Written evidence submitted by Dr Eszter Somogyi

Who am I and why am I submitting evidence?
I am a researcher at the University of Portsmouth and part of my research investigates the effects screen exposure has on the cognitive development of young children under 3 years of age. The evidence I would like to submit here focuses on the effect of television or passive screens on young children's cognitive development.

What is the current understanding of how screen time can support and impact children's development and educational outcomes, during the first 3 years of life?

1.1. Evidence summary and evidence-based recommendations
This submission makes the following observations:

(1) A growing body of research shows that screens (non-interactive/passive and interactive) are continuing to become more pervasive in this youngest age group;
(2) Between 12 and 30 months of age, there is a so-called video deficit effect, meaning that young infants do not consider video as relevant to real life, in other words they learn less from screens than from the real model, and do not generalise or apply the information viewed on screen[1]. Until age 2, infants have trouble understanding speech on screens without adult guidance[2]. This helps explain why;
(3) Screen viewing, even when viewing programs that are designed to be educational, generally does not help to develop infants' cognitive skills. On the contrary, due to the time it may take from other activities (learning through manipulation of objects, play, sleep, etc), it can be associated with impaired language development, school readiness, executive functions, and attention capacities.
(4) Screen viewing is especially detrimental when viewing is unsupervised, when the content is not appropriate for the age, or when in the television is switched on in the background[3];
(5) It is not watching screens per se that determines the effects on development but rather the viewing context. Indeed, supervised viewing of appropriate-age content in the foreground can be beneficial, particularly when adults interact with the infant alongside screen time.

In sum, screen viewing in the wrong context can be associated with lower cognitive development[3, 4, 5]. Learning from screens in infants appears to be negligible without parental or adult guidance, mainly because of the video deficit effect and difficulties to process speech on video.

Evidence-based recommendations:
The impact of screen time should be tackled through efforts to equip parents and caregivers with clear guidance regarding screen use in young children, as parents have full responsibility for their child's screen use at this age (their influence is more limited in older children). The guidance could include the following guidelines and recommendations:

- Caregivers' focus should be on the *quality or context* of what a child is watching, not simply the quantity (i.e., number of hours per day).

- Weak narrative, fast-paced editing, and complex stimuli can make it difficult for a child to extract or generalise information. When screen content is appropriate for a child's age, it is more likely to have a positive effect on cognitive development, if any, but this effect is stronger when the programme is designed to *encourage interaction*.
- Screen time is more beneficial to a child if a *parent or adult is present*, as they can engage with them and ask questions. Watching television with the child and elaborating and commenting on what is viewed can help enhance their understanding of the content, reinforcing their learning during educational programs. Co-viewing can also contribute to the development of their conversation skills and provides children with a *role model* for appropriate television viewing behaviour.
- Watching TV should *not replace other learning activities* or socialising. Instead, it is imperative to inform caregivers of children younger than 3 about the risks associated with prolonged exposure to screen viewing in the wrong context.
- Caregivers should *avoid having a second device or TV screen on in the background* as this may continuously distract the child, even if they are not explicitly attending the program, from other activities, such as play or social interactions.

In conclusion, the effects and consequences of screen time exposure have received considerable attention in research over the past decade and enough work now exists to address the question of the effect of exposure for children younger than 3. In the next sections, I would like to explain in more detail what we know about the effects of screen viewing on cognitive development.

1.2. Can children understand and learn at all from content presented on screens?

Child development studies show that infants do not seem to view video as relevant to real life and this effect is called the 'video deficit effect'. For instance, 15–24 months old infants have difficulties generalising an action learned on a TV screen to a real situation and vice versa, or to locate an object in the room when clues are given through a screen[e.g.,6]. Children also imitate an adult more when the on-screen model interacts in real time with the child than when the model is filmed in advance and cannot interact with him/her[7]. Overall, we can conclude that live interaction with others remains a privileged source of learning and information that cannot be replaced by educational screen content.

1.3. Does screen viewing promote language development?

It is often thought that hearing speech, even on television, helps infants' language acquisition. Studies however, generally found an overall negative association between the amount of screen viewing and language development in children younger than 3 years. This is because television viewing is generally non-interactive, except for programs specifically designed for interaction. Furthermore, the amount of time spent watching television alone before the age of 3 was associated with poorer syntax levels at ages 3 and 4[e.g.,8], therefore we can expect deficits in language development from over-exposure to television.

1.4. The importance of the context of viewing

There are three contextual aspects that modulate the effects of screens on cognitive development:

- Type of content viewed

It is important to distinguish between the effects of exposure to contents created specifically for infants and young children and those intended for an adult audience. Adult programs are associated with negative effects on the development of cognition before the age of 3, while child-directed programs have been linked with either a slight positive effect or no effect. For example, longitudinal studies show that children who were more exposed to adult-directed television programs during infancy were rated by their parents as worse on mental skills that include working memory, flexible thinking, and self-control (executive functioning skills) at age 4, in comparison to children who had lower levels of exposure[9,10]. On the contrary, early exposure to child-directed content was not associated with cognitive ability at age 4.

Along similar lines, exposure to educational programs before age 3 does not seem to be linked to attention issues when reaching age 7, while exposure to adult television content may be negatively associated with executive functioning and cognitive skills at older ages[11]. Regarding language development, watching adult programs vs. child-directed programs in infancy increases the probability of delaying language acquisition[4].

- Caregiver's behaviour during viewing

Both television and interactive media may reduce at least the quantity of parent-child interactions, which are crucial for the development of cognitive skills, especially language and executive function. Surveys generally show that only about one third of parents say that they watch television with their children.

As early as 6 months of age, having a parent who participates and comments on television program content has a positive effect on the child's attention, as quasi-experimental studies show[10]. Indeed, the presence vs. absence of interactions during television viewing between 15- and 48-months improves the probability of a delay in language development[4].

Educational programs can also form a basis for play and creativity between parents and babies in the first 2 years of life, for example encouraging parents to name objects or to imagine new activities[11]. Whereas parents speak less to their infants during co-viewing of infant-directed television programs, they also tend to use richer vocabularies both during and immediately after viewing[13] (compared with no television).

- Background television

Background television can refer to situations where the television is switched on in the background while the child is participating in other activities or when the child is in front of or in the immediate vicinity of an adult program on a screen. The consequences of early exposure to television in the background are twofold. On the one hand, the quantity and quality of parent-child interactions are affected, on the other hand, children are distracted from their ongoing activity.

For instance, parents talk less to 12- and 24-month-old children, and more passively, when the television is in the background than when it is turned off, which possibly mediates the negative impact of screens on the vocabulary size of these children at 17 months[3].

Background television also distracts the child from the action in progress, diverting their attention from play and learning. Experimental studies have shown that television in the background interrupts the play sessions of young children. This is because the audiovisual changes, such as loud advertisements, that frequently occur on television, cause the child to repeatedly orient toward the screen. Studies that looked at the quality of play reveal shorter play episodes, and shorter periods of focused attention in the presence of television in the background[3,14,15]

Finally, infants do not process adult-directed information presented on screens for more than 3–5 seconds[3], and have trouble processing speech (adult- and infant-directed speech) on screen until the age of 2 years[2,15].

Thank you for your time and consideration,
Eszter Somogyi, October 2023

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