Screen-Time versus Screen Type: The Impact of Screen Engagement on Cognitive Development in Irish 5 year olds

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What is Screen Time?

- Early research uses the term ‘screen time’ to refer largely to TV watching.

- In more recent years screen time has been used interchangeably to refer to both TV watching and engaging in interactive screen technology devices such as tablets, phones, or video games (Strasburger et al., 2013).

- Has been an area of interest for researchers in physical development (i.e. Screen time and Obesity) (Peck, Scharf, Conaway, & DeBoer, 2015).
Extent of Screen Time Use

• 85% of children under 24 months were reported to be watching over 2 hours of TV daily
  (Early Childhood Ireland, 2016)

• In the UK – 75% of children under three have daily use of a touchscreen device
  (Bedford et al., 2017).

• In America – 75% of children owned mobile devices, with most using digital devices before they were 12 months old
  (Kabali et al., 2015)
TV versus Contemporary Screen Time

• Growing Up in Australia dataset:
  2-3 hours a day engaging in TV viewing
  <30 minutes with digital devices
  (Australian Government: Department of Health and Ageing, 2011)

• In the UK: 1.75 hours watching TV,
  25 minutes on computers
  15 minutes on smartphones, and
  29 minutes on tablets
  (Lauricella, Wartella, & Rideout, 2015)
Changing with the times

• Daily TV viewing decreased from 79% to 63% from 2005 to 2014, and exposure to DVDs/Videos also dropped from 65% to 32% in the same time period

  (McClure et al., 2015)

• Use of daily touchscreen devices jumped from 10% to 38% in just two years for children under the age of 3 years

  (Rideout, 2011; 2013)

• 0–5 year olds used touchscreens on average for 79 minutes per day, an increase from the 20 minutes per day reported in 2014

  (Neumann, 2014; Marsh et al., 2015)
Is there a difference between types?

• Research on physical development suggests so –
  In studies concerned with cardiovascular risks, blood pressure and obesity, TV was the only form of screen time to indicate a negative impact on physical health
  (Anderson, Economos, & Must, 2008; Stamatakis et al., 2013)

• TV viewing doesn’t even have the same effect as sedentary time. Computer use, painting, sitting, and reading are not positively associated with high blood pressure.
  (Gopinath et al., 2012)
Is there a difference between types?

• ‘Video Deficit’ – Difficulties learning from a screen i.e. Imitating actions, word-learning, and language-recognition tasks

• However, this only stands for TV viewing
  (Kirkorian, Choi, & Pempek, 2016; Neumann, 2018)

• Higher cases of scaffolding (by devices themselves)
  (Yelland & Masters, 2007)

• Child Interaction – The multisensory features and presence of in-built support features in child-directed educational apps
  (Neumann, 2018)
Is there a difference between types?

• Cause and Effect – Children from as young as 6 months of age have an interest in the cause and effect phenomena
  
  (Lerner and Ciervo, 2003)

• Computer games were also found to improve spatial awareness, attention, multi-tasking, and perceptual abilities in children
  
  (Spence and Feng, 2010)

• Computer use during the preschool years is associated with improvements in school readiness and cognitive development, and ICT classes improving maths and science grades
  
  (Li & Atkins, 2004; Delen, 2016)
Is there a difference between types?

- Fast-paced video games and aggression and ADHD
  (Kostyrka-Allchorne et al., 2017)

- Delays in language development
  (Kostyrka-Allchorne et al., 2017)

- Increase risk for mental health problems
  (Twenge & Campbell, 2018)

- AAP’s recommendations for less than 2 hours of screen time exposure
• Participants – 9,000 Irish 5 year olds (1 in 7)

• Design – Secondary research, analysis of Growing Up in Ireland dataset
  – 2 DVs = Reasoning Ability, Vocabulary Development
  – 2 IVs = Amount of Screen Time exposure (4 groups), and Type of Screen Time Exposure (5 groups)

• Materials – Primary Caregiver Questionnaire (Screen time variables) & British Abilities Scale (Pictures Similarities task and Naming Vocabulary task)

• Procedure – Discriminate variables of interest, compute Statistics, including Hierarchical Multiple Regressions
Results - Type of Screen Time

Children who engaged in mostly educational games and TV viewing scored significantly lower than the other groups in reasoning ability.

Children who engaged in mostly computer or video games scored significantly lower than all other groups in vocabulary development.
Children who engaged in screen time for more than two hours a day had significantly lower cognitive scores overall than those who engaged in under two hours of daily screen time.
External Factors Impacting on Screen Time

Child Screen Time And Primary Caregiver's Educational Achievement

- Technical Qualification / Apprentice
- National Certificate
- Third Level Bachelor Degree
- Masters or PhD

<table>
<thead>
<tr>
<th>No Screen Time</th>
<th>1 to &lt;2 Hours</th>
<th>2 to &lt;3 Hours</th>
<th>3+ Hours</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2%</td>
<td>50%</td>
<td>30%</td>
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<tr>
<td></td>
<td>2%</td>
<td>56%</td>
<td>18%</td>
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<tr>
<td></td>
<td>3%</td>
<td>61%</td>
<td>12%</td>
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<tr>
<td></td>
<td>6%</td>
<td>67%</td>
<td>6%</td>
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</table>

Technical Qualification / Apprentice
National Certificate
Third Level Bachelor Degree
Masters or PhD
Hierarchical Multiple Regressions

• 5 Step Model – Screen Time Variables and Home Environment Factors (Parent Education, Employment, Attachment, Siblings)

Reasoning Ability

Significant impact of:

• ‘No Screen Time’,
• ‘Mix of All’
• ‘More than 3 hours’

Even after other factors are accounted for

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>Sig.</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 5</td>
<td></td>
<td></td>
<td>.027</td>
</tr>
<tr>
<td>(Constant – TV &amp; 1 to &lt; 2 Hours)</td>
<td>75.304</td>
<td>.000</td>
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<tr>
<td>No Screen Time</td>
<td>1.973</td>
<td>.013*</td>
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<tr>
<td>Educational Games</td>
<td>-1.321</td>
<td>.190</td>
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<tr>
<td>Video Games</td>
<td>.876</td>
<td>.259</td>
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<tr>
<td>Mix of all</td>
<td>1.189</td>
<td>.000*</td>
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<tr>
<td>2 to &lt; 3 hours</td>
<td>-.565</td>
<td>.052</td>
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<tr>
<td>3 + hours</td>
<td>-1.699</td>
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<tr>
<td>Employment Status</td>
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<td>Education Level</td>
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<td>Level of Closeness</td>
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<tr>
<td>Level of Conflict</td>
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<td>Parental Stress Score</td>
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<tr>
<td>Siblings</td>
<td>.623</td>
<td>.121</td>
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Hierarchical Multiple Regressions

- 5 Step Model – Screen Time Variables and Home Environment Factors (Parent Education, Employment, Attachment, Siblings)

**Vocabulary**

Significant impact of:

- ‘Video games’

Even after other factors are accounted for

<table>
<thead>
<tr>
<th>Variable</th>
<th>β</th>
<th>Sig.</th>
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<td>2 to &lt; 3 hours</td>
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<td>3 + hours</td>
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<td>Education Level</td>
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<tr>
<td>Level of Closeness</td>
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<td>Parental Stress Score</td>
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<tr>
<td>Siblings</td>
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Summary of Findings

• Screen time contributed to lower cognitive scores when children engage in over 3 hours per day of screen time

• As seen from the scores on both cognitive scales, the type of use seems to impact cognitive scores, particularly game use

• Unknown if a similar trend will appear for younger children

• Unknown what impact more contemporary forms of screen interactions have i.e. use of smartphones and touchscreens
Considerations

• Parental Engagement – Talk time, Scaffolding, and Language Development
  (Pempek et al., 2011; Lavigne, Hanson, & Anderson, 2015)

• Content – Educational content or child-directed content have better cognitive outcomes at a later age
  (Wright et al., 2001; Linebarger & Walker, 2005)

• CyberSafe Ireland
Implications

• Governmental policies and regulations on screen time habits (advice for parents)

• Irish Classroom Setting – Moving from traditional to incorporating technology use
  
  (McCoy, Smyth, & Banks, 2012)

• Expanding research on a relatively unexplored area
Thank You

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References


Peck, T., Scharf, R. J., Conaway, M. R., & DeBoer, M. D. (2015). Viewing as little as 1 hour of TV daily is associated with higher change in BMI between kindergarten and first grade. *Obesity, 23*(8), 1680-1686.


