels of persistence are related to high levels of screen time. The results of the study also provides evidence that enforces the ideas that physical activity allows children to improve their attention span, their memory, and their academic performance. Sports and physical activity also allow children to develop certain life skills, like patience.

In the study done by Swing, Gentile, Anderson, and Walsh (2010) researched these ideas further. They conducted a study that sampled 1,323 middle childhood participants during a 13 month period. The parents and child participants reported television and video game exposure, while teachers reported attention problems. Swing et al. (2010) also used young adults to do this study. For the purposes of this review, those results will be excluded from the review.

Swing et al. (2010) found that the exposure children have to television and video games was associated with higher amounts of attention problems in school. The results of the study also indicated that one media platform did not attribute to more attention problems than the other. In fact, the results were pretty much the same. This concluded that all forms of media, if children exceed the recommended 2 hours of screen time, can develop attention problems that can affect them currently, as well as later on in life.

Parental Involvement and Attitudes

The amount of time a child has with digital media, whether it be television, smartphones, computers, or tablets, has some correlation to the amount of parental involvement and attitudes

towards technology in the child's life. It is important for us to understand this correlation so we can better understand the impact that screen time has on child development.

Many children today grow up with their parents working, so caring for the children is not always done by one or both parents. In the study done by Tandon, Zhou, Lozano, and Christakis (2011) suggest that preschoolers are cared for in one of the following categories: parental care only, home-based child care, center-based child care, and Head Start. Using other variables such as race, age, sex, family income, mother's education, marital status, and employment; they conducted a bivariate analysis to calculate the total daily screen time for each of the child care categories.

The study conducted by Tandon et al. (2011) determined that more than 80% of children were in the care of someone other than their parents. They also determined that on average, the children in the study were exposed to 4.1 hours of screen time inside the home and 0.4 hours in child care. Children who were in child care, excluding parental child care, had an average of 3.5 hours of daily screen time. The children who had the least amount of screen time during child care were those who attended child care centers. However, the study concluded that in total, 66% of all children exceeded the recommended 2 hours of screen time.

The results of the study done by Tandon et al. (2011) show that preschoolers are spending more than the recommended amount of daily screen time. In order to lower that amount, the recommended number of hours for preschool children should be discussed not only with parents, but with other caregivers and child care centers.

Child care is not the only factor that can play into the increased amounts of a child's screen time. Parental attitudes and a child's home setting can also be factors. The results of the study

conducted by Zimmerman et al. (2007) stated that “parents gave education, entertainment, and babysitting as major reasons for media exposure”.

In the study conducted by Lauricella, Wartella, and Ridout (2015), they acknowledged the two theories for how children learn. They either learn by watching their parents and how they interact with different people and objects, or they learn because of molar activities that happen within concentric system. Both theories apply to the idea that a parent’s interaction and attitude about technology can influence the way their child will feel about technology.

In the study conducted by Lauricella et al. (2015) they had parents complete an online survey to determine the impacts they believe that television, computers, and mobile devices have on their children. The results of the study showed that 98% of parents owned at least one television in their home, 86% owned a computer, 69% owned a smartphone, and 48% owned a tablet. The surveys then showed that parents had a positive attitude toward all devices, but indicated that the attitudes toward televisions and computers were higher. In every screen time category -- television, computers, smartphone, and tablets -- the study conducted by Lauricella et al. (2015) showed that the parents’ positive attitudes toward the technology led to increase use in child screen time.

Parents are the first teachers for children and their habits, beliefs, and ideas usually are passed down to them. Educating and changing the attitudes and behaviors in the parents would be the most effective way in decreasing the amount of screen time that our children use. The study done by Carson and Janssen (2012) measured the number of preschool children who watched television or played video games, while evaluating if interpersonal, intrapersonal, and physical

environmental factors played a role. The study concluded that a large portion of screen time in the preschool children that participated was caused by the factors within the home.

To find these results, Carson and Janssen (2012) had the parents complete a questionnaire. They found from the questionnaire that age, parental attitudes, parental barriers, parental descriptive norms, parental screen time, and having a television in the bedroom all had a positive influence on the increased amounts of child screen time. Factors such as parental education, parental income, and parental self-efficacy had no influence on the increased amount of child screen time.

Parental influence on physical activity and screen time is also very important. The attitudes and behaviors that parents have toward technology could be lowering the amount of physical activity that their child is participating in. In the review done by Xu, Wen, and Rissel (2015) reinforces the argument that parents play a critical role in child development. The review concluded that there is strong evidence that parental influence is associated with children's physical activity and screen time. Xu et al. (2015) stated also that "reducing parents own screen time can lead to decreased child screen time."

Children's Attention During Screen Time

Though we have discovered that children are spending too much time with their screen media, it is important to know what exactly they are paying attention to during their leisure screen time and how it is affecting them. In the study done by Anderson and Levin (1976) they researched the attention children gave to the children's show *Sesame Street*. The study concluded that a dramatic increase in television use (or screen time) happened during the ages of 1 to 4 years old.

Children younger than 30 months did not systematically watch the television, but it would capture their interest for short periods of time.

The study went further to determine what actually caught the children's attention while participating in screen time. The main result of this was the presence of men versus the presence of women on the show. The children were less interested in seeing a male character on the show than they were seeing a female character on the show. According to Anderson and Levin (1976) children also seemed more attentive to *Sesame Street* when there were "children, eye contact, puppets, peculiar voices, animation, movement, lively music, rhyming, repetition and alliteration, and auditory change."

Since this study is older than most, it can definitely be considered a preliminary research study that provides a starting point for new data to be collected. The study even suggests that other research on what attracts children's attention to the television screen should be investigated.

In the study by Anderson, Field, Collins, Lorch, and Nathan (1985) they provided some of the same information that the previous study did by Anderson and Levin (1976). Anderson et al. (1985) found that children spent approximately 67% of their time with the television actually watching it. The major part of this study was to distinguish if parental observations are as accurate as they seem to be.

Anderson et al. (1985) concluded that in their study, the parent's diary reports on the observations of their children seemed quite accurate. In the above statistic, parents recorded that their child spent about 60% of their time looking at the television. While there is a 7% difference between the two observations, the parents and the conductors of the study were able to conclude

the argument that while children are around the television, their attention and focus on other things takes up a good amount of their screen time. This, too, is an older study, so the same methods should be constructed again to see what the current generation does with their television screen time.

While children are mostly using screen time leisurely, many do learn from the screen media that is made available to them. In the study done by Richert, Robb, and Smith (2011) they concluded two key implications that would benefit parents, teachers, and programmers. The first is that children learn via a screen because of the social relevance that screen media has in our society. However, there are limitations to children learning from screen media.

According to Richert et al. (2011) preschoolers recognize information on the screen as pretend, or not real. This is because by the preschool age, children are already learning and must learn who provides reliable information in their environment. Since information cannot be confirmed from the person on the screen, this is not reliable information to a preschooler. Another factor that leads to whether a child will learn from a screen or not is if the child can relate to the character on the screen. While it may seem like a good idea to get our children to learn from a screen, programmers need to lower the risks and limitations of screen time learning.

Screen media does have a negative connotation attached to it, however two studies suggest that children are indeed learning and developing normally during their screen time use. Screen time has even allowed children to become physically and cognitively engaged. The study and research done by Sweetser, Johnson, Ozdowska, and Wyeth (2012) describes two types of screen time -- active and passive. Active screen time “involves cognitively and physically engaging in screen-based activities, such as playing video games or completing homework on a computer.”

Passive screen time “involves sedentary screen-based activities and / or passively receiving screen-based information, such as watching a TV or a DVD.”

Sweetser et al. (2012) dive in deeper into the benefits of active screen time for both physical and cognitive development. They recognize that there is a negative correlation between screen time and physical activity. However, they bring up the physically active video games such as *Wii*, *Playstation Move*, and *XBOX Kinect*. All of these have become readily available and popular on the market. “Playing active games has been shown to be similar in intensity to light to moderate walking, skipping, and jogging.” The cognitive developments of active screen time include enhancing the visual attention and dynamic of spatial skills while playing video games. Video games can also lead to changes across sensory, perceptual, and attentional abilities. The old adage that video games help hand-eye coordination is actually true.

Passive screen time is what most people think of when they hear the words screen time. According to Sweetser et al. (2012) passive screen time can lead to childhood obesity, delays in cognitive development, reading comprehension, mathematical proficiency, and short term memory. Sweetser et al. (2012) investigated and distinguished the two types of screen time. They suggest that separating the two can show both the positive and negative effects of screen time. One’s benefits of screen time should not be associated with the other’s negative consequences of screen time.

Screen Time Interventions

The concern of screen time and child development has not only been thoroughly researched to show a correlation, but interventions and ideas for preventative measures have been studied. The study done by Sanders, Feng, Lonsdale, and Burt (2015) took the hypothesized idea of how an

increase in neighborhood green space might increase physical activity and decrease screen time in children. Sanders et al. (2015) used data from the Longitudinal Study of Australian Children. This study was a “nationally representative study on health and child development.” Physical activity and screen time were recorded using surveys and diaries. Green space was measured, as well. Socio-economic factors were also taken into account during the study.

The results of the study done by Sanders et al. (2015) found that boys with more green space, approximately 10% more, had a 7% increase in choosing physical activity over screen time. No statistics were found for girls during the study. The researchers concluded from the study that there may be a positive correlation between neighborhood green spaces and promoting a more active lifestyle in our children. Further research needs to be done on this topic to see how girls are affected by having a green space in their neighborhood.

In the study done by Yilmaz, Caylan, and Karacan (2014) they used the same information that has been researched before about the negative health consequences and its correlation to screen time. In their research design, they divided participants, which consisted of preschoolers and their parents, into two groups -- a control group and an intervention group. The intervention group received materials every two weeks. These materials included three printed materials, interactive CDs, and one counseling phone call, all of which were intended to decrease screen time.

The results of the study showed that the intervention group reported to have less screen time than the control group. The children’s behavior was also less aggressive, but there was no change in their body mass index (BMI) scores. According to Yilmaz, et al. (2014) the study showed that intervention can lead to reductions in young children’s screen time. However, future research

needs to be conducted to see what intervention methods would work well with older children, as this was done on preschool children only.

In the final source for this review, the research study by Robinson (1999) hypothesized that reducing the amount of time fourth grade students watched television, videos, or played video games would also reduce their chances of becoming or remaining obese. The study was done by having an intervention with the children at an elementary school. The children received an 18 lesson, 6 month classroom curriculum to reduce television, videotape, and video game use.

Robinson (1999) then measured the height, weight, triceps skinfold thickness, waist and hip circumferences, and cardiorespiratory fitness of the children. The participants and their parents then self reported the children's screen time, physical activity, and dietary behaviors. The results showed that the intervention group had an overall lower body mass index (BMI) than the control group. They also reported on having lower amounts of screen time and meals eaten in front of the television. There were no drastic dietary changes in either group during the study. This study shows that reducing screen time within children may be a promising solution to stopping childhood obesity.

Summary

From the review of the sources mentioned in this paper, it is clear that there is a positive correlation between screen time and child development. Screen time is influenced in many different ways, but there is outstanding evidence that it is mainly influenced by the parents and caregivers of the child. These influences are having devastating effects on our children's physical and mental health. There are some positives to our children having screen time, but having too much can lead to those negative consequences.

While there have been many studies and theories about the amount of screen time that children should have, it is important to educate and intervene to prevent the phenomenon from continuing. High amounts of screen time is not good for the development of our children. Physical and mental problems can occur when children receive too much screen time. To prevent this, more research needs to be done on parental screen time. What drives parents to increase their screen time if they did not grow up with the same media that the current generation does?

More research should be conducted on how boys and girls approach screen time differently. Throughout this review, there have been many studies that compared the screen time usage between boys and girls. Also, would a decrease in screen time really have an effect on childhood obesity? Because of the high amounts of screen time from our children, it is a hard question to answer. Future studies should look into if screen time is really to blame, or if other factors such as; fast food, parents working outside the home, caregivers, etc. are really to blame.

Future research is definitely a must on this topic because of the changes in technology and generations. The oldest study in this review dates back to 1976. However, because of the few changes in the television category of technology, that research is still relevant today. Future research will depend on this research as a starting place for researchers to conduct their studies. Child development is something that should concern everyone in our society. Our children are our future, and we need to ensure that they are receiving the best advice and care that we can offer.

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